

UNDERWRITERS LABORATORIES INC. CERTIFICATION REQUIREMENT DECISION

This Certification Requirement Decision is prepared by UL LLC. It is normative for the applicable UL Product Certification Program(s); however, it is currently not part of the UL Standard(s) referenced below.

Product Category (CCN): PWVX

Standard Number: UL 719

Standard Title: Standard for Nonmetallic-Sheathed Cables

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Section / Paragraph Reference: Revised 3.10, 4.3.2, 4.4.1, 4.6.1.1, 4.6.2, 5.6.1, 5.14, 5.15, 5.16, 7.12.2, 7.15, Table 1; New 4.6.1.3, 4.6.2.2, 4.6.2.3, 6.1.16, 6.1.17, 6.1.18, 6.2.11

Subject: NM-PCS cable

DECISION:

3.10 SIGNAL/CONTROL CONDUCTORS – Conductors installed as Class 2 and Class 3 in accordance with Article 725 of the National Electrical Code(NEC).

~~3.10~~ 11 THERMOPLASTIC - a polymeric material that repeatedly can be softened by heating and hardened by cooling through a temperature range characteristic of the material, and that in the softened state can be shaped through the application of force.

4.3.2 A copper circuit conductor shall not be smaller than 14 AWG and shall not be larger than 2 AWG. An aluminum or copper-clad aluminum circuit conductor shall not be smaller than 12 AWG and shall not be larger than 2 AWG. Signal/control conductors used within a Type NM-PCS cable shall be 18 or 16 AWG copper.

4.4.1 Both before and after assembly into finished cable, the insulation employed on the circuit conductors shall comply with (a) or (b) and the insulation employed on the control/signal conductors shall comply with (c):

a) THHN Construction - Jacketed insulation for a Type NM or NMC cable shall have a nylon or similar jacket and shall comply with the thickness and other applicable requirements for Type THHN thermoplastic-insulated wire without (see 6.2.4) any surface marking of "THHN", "-B", or any ampacity or temperature rating.

b) TW Construction - Insulation without a nylon jacket shall comply with the thickness requirements for a Type TW thermoplastic-insulated wire. The insulation material shall comply with (1) or (2):

2) For TYPE NM only - Type NM is eligible to use a thermoplastic insulating material other than PVC. The performance and ratings of the material as insulation shall be determined by investigation and shall be:

ii) Mechanically comparable to the nylon or similarly jacketed PVC insulation of Type THHN wire, and

iii) In accordance with "Physical properties of insulation of thermoplastic other than PVC from Type NM cables" Table in UL 1581.

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(c) Insulated control/signal conductors - The insulation material shall be a dry-locations PVC that complies with the requirements for Type TFN insulation without any surface marking of the temperature rating. The tensile strength and elongation shall comply with the "Physical properties of PVC insulation from Type TFN and TFFN fixture wires" Table 50.155 in UL 1581. The deformation test is to be conducted at $121.0 \pm 1.0^{\circ}\text{C}$ ($249.8 \pm 1.8^{\circ}\text{F}$) with a decrease of not more than 50 percent in the thickness of the PVC insulation. The force to be used is 300 grams for 18 AWG and 400 grams for 16 AWG conductors.

4.6 Assembly

4.6.1 General

4.6.1.1 At least two but not more than four circuit conductors, and an optional "-PCS" signal/control subassembly in accordance with 4.6.1.3 shall be used in a Type NM cable. Two or three circuit conductors shall be used in a Type NMC cable. In a given cable all of the circuit conductors shall be of the same size.

4.6.1.2 One grounding conductor shall be used in every cable.

4.6.1.3 PCS Subassemblies

A round or flat NM cable may employ a "-PCS" subassembly consisting of two 18 or 16 AWG signal/control conductors for use in Class 2 and Class 3 circuits with a thermoplastic jacket over the two 18 or 16 AWG conductors. The thermoplastic jacket shall be a minimum of 30 mils (0.76mm) thick. The thermoplastic jacket shall meet the requirements of 5.2.

Exception: A flat NM cable may employ a "-PCS" subassembly consisting of two 18 or 16 AWG conductors for use in Class 2 and Class 3 circuits provided with an overall thermoplastic jacket that is a minimum of 60 mils (1.52mm) thick where the PCS subassembly is attached to the power conductor subassembly by a web or similar means. The thermoplastic jacket shall meet the requirements of 5.2.

4.6.2 Cabling Methods

4.6.2.1 In Type NM cables containing two circuit conductors, the circuit conductors shall either be laid parallel or shall be cabled with a length of lay that is not longer than indicated in Table 2. In Type NM cables containing more than two ~~two or more~~ circuit conductors, the circuit conductors shall be cabled with a length of lay no longer than indicated in Table 2 except that, for sizes 14 - 10 AWG copper or 12 - 10 AWG aluminum or copper-clad aluminum, whether or not a binder is employed, the circuit conductors shall either be cabled with a length of lay which is not specified, shall be bundled together parallel to one another, or shall be laid parallel. In Type NMC cables, the circuit conductors shall be laid parallel. In a round cable, the direction of lay may be changed at intervals throughout the length of the cable. The intervals need not be uniform. In a cable in which the lay is reversed:

- a) Each area in which the lay is right- or left-hand for not less than 5 complete twists (full 360° cycles) shall have the insulated conductors cabled with a length of lay that is not greater than indicated in Table 2, and
- b) The length of each lay-transition zone (oscillated section) between these areas of right- or left-hand lay shall not exceed 1.8 times the maximum length of lay indicated in Table 2.

4.6.2.2 A flat NM-PCS cable shall consist of an NM cable where either 1) the NM cable is joined to the PCS subassembly by means of a web or similar method or 2) the power conductors and PCS subassembly are contained under the overall jacket. One of the following constructions is acceptable.