## **RESIDENTIAL ELECTRICAL SWIMMING POOL INFO**

## City of Brook Park, Ohio

This is not an inclusive list of all the requirements of the 2017 National Electrical Code (NEC) Article 680. The following is a basic overview of some of the key points of Article 680. Installations shall comply with all of the requirements of the 2017 NEC.

## Definitions:

**Permanently Installed Swimming, Wading, Immersion and Therapeutic Pools** – Those that are constructed in the ground, and all others capable of holding water in a depth greater than 1.0 m (42 in.), and all pools installed inside of a building, regardless of the water depth, whether or not served by electrical circuits of any nature.

**Storable Swimming, Wading, or Immersion Pools; or Storable / Portable Spas and Hot Tubs** – Swimming, wading, or immersion pools that are intended to be stored when not in use, constructed on or above the ground and are capable of holding water to a maximum depth of 1.0 m (42 in.), or a pool, spa, or hot tub constructed on or above the ground, with nonmetallic, molded polymeric walls or inflatable fabric walls regardless of dimension.

## **General Requirements:**

- 1) Placement of installation of pools shall maintain clearances from overhead conductors, communication cables, and underground wiring. (2017 NEC 680.9, Table 680.9(A), Figure 680.9(A))
- <u>NEC 300.5</u> Branch circuits for pool-associated motors shall comply with this section for underground installations (UF cable not permitted, see 680.21(A)(1)). Conductors installed underground in conduit shall be listed for wet locations.
- 3) <u>NEC 680.21(A)(1)</u> The branch circuits for pool-associated motors shall be installed in rigid metal conduit, intermediate metal conduit, rigid polyvinyl chloride conduit, reinforced thermosetting resin conduit, or Type MC cable listed for the location. Other wiring methods and materials shall be permitted in specific locations or applications as covered in this section. <u>Any wiring method employed shall contain an</u> <u>"insulated copper equipment grounding conductor" sized in accordance with 250.122 but not smaller than #12 AWG.</u>
- 4) <u>NEC 680.22(A) (1)</u> Where permanently installed pool is installed, no fewer than one 125-volt, 15 or 20 ampere receptacle on a general purpose branch circuit shall be located not less than 1.83 m. (6 feet) from, and not more than 6.0 m. (20 feet) from, the inside wall of the pool. (2) Receptacles that provide power for water-pump motors or for other loads directly related to the circulation and sanitation system shall be located at least 10 feet from the inside wall of the pool, or not less than 6 feet from the inside wall of the pool, if they meet the following conditions: a) consist of locking or a single receptacle both of the grounding type, b) shall be protected by ground-fault circuit interrupter.
- 5) NEC 680.22(A)(3) Other receptacles shall be not less than 1.83 m. (6 feet) from the inside wall of the pool.
- 6) <u>NEC 680.22(A)(4)</u> A 15 and 20 ampere receptacles located within 20 feet of the inside wall of the pool shall be protected by ground-fault circuit interrupter. <u>The receptacle shall be tamper resistant per section</u> <u>NEC 406.12</u>, and shall be listed as weather-resistant type per NEC 406.9(A). Weather proof cover required.
- 7) <u>NEC 680.21(C)</u> Outlets supplying pool pump motors connected to single-phase, 120-volt through 240volt branch circuits, rated 15 or 20 amperes, whether by receptacle or direct connection, <u>shall be provided</u> <u>with ground-fault circuit-interrupter protection for personnel.</u>

- 8) Pool Bonding Parts: NEC 680.26(B) The parts specified in 680.26(B)(1) through (B)(7) shall be bonded together using solid copper conductors, insulated covered, or bare, not smaller than 8 AWG or with rigid metal conduit of brass or other identified corrosion-resistant metal. Connections to bonded parts shall be made in accordance with 250.8. An 8 AWG or larger solid copper bonding conductor provided to reduce voltage gradients in the pool area shall not be required to be extended or attached to remote panel boards, service equipment, or electrodes.
- 9) Bonding Perimeter Surfaces NEC 680.26(B)(2) The perimeter surface to be bonded shall be considered to extend for 1 m (3 ft) horizontally beyond the inside walls of the pool and shall include unpaved surfaces and other types of paving. Perimeter surfaces separated from the pool by a permanent wall or building 1.5 m (5 ft) in height or more shall require equipotential bonding only on the pool side of the permanent wall or building. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a), (B)(2)(b), or (B)(2)(c) and shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four points uniformly spaced around the perimeter of the pool. For nonconductive pool shells, bonding at four points shall not be required.

(a) *Structural Reinforcing Steel*. Structural reinforcing steel shall be <u>bonded</u> in accordance with <u>680.26(B)</u> (<u>1)</u>(a).

(b) Copper Ring. Where structural reinforcing steel is not available or is encapsulated in a nonconductive compound, a copper conductor(s) shall be utilized where the following requirements are met: 1) At least one minimum 8 AWG bare solid copper conductor shall be provided. 2) The conductors shall follow the contour of the perimeter surface. 3) Only listed splicing <u>devices</u> or exothermic welding shall be permitted.
3) The required conductor shall be 450 mm to 600 mm (18 in. to 24 in.) from the inside walls of the <u>pool</u>.
4) The required conductor shall be secured within or under the perimeter surface 100 mm to 150 mm (4 in. to 6 in.) below the subgrade.

10) Bonding Pool Water NEC 680.26(C) - Where none of the bonded parts are in direct connection with the pool water, the pool water shall be in direct contact with an approved corrosion-resistant conductive surface that exposes not less than 5800 mm<sup>2</sup> (9 in.<sup>2</sup>) of surface area to the pool water at all times. The conductive surface shall be located where it is not exposed to physical damage or dislodgement during usual pool activities, and it shall be bonded in accordance with 680.26(B).

