

## NEC-70 ARTICLE 411

### ARTICLE 411 Lighting Systems Operating at 30 Volts or Less

#### 411.1 Scope.

This article covers lighting systems operating at 30 volts or less and their associated components.

#### 411.2 Definition.

Lighting Systems Operating at 30 Volts or Less. A lighting system consisting of an isolating power supply, the low-voltage luminaires, and associated equipment that are all identified for the use. The output circuits of the power supply are rated for not more than 25 amperes and operate at 30 volts (42.4 volts peak) or less under all load conditions.

#### 411.3 Listing Required.

Lighting systems operating at 30 volts or less shall comply with 411.3(A) or 411.3(B).

**(A) Listed System.** Lighting systems operating at 30 volts or less shall be listed as a complete system. The luminaires, power supply, and luminaire fittings (including the exposed bare conductors) of an exposed bare conductor lighting system shall be listed for the use as part of the same identified lighting system.

**(B) Assembly of Listed Parts.** A lighting system assembled from the following listed parts shall be permitted:

- (1) Low-voltage luminaires
- (2) **Low-voltage luminaire power supply**
- (3) Class 2 power supply
- (4) Low-voltage luminaire fittings
- (5) Cord (secondary circuit) for which the luminaires and power supply are listed for use
- (6) Cable, conductors in conduit, or other fixed wiring method for the secondary circuit

The luminaires, power supply, and luminaire fittings (including the exposed bare conductors) of an exposed bare conductor lighting system shall be listed for use as part of the same identified lighting system.

#### 411.4 Specific Location Requirements.

**(A) Walls, Floors, and Ceilings.** Conductors concealed or extended through a wall, floor, or ceiling shall be in accordance with (1) or (2):

- (1) Installed using any of the wiring methods specified in Chapter 3
- (2) Installed using wiring supplied by a listed Class 2 power source and installed in accordance with 725.130

**(B) Pools, Spas, Fountains, and Similar Locations.** Lighting systems shall be installed not less than 3 m (10 ft) horizontally from the nearest edge of the water, unless permitted by Article 680.

#### 411.5 Secondary Circuits.

**(A) Grounding.** Secondary circuits shall not be grounded.

**(B) Isolation.** The secondary circuit shall be insulated from the branch circuit by an isolating transformer.

**(C) Bare Conductors.** Exposed bare conductors and current-carrying parts shall be permitted for indoor installations only. Bare conductors shall not be installed less than 2.1 m (7 ft) above the finished floor, unless specifically listed for a lower installation height.

**(D) Insulated Conductors.** Exposed insulated secondary circuit conductors shall be of the type, and installed as, described in (1), (2), or (3):

- (1) Class 2 cable supplied by a Class 2 power source and installed in accordance with Parts I and III of Article 725.
- (2) Conductors, cord, or cable of the listed system and installed not less than 2.1 m (7 ft) above the finished floor unless the system is specifically listed for a lower installation height.
- (3) Wiring methods described in Chapter 3

#### 411.6 Branch Circuit.

Lighting systems operating at 30 volts or less shall be supplied from a maximum 20-ampere branch circuit.

#### 411.7 Hazardous (Classified) Locations.

Where installed in hazardous (classified) locations, these systems shall conform with Articles 500 through 517 in addition to this article.

## NEC-70 Annex A Product Safety Standards

### Product Standard Name

Low-Voltage Landscape Lighting Systems

Low-Voltage Luminaires

### Product Standard Number

UL 1838

UL 2108