

**PERMANENTLY INSTALLED SWIMMING POOLS
ELECTRICAL WIRING REQUIREMENTS
2008 National Electrical Code/2010 Residential Code of New York State**

Permanently installed swimming pools are those that are constructed in the ground or partially in the ground and all others capable of holding water with a depth greater than 42 inches

1) **Building Permit**

- a. Building Permits are required. Secure a Building Permit, Electrical Permit and if required a Fence Permit prior to beginning work.
- b. Pool Alarms are required (Check with your local Building Department for additional information)
- c. If a Pool Heater is present, and Automatic Timer (Time Switch) must be installed on the pool heater and must be equipped with a readily accessible on-off switch to shut off the heater without adjusting the thermostat.

2) **Pool pump Receptacle (Outlet) and wiring method**

- a. If a pump motor receptacle is location between 6 ft - 10 ft from the inside pool wall, the receptacle must be a single twist-lock outlet, grounded, and Ground Fault Circuit Interrupter (GFCI) protected.
- b. Receptacle must have a weatherproof cover that can be closed when the cord is plugged in (In-use type cover)
- c. An automatic timer (time switch) must be installed on swimming pool pumps
- d. The circuit line for the pump motor must be a continuous line going directly to the panel box, and is to be isolated from all other receptacles.
- e. Wire for the pump motor shall not be less than #12 AWG insulated copper grounded wire, and must be in conduit (except when entering a building the wire can change to NM) (Cannot Use NM wire in conduit)
- f. Conduit:
 1. PVC - All PVC Conduit* must be buried at least 18" deep (12" if GFCI protected)
 2. Metal - All Rigid Metal Conduit* must be at least 6" deep

*Wires used in conduit must be single strand wires (ex. THWN, etc - NO NM or UF CABLE in Conduit)

3) **Convenience Receptacle (Outlet) and Wiring Method**

- a. At least one (1) 15 or 20 ampere convenience receptacle must be located not closer than 6' but not further than 20' from the outside pool wall (Can be existing and/or wired with any approved wiring method)
- b. Convenience receptacle must be Ground Fault Circuit Interrupter (GFCI) protected
- c. Must have a weatherproof cover where exposed to the weather (In-use type cover required on used, unattached, receptacles in wet locations)
- d. Must be separate from the pool pump receptacle wiring
- e. Wiring:
 1. UF cable if buried must be at least 24" deep
 2. All PVC Conduit* must be buried at least 18" deep (12" if GFCI protected)
 3. Metal - All Rigid Metal Conduit* must be at least 6" deep

*Wires used in conduit must be single strand wires (ex. THWN, etc - NO NM or UF CABLE in Conduit)

4) **Bonding the Pool**

- A. **Performance.** The equipotential bonding required by this section shall be installed to reduce voltage gradients in the pool area.
- B. **Bonded Parts.** 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 panelboards, service equipment or electrodes.

(1) **Conductive Pool Shells.** Bonding to conductive pool shall be provided as specified in 680.26(B)(1)(a) or (B)(1)(b). Poured concrete, pneumatically applied or sprayed concrete, and concrete block with painted or plastered coatings shall be considered conductive materials due to water permeability and porosity. Vinyl liners and fiberglass composite shells shall be considered to be non-conductive materials.

- (a) **Structural Reinforcing Steel.** Unencapsulated structural reinforcing steel shall be bonded together by steel tie wires or the equivalent. Where structural reinforcing steel is encapsulated in a nonconductive compound, a copper conductor grid shall be installed in accordance with 680.26(B)(1)(b)

- (b) Copper Conductor Grid. A copper conductor grid shall be provided and shall comply with (b)(1) through (b)(4)
 - (1) Be constructed of minimum 8 AWG bare solid copper conductors bonded to each other at all points of crossing
 - (2) Conform to the contour of the pool and the pool deck
 - (3) Be arranged in a 300-mm (12 in) by 300-mm (12 in) network of conductors in a uniformly spaced perpendicular grid pattern with a tolerance of 100 mm (4 in)
 - (4) Be secured within or under the pool no more than 150 mm (6 in) from the outer contour of the pool shell

(2) **Perimeter Surfaces.** The perimeter surface shall be extend for 1m (3 ft) horizontally beyond the inside walls of the pool and shall include unpaved surfaces as well as poured concrete and other types of paving. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a) or (2)(b) and shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four (4) 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 bonded in accordance with 680.26(B)(1)(a)

(b) Alternate Means. 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 splices shall be permitted
- (4) The required conductor shall be 450 to 600 mm (18 to 24 in) from the inside walls of the pool.
- (5) 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.

(3) **Metallic Components.** All metallic parts of the pool structure, including reinforcing metal not addressed in 680.26(B)(1)(a) shall be bonded. Where reinforcing steel is encapsulated with a nonconductive compound, the reinforcing steel shall not be required to be bonded.

(4) **Underwater Lighting.** All metal forming shells and mounting brackets of no-niche luminaries shall be bonded. *Exception: Listed low-voltage lighting systems with non-metallic forming shells shall not require bonding*

(5) **Metal Fittings.** All metal fittings within or attached to the pool structure shall be bonded. Isolated parts that are not over 100 mm (4 in) in any dimension and do not penetrate into the pool structure more than 25 mm (1 in) shall not require bonding.

(6) **Electrical Equipment.** Metal Parts of electrical equipment associated with the pool water circulating system, including pump motors and metal parts of equipment associated with pool covers, including electric motors, shall be bonded.

Exception: Metal parts of listed equipment incorporating an approved system of double insulation shall not be bonded.

(a) Double-insulated Water Pump Motors. Where a double-insulated water pump motor is installed under the provisions of this rule, a solid 8AWG copper conductor of sufficient length to make a bonding connection to a replacement motor shall be extended from the bonding grid to an accessible point in the vicinity of the pool pump motor. Where there is no connection between the swimming pool bonding grid and the equipment grounding system for the premises, this bonding conductor shall be connected to the equipment grounding conductor of the motor circuit.

(b) Pool Water Heaters. For pool water heaters rated at more than 50 amperes and having specific instructions regarding bonding and grounding, only those parts designated to be bonded shall be bonded and only those parts designated to be grounded shall be grounded.

(7) **Metal Wiring Methods and Equipment.** Metal-sheathed cables and raceways, metal piping, and all fixed metal parts shall be bonded,

Exception No. 1: Those separated from the pool by a permanent barrier shall not be required to be bonded.

Exception No 2: Those greater than 1.5m (5 ft) horizontally of the inside walls of the pool shall not be required to be bonded.

Exception No. 3: Those greater than 3.7 m (12 ft) measured vertically above the maximum water level of the pool or as measured vertically above any observations stands, towers, or platforms, or any diving structure, shall not be required to be bonded.

(C) **Pool Water.** An intentional bond of a minimum conductive surface area of 5806 mm² (9in²) shall be installed in contact with the pool water. This bond shall be permitted to consist of parts that are required to be bonded in 680.26(B)