

## Chapter E 680

## SWIMMING POOLS

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**E 680.01 Scope.** The provisions of this chapter apply to the construction and installation of electric wiring for equipment in or adjacent to swimming, wading, physical therapy and similar pools, to metallic appurtenances in or within 5 feet of the pool, and to the auxiliary equipment such as pumps, filters and similar equipment. No electric appliances or wiring shall be installed in the water or in the enclosing walls of a swimming, wading, physical therapy or similar pool, except as provided for in this chapter. Movable pools need not comply with the requirements of this chapter.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 680.02 Approval of equipment.** All equipment shall be approved for the purpose.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 680.03 Application of other chapters.** Except as modified by this chapter, wiring and equipment in or adjacent to swimming pools shall comply with the applicable requirements of Wis. Adm. Code chapters E 100 to E 400, inclusive.

**Note:** See chapter E 720 for low voltage lighting.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 680.04 Wiring method and lighting.** (1) All wiring supplying pool lighting boxes shall be in threaded rigid metal conduit and all boxes, fittings and joints shall be threaded for connection to the conduit. The provisions of the following subsections apply to lighting fixtures installed below the pool surface.

(2) No lighting fixture shall be installed for operation at more than 150 volts.

(3) A nonmetallic fixture shall not be used with a grounded power supply.

(4) All noncurrent carrying metal parts of lighting fixtures shall be grounded whether exposed or enclosed in nonconducting materials. The fixture shall be secured and grounded to the forming shell by a positive locking device which will assure a low resistance contact and which will require a tool to remove the fixture from the forming shell.

(a) **Definition.** A forming shell is a metal housing designed to contain a lighting fixture assembly for mounting into a swimming pool structure. The forming shell provides a bond between the raceway and the noncurrent carrying metal parts of the fixture.

(5) Fixtures approved for the purpose may be installed outside the walls of the pool in closed recesses which are adequately drained and accessible for maintenance.

(6) Approved metal fixture housings (forming shells) shall be installed for the mounting of all wet niche underwater fixtures and shall be equipped with provisions for threaded conduit entries. Metal parts of the fixtures and fixture housings in contact with the pool water and the supply conduit below grade level shall be of brass or other approved corrosion-resistant metal. The rigid conduit shall extend from the fixture housing (forming shell) to a suitable junction box located as provided in section E 680.05.

(7) Underwater lighting fixtures shall perform reliably under any likely combination of fault conditions so that there is no shock hazard. Compliance with this requirement shall be assured by one of the following:

- (a) The design and construction of the fixtures; or
- (b) The use of differential type circuit protection; or
- (c) The use of a transformer complying with section E 680.04 (8) and further provided with a ground detector if the circuit voltage is greater than 15 volts; or
- (d) Other acceptable means.

(8) Transformers used for the supply of fixtures, together with the transformer enclosure, shall be approved for the purpose. The transformers shall be a two-winding type having a grounded metal barrier between the primary and secondary voltage windings.

(9) Within the fixture the cord termination, all splices, and the ground connection shall be covered with a suitable compound to protect them from the deteriorating effect of exposure to pool water in the event of a failure causing water to enter the fixture.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 680.05 Junction boxes and transformer enclosures.** (1) Junction boxes installed on the supply side of conduits extending to underwater pool lights shall be provided with threaded hubs for conduit connection. These boxes shall be located not less than 8 inches above ground, pool deck, or maximum pool water level, whichever provides the greatest elevation, nor less than 4 feet from the perimeter of the pool unless part of an approved fixture assembly. Junction boxes mounted above the grade of the finished walkway around the pool shall not be located in the walkway unless afforded additional protection such as by location under diving boards, adjacent to fixed structures, and the like.

(2) Transformer enclosures shall be located not less than 12 inches above ground, pool deck, or maximum pool water level, whichever provides the greatest elevation, nor less than 4 feet from the perimeter of the pool. Transformer enclosures mounted above the grade of the finished walkway around the pool shall not be located in the walkway unless afforded additional protection such as by location under diving boards, adjacent to fixed structures, and the like.

(3) Boxes shall be provided with means for independently terminating not less than two grounding conductors.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 680.06 Attachment plug receptacles.** No attachment plug receptacles shall be installed within 10 feet of the inside walls of the swimming pool.

(1) **EXCEPTION.** Attachment plug receptacles of other than the standard 15 ampere parallel slot type may be installed where an integral part of the lighting fixture assembly and where used for the installation, maintenance, or servicing of the fixture.

*Note:* In determining the 10-foot dimension, the distance to be measured is the shortest path which the supply cord of an appliance connected to the receptacle would follow without piercing a building floor, wall or ceiling.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 680.07 Grounding.** (1) All metallic conduit, piping systems, pool reinforcing steel, lighting fixtures, lighting fixture housings, metal parts of ladders, diving boards and their supports and the like shall be bonded together and grounded to a common ground. The bonding conductor shall be not smaller than No. 8 copper.

(a) *Exception:* The usual steel tie wires are considered suitable for bonding the reinforcing steel together and welding or special clamping will not be required.

(2) An unbroken No. 12 AWG, or larger, insulated copper wire shall be provided for a grounding conductor from the junction box to the distribution panel ground. This conductor shall be installed in rigid metallic conduit with the circuit conductors from the pool junction box to the distribution panel ground terminal.

(3) Metallic raceways shall not be depended upon for grounding. Where exposed to pool water and in other corrosive areas such as in pump houses or adjacent to water treating and other equipment, the grounding of the noncurrent carrying parts shall be by means of an insulated copper conductor sized in accordance with section E 250.095 and not smaller than No. 12 AWG.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 680.08 Methods of grounding and bonding.** (1) Metal wiring enclosures shall be grounded in accordance with chapter E 250, in addition to other requirements of this chapter.

(2) In addition to other requirements of this chapter, lighting fixtures that are supplied by flexible cord or cable shall have all metal parts grounded by means of an insulated grounding conductor that is an integral part of the cord or cable. This grounding conductor shall be connected to a grounding terminal in the supply junction box. This conductor shall be equal in size to the supply conductors but not smaller than No. 16 AWG.

(3) Nonelectrical equipment shall be grounded to a common ground in accordance with section E 680.07.

*Note:* Structural reinforcing steel may be used as a common bonding conductor for nonelectrical parts where connections can be made in accordance with section E 250.113.

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.

**E 680.09 Clearances.** A horizontal clearance of at least ten feet shall be maintained between service drops or other open overhead wiring, and swimming pools, diving structures, observation stands, towers or platforms.

*Note:* See section E 190.02 (1) (b).

**History:** Cr. Register, January, 1968, No. 145, eff. 2-1-68.