

Township Of West Milford

1480 Union Valley Road • West Milford, NJ 07480 • Tel: (973) 728-2780 • Fax: (973) 728-2843

DEPARTMENT
OF BUILDING SAFETY

Pool Installation Guide

1. This handout is based on the 2015 International Residential Code NJ Edition, the 2015 International Energy Conservation Code and the 2017 National Electric Code for single-family dwellings. This is only a guide and cannot cover every situation that you may encounter.
2. Permits are required for both in ground and above ground pools more than 24" deep.
3. Drawings are required for in ground pools. Drawings should be drawn by an architect or engineer licensed in the state of New Jersey.
4. A sealed survey of your property will be required, indicating the location of the pool and fence.
5. Required Permits:
 - **Building** for the pool, fence and deck (if planned).
 - **Electric** for pump motor, lights (if any) and pool bond.
 - **Plumbing** for bottom suction drains, vacuum release system and gas piping to pool heater (if one is being installed)
6. Required Inspections:
 - **Building**- In ground: Concrete lock around pool walls and Final.
Above ground: Footing (for deck footings if planned) Final.
 - **Electric**- Rough (before any trenched wires are backfilled or any bond wires are covered) including the equipotential bonding grid and a Final.
 - **Plumbing**- Rough (for gas piping with pressure test to be inspected by plumbing inspector) and Final.

Pool Enclosure Requirements

Private swimming pools must be surrounded by a barrier, such as a fence or wall. The barrier must meet the following requirements.

1. The top of the barrier shall be at least **48 inches** above finished ground level measured on the side of the barrier, which faces away from the swimming pool. The maximum vertical clearance between finished ground level and the bottom of the barrier shall be 2 inches measured on the side of the barrier, which faces away from the swimming pool. Where the top of the pool structure is above finished ground level, such as an above-ground pool, the barrier shall be at finished ground level, such as the pool structure, or shall be mounted on top of the pool structure. Where the barrier is mounted on the pool structure, the opening between the top surface of the pool frame and the bottom of the barrier shall not allow passage of a 4-inch diameter sphere.
2. Openings in the barrier shall not allow passage of a **4 inch** diameter sphere.

3. Solid barriers shall not contain indentations or protrusions except for normal construction tolerances and tooled masonry joints.
4. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is less than 45 inches, the horizontal members shall be located on the swimming pool side of the fence. Spacing between vertical members shall not exceed 1- $\frac{3}{4}$ inches in width. Decorative cutouts shall not exceed 1- $\frac{3}{4}$ inches in width. (figure 1)

Fences with horizontal rails less than 45" apart

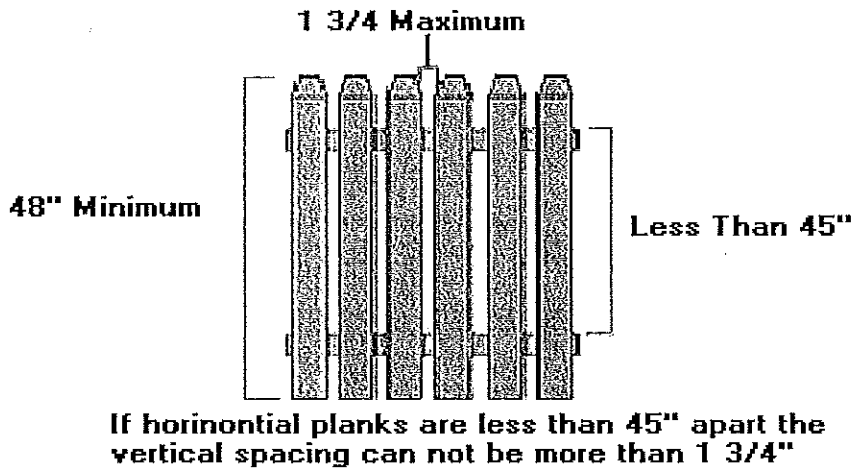


Figure 1

5. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is 45 inches or more, spacing between vertical members shall not exceed 4 inches. Decorative cutouts shall not exceed 1- $\frac{3}{4}$ inches in width. (Figure 2)

Fences with horizontal rails more than 45"aparts

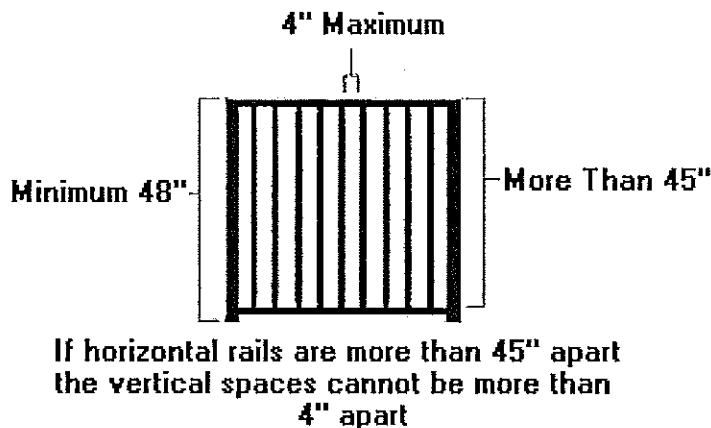
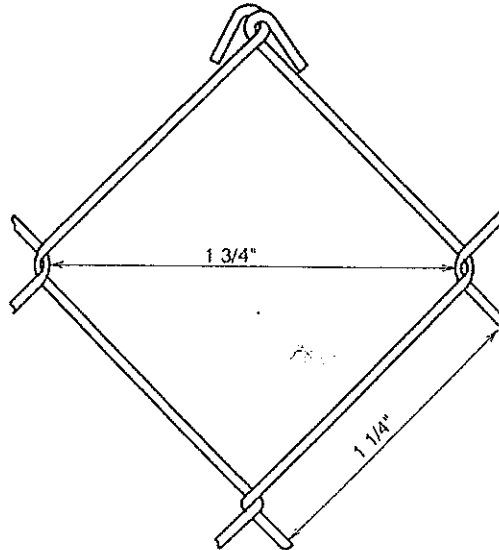


Figure 2

6. Maximum mesh size for chain link fences shall be a 1 ¼-inch square unless the fence is provided with slats fastened at the top or the bottom which reduce the openings to not more than 1 ¾-inches. (Figure 3)

Chain link Fence Mesh Size Limit

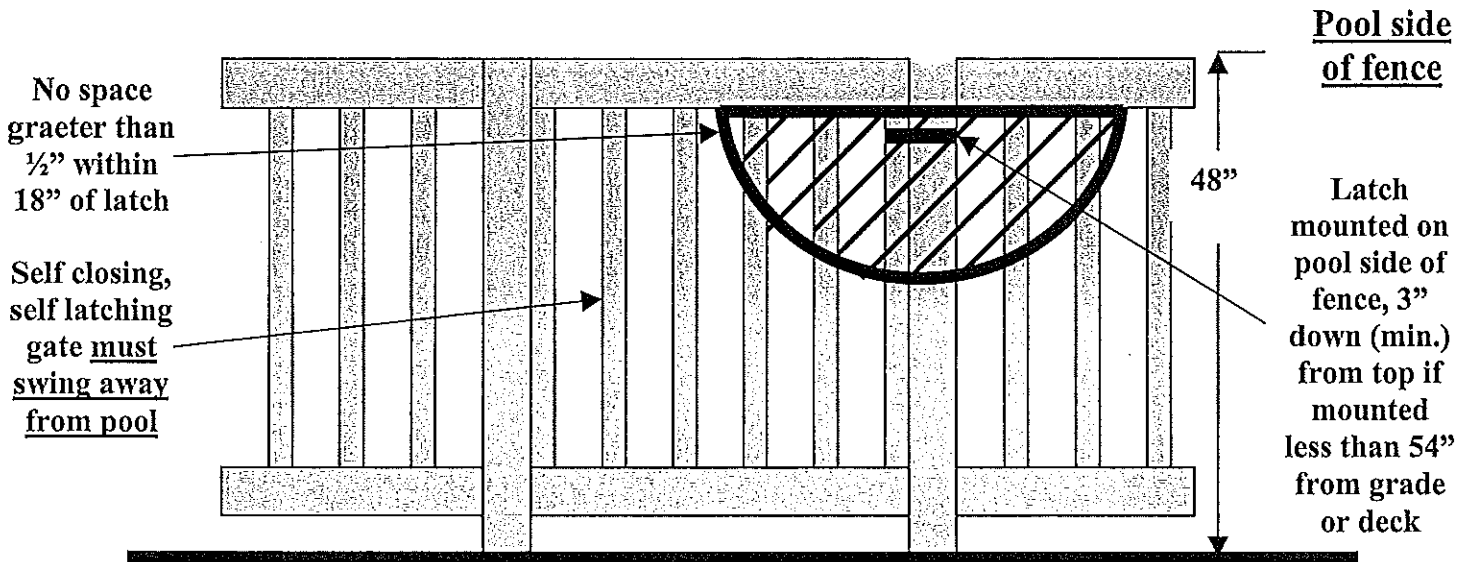


Important: The required mesh size for a pool fence are smaller than the standard chain link mesh

Figure 3

7. Where the barrier is composed of diagonal members, such as a lattice fence, the maximum opening formed by the diagonal members shall be not more than 1 ¾ inches.
8. Access gates shall comply with the requirements of items 1 through 7, and shall be equipped to accommodate a locking device. Pedestrian access gates shall open outwards away from the pool and shall be self-closing and have a self-latching device. Gates other than pedestrian access gates shall have a self-latching device. Where the release mechanism of the self-latching device is located less than 54 inches from the bottom of the gate: (a) the release mechanism shall be located on the pool side of the gate at least 3 inches below the top of the gate; and (b) the gate and barrier shall not have an opening greater than 1/2 inch within 18 inches of the release mechanism. (Figure4 and 5)

Latch mounting position if mounted less than 54" high



If latch is mounted less than 54" from grade, it must be mounted on the pool side of the gate, a minimum of 3" down from the top of the gate and have no space greater than $\frac{1}{2}$ " within 18" of the latch

Figure 4

Requirements for gates leading to pool

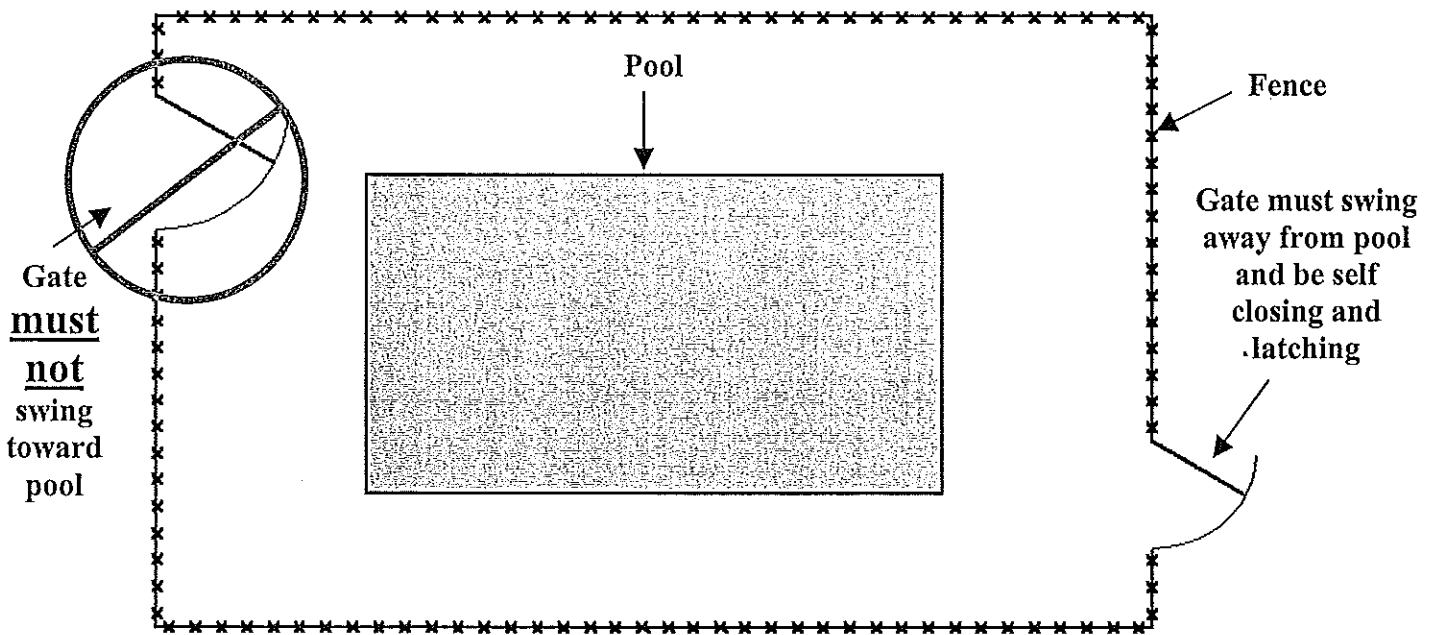


Figure 5

- Where an above-ground pool structure is used as a barrier or where the barrier is mounted on top of the pool structure, and the means of access is a fixed or removable ladder or steps, the ladder or steps shall be surrounded by a barrier, which meets the

requirements of items 1 through 8. A removable ladder shall not constitute an acceptable alternative to enclosure requirements. (Figure 7, 8 and 9)

Gate enclosure

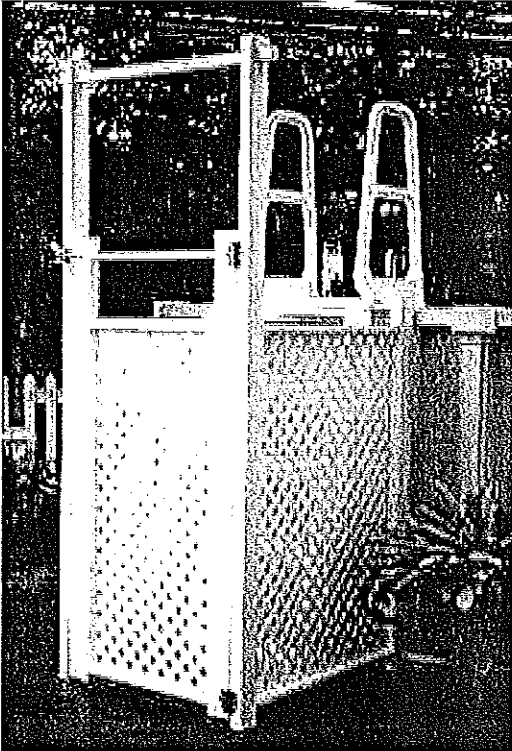


Figure 7

Maximum Space Between Top Mounted Barrier and Pool Wall

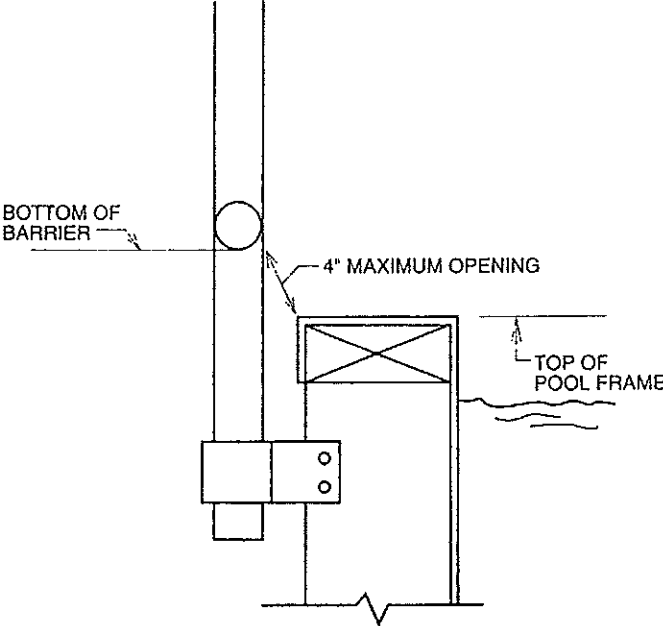


Figure 8

Pool with top mounted barrier and stair gate

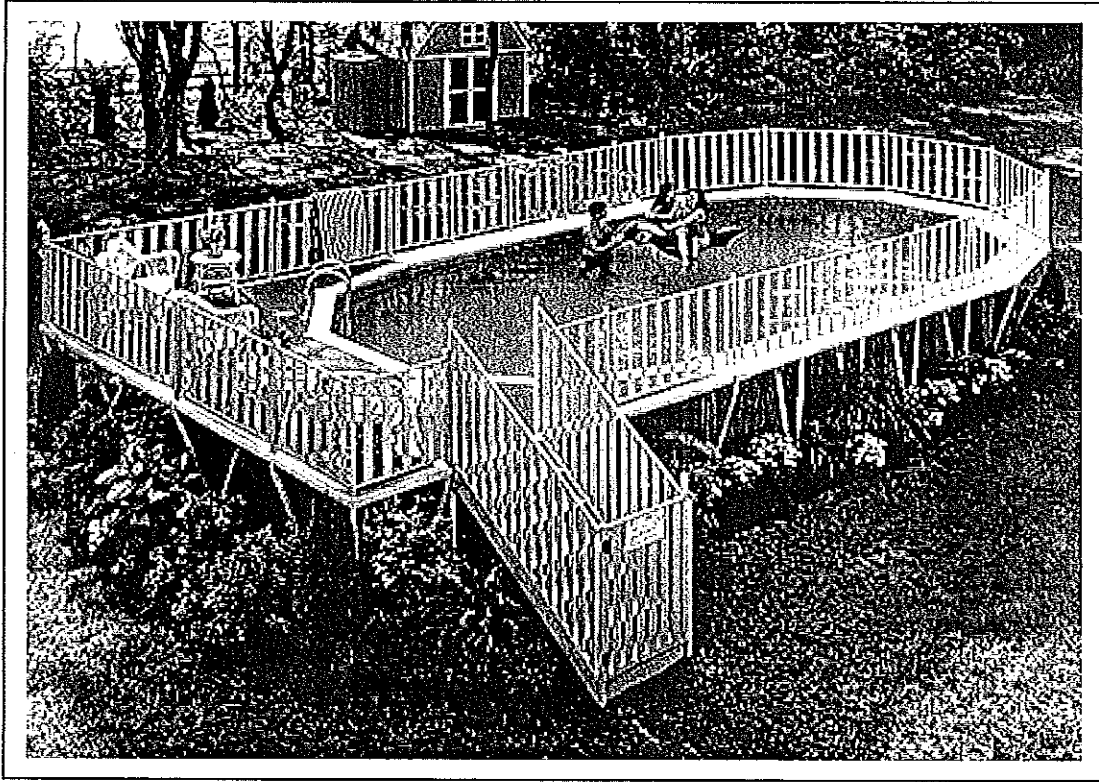


Figure 9

10. Where an above-ground pool on a sloped site that will make a portion of the top of the pool structure to be less than 48" to grade, a minimum of 3-foot level surface around the portion of the pool structure that is less than 48" to grade should be provided. The level surface should be measured away from the pool wall to the excavation edge and should be tapered away from the pool at a minimum of 45-degree angle for a distance of one half the level surface. (Figure 10)

Pool wall acting as barrier on a sloped site

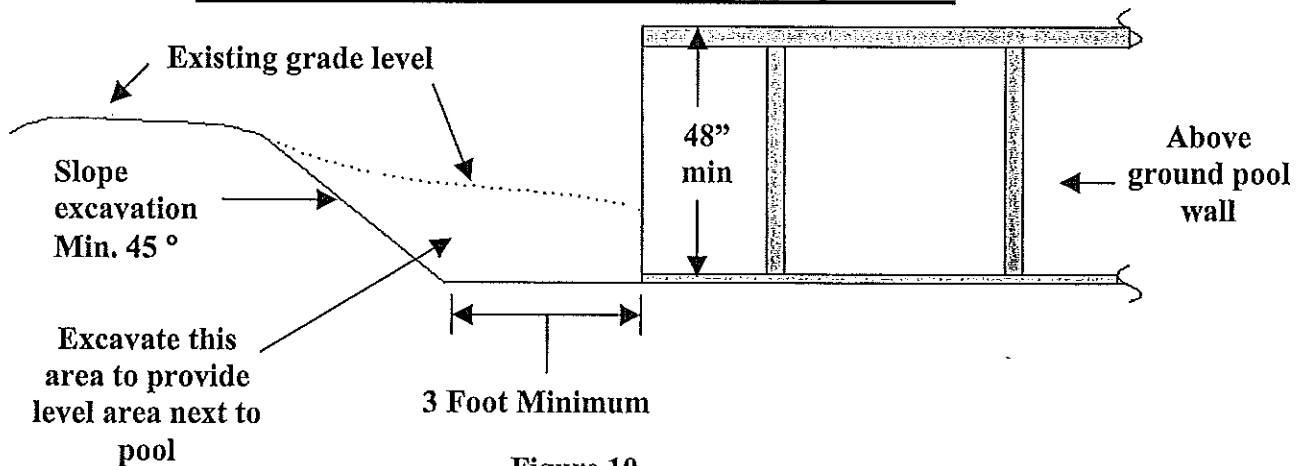


Figure 10

Stair Dimensions Requirements

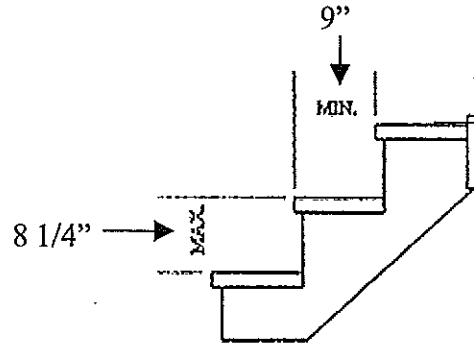
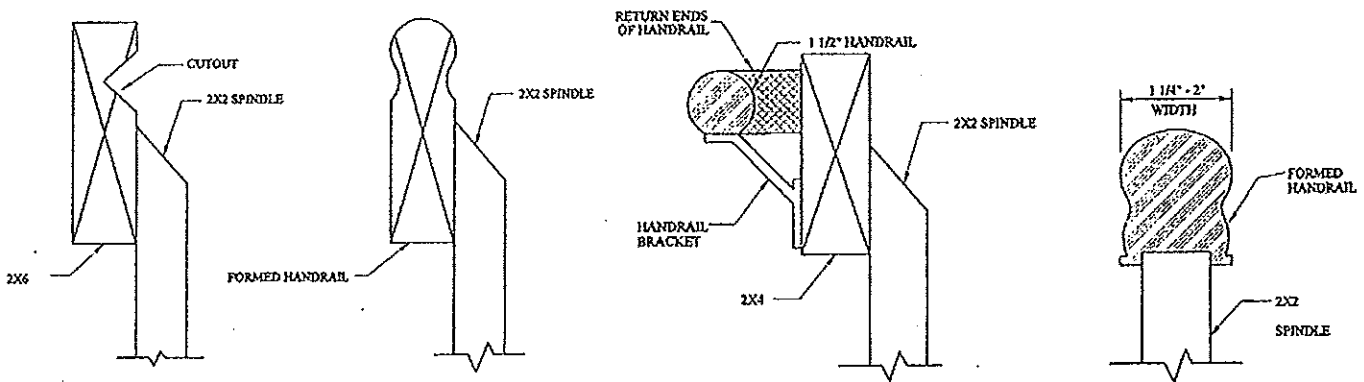


Figure12

7. Stairs must be equal in rise and tread depth to within 3/16".
8. A graspable handrail must be provided on all stairs. The handrail must be mounted 34" to 38" above the stair nosing. (Figure 13)

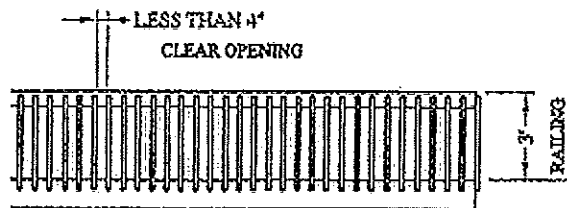
Example of Graspable Handrails



Handrails on stairs must be easy graspable. The dimension must not exceed those above. **Note:** A 2x4 or 2x6 mounted on top of the guard is not considered graspable **Figure13**

9. A railing is required around any deck more than 30" above grade. The railing must be 36" high, have balusters no more than 4" apart. (Figure 14)

Deck Railing Requirements



A permit is required for decks around pools this may be included on the same permit as your pool. A drawing showing the following will be needed:

- Footing size and depth.
- Post size and Girder size.
- Floor joist size and span.
- Decking material.
- Railings and gates, including gate swing direction.

Required inspections for decks around pools:

- **Footing-** *(after holes are dug but before concrete is placed)*
- **Final-** after all work has been completed

Energy Code Requirements

1. A time clock (timer) shall be installed so the pump can be set to run at off-peak electric demand period and can be set for minimum time necessary to maintain the water in a clear and sanitary condition. (SEE ATTACHED IECC 504.7.2)
2. Pools Equipped with a heater shall be equipped with a pool cover to minimize heat loss during time of non-use. (SEE ATTACHED IECC 504.7.3)

Electric Code Requirements

1. Required receptacle, Location. Where a 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 ft) from, and not more than 6.0 m (20 ft) from, the inside wall of the pool. This receptacle shall be located not more than 2.0 m (6 ft 6 in) above the floor, platform, or grade level serving the pool.
2. Cord-and-Plug Connections. Pool-associated motors shall be permitted to employ cord-and-plug connections. The flexible cord shall not exceed 900 mm (3 ft) in length. The flexible cord shall include a copper equipment grounding conductor sized in accordance with 250.122 but not smaller than 12 AWG. The cord shall terminate in a grounding-type attachment plug.
3. The following items shall be bonded:
 - A. All metal parts of the pool structure, including the reinforcing metal of the pool shell, coping stones and deck.
 - B. All forming shells.
 - C. All metal fittings within or attached to the pool structure.
 - D. Metal parts of electric equipment associated with the pool water circulating system.
 - E. Metal conduit, metal piping and all fixed parts that are within 5 feet of the inside walls of the pool and that are not separated from the pool by a permanent barrier. (Article 680.26)
 - F. These parts shall be connected to a common bonding grid with a solid copper conductor, insulated, covered and green in color, not smaller than a No. 8. Connection shall be made by pressure connectors or clamps of brass, copper or copper alloy.

G. Pool water must be bonded in 9 in² of surface area. (Article 680.26 C)

4. The minimum burial depth for non-metallic conduit shall be 18''.

****THE REQUIREMENTS LISTED ABOVE ARE BASIC REQUIREMENTS FOR SIMPLE POOLS,
ADDITIONAL RULES MAY APPLY TO MORE COMPLICATED INSTALLATIONS****

504.5 Pipe insulation. For automatic-circulating hot water systems, piping shall be insulated with 1 inch (25 mm) of insulation having a conductivity not exceeding 0.27 Btu per inch/h \times ft² \times °F (1.53 W per 25 mm/m² \times K). The first 8 feet (2438 mm) of piping in noncirculating systems served by equipment without integral heat traps shall be insulated with 0.5 inch (12.7 mm) of material having a conductivity not exceeding 0.27 Btu per inch/h \times ft² \times °F (1.53 W per 25 mm/m² \times K).

504.6 Hot water system controls. Automatic-circulating hot water system pumps or heat trace shall be arranged to be conveniently turned off automatically or manually when the hot water system is not in operation.

504.7 Pools. Pools shall be provided with energy conserving measures in accordance with Sections 504.7.1 through 504.7.3.

504.7.1 Pool heaters. All pool heaters shall be equipped with a readily accessible on-off switch to allow shutting off the heater without adjusting the thermostat setting. Pool heaters fired by natural gas or LPG shall not have continuously burning pilot lights.

* **504.7.2 Time switches.** Time switches that can automatically turn off and on heaters and pumps according to a preset schedule shall be installed on swimming pool heaters and pumps.

Exceptions:

1. Where public health standards require 24-hour pump operation.
2. Where pumps are required to operate solar-and waste-heat-recovery pool heating systems.

* **504.7.3 Pool covers.** Heated pools shall be equipped with a vapor retardant pool cover on or at the water surface. Pools heated to more than 90°F (32°C) shall have a pool cover with a minimum insulation value of R-12.

Exception: Pools deriving over 60 percent of the energy for heating from site-recovered energy or solar energy source.

**SECTION 505
ELECTRICAL POWER AND LIGHTING SYSTEMS
(Mandatory)**

505.1 General (Mandatory). This section covers lighting system controls, the connection of ballasts, the maximum lighting power for interior applications and minimum acceptable lighting equipment for exterior applications.

Exception: Lighting within dwelling units where 50 percent or more of the permanently installed interior light fixtures are fitted with high-efficacy lamps.

505.2 Lighting controls (Mandatory). Lighting systems shall be provided with controls as required in Sections 505.2.1, 505.2.2, 505.2.3 and 505.2.4.

505.2.1 Interior lighting controls. Each area enclosed by walls or floor-to-ceiling partitions shall have at least one manual control for the lighting serving that area. The required controls shall be located within the area served by

the controls or be a remote switch that identifies the lights served and indicates their status.

Exceptions:

1. Areas designated as security or emergency areas that must be continuously lighted.
2. Lighting in stairways or corridors that are elements of the means of egress.

505.2.2 Additional controls. Each area that is required to have a manual control shall have additional controls that meet the requirements of Sections 505.2.2.1 and 505.2.2.2.

505.2.2.1 Light reduction controls. Each area that is required to have a manual control shall also allow the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern by at least 50 percent. Lighting reduction shall be achieved by one of the following or other approved method:

1. Controlling all lamps or luminaires;
2. Dual switching of alternate rows of luminaires, alternate luminaires or alternate lamps;
3. Switching the middle lamp luminaires independently of the outer lamps; or
4. Switching each luminaire or each lamp.

Exceptions:

1. Areas that have only one luminaire.
2. Areas that are controlled by an occupant-sensing device.
3. Corridors, storerooms, restrooms or public lobbies.
4. *Sleeping unit* (see Section 505.2.3).
5. Spaces that use less than 0.6 watts per square foot (6.5 W/m²).

505.2.2.2 Automatic lighting shutoff. Buildings larger than 5,000 square feet (465 m²) shall be equipped with an automatic control device to shut off lighting in those areas. This automatic control device shall function on either:

1. A scheduled basis, using time-of-day, with an independent program schedule that controls the interior lighting in areas that do not exceed 25,000 square feet (2323 m²) and are not more than one floor; or
2. An occupant sensor that shall turn lighting off within 30 minutes of an occupant leaving a space; or
3. A signal from another control or alarm system that indicates the area is unoccupied.

Exception: The following shall not require an automatic control device:

1. *Sleeping unit* (see Section 505.2.3).
2. Lighting in spaces where patient care is directly provided.

Equipotential Bonding Grid

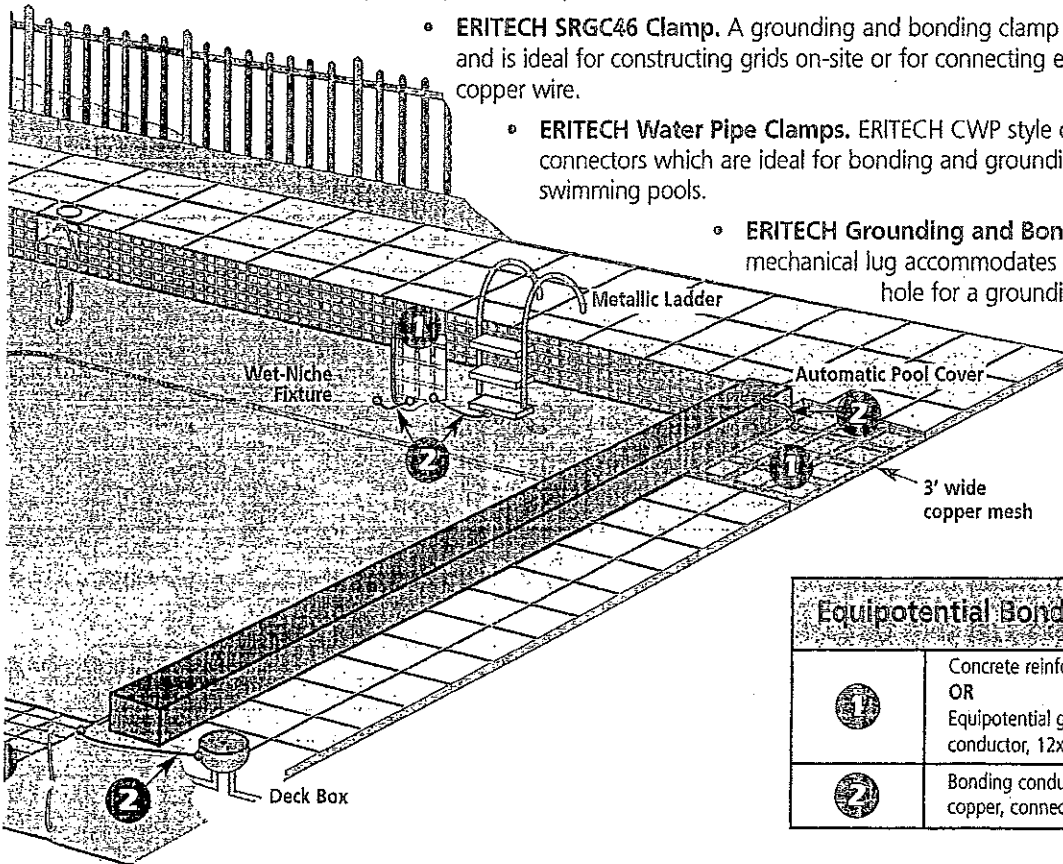
All of the bonded parts in or around the swimming pool must be attached to an equipotential bonding grid. This grid must extend 3' beyond the inside surface of the pool under concrete, stone or other paved walking surfaces. This grid can consist of the following:

- **Reinforcing Steel.** Uncoated reinforcing steel of a concrete pool (poured or sprayed, with painted or plaster coatings) can be used as the equipotential bonding grid.
- **Copper Grid.** A grid constructed with a minimum of #8 AWG bare solid copper conductors with 12" x 12" spacing.

Pools made of non-conductive materials (fiberglass composite, vinyl lined polymer or other non-conductive materials) do not require an equipotential grid that covers the full contour of the bottom and sides of the pool, however an equipotential grid is still required around the perimeter of the pool extending 3' beyond the sides of the pool.

EQUIPOTENTIAL BONDING SOLUTIONS FROM ERICO® INCLUDE THE FOLLOWING:

- **ERITECH® Prefabricated Mesh.** Convenient, efficient and economical for equipotential bonding grids. Prefabricated mesh is constructed with #8 AWG solid copper conductor with 12" x 12" spacing and is available in 3' x 100' rolls and other convenient sizes.
- **CADWELD® Welded Electrical Connections.** For connecting the bonding conductor to rebar and to the copper grid. CADWELD provides a permanent, low-resistance connection needed to create a long-lasting, reliable bonding network. CADWELD connections will not deteriorate with age, cannot loosen and are made with inexpensive, lightweight and portable equipment.
- **ERITECH® Direct-Burial Grounding Clamps.** EK16 / EK17 - a timesaving, cost-effective, versatile product that combines four clamps into one. The bronze-alloy clamp consolidates separate rebar clamps, ground rod clamps, water pipe clamps and direct-burial water pipe clamps into one product.
 - **ERITECH SRGC46 Clamp.** A grounding and bonding clamp that is UL® listed for direct burial in concrete and is ideal for constructing grids on-site or for connecting equipotential bonding mesh to #8 AWG copper wire.
 - **ERITECH Water Pipe Clamps.** ERITECH CWP style clamps are UL-approved mechanical connectors which are ideal for bonding and grounding the metallic pipes and conduit of swimming pools.
 - **ERITECH Grounding and Bonding Lug.** The EL4 bronze single hole mechanical lug accommodates a #8 AWG solid conductor and has a 1/4" hole for a grounding stud.



Equipotential Bonding	
①	Concrete reinforcing steel per NEC 680.26 (B)(1) OR Equipotential grid, #8 AWG or larger solid copper conductor, 12x12 spacing per NEC 680.26(C)(3)
②	Bonding conductor, #8 AWG or larger solid copper, connected per NEC 250.8

ERTECH® EQUIPOTENTIAL BONDING

Equipotential Bonding of Permanently Installed Swimming Pools

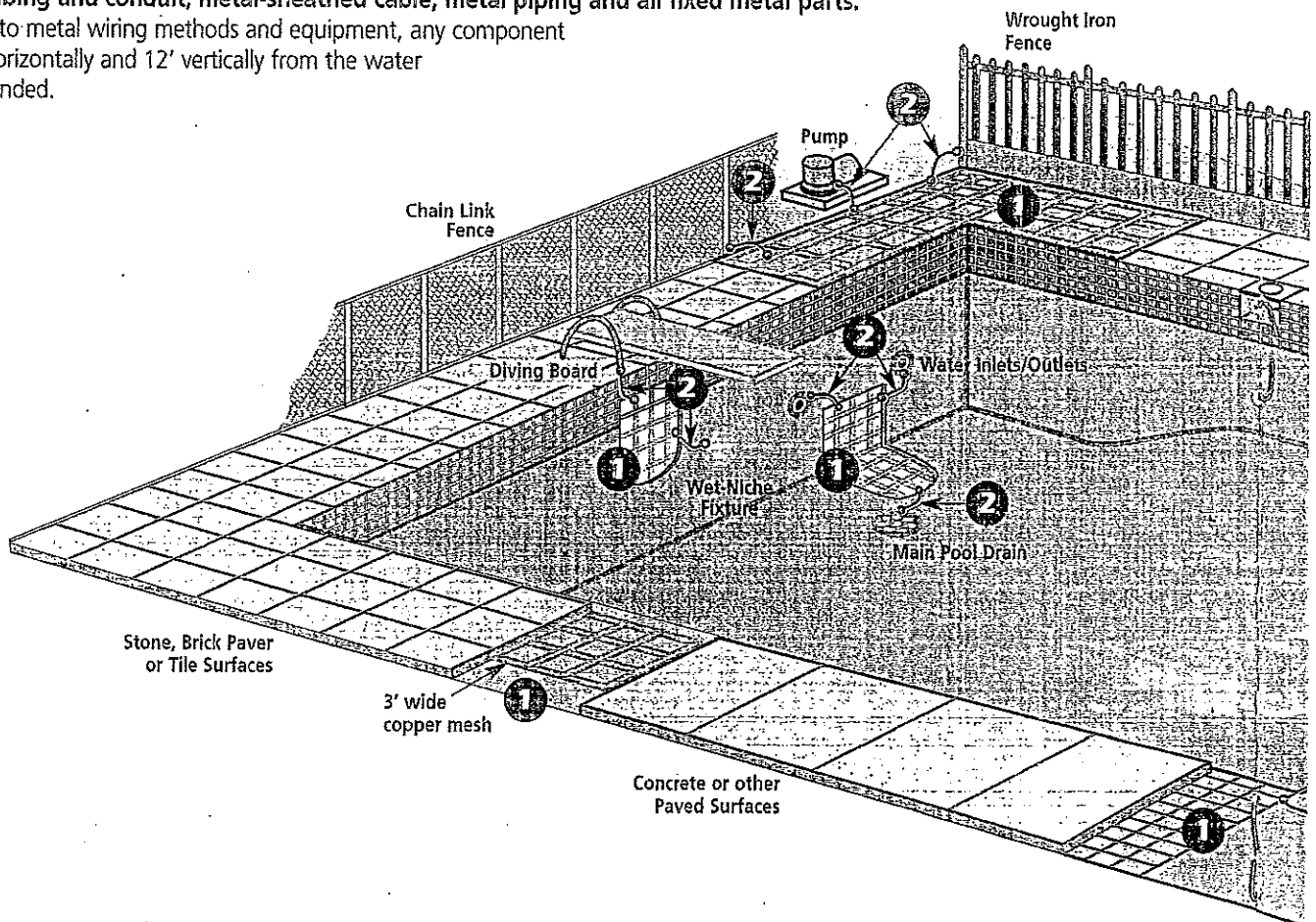
The requirements for bonding and grounding permanently installed indoor and outdoor swimming pools are provided in Article 680 "Swimming Pools, Fountains and Similar Installations" of the 2005 Edition of the National Electrical Code (NEC®).

What is Equipotential Bonding?

Article 680.26 details the bonding requirements for permanently installed swimming pools in order to "eliminate voltage gradients in the pool area as prescribed." Bonding the metallic parts in and around the pool area prevents differences of potential from developing in the event of an electrical equipment fault and reduces the possibility of electric shock. The area created by bonding the metallic parts together is known as an equipotential plane.

The NEC requires bonding all of the following metallic parts in a permanently installed swimming pool with a #8 AWG solid or larger conductor.

- **Concrete reinforcing steel and all metallic structural components.** Uncoated reinforcing steel and all other metallic structures.
- **Underwater lighting.** All metallic parts (housings and mounting brackets).
- **Metal fittings.** Metal fittings for pipes, drains and water inlets.
- **Electrical equipment.** All metal parts of any electrical equipment associated with the pool including pumps and recirculating equipment, heaters and blowers and automatic covers.
- **Metallic tubing and conduit, metal-sheathed cable, metal piping and all fixed metal parts.** In addition to metal wiring methods and equipment, any component within 5' horizontally and 12' vertically from the water must be bonded.



ERITECH® EQUIPOTENTIAL BONDING

Pool Grounding - Parts List

ERITECH® Prefabricated Mesh

POOLMESH350 #8 copper wire, 12" x 12" mesh, 3' wide, 50' long
 POOLMESH3100 #8 copper wire, 12" x 12" mesh, 3' wide, 100' long



ERITECH Direct-Burial Grounding Clamps

EK16 & EK17 direct burial ground clamps. #10 to #2 conductor. Use on pipe up to 1", ground rods up to 1", rebar #4 to #8

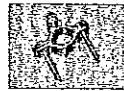


SRGC46 grid connector #10 - 4 solid or stranded wire



ERITECH Split Bolts & Water Pipe Clamps

CWP2JU bronze pipe clamp 1-1/4" to 2" pipe, #10 - 2



ESB8 bronze split bolt #8 to #14



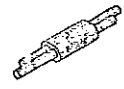
ERITECH Grounding and Bonding Lugs

EL4 bronze mechanical lug #14 solid to #4 stranded



CADWELD® Copper Wire Mesh CADWELD Molds

PGT08CU CADWELD mold with frame #8 solid copper mesh
 requires #15 F20 CADWELD welding material



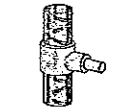
CADWELD Horizontal Rebar CADWELD Molds

RRA521D CADWELD mold with frame #8 solid to #4 rebar, requires #25 F20 welding material and B143A packing
 RRC511D CADWELD mold for #8 solid to #3 rebar, requires #25 F20 welding material and L160 handle clamp



CADWELD Vertical Rebar CADWELD Molds

RJC521D CADWELD mold for #8 solid wire with B1331K sleeve to #4 rebar, requires #45 F20 welding material and B140A packing, & L160 handle
 RJC511D CADWELD mold for #8 solid wire with B1331K sleeve to #3 rebar, requires #45 F20 welding material and B140A packing, & L160 handle



CADWELD Vertical Pipe or Fence Post CADWELD Mold

VSC1DV3C #8 solid copper with B1331K sleeve to 1-1/2" to 4" pipe
 requires #45 F20 welding material & B160V pipe chain support clamp



CADWELD Cable to Lug CADWELD Mold

GLCCE1D #8 solid with B1331K sleeve to 1/8" x 1" type GL lug
 #32 F20 welding material, L160 handle clamp



CADWELD Type GL Lug

B121CE 1/8" x 1" tin plated lug with one 9/16" diameter hole



NEC is a registered trademark of, and the National Electric Code (NEC) standard is a copyright of the National Fire Protection Association.
 UL is a registered trademark of Underwriters Laboratories, Inc.

(A) **Wiring Methods.** Feeders shall be installed in rigid metal conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, rigid polyvinyl chloride conduit, or reinforced thermosetting resin conduit. Electrical metallic tubing shall be permitted where installed on or within a building, and electrical nonmetallic tubing shall be permitted where installed within a building. Aluminum conduits shall not be permitted in the pool area where subject to corrosion.

Exception: An existing feeder between an existing remote panelboard and service equipment shall be permitted to run in flexible metal conduit or an approved cable assembly that includes an equipment grounding conductor within its outer sheath. The equipment grounding conductor shall comply with 250.24(A)(5).

(B) **Grounding.** An equipment grounding conductor shall be installed with the feeder conductors between the grounding terminal of the pool equipment panelboard and the grounding terminal of the applicable service equipment or source of a separately derived system. For other than (1) existing feeders covered in 680.25(A), Exception, or (2) feeders to separate buildings that do not utilize an insulated equipment grounding conductor in accordance with 680.25(B)(2), this equipment grounding conductor shall be insulated.

(1) **Size.** This conductor shall be sized in accordance with 250.122 but not smaller than 12 AWG. On separately derived systems, this conductor shall be sized in accordance with Table 250.66 but not smaller than 8 AWG.

(2) **Separate Buildings.** A feeder to a separate building or structure shall be permitted to supply swimming pool equipment branch circuits, or feeders supplying swimming pool equipment branch circuits, if the grounding arrangements in the separate building meet the requirements in 250.32(B)(1). Where installed in other than existing feeders covered in 680.25(A), Exception, a separate equipment grounding conductor shall be an insulated conductor.

680.26 Equipotential Bonding.

(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 shells 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 all be considered conductive materials due to water permeability and porosity. Vinyl liners and fiberglass composite shells shall be considered to be nonconductive 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 extend for 1 m (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 luminaires 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 8 AWG 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 1.5 m (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 observation stands, towers, or platforms, or any diving structures, shall not be required to be bonded.

(C) Pool Water. An intentional bond of a minimum conductive surface area of 5806 mm² (9 in.²) 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).

End

680.27 Specialized Pool Equipment.

(A) Underwater Audio Equipment. All underwater audio equipment shall be identified for the purpose.

(1) Speakers. Each speaker shall be mounted in an approved metal forming shell, the front of which is enclosed by a captive metal screen, or equivalent, that is bonded to, and secured to, the forming shell by a positive locking device that ensures a low-resistance contact and requires a tool to open for installation or servicing of the speaker. The forming shell shall be installed in a recess in the wall or floor of the pool.

(2) Wiring Methods. Rigid metal conduit of brass or other identified corrosion-resistant metal, liquidtight flexible non-metallic conduit (LFNC-B), rigid polyvinyl chloride conduit, or reinforced thermosetting resin conduit shall extend from the forming shell to a listed junction box or other enclosure as provided in 680.24. Where rigid polyvinyl chloride conduit, reinforced thermosetting resin conduit, or liquidtight flexible nonmetallic conduit is used, an 8 AWG insulated solid or stranded copper bonding jumper shall be installed in this conduit. The bonding jumper shall be terminated in the forming shell and the junction box. The termination of the 8 AWG bonding jumper in the forming shell shall be covered with, or encapsulated in, a listed potting compound to protect such connection from the possible deteriorating effect of pool water.

(3) Forming Shell and Metal Screen. The forming shell and metal screen shall be of brass or other approved corrosion-resistant metal. All forming shells shall include provisions for terminating an 8 AWG copper conductor.

(B) Electrically Operated Pool Covers.

(1) Motors and Controllers. The electric motors, controllers, and wiring shall be located not less than 1.5 m (5 ft) from the inside wall of the pool unless separated from the pool by a wall, cover, or other permanent barrier. Electric motors installed below grade level shall be of the totally enclosed type. The device that controls the operation of the motor for an electrically operated pool cover shall be located such that the operator has full view of the pool.

FPN No. 1: For cabinets installed in damp and wet locations, see 312.2.

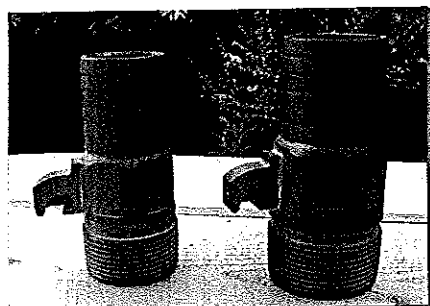
FPN No. 2: For switches or circuit breakers installed in wet locations, see 404.4.

FPN No. 3: For protection against liquids, see 430.11.



Swim safely in your pool

There are many things to think about when it comes to your swimming pool, getting shocked shouldn't be one of them.



Model: PBB125
1 1/4 male NPT
x 1 1/4 hose barb

Model: PBB150
1 1/2 male NPT
x 1 1/2 hose barb

E341154  LISTED
Patent Pending

That is precisely why the Papageorge Bonding Barb was developed – to bond pool water in accordance with the National Electrical Code (NEC) 680.26(C). The bonding barb is the most affordable, safe, easy to install

and maintain product made for this application.

The NEC Code 680.26(C) states "Pool water shall have an electrical connection to one or more of the bonded parts described in 680.26(B).

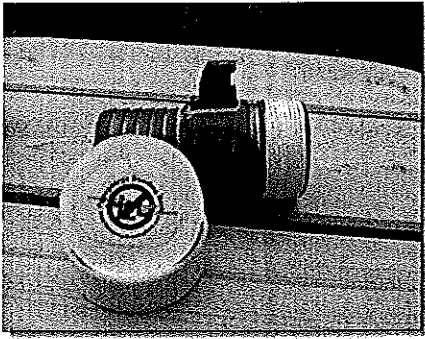
Where none of the bonded parts is in direct connection with the pool water, the pool water shall be in direct contact with an approved corrosion-resistant conductive surface that exposes not less than 5800 mm² (9 in²) of surface area to the pool water at all times. The conductive surface shall be located 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)."

Depending upon your plumbing needs, the Papageorge Bonding Barb is available in two sizes; the 1 1/2" and 1 1/4" models.

Everyone knows water and electricity don't play well together and isn't your family's safety worth taking care of today?



Installation Instructions for the Papageorge Bonding Barb



The Bonding Barb comes with everything required to install including the teflon tape. The easy to follow instructions allow the electrician to install the Bonding Barb in minutes.

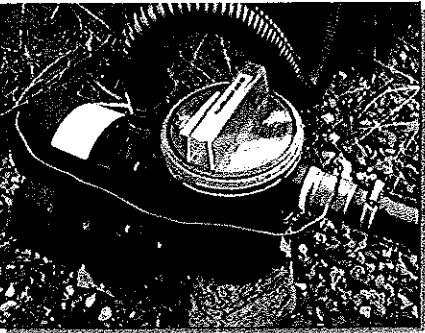
Once installed, the Barb is connected to the pre-installed bonding wire to complete the pool bonding. During the off-season the owner can easily disconnect bond wire and water hose to allow for easy and safe storage; leaving the Bonding Barb attached to the pump. Reassembly is just as simple and ensures that the owner has a safe, compliant system.



Before installation be sure to review and comply with the National Electrical Code (NEC) and all state/local requirements.

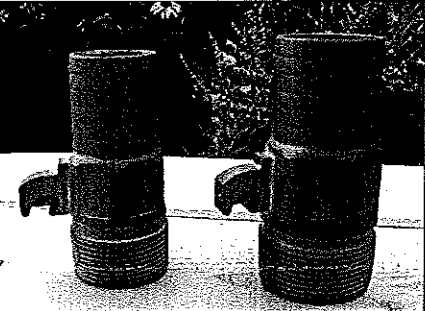
Installation Instructions

- Locate Bonding Barb as close as possible to pool and/or pump.
- Use the included teflon tape on the threaded end of the bonding barb.
- Install in a location that ensures that Bonding Barb will be completely filled with water. A flooded Bonding Barb is required for a properly bonded system. A typical installation has the Bonding Barb installed on the inlet to the circulation pump.
- Bond the Bonding Barb in accordance with the NEC and all state/local requirements; paying particular attention to ensure that properly sized bonding conductor is utilized.



Disassemble & Reassemble Instructions

- During the off-season the owner can easily disconnect bond wire and water hose to allow for easy and safe storage; leaving the Bonding Barb attached to the pump. Alternatively the Bonding Barb can be completely removed from the pump for separate storage.
- Reassembly requires the pool hose to be reconnected to the barb end of the fitting and the bonding wire attached to the ground lug. If the fitting was completely removed for the off-season owner should remove old teflon tape from threaded end and apply new teflon tape before mounting fitting.



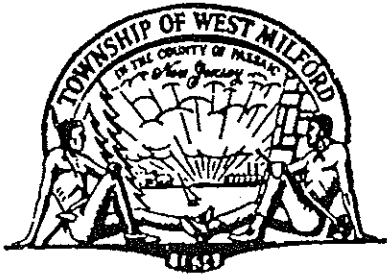
Model: PBB125 Model: PBB150
 1¼ male NPT 1½ male NPT
 x 1¼ hose barb x 1½ hose barb

E341154  LISTED
 Patent Pending

Below is a torque table depending upon the wire gauge which is required by your local authority:

Wire Gauge	Torque
12-10 AWG	20 lb-in
8 AWG	25 lb-in
6-4 AWG	35 lb-in





Township Of West Milford

DEPARTMENT
OF BUILDING SAFETY

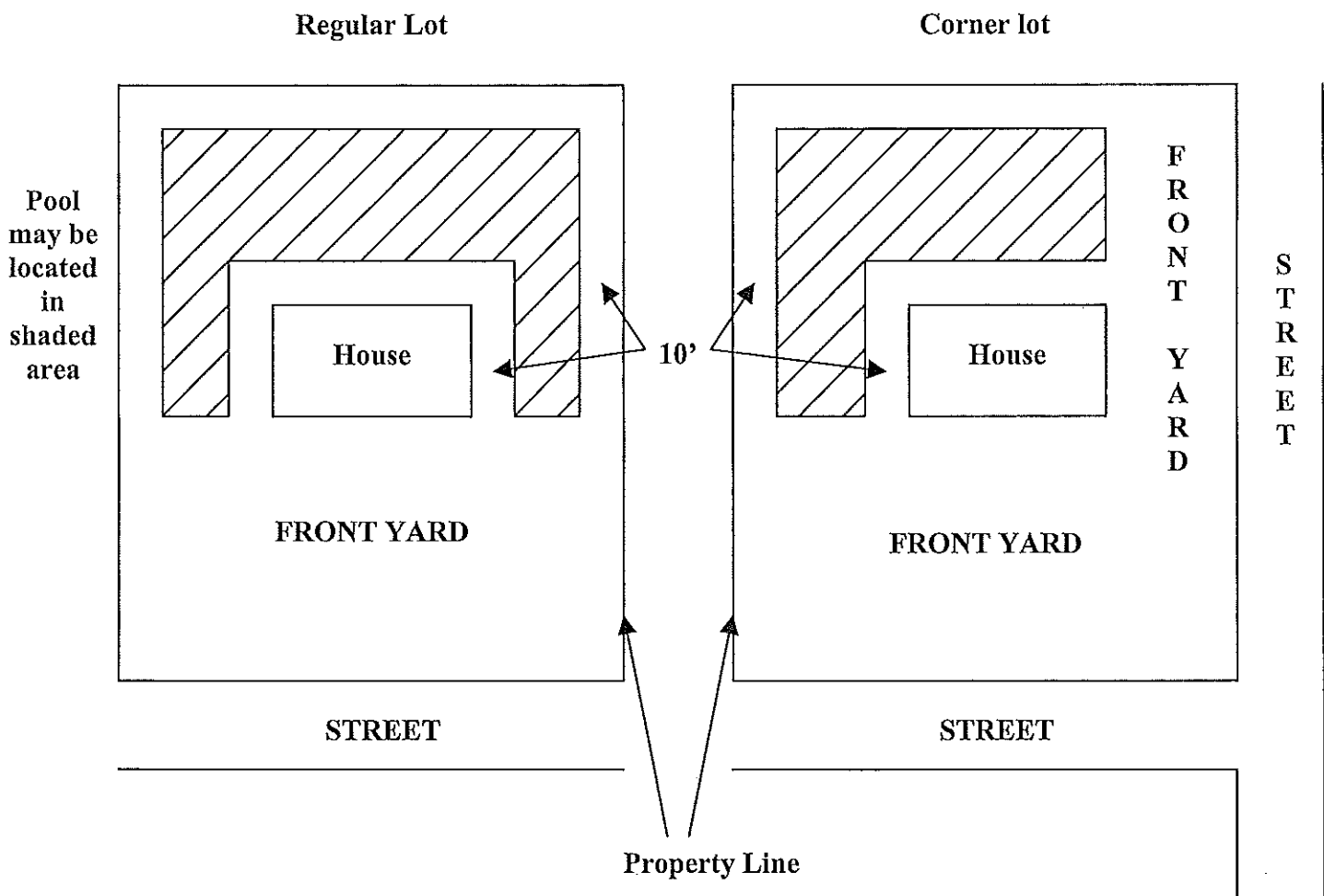
1480 Union Valley Road • West Milford, NJ 07480 • Tel:(973) 728-2780 • Fax: (973) 728-2843

Pool Zoning Information

Prior to purchasing your new pool, it would be suggested that you bring in a survey of your property to determine if the pool location conforms to Zoning, or a Variance would be required.

- All pools are to be located in the rear or side yard. Note: If your property is located on a corner you have more than one front yard.
- The pool is to be located ten feet (10') from any structure.
- The pool is to be located ten feet (10') from all property lines

Allowable locations for pools



If you have any further questions, please contact the Zoning Officer at (973) 728-2759