

**UPDATE NFPA 70-2017: National Electrical Code (NEC)  
Analysis of Impact Considerations on Design and Installation of AV/ICT Equipment**

This analysis is intended to identify and analyze changes in the **2017 Edition of NFPA 70, National Electrical Code (NEC)** that have potential impact on safety and installation of AV & ICT equipment, including the requirements in **CSA/UL 62368-1, Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements.**

Also provided is early indication whether the CAN/US Technical Harmonization Committee (THC) is pursuing National Differences based on these changes in the next (third) edition of CSA/UL 62368-1, which was published in 4Q 2019.

The 2017 NEC is available from the NFPA: <https://catalog.nfpa.org/NFPA-70-National-Electrical-Code-NEC-C4022.aspx>.

NEC Article / Section	Title	Summary	Details	Impact Statement	NEW Planned new / revised ND in next CSA/UL 62368-1?
100	Definitions - Information Technology Equipment	<p>Updated definition of <b>Information Technology Equipment (ITE)</b>.</p> <p>Includes ratings of 1000 v or less to align with some universal changes in the 2017 NEC, and both <b>UL 60950-1 &amp; UL 62368-1</b> now are referenced as suitable standards for compliance.</p> <p>Note that in this definition of ITE, it does not include consideration of “communications circuits” and “communications equipment”, which generally are associated with ‘communication technology equipment’ from an <b>UL/IEC 62368-1</b> perspective.</p>	<p><b>Information Technology Equipment (ITE).</b> Equipment and systems rated 1000 volts or less, normally found in offices or other business establishments and similar environments classified as ordinary locations, that are used for creation and manipulation of data, voice, video, and similar signals that are not communications equipment as defined in Part I of Article 100 and do not process communications circuits as defined in 800.2. (CMP-12)</p> <p>Informational Note: For information on listing requirements for both information technology equipment and</p>	<p><b>None.</b></p> <p>Definition.</p> <p>However, these definitions, and the associated changes in Articles 725 (725.144, 725.170) and 840 (840.1, 840.2, 840.160, 840.170), now essentially result in similar NEC requirements being applied to PoE and similar protocols involving power distribution whether CL2 or CM cable is used.</p>	No.

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		<p>These aspects are covered in the definitions of <b>Communications Equipment</b> and <b>Communications Circuit</b>.</p> <p>However, because the definitions of ITE, Communications Equipment and Communications Circuit all use the terms “voice” and “data”, they essentially overlap each other and may make it difficult to distinguish between one and another.</p>	<p>communications equipment, see UL 60950-1-2014, <i>Information Technology Equipment – Safety – Part 1: General Requirements</i> or UL 62368-1-2014, <i>Audio/Video Information and Communication Technology Equipment Part 1: Safety Requirements</i>.</p> <p><b>Also</b> note existing definitions of (a) <b>Communication Circuit</b> per 800.2, Communication Systems – Definitions, and (b) <b>Communications Equipment</b> per 100 - Definitions.</p>		
<b>110.14 (D)</b>	Requirements for Electrical Installations – Electrical Connections – Installation	To address problems when electricians overtighten electrical connections, such as field wiring terminals, a new requirement has been added to the general installation requirements in Article 110 that if a tightening torque is indicated on the equipment, or within installation instructions, typically a calibrated torque tool is to be used for such tightening.	<b>(D) Installation.</b> Where a tightening torque is indicated as a numeric value on equipment or in installation instructions provided by the manufacturer, a calibrated torque tool shall be used to achieve the indicated torque value, unless the equipment manufacturer has provided installation instructions for an alternative method of achieving the required torque.	<p><b>Minor (+).</b></p> <p>This new requirement could eventually impact some AV/ICT equipment with Listed terminals that have such information provided for tightening.</p> <p>From a manufacturers’ perspective, the most significant development likely is that authorities having jurisdiction (AHJ) could be looking closer at field wiring compartments of Listed AV/ICT equip. (as allowed by 90.7 &amp; 110.3).</p>	<b>Yes.</b> Modification to regulatory annex (DVA), including references to modified NEC section(s).

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<b>110.21 (A)(2)</b>	Requirements for Electrical Installations – Marking – Equipment Markings – Reconditioned Equipment	<p>A new requirement for “reconditioned equipment” provides additional identification requirements for such equipment, including the provision, “...approval of the reconditioned equipment shall not be based solely on the equipment’s original listing.”</p> <p>Note also that a new Informational Note 1 in Section 110.3 acknowledges the installation of <i>reconditioned, refurbished, or remanufactured equipment</i>, which aligns with 110.21(A)(2). However, it may be problematic there are no associated definitions, and the words are not used consistently in both sections.</p>	<p><b>(2) Reconditioned Equipment.</b> Reconditioned equipment shall be marked with the name, trademark, or other descriptive marking by which the organization responsible for reconditioning the electrical equipment can be identified, along with the date of the reconditioning.</p> <p>Reconditioned equipment shall be identified as “reconditioned” and approval of the reconditioned equipment shall not be based solely on the equipment’s original listing...</p> <p>. . .</p> <p>Informational Note: Industry standards are available for application of reconditioned and refurbished equipment. Normal servicing of equipment that remains within a facility should not be considered reconditioning or refurbishing.</p> <p>110.3 Examination, Identification, Installation, Use, and Listing (Product Certification) of Equipment. (A) Examination. In judging equipment, considerations such as the following shall be evaluated: (1) Suitability for installation and use in</p>	<p><b>Minor - Considerable (+).</b></p> <p>Although the industries likely serving as the driver for these requirements are the industrial control, overcurrent protection device and similar power sectors, the fact that some AV/ICT equipment is reconditioned (refurnished / rebuilt) and resold could have result in some impact on the AV/ICT industry.</p> <p>(Note - UL has an existing ‘Rebuilt’ product certification/Mark program for such equipment.)</p>	<p><b>No.</b></p> <p>THC believes that including a National Difference at this stage when the requirements are not necessarily targeting AV/ICT equipment could cause more confusion than be helpful. May be revisited after 2020 NEC.</p>

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			conformity with the provisions of this Code. Informational Note No. 1: Equipment may be new, reconditioned, refurbished, or remanufactured.		
400.5	<b>Ampacities for Flexible Cords and Flexible Cables</b>	Table 400.5 has been updated to include additional AWGs of 3, 5 & 7.	<p><b>400.5 Ampacities for Flexible Cords and Flexible Cables.</b>  <b>(A) Ampacity Tables.</b> Table 400.5(A)(1) provides the allowable ampacities, and Table 400.5(A)(2) provides the ampacities for flexible cords and flexible cables with not more than three current-carrying conductors. These tables shall be used in conjunction with applicable end-use product standards to ensure selection of the proper size and type.</p> <p><i>[see NFPA 70 for complete text]</i></p> <p><b>Table 400.5(A)(1) Allowable Ampacity for Flexible Cords and Flexible Cables [Based on Ambient Temperature of 30°C (86°F). See 400.13 and Table 400.4.]</b></p> <p><i>[See NFPA 70 for complete table]</i></p>	<p><b>Minor (-).</b></p> <p>Allows for additional flexibility when power supply cords with flexible cords when 3, 5 or 7 AWG are used.</p>	<p><b>No.</b></p> <p>The 2018 CEC did not have a similar modification, so a change was not pursued since the standard is CAN/US bi-national. May be revisited after 2020 NEC.</p>

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400.12	Flexible Cords and Flexible Cables - Uses Not Permitted	NEC now clarifies (in (5)), that flexible cables, flexible cords sets (extension cords) and <i>power-supply cords</i> (new) are not permitted to be concealed by walls, floors, or ceilings, or located above suspended or dropped ceilings.	<p><b>400.12 Uses Not Permitted.</b> Unless specifically permitted in 400.10, flexible cables, flexible cord sets, and power supply cords shall not be used for the following:</p> <p>(1) As a substitute for the fixed wiring of a structure</p> <p>(2) Where run through holes in walls, structural ceilings, suspended ceilings, dropped ceilings, or floors</p> <p>(3) Where run through doorways, windows, or similar openings</p> <p>(4) Where attached to building surfaces <i>Exception to (4): Flexible cord and flexible cable shall be permitted to be attached to building surfaces in accordance with 368.56(B).</i></p> <p>(5) Where concealed by walls, floors, or ceilings or located above suspended or dropped ceilings <i>Exception to (5): Flexible cord and flexible cable shall be permitted if contained within an enclosure for use in Other Spaces Used for Environmental Air as permitted by 300.22(C)(3).</i></p> <p>(6) Where installed in raceways, except as otherwise permitted in this Code</p> <p>(7) Where subject to physical damage.</p>	<p><b>Minor (+).</b></p> <p>Although consistent with past and current interpretations of the NEC and application of UL 62368-1 (and UL 60065 and UL 60950-1), from an installation perspective, clarification could impact some specific equipment, such as projectors (beamers) used in offices that are mounted on ceilings and are connected to receptacles mounted above a dropped ceiling, since AHJs may be scrutinizing installations closer.</p> <p>Specific inclusion of “power supply cords” in 400.12 also helps clarify that in the U.S. the European practice of using a power supply cord for permanent connection to the supply is not permitted.</p>	<p><b>Yes.</b></p> <p>Modification to regulatory annex (DVA), including references to modified NEC section(s).</p>

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406.3 (F)	Receptacles, Cord Connectors, and Attachment Plugs (Caps)- Receptacle Rating and Type – Receptacle with USB Charger	<p>New provision requires that Receptacles with integral USB Chargers, typically provided by a switch mode power supply, be Listed with Class 2 power levels.</p> <p>Typically, such Receptacles w/USB are Listed under the UL CCN <b>RTRT</b>:  <a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/showpage.html?name=RTRT.GuideInfo&amp;ccnshorttitle=Receptacles+for+Plugs+and+Attachment+Plugs&amp;objid=1074120002&amp;cfgid=1073741824&amp;version=versionless&amp;parent_id=1073992975&amp;sequence=1">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/showpage.html?name=RTRT.GuideInfo&amp;ccnshorttitle=Receptacles+for+Plugs+and+Attachment+Plugs&amp;objid=1074120002&amp;cfgid=1073741824&amp;version=versionless&amp;parent_id=1073992975&amp;sequence=1</a></p> <p><b>“Receptacle Providing Power to Class 2 Equipment</b> — A flush-mounted receptacle with an integral power supply with one or more Class 2 output low-voltage connectors, a Class 2 separable conductor lead assembly, or both, intended to be installed in an outlet box.”</p>	<b>(F) Receptacle with USB Charger.</b> A 125-volt 15- or 20-ampere receptacle that additionally provides Class 2 power shall be listed and constructed such that the Class 2 circuitry is integral with the receptacle.	<b>None.</b>  Provided for information only. Since these receptacles with USB chargers are not considered AV/ICT Equipment, no direct impact on AV/ICT equipment.	<b>No.</b>
480.3	Storage Batteries - Equipment	New section now clarifies that storage batteries and battery management equipment other than lead-acid need to be Listed. Addresses growing use of Lithium-Ion and other modern chemistries.	<b>480.3 Equipment.</b> Storage batteries and battery management equipment shall be listed. This requirement shall not apply to lead-acid batteries.	<b>Minor (+).</b>  Although most of this equipment already is being Listed, this new requirement serves as a firm regulatory driver.	<b>Yes.</b>  Although this type of energy storage equipment is not AV/ICT equipment per se, a modification is being pursued to regulatory annex (DVA) to reference

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					the modified NEC sections for informational purposes.
640.9 (C)	Audio Signal Processing, Amplification, and Reproduction Equipment – Wiring Methods – Output Wiring and Listing of Amplifiers	Code acknowledges amplifiers now can be Listed to <b>UL 62368-1</b> as an alternative to legacy UL A/V standards.	<p><b>(C) Output Wiring and Listing of Amplifiers.</b> Amplifiers with output circuits carrying audio program signals shall be permitted to employ Class 1, Class 2, or Class 3 wiring where the amplifier is listed and marked for use with the specific class of wiring method...</p> <p>. . . .</p> <p>Informational Note No. 2: Examples of requirements for listing amplifiers used in residential, commercial, and professional use are found in ANSI/UL 813-1996, <i>Commercial Audio Equipment</i>; ANSI/UL 1419-2011, <i>Professional Video and Audio Equipment</i>; ANSI/UL 1492-2010, <i>Audio-Video Products and Accessories</i>; ANSI/UL 6500-2006, <i>Audio/Video and Musical Instrument Apparatus for Household, Commercial, and Similar Use</i>; and UL 62368-1-2012, <i>Audio/Video, Information and Communication Technology Equipment— Part 1: Safety Requirements</i>.</p>	<p><b>Minor (-).</b></p> <p>Additional option for certifying Amplifiers.</p>	<p><b>No.</b></p> <p>Amplifiers already are under the scope of IEC 62368-1.</p>

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725.2  (TIA 17-10)	Definitions – Nominal Current	<p>To allow for proper application of <b>725.121 (C)</b>, a new definition for “nominal current” has been adopted as a <b>Tentative Interim Amendment (TIA)</b>.</p> <p>[Per the content of the TIA, “Pursuant to Section 5 of the NFPA <i>Regulations Governing the Development of NFPA Standards</i>, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 70®, <i>National Electrical Code</i>®, 2017 edition. The TIA was processed by the National Electrical Code Panel 3 and the NEC Correlating Committee, and was issued by the Standards Council on December 6, 2017, with an effective date of December 26, 2017.</p> <p>A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a public input of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.”]</p>	<p><b>725.2 Definitions.</b></p> <p>Nominal Current. The designated current per conductor as specified by equipment design.</p> <p>Informational Note: One example of nominal current is 4-pair Power over Ethernet (PoE) applications based on IEEE 802.3-2015, <i>IEEE Standard for Ethernet</i>, 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.</p>	<p><b>None.</b></p> <p>Definition, but will allow for more practical application of Section 725.121(C).</p>	<p><b>Yes.</b></p> <p>Modification to regulatory annex (DVA), including references to modified NEC section(s).</p>



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<b>725.121 (A)(4)</b>	Class 1, Class 2, & Class 3 Remote-Control, Signaling, & Power-Limited Circuits - Power Sources for Class 2 and Class 3 Circuits – Power Source	<p>To supplement the existing reference to <b>UL 60950-1</b> for a limited power source output, <b>UL 62368-1</b> has been added as alternative. Equipment with outputs considered a limited power source can be used as an alternative to a traditional Class 2 Power Source for purposes of Article 725 CL2 wiring/cablings.</p> <p>There are other expanded options too, such as limited power outputs associated with <b>UL 61010-2-201</b> and <b>UL 61800-5-1</b>.</p>	<p>4) Listed audio/video information technology (computer), communications, and industrial equipment limited-power circuits.</p> <p>Informational Note: One way to determine applicable requirements for listing of information technology (computer) equipment is to refer to UL 60950-1-2011, <i>Standard for Safety of Information Technology Equipment</i>. Another way to determine applicable requirements for listing of audio/video, information and communication technology equipment is to refer to UL 62368-1-2014, <i>Safety of audio/video, information and communication technology equipment</i>. Typically, such circuits are used to interconnect data circuits for the purpose of exchanging information data...</p>	<p><b>Minor (-).</b></p> <p>Additional standards as options for classifying equipment with Limited Power Source (LPS) outputs and their consideration under Article 725 for Class 2 wiring.</p>	<p><b>Yes.</b></p> <p>Modification to regulatory annex (DVA), including references to modified NEC section(s).</p>
<b>725.121 (C) (TIA 17-10)</b>	Class 1, Class 2, & Class 3 Remote-Control, Signaling, & Power-Limited Circuits - Power Sources for Class 2 and Class 3	<p>LPS outputs used for NEC Article 725 purposes now are required to be identified with maximum output voltage &amp; current for each connection point.</p> <p>Note however the details of this new 725.121 requirement as published could be problematic because it is not clear whether the “maximum voltage and current output” is under normal operation or a single fault conditions.</p> <p>Also, per the original provision, requiring such</p>	<p><del><b>(C) Marking.</b> 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 for each connection point. The effective date shall be January 1, 2018.</del></p> <p><b>Per TIA 17-10:</b></p>	<p><b>Considerable (+).</b></p> <p>This equipment output marking/ identification requirement is a new requirement. However, it is confusing how it will be applied. Likely won’t be looked at too closely by AHJs until refinements are made in the 2020 NEC.</p>	<p><b>Yes.</b></p> <p>Modification to regulatory annex (DVA), including references to modified NEC section(s).</p> <p>However, it will be proposed that the manufacturer can</p>

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	Circuits – Marking	<p>labeling for “each connection point” would be challenging and redundant for many constructions with multiple connection points/ports.</p> <p>A Tentative Interim Agreement (TIAs) since has been issued that may provide some clarity, but additional modifications anticipated in the 2020 NEC.</p>	<p><b>725.121(C) Marking.</b> The power sources for limited power circuits in 725.121(A)(3) and limited power circuits for listed audio / video, information, <u>and communications</u> technology (equipment), and listed industrial equipment in 725.121(A)(4) shall have a label indicating the maximum voltage and <u>maximum</u> current or <u>maximum voltage and nominal current</u> output for each connection point. <u>Where multiple connection points have the same rating, a single label shall be permitted to be used.</u> The effective date shall be January 1, 2018. <u>Exception: Marking shall not be required for power sources providing 0.3 amperes nominal current or less per conductor.</u></p>		<p>have some leeway on how such information is communicated. Likely will be further clarified after 2020 NEC.</p>
<b>725.144 (TIA 17-11)</b>	Class 1, Class 2, & Class 3 Remote-Control, Signaling, & Power-Limited Circuits - Power Sources for Class 2 and Class 3 Circuits – Transmission of Power and Data	<p>New section typically will apply to connection of ‘building wiring’ (typically &gt; 3.05 m (10 ft) in the context of <b>CSA/UL 60950-1</b> and <b>CSA/UL 62368-1</b>) and utilizing an NEC Class 2 wiring method.</p> <p>“LP” suffix marking added to recognized limited power cables that can be used at 0.5 amperes without restriction on number of cables in a bundle.</p> <p>Either (A) traditional CL2 cable can be used if subjected to the new ampacity limits in Table 725.144, which take into account individual cable ampacity, temperature rating, and bundling, or (B) new type Class2 –LP cable can be used at current levels up to the marked</p>	<p><b>725.144 Transmission of Power and Data.</b> 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.</p> <p>Informational No. 1: One example of the use of cables that transmit power and data is the connection of closed-circuit TV</p>	<p><b>Minor (+).</b></p> <p>The direct impact on AV/ICT equipment manufacturers is likely to be relatively low, but the impact on installers of the equipment and the selection of cabling within the building could be considerable (high).</p>	<p><b>Yes.</b></p> <p>Modification to regulatory annex (DVA), including references to modified NEC section(s).</p> <p>The THC did not attempt to solve all the potential application issues, but rather let the Code stand as the published,</p>

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		<p>ampere limit located immediately following the suffix LP, for example, L2-LP(0.5A).</p> <p>The proposal for this new requirement was made by SPI, the plastics industry trade association, and was based on a fact-finding investigation performed by UL LLC W&amp;C Division.</p> <p>A Tentative Interim Agreement (TIAs) has been issued that may provide some clarity, including a provision excluding application if the nominal current does not exceed 0.3 A. However, additional modifications are anticipated in the 2020 NEC.</p>	<p>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.</p> <p><del>(A) Use of Class 2 or Class 3 Cables to Transmit Power and Data.</del></p> <p><b><i>[see NFPA 70 for complete text]</i></b></p> <p><b>(A) Use of Class 2 or Class 3 Cables to Transmit Power and Data.</b> 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 to the nominal current 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.</p> <p><u>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.</u></p> <p><del><b>725.144(B) Use of Class 2 LP or Class 3 LP Cables to Transmit Power and Data</b></del></p>		<p>anticipating further refinement in the 2020 NEC.</p>

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			<p><b>725.144(B) Use of Class 2-LP or Class 3-LP Cables to Transmit Power and Data.</b> Types CL3PLP, 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. <u>For ambient temperatures above 30°C (86°F), the correction factors of 310.15(B)(2) shall apply.</u> The Class 2-LP and Class 3-LP cables shall comply with the following, as applicable: ...</p> <p><b>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</b></p> <p><i>[See NFPA 70 for complete table]</i></p>		

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725.170	Class 1, Class 2, & Class 3 Remote-Control, Signaling, & Power-Limited Circuits - Power Sources for Class 2 and Class 3 Circuits – Part IV Listing Requirements - Listing and Marking of Equipment for Power and Data Transmission	<p>New Section specifies Listing requirements for power sources used to supply limited power in accordance with 725.121(A)(4), such as Listed ICT to UL 60950-1 or UL 62368-1, and having an LPS output. Specifies the output shall not be paralleled or otherwise interconnected unless listed for such.</p> <p>Maybe more importantly, the “powered devices” connected to such circuits now also are required to be Listed, which essentially now requires all PoE powered equipment, including surveillance cameras, etc. to be Listed.</p>	<p><b>Part IV. Listing Requirements</b></p> <p><b>725.170 Listing and Marking of Equipment for Power and Data Transmission.</b> 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). In accordance with 725.121(B), the power sources shall not have the output connections paralleled or otherwise interconnected, unless listed for such interconnection.</p> <p>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).</p>	<p><b>Considerable (+).</b></p> <p>The impact on equipment providing a power source (LPS) is likely to be small since most of this equipment already is Listed (due to its mains connection, e.g., PoE extender).</p> <p>However, some ‘powered devices’, including such products as PoE surveillance cameras, are not Listed, so this is an additional regulatory requirement now driving Listing.</p>	<p><b>Yes.</b></p> <p>Modification to regulatory annex (DVA), including references to modified NEC section(s).</p>
800.170	Communications Circuits – Part VI - Listing Requirements - Equipment	<p>Communications equipment now is allowed to be Listed to UL 62368-1 as an alternative to UL 60950-1.</p>	<p><b>800.170 Equipment.</b> Communications equipment shall be listed as being suitable for electrical connection to a communications network.</p> <p>Informational Note: One way to determine applicable requirements is to refer to ANSI/UL 60950-1-2014, <i>Standard for Safety of Information Technology Equipment</i>; UL 1459-1998, <i>Standard for Safety Telephone</i></p>	<p><b>Minor (+).</b></p> <p>Now there is an additional standard option considered acceptable for certifying communications equipment.</p> <p>However, communications equipment already is under</p>	<p><b>Yes.</b></p> <p>Modification to regulatory annex (DVA), including references to modified NEC section(s).</p>

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			<i>Equipment; ANSI/UL 1863-2012, Standard for Safety Communications Circuit Accessories; or ANSI/ UL 62368-1-2014, Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements.</i>	the scope of IEC 62368-1.	
<b>840.1</b>	Premises-Power Broadband Communication Systems – Scope	The scope of Article 840 has been expanded from optical fiber-based broadband systems (in the 2014 NEC) to now cover coaxial and twisted pair communication circuits, in addition to fiber optic, to allow it cover applications of communication via Power Over Ethernet (PoE) via CM and similar communications cabling.	<p><b>840.1 Scope.</b> This article covers premises-powered broadband communications systems.</p> <p>Informational Note No. 1: A typical basic system configuration consists of an optical fiber, twisted pair, or coaxial cable to the premises supplying a broadband signal to a network terminal that converts the broadband signal into component electrical signals, such as traditional telephone, video, high-speed Internet, and interactive services. Powering for the network terminal and network devices is typically accomplished through a premises power supply that might be built into the network terminal or provided as a separate unit. In order to provide communications in the event of a power interruption, a battery backup unit or an uninterruptible power supply (UPS) is typically part of the powering system.</p>	<p><b>Minor (+).</b></p> <p>To date, most applications of PoE have been exclusively considered under Article 725 and associated with Class 2 cabling. However, the changes to Article 840 will broaden the scope of Article 840 and its application to <b>communications equipment and communications circuits</b> when PoE and similar powering methods are used with this equipment.</p> <p>Although the impact may appear significant, the impact likely will be the same on communications equipment as they are on IT equipment since from a certifications perspective</p>	<p><b>Yes.</b></p> <p>Modification to regulatory annex (DVA), including references to modified NEC section(s).</p>

NEC Article / Section	Title	Summary	Details	Impact Statement	NEW Planned new / revised ND in next CSA/UL 62368-1?
				(to 60950-1 or 62368-1), both essentially are subjected to the same requirements (as both are classed ICT equipment by 62368-1).	
<b>840.2 (TIA 17-12)</b>	Premises-Power Broadband Communication Systems – Definitions	<p>The definition of a Network Terminal has been modified to describe the types of output signals it provides, including signals considered PoE.</p> <p>Also, a Tentative Interim Agreement (TIAs) has been issued that may provide some clarity, including a definition of “Nominal Current.”</p>	<p><b>Network Terminal.</b> A device that converts network-provided signals (optical, electrical, or wireless) into component signals, including voice, audio, video, data, wireless, optical, and interactive services, and is considered a network device on the premises that is connected to a communications service provider and is powered at the premises.</p> <p><b>Per TIA 17-12:</b></p> <p><b>840.2 Definitions.</b>  <u>Nominal Current.</u> The designated current per conductor as specified by equipment design.  <u>Informational Note:</u> One example of nominal current is 4-pair Power over Ethernet (PoE) applications based on IEEE 802.3-2015, <i>IEEE Standard for Ethernet</i>, 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.</p>	<b>None.</b> Definition.	<b>Yes.</b>  Modification to regulatory annex (DVA), including references to modified NEC section(s).

NEC Article / Section	Title	Summary	Details	Impact Statement	NEW Planned new / revised ND in next CSA/UL 62368-1?
<b>Article 840 Part VI, and 840.160 (TIA 17-12)</b>	Premises-Power Broadband Communication Systems - Premises Powering of Communications Equipment over Communications Cables – Powering Circuits	<p>New Part VI and Section specifically targeting Power Over Ethernet (PoE).</p> <p>For applications typically involving PoE carrying &gt;60W via communications cables (e.g., Type CM), essentially the same Class 2 requirements apply to the premises powering of communications equipment as is applied to ITE.</p> <p>Also see Section 840.170(G).</p> <p>A Tentative Interim Agreement (TIAs) has been issued that may provide some clarity, including the same exclusion as in Article 725 for a nominal current not exceeding 0.3A.</p>	<p><b>Part VI. Premises Powering of Communications Equipment over Communications Cables</b></p> <p><del><b>840.160 Powering Circuits.</b> 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.</del></p> <p><b>840.160 Powering Circuits.</b> 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 listed communications cables shall comply with 725.144 where listed communications cables are used in place of Class 2 and Class 3 cables.</p>	<p><b>Minor (+).</b></p> <p>See analysis of Article 100 and Sections 725.144 and 840.1. Essentially, ICT equipment serving to source power at greater than 60 watts now is required to comply with Section 725.144 and its new requirements for temperature considerations and bundled cables, whether Class 2 or communications cables are used.</p>	<p><b>Yes.</b></p> <p>Modification to regulatory annex (DVA), including references to modified NEC section(s).</p>



NEC Article / Section	Title	Summary	Details	Impact Statement	NEW Planned new / revised ND in next CSA/UL 62368-1?
			<p><u>Exception: Compliance with 725.144 shall not be required for installations of listed 4-pair communications cables where the nominal current does not exceed 0.3 amperes in any conductor.</u></p>		
<p><b>840.170 (A) &amp; (C)</b></p>	<p>Premises-Power Broadband Communication Systems – Listing Requirements – Network Terminals</p>	<p>Network terminals now can be Listed to UL 62368-1 as an alternative to UL 60950-1.</p> <p>Clarification that Communication Equipment in general shall be Listed per 800.170.</p>	<p><b>(A) Network Terminal.</b> The network terminal and applicable grounding means shall be listed for application with premises powered broadband communications systems.</p> <p>Informational Note No. 1: One way to determine applicable requirements is to refer to ANSI/UL 60950-1-2014, <i>Standard for Safety of Information Technology Equipment</i>; ANSI/UL 498A-2015, <i>Current Taps and Adapters</i>; ANSI/UL 467-2013, <i>Grounding and Bonding Equipment</i>; or ANSI/UL 62368-1-2014, <i>Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements</i>.</p> <p><b>(B) Communications Equipment.</b> Communications equipment shall be listed in accordance with 800.170. Premises communications wires and cables connecting to the network terminal shall be listed in accordance with 800.179.</p>	<p><b>Minor.</b></p> <p>An additional standard option considered acceptable for certifying <b>network terminals</b>.</p> <p>Generally, Communications Equipment already is Listed per the existing 800.170.</p>	<p><b>Yes.</b></p> <p>Modification to regulatory annex (DVA), including references to modified NEC section(s).</p>

NEC Article / Section	Title	Summary	Details	Impact Statement	NEW Planned new / revised ND in next CSA/UL 62368-1?
<b>840.170 (G)</b>	Premises-Powered Broadband Communications Systems – Listing Requirements – Power Source	<p>The outputs of power sources supplying PoE are required to be LPS per UL 60950-1 or UL 62368-1.</p> <p>Note, the term “<i>power over communications cables</i>” is used instead of Power over Ethernet, or PoE, because not all circuits viewed as PoE may comply with the PoE industry standard; also, there are companies (e.g., Cisco) who provide similar proprietary networks as PoE that purposely do not comply with the published limits since they want to distribute different power levels than may be allowed by the industry specification/standard. Also, see definitions of “communications circuits” and “communications equipment” in Article 100.</p>	<p><b>G) Power Source.</b> The power source for circuits intended to provide power over communications cables to remote equipment shall be limited in accordance with Table 11(B) in Chapter 9 for voltage sources up to 60 V dc and be listed as specified in either of the following:</p> <p>(1) A power source shall be listed as specified in 725.121(A)(1), (A)(2), (A)(3), or (A)(4). The power sources shall not have the output connections paralleled or otherwise interconnected unless listed for such interconnection.</p> <p>(2) A power source shall be listed as communications equipment for limited-power circuits.</p> <p>Informational Note: One way to determine applicable requirements is to refer to ANSI/UL 60950-1-2014, <i>Standard for Safety of Information Technology Equipment-Safety — Part 1</i>; or ANSI/UL 62368-1-2014, <i>Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements</i>. Typically, such circuits are used to interconnect equipment for the purpose of exchanging information (data).</p>	<p><b>Minor (+).</b></p> <p>See analysis of Article 100, Section 840.1, and Article 840 Part VI, and 840.160. Essentially, ICT equipment serving to source power (as LPS) now is required to comply with Section 725.121 and its Listing requirement for ICT equipment with LPS output (and whether Class 2 or communications cables are used).</p>	<p><b>Yes.</b></p> <p>Modification to regulatory annex (DVA), including references to modified NEC section(s).</p>

**Explanation of Impact Statements:**

<b>Statement</b>	<b>Impact</b>
None	Anticipate no impact on AV/ICT equipment due to the change.
Minor*	Anticipate limited impact on AV/ICT equipment due to the change.
Considerable*	Anticipate considerable impact on AV/ICT equipment due to the change.

\* For new/revised requirements that are considered at this time **more onerous** than existing requirements, the Impact Statement (Minor, Considerable) will be followed by a (+). For new/revised requirements that are considered at this time **less onerous** than existing requirements, the Impact Statement (Minor, Considerable) will be followed by a (-). No symbol next to a Minor statement indicates that, although there could be limited impact associated with the change, it is indeterminate at this time whether it will be more or less.