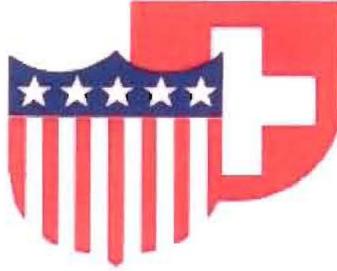
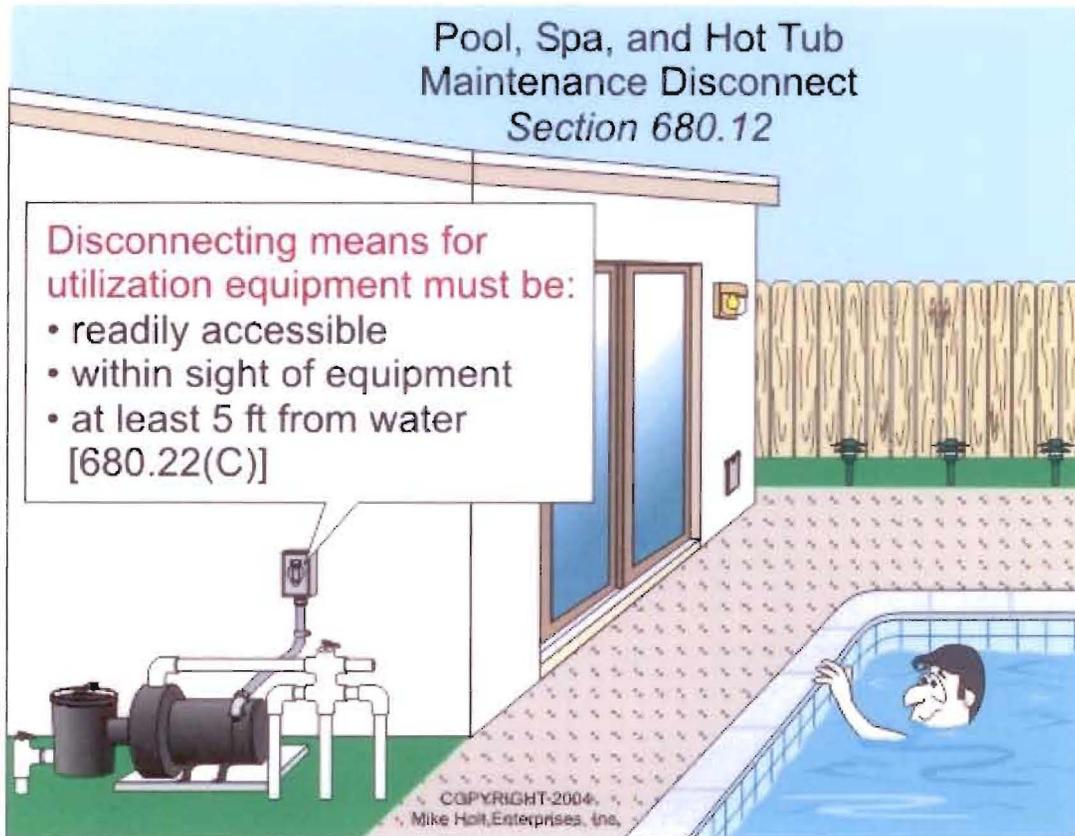


CITY OF HIGHLAND



INGROUND POOL
BONDING REQUIREMENTS
2005 NATIONAL ELECTRIC CODE



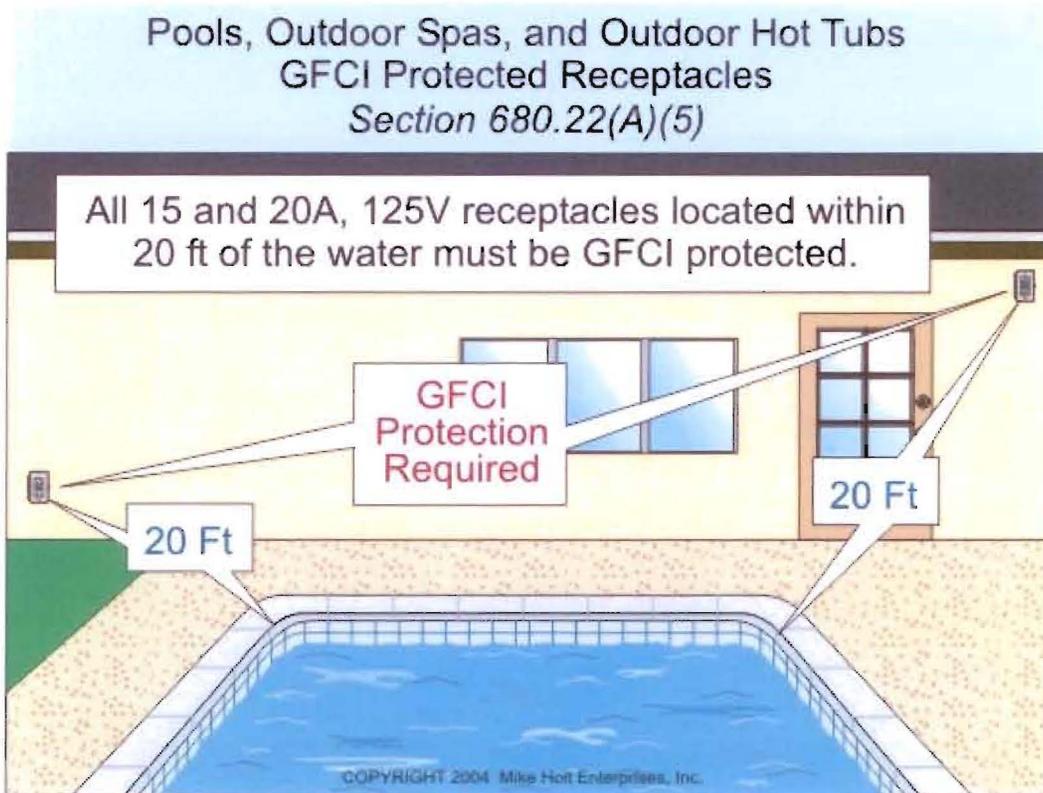


This rule was revised to clarify that the permanently installed pool, storable pool, outdoor spa and hot tub, or fountain equipment maintenance disconnecting means must now be “readily accessible.” The 2002 *NEC* only required the maintenance disconnect to be “accessible,” and within sight of the permanently installed pool, storable pool, outdoor spa and hot tub, or fountain equipment.

A maintenance disconnecting means is required for permanently installed pool, storable pool, outdoor spa, outdoor hot tub, or fountain equipment, other than lighting for these water bodies. The maintenance disconnecting means must be readily accessible and located within sight from the permanently installed pool, storable pool, outdoor spa, outdoor hot tub, or fountain equipment. Figure 680-1

Author’s Comment: Disconnects must be located not less than 5 ft horizontally from the inside walls of a permanently installed pool, storable pool, outdoor spa, outdoor hot tub, or fountain, unless separated by a solid fence, wall, or other permanent barrier [680.22(C)].

This material was extracted from Mike Holt Training Materials copyright 2011 by permission.
Visit www.NECCode.com or call 1.888.NEC.Code (632-2633) for more information.



Text added to clarify that GFCI protection is only required for 15 and 20A, 125V receptacles located within 20 ft of the inside walls of a permanently installed pool, outdoor spa, and outdoor hot tub.

(A) Receptacles.

(5) GFCI Protected Receptacles. All 15 and 20A, 125V receptacles located within 20 ft of the inside walls of the permanently installed pool, outdoor spa, and outdoor hot tub water must be GFCI protected. Figure 680-2

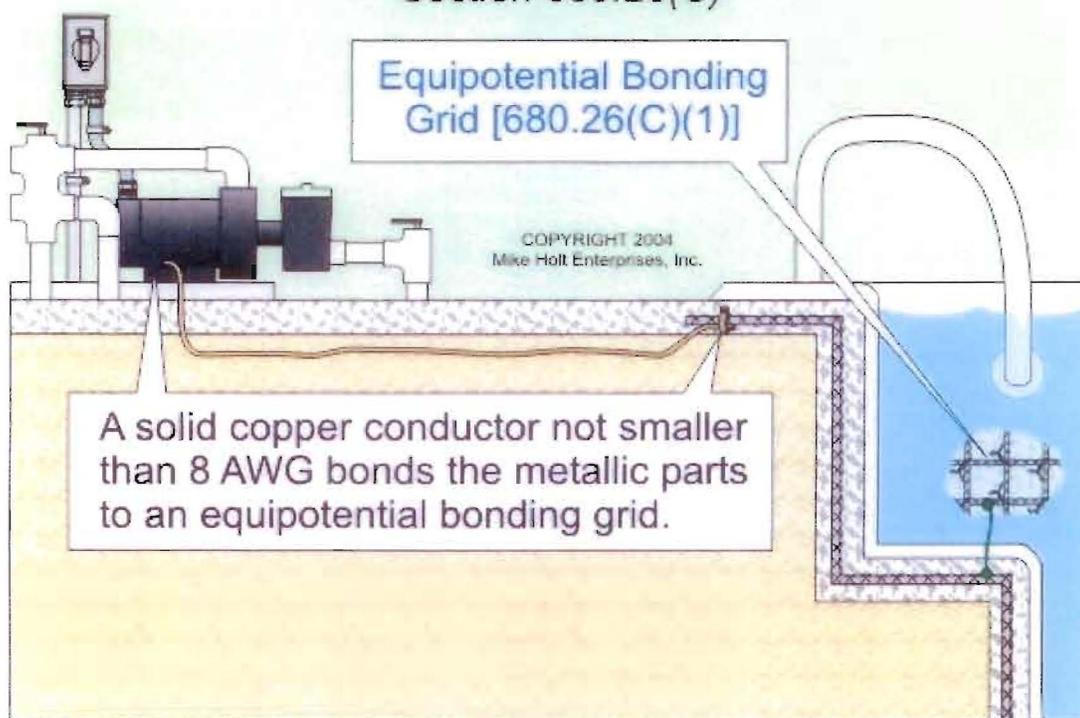
Author's Comment: All outdoor dwelling-unit receptacles must be GFCI-protected, regardless of the distance from a permanently installed pool, outdoor spa, and outdoor hot tub [210.8(A)(3)]. In addition, all 15 and 20A, 125V receptacles for nondwelling units located outdoors with public access or is accessible to the public require GFCI protection [210.8(B)(4)].

All receptacles rated 15 or 20A, 125V through 250V for permanently installed pool, outdoor spa, and outdoor hot tub supplying cord-and-plug connected pump motors must be GFCI protected. Figure 680-3

Author's Comment: The 2002 *NEC* required GFCI protection for receptacles rated 120V through 240V. Since receptacles are rated 125V through 250V, this rule did not apply to 250V rated receptacles!

This material was extracted from Mike Holt Training Materials copyright 2011 by permission.
 Visit www.NECCode.com or call 1.888.NEC.Code (632-2633) for more information.

Pools, Outdoor Spas, and Outdoor Hot Tubs Equipotential Bonding Grid Section 680.26(C)



Equipotential grid now required in or under the permanently installed pool, outdoor spa, and outdoor hot tub deck to help mask stray voltage from utility wiring errors, deteriorating primary utility neutral conductors, ground faults that have not cleared, as well as appliance and equipment leakage current.

(C) Equipotential Grid. A solid copper conductor not smaller than 8 AWG must be used to bond the metallic parts of a permanently installed pool, outdoor spa, and outdoor hot tub as specified in 680.26(B) to an equipotential grid. The termination of the bonding conductor must be made by exothermic welding, listed pressure connectors, or listed clamps that are suitable for the purpose. Figure 680-5

To properly mask stray voltage, an equipotential grid must extend under the permanently installed pool, outdoor spa, and outdoor hot tub, and walking surfaces for 3 ft horizontally from the water. The equipotential grid must be formed from one or more of the following: Figure 680-6

(1) Structural Reinforcing Steel. Structural reinforcing steel of the concrete permanently installed pool, outdoor spa, and outdoor hot tub.

(2) Bolted or Welded Metal Pools. The walls of a bolted or welded metal permanently installed pool, outdoor spa, and outdoor hot tub.

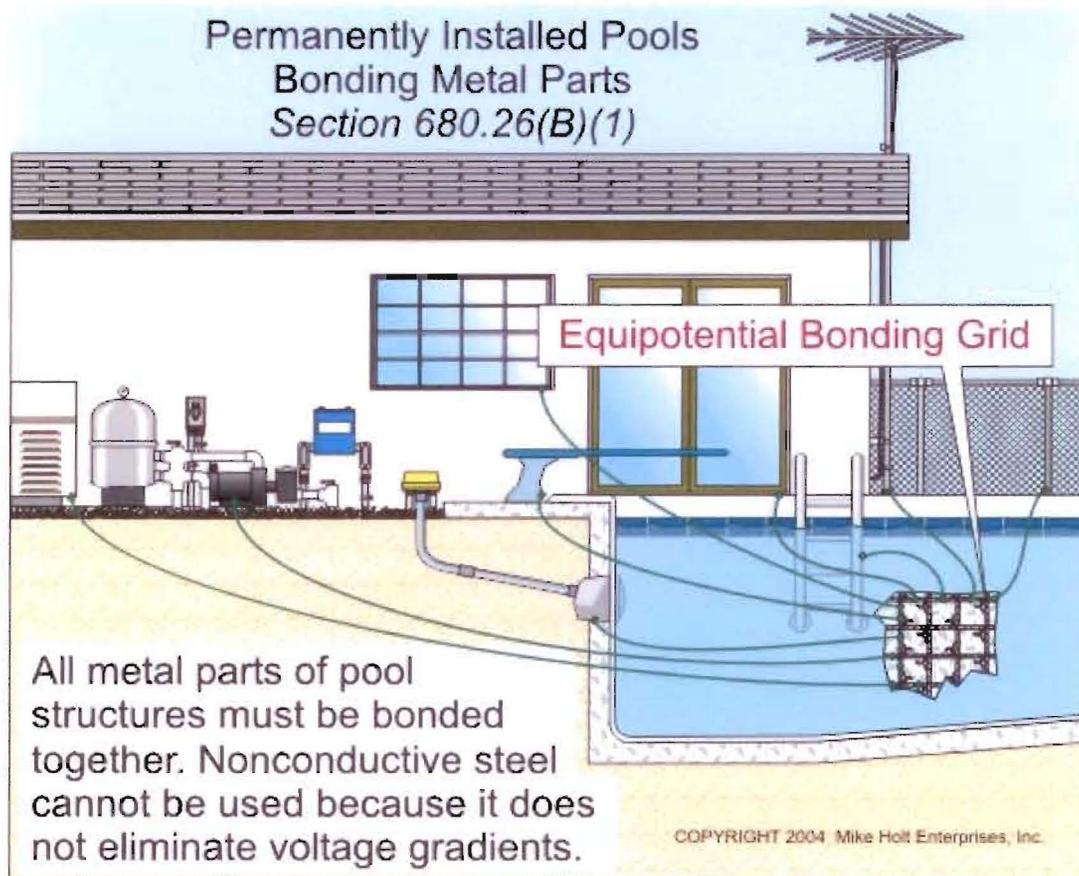
(3) Other Methods. The equipotential grid can be constructed as specified in (a) through (c).

(a) Materials and Connections. The equipotential grid can be constructed with 8 AWG bare solid copper conductors that are bonded to each other at all points of crossing.

(b) Grid. The equipotential grid must cover the contour of the permanently installed pool, outdoor spa, and outdoor hot tub, and deck extending 3 ft horizontally from the water. The equipotential grid must be arranged in a 1 ft x 1 ft network of conductors in a uniformly spaced perpendicular grid pattern

with a tolerance of 4 in.

(c) Securing. The equipotential grid must be secured.



Change requires an equipotential bonding grid be installed to reduce voltage gradients in and around permanently installed pools, outdoor spas, and outdoor hot tubs.

(B) Bonded Parts. The following parts of a permanently installed pool, outdoor spa, and outdoor hot tub must be bonded to a equipotential bonding grid of the type specified in 680.26(C).

Author's Comment: See 680.42(B) for the bonding methods permitted for outdoor spas and hot tubs.

(1) **Metallic Parts of Structure.** All metallic parts of the water structure, including the reinforcing metal of the permanently installed pool, outdoor spa, and outdoor hot tub shell and deck, must be bonded to the equipotential grid. The usual steel tie wires are considered suitable for bonding the reinforcing steel together for this purpose. Welding or special clamping is not required, but the tie wires must be made tight. Figure 680-4

Where the reinforcing steel of the permanently installed pool, outdoor spa, and outdoor hot tub shell and deck are encapsulated with a nonconductive compound or if it's not available, an equipotential grid constructed in accordance with 680.26(C) must be installed to mask stray voltage gradients.

(2) **Underwater Lighting.** All metal forming shells for underwater permanently installed pool, outdoor spa, and outdoor hot tub luminaires and speakers.
 (3) **Metal Fittings.** Metal fittings within or attached to the permanently installed pool, outdoor spa, and outdoor hot tub structure, such as ladders and handrails.

(4) Electrical Equipment. Metal parts of electrical equipment associated with the permanently installed pool, outdoor spa, and outdoor hot tub water circulating system, such as water heaters and pump motors. Accessible metal parts of listed equipment incorporating a system of double insulation and providing a means for grounding internal metal parts are not required to be directly bonded to the equipotential grid.

(5) Metal Wiring Methods and Equipment. Metal-sheathed cables and raceways, metal piping, and all fixed metal parts, as well as metallic surfaces of electrical equipment, must be bonded to the equipotential grid if located:

(1) Within 5 ft horizontally of the inside walls of the permanently installed pool, outdoor spa, and outdoor hot tub, and

(2) Within 12 ft measured vertically above the maximum water level of the permanently installed pool, outdoor spa, and outdoor hot tub, or any observation stands, towers, or platforms or any diving structures.

This material was extracted from Mike Holt Training Materials copyright 2011 by permission.

Visit www.NECCode.com or call 1.888.NEC.Code (632-2633) for more information.