

SWIMMING POOLS, SPAS OR HOT TUBS

INFORMATION

PERMIT REQUIRED

A building permit is required from any person desiring to install a swimming pool, spa or hot tub.

The following conditions and requirements apply:

- Setbacks of at least 5' five feet are required from the property lines, except in Estate Zoned district it is 10' ten feet. Depending on the property location there are certain limitations to lot coverage area. This includes all improvements on the property.
- Cannot be located in any easement.
- The pool should not be placed over or under any electric lines.
- Above ground pools higher than 48 inches do not require a fence, but should have a removable/collapsible ladder.
- If the pool side is less than 48 inches from the ground or is an in ground pool; the pool or yard must be fenced and have self-closing/latching gates that open away from the pool and may be required to have alarms at the doors.
- Call J.U.L.I.E. AT 811.
- If the property is in an area having a Homeowner's Association, the property owner is obligated to check with the Homeowner's Association to ensure compliance with their regulations.
- Allowable hours for construction within the Village are 6:30 a.m. to 8:30 p.m. daily.
- Swimming pool, spa and hot tub permits are authorized on a case-by-case basis.

APPLICATION CHECKLIST

Applications for a swimming pool, spa and hot tub permit shall include the following items and information:

- a completed short-form permit application listing the contractor(s) performing the work;
- valid contractor registration with the Village of Sugar Grove;
- a copy of the contract with the property owner's signature;
- the plat of survey, drawn to scale showing the size, shape and location of the pool, as well as:
 - all existing and/or intended platforms, equipment, decks and fencing;
 - the location of the electric and trench including the disconnect, grounding and pump location;
 - the location of the gas and trench;
 - Describe the wiring method, depth, raceway and type and size of wire.
- PLEASE REFER TO THE ATTACHED NEC 2014 DRAWING FOR ABOVE GROUND POOLS.

CONTRACTOR REGISTRATION

Any contractor engaged in or having obligation to do work where the scope of work requires a building permit is required to be registered with the Village of Sugar Grove. If the contractor is not currently registered with the Village, a registration application can be obtained from the Building Division at 630.391.7220 or from the Village's website www.sugargroveil.gov

INSPECTIONS REQUIRED

A copy of the Swimming Pool Compliance Form completed by the installer must be submitted by the final inspection for any in-ground installation (pools, hot tub, spa, etc.).

Inspections may include: footing (with soil test), post holes for fence, underground gas & electric, pool bonding of ladder, lights and mesh, final fence and pool depending on the scope of construction. The owner/contractor is responsible for scheduling all required inspections. Please call 630.391.7220 to schedule the inspections. Please schedule the inspections by 3:30 PM THE DAY BEFORE you want it.

PLAN REVIEW

Please allow 10 (ten) working days for processing.

PERMIT FEE

- | | |
|---|--------------|
| • Above ground pool, spa or hot tub (does not include fence or gas) | \$245 |
| • In ground swimming pool (includes gas and fence) | \$460 |
| • Gas line | \$215 |
| • Spa or Hot Tub | \$245 |

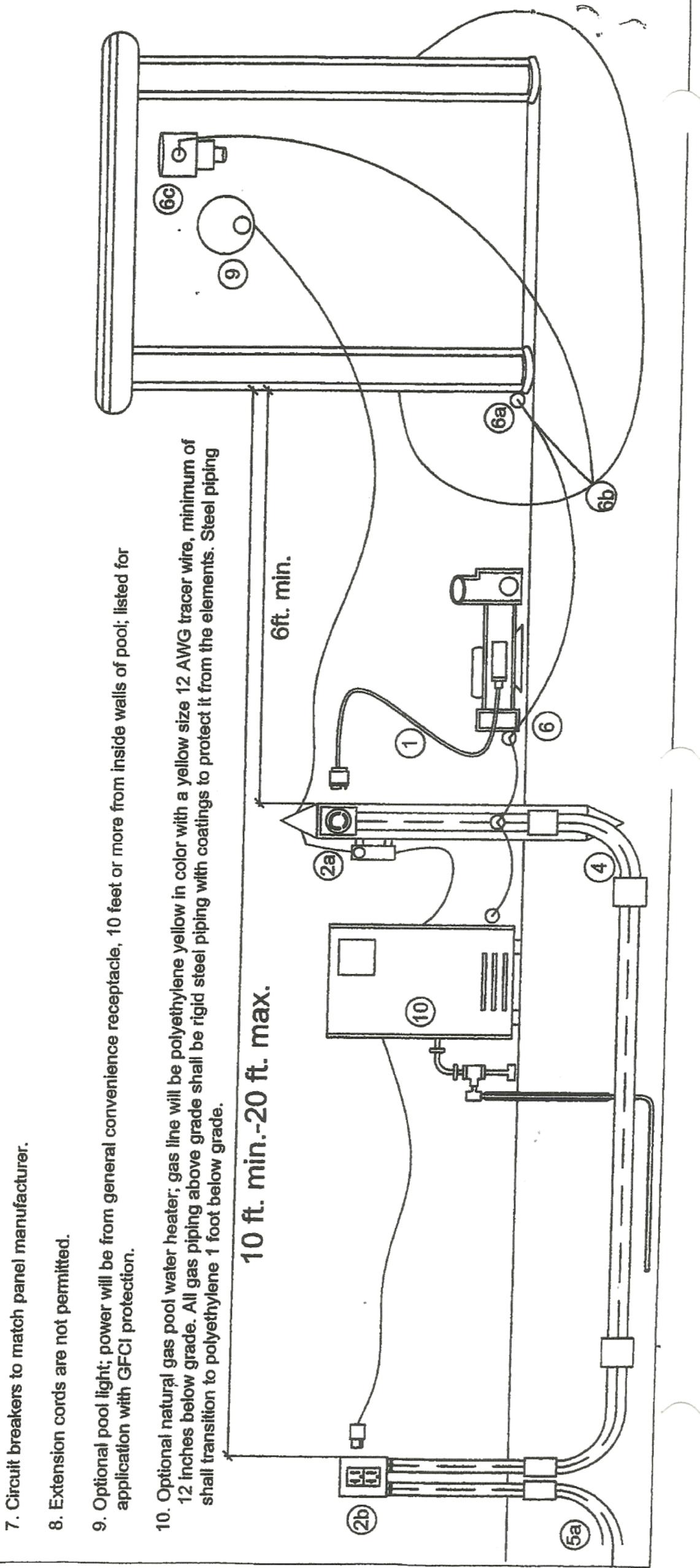
Additional fees may be charged if there is a grade change proposed or the proposed modification requires review and inspection by the Village Engineer.

The permit fee is paid when the permit is picked-up after the application has been approved.

NO WORK CAN BEGIN UNTIL THE PERMIT HAS BEEN ISSUED. WORK BEGUN PRIOR TO ISSUANCE OF THE PERMIT WILL INCUR A FINE, PENALTY OR BOTH.

BASIC ABOVE GROUND POOL ELECTRICAL REQUIREMENTS BASED ON NEC 2014 EDITION ARTICLE 680

1. Listed swimming pool pump motor with minimum 12/3 AWG cord not longer than 36 inches in length.
2. Receptacles on property shall be located a minimum of 10 feet from inside walls of pool. All receptacles within 20 feet shall be GFCI protected.
 - (a.) A GFCI protected receptacle of a single twist lock type would be permitted between 6 to 10 feet from inside wall of pool for pump use only.
 - (b.) A GFCI protected convenience receptacle shall be located a minimum of 10 feet and not more than 20 feet from inside walls of pool.
 - (c.) Boxes shall be supported and not rely on raceway pipes alone unless installed as at 2b below.
 - (d.) Receptacles shall be TR (Tamper Resistant), WR (Weather Resistant) as well as GFCI protected.
3. Listed wet location "In-Use" covers for all receptacles.
4. UNDERGROUND RACEWAYS
 - (a.) Intermediate metal conduit or rigid metal conduit, 6 inch minimum burial below grade.
 - (b.) Rigid non metallic conduit, Schedule 80, 18 inch minimum burial below grade with rigid or IMC elbows.
5. Branch circuit conductors shall be 20 amp rated, minimum, but sized to meet the equipment requirements.
 - (a.) An insulated copper equipment grounding conductor, green in color, shall be installed in any wiring method used, minimum size 12 AWG or as required by Table 250.122.
6. A solid 8 AWG copper equipotential bonding conductor to connect all pool equipment and all metal surfaces located within 5 feet horizontally of inside walls of pool.
 - (a.) Equipotential bonding connectors or "Lugs" to be suitable for the purpose and of stainless steel, brass, copper or copper alloy.
 - (b.) Perimeter surface bonding conductor (#8 SOLID COPPER) 18" to 24" from inside wall of pool, 4" to 6" below subgrade following contour of the pool, connected to metal pool frame at 4 equidistant points. sec.680.26(B)(2).
 - (c.) Pool water bond: sec. 680.26 (C); use NRTL listed kit at skimmer basket.
7. Circuit breakers to match panel manufacturer.
8. Extension cords are not permitted.
9. Optional pool light; power will be from general convenience receptacle, 10 feet or more from inside walls of pool; listed for application with GFCI protection.
10. Optional natural gas pool water heater; gas line will be polyethylene yellow in color with a yellow size 12 AWG tracer wire, minimum of 12 inches below grade. All gas piping above grade shall be rigid steel piping with coatings to protect it from the elements. Steel piping shall transition to polyethylene 1 foot below grade.



For Office Use Only
 Permit # _____
 Building Dept Approval: _____
 Fees: _____



601 HEARTLAND DRIVE
Sugar Grove, IL 60554
Phone 630-391-7220
Fax 630-391-7245
www.sugargroveil.gov
permits@sugargroveil.gov

BUILDING PERMIT APPLICATION
(FOR MINOR PERMITS; NOT NEW CONSTRUCTION)

Application Date: _____	Permit Type					
Value of Work: _____	Basement <input type="checkbox"/>	Deck <input type="checkbox"/>	Garage/ Shed <input type="checkbox"/>	Patio <input type="checkbox"/>	Screen Porch <input type="checkbox"/>	Window/ Door <input type="checkbox"/>
Square Footage: _____	Commercial Remodel <input type="checkbox"/>	Driveway <input type="checkbox"/>	Gazebo/ Pergola <input type="checkbox"/>	Pool <input type="checkbox"/>	Sign <input type="checkbox"/>	
	Decorative Brick <input type="checkbox"/>	Fence <input type="checkbox"/>	Irrigation <input type="checkbox"/>	Roof <input type="checkbox"/>	3 Season Room <input type="checkbox"/>	Other <input type="checkbox"/>
Start Date _____	End Date _____					
Description of Work: _____ _____ _____						
Property Information						
Address _____		Lot _____	Subdivision _____		Parcel Number _____	
Property Owner Name _____		Email Address _____			Phone _____	
Property Owner Street Address _____		City _____		State _____	Zip _____	
Contractor Information						
Name(s) of Contractor (s)	Phone#	Email		City	Zip	

I certify that I am the owner of record of the above name property, or that the proposed work is authorized by the owner of record, and that I have been authorized by the owner to make this application. I agree to conform to all applicable laws of the Village of Sugar Grove.

Signature of Property Owner (or Attach Signed Contract) Address (if different) Phone No.

Signature & Printed Name of Responsible person in Charge of Work & Email Phone No.



Swimming Pool Compliance Form -- Residential and Facility Owner's Form

VGB Act Compliance and KCHD Best Practices

*Complete a form for each pump at the facility. Attach drain cover certification documentation (Lab Listing/P.E. Report)

PART I — POOL MANAGEMENT INFORMATION

Provided By <small>(Print full name)</small>		Report Date	
Signature		*Report Number	_____ of _____
Email Address		Phone Number	
Facility Name		Facility Permit ID	
Facility Address		Facility Phone #	
		Facility Contact	

PART II — POOL/SPA/PUMP INFORMATION

Pool Location		Location Type	<input type="checkbox"/> Indoor <input type="checkbox"/> Outdoor
Pool Type	<input type="checkbox"/> Wading Pool <input type="checkbox"/> Spa <input type="checkbox"/> Hot Tub <input type="checkbox"/> Pool	Other Pool	
System Type	<input type="checkbox"/> Filtration <input type="checkbox"/> Spa Jets <input type="checkbox"/> Slide <input type="checkbox"/> Feature	Other Type	
Design GPM	<small>(Turnover, feature spec, etc.)</small>	Flow Meter GPM	
Pump Make		Measured TDH	
Pump Model/HP		Pump Curve GPM	

PART III — DRAIN COVERS

Drain Cover Manufacturer(s):							
Drain Cover	Drain Cover Model / Life in Years	Date Installed (M/Y)	Manufacturer Specified Sump Depth	Installer Measured Sump Depth	Installed Orientation	Orientation Flow Rating	Total System Flow Rating
1					<input type="checkbox"/> Floor <input type="checkbox"/> Wall		
2					<input type="checkbox"/> Floor <input type="checkbox"/> Wall		
3					<input type="checkbox"/> Floor <input type="checkbox"/> Wall		
4					<input type="checkbox"/> Floor <input type="checkbox"/> Wall		
5					<input type="checkbox"/> Floor <input type="checkbox"/> Wall		
6					<input type="checkbox"/> Floor <input type="checkbox"/> Wall		
7					<input type="checkbox"/> Floor <input type="checkbox"/> Wall		
8					<input type="checkbox"/> Floor <input type="checkbox"/> Wall		

Note: VGB Act Total System Flow Ratings – for "Blockable" drain systems = sum of all flow ratings, minus the flow rating of one cover with the highest orientation flow rating; for "Unblockable" drain system systems = sum of all drain cover flow ratings

PART IV — SINGLE DRAIN SYSTEMS

1) Single Drain System: Yes No Is this an "Unblockable" drain with a Sump Opening that can not be shadowed by the 18" x 23" Blocking Element of ANSI/APSP 16 - 2011? Yes No. (If no, go to next section)

2) Multi-Drain System: Yes No Are two of the multi-drain system covers at least three (3) feet apart measured center to center, or located on different planes, such as floor and wall? Yes No. (If no, got to next section)

Select Secondary Device or System that is installed

Safety Vacuum Release System (SVRS) compliant with ASME/ANSI A112.19.17 or ASTM F2387
 Manufacturer Name and Model Number:

Suction-Limiting Vent System:

Gravity Drainage System:

Automatic Pump Shutoff System — Manufacturer Name and Model Number:

Drain Disablement — Describe how this was accomplished:

PART V — SKIMMER EQUALIZER LINES

1) Are equalizer lines disabled? Yes No (If no, go to next question)

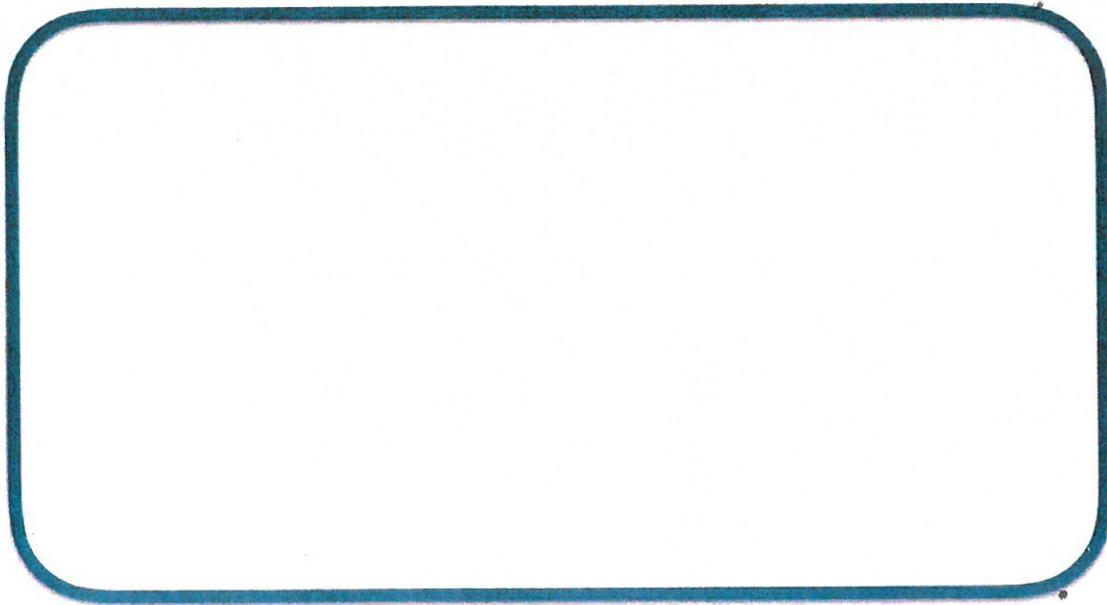
2) Do equalizer lines have VGB-2008 drain covers that cannot be removed without tools? Yes No
 (If yes, provide the following information. If no, additional work is required to bring pool into VGB Act compliance.)

Provide manufacturer name and model number: _____

Provide installation date (month/year): _____

Drain Cover Location Map

(Use Section III drain cover item number to mark approximate location)



CHAPTER 42

SWIMMING POOLS

SECTION E4201 GENERAL

E4201.1 Scope. The provisions of this chapter shall apply to the construction and installation of electric wiring and equipment associated with all swimming pools, wading pools, decorative pools, fountains, hot tubs and spas, and hydromassage bathtubs, whether permanently installed or storable, and shall apply to metallic auxiliary equipment, such as pumps, filters and similar equipment. Sections E4202 through E4206 provide general rules for permanent pools, spas and hot tubs. Section E4207 provides specific rules for storable pools and storable/portable spas and hot tubs. Section E4208 provides specific rules for spas and hot tubs. Section E4209 provides specific rules for hydromassage bathtubs. (680.1)

E4201.2 Definitions. (680.2)

CORD-AND-PLUG-CONNECTED LIGHTING ASSEMBLY. A lighting assembly consisting of a cord-and-plug-connected transformer and a luminaire intended for installation in the wall of a spa, hot tub, or storable pool.

DRY-NICHE LUMINAIRE. A luminaire intended for installation in the floor or wall of a pool, spa or fountain in a niche that is sealed against the entry of water.

FORMING SHELL. A structure designed to support a wet-niche luminaire assembly and intended for mounting in a pool or fountain structure.

FOUNTAIN. Fountains, ornamental pools, display pools, and reflection pools. The definition does not include drinking fountains.

HYDROMASSAGE BATHTUB. A permanently installed bathtub equipped with a recirculating piping system, pump, and associated equipment. It is designed so it can accept, circulate and discharge water upon each use.

LOW VOLTAGE CONTACT LIMIT. A voltage not exceeding the following values:

1. 15 volts (RMS) for sinusoidal AC
2. 21.2 volts peak for nonsinusoidal AC
3. 30 volts for continuous DC
4. 12.4 volts peak for DC that is interrupted at a rate of 10 to 200 Hz

MAXIMUM WATER LEVEL. The highest level that water can reach before it spills out.

NO-NICHE LUMINAIRE. A luminaire intended for installation above or below the water without a niche.

PACKAGED SPA OR HOT TUB EQUIPMENT ASSEMBLY. A factory-fabricated unit consisting of water-circulating, heating and control equipment mounted on a common base, intended to operate a spa or hot tub. Equipment may include pumps, air blowers, heaters, luminaires, controls and sanitizer generators.

PERMANENTLY INSTALLED SWIMMING, WADING, IMMERSION AND THERAPEUTIC POOLS.

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 (1067 mm), and all pools installed inside of a building, regardless of water depth, whether or not served by electrical circuits of any nature.

POOL. Manufactured or field-constructed equipment designed to contain water on a permanent or semipermanent basis and used for swimming, wading, immersion, or therapeutic purposes.

POOL COVER, ELECTRICALLY OPERATED. Motor-driven equipment designed to cover and uncover the water surface of a pool by means of a flexible sheet or rigid frame.

SELF-CONTAINED SPA OR HOT TUB. A factory-fabricated unit consisting of a spa or hot tub vessel with all water-circulating, heating and control equipment integral to the unit. Equipment may include pumps, air blowers, heaters, luminaires, controls and sanitizer generators.

SPA OR HOT TUB. A hydromassage pool, or tub for recreational or therapeutic use, not located in health care facilities, designed for immersion of users, and usually having a filter, heater, and motor-driven blower. They are installed indoors or outdoors, on the ground or supporting structure, or in the ground or supporting structure. Generally, a spa or hot tub is not designed or intended to have its contents drained or discharged after each use.

STORABLE SWIMMING, WADING OR IMMERSION POOLS; OR STORABLE/PORTABLE SPAS AND HOT TUBS. Those that are constructed on or above the ground and are capable of holding water with a maximum depth of 42 inches (1067 mm), or a pool with nonmetallic, molded polymeric walls or inflatable fabric walls regardless of dimension.

THROUGH-WALL LIGHTING ASSEMBLY. A lighting assembly intended for installation above grade, on or through the wall of a pool, consisting of two interconnected groups of components separated by the pool wall.

WET-NICHE LUMINAIRE. A luminaire intended for installation in a forming shell mounted in a pool or fountain structure where the luminaire will be completely surrounded by water.

SECTION E4202 WIRING METHODS FOR POOLS, SPAS, HOT TUBS AND HYDROMASSAGE BATHTUBS

E4202.1 General. Wiring methods used in conjunction with permanently installed swimming pools, spas, hot tubs or hydromassage bathtubs shall be installed in accordance with Table E4202.1 and Chapter 38 except as otherwise stated in this section. Storable swimming pools shall comply with Section E4207. [680.7; 680.21(A); 680.23(B) and (F); 680.25(A); 680.42; 680.43; and 680.70]

E4202.3 Double insulated pool pumps. A listed cord and plug-connected pool pump incorporating an approved system of double insulation that provides a means for grounding only the internal and nonaccessible, noncurrent-carrying metal parts of the pump shall be connected to any wiring method recognized in Chapter 38 that is suitable for the location. Where the bonding grid is connected to the equipment grounding conductor of the motor circuit in accordance with Section E4204.2, Item 6.1, the branch circuit wiring shall comply with Sections E4202.1 and E4205.5. [680.21(B)]

SECTION E4203

EQUIPMENT LOCATION AND CLEARANCES

E4203.1 Receptacle outlets. Receptacle outlets shall be installed and located in accordance with Sections E4203.1.1 through E4203.1.5. Distances shall be measured as the shortest path that an appliance supply cord connected to the receptacle would follow without penetrating a floor, wall, ceiling, doorway with hinged or sliding door, window opening, or other effective permanent barrier. [680.22(A)(5)]

E4203.1.1 Location. Receptacles that provide power for water-pump motors or other loads directly related to the circulation and sanitation system shall be permitted to be located between 6 feet and 10 feet (1829 mm and 3048 mm) from the inside walls of pools and outdoor spas and hot tubs, where the receptacle is single and of the grounding type and protected by ground-fault circuit interrupters.

Other receptacles on the property shall be located not less than 6 feet (1829 mm) from the inside walls of pools and outdoor spas and hot tubs. [680.22(A)(2) and (A)(3)]

E4203.1.2 Where required. At least one 125-volt, 15- or 20-ampere receptacle supplied by a general-purpose branch circuit shall be located a minimum of 6 feet (1829 mm) from and not more than 20 feet (6096 mm) from the inside wall of pools and outdoor spas and hot tubs. This receptacle shall be located not more than 6 feet, 6 inches (1981 mm) above the floor, platform or grade level serving the pool, spa or hot tub. [680.22(A)(1)]

E4203.1.3 GFCI protection. All 15- and 20-ampere, single phase, 125-volt receptacles located within 20 feet (6096 mm) of the inside walls of pools and outdoor spas and hot tubs shall be protected by a ground-fault circuit-interrupter. Outlets supplying pool pump motors supplied from branch circuits rated at 120 volts through 240 volts, single phase, whether by receptacle or direct connection, shall be provided with ground-fault circuit-interrupter protection for personnel. [680.21(C) and 680.22(A)(4)]

E4203.1.4 Indoor locations. Receptacles shall be located not less than 6 feet (1829 mm) from the inside walls of indoor spas and hot tubs. A minimum of one 125-volt receptacle shall be located between 6 feet (1829 mm) and 10 feet (3048 mm) from the inside walls of indoor spas or hot tubs. [680.43(A) and 680.43(A)(1)]

E4203.1.5 Indoor GFCI protection. All 125-volt receptacles rated 30 amperes or less and located within 10 feet

(3048 mm) of the inside walls of spas and hot tubs installed indoors, shall be protected by ground-fault circuit-interrupters. [680.43(A)(2)]

E4203.2 Switching devices. Switching devices shall be located not less than 5 feet (1524 mm) horizontally from the inside walls of pools, spas and hot tubs except where separated from the pool, spa or hot tub by a solid fence, wall, or other permanent barrier or the switches are listed for use within 5 feet (1524 mm). Switching devices located in a room or area containing a hydromassage bathtub shall be located in accordance with the general requirements of this code. [680.22(C); 680.43(C); and 680.72]

E4203.3 Disconnecting means. One or more means to simultaneously disconnect all ungrounded conductors for all utilization equipment, other than lighting, shall be provided. Each of such means shall be readily accessible and within sight from the equipment it serves and shall be located at least 5 feet (1524 mm) horizontally from the inside walls of a pool, spa, or hot tub unless separated from the open water by a permanently installed barrier that provides a 5-foot (1524 mm) or greater reach path. This horizontal distance shall be measured from the water's edge along the shortest path required to reach the disconnect. (680.12)

E4203.4 Luminaires and ceiling fans. Lighting outlets, luminaires, and ceiling-suspended paddle fans shall be installed and located in accordance with Sections E4203.4.1 through E4203.4.6. [680.22(B)]

E4203.4.1 Outdoor location. In outdoor pool, outdoor spas and outdoor hot tubs areas, luminaires, lighting outlets, and ceiling-suspended paddle fans shall not be installed over the pool or over the area extending 5 feet (1524 mm) horizontally from the inside walls of a pool except where no part of the luminaire or ceiling-suspended paddle fan is less than 12 feet (3658 mm) above the maximum water level. [680.22(B)(1)]

E4203.4.2 Indoor locations. In indoor pool areas, the limitations of Section E4203.4.1 shall apply except where the luminaires, lighting outlets and ceiling-suspended paddle fans comply with all of the following conditions:

1. The luminaires are of a totally enclosed type;
2. Ceiling-suspended paddle fans are identified for use beneath ceiling structures such as porches and patios.
3. A ground-fault circuit interrupter is installed in the branch circuit supplying the luminaires or ceiling-suspended paddle fans; and
4. The distance from the bottom of the luminaire or ceiling-suspended paddle fan to the maximum water level is not less than 7 feet, 6 inches (2286 mm). [680.22(B)(2)]

E4203.4.3 Low-voltage luminaires. Listed low-voltage luminaires not requiring grounding, not exceeding the low-voltage contact limit, and supplied by listed transformers or power supplies that comply with Section E4206.1 shall be permitted to be located less than 1.5 m (5 ft) from the inside walls of the pool. [680.22(B)(6)]

TABLE E4203.7 (680.10)
MINIMUM BURIAL DEPTHS

WIRING METHOD	UNDERGROUND WIRING (inches)
Rigid metal conduit	6
Intermediate metal conduit	6
Nonmetallic raceways listed for direct burial and under concrete exterior slab not less than 4 inches in thickness and extending not less than 6 inches (162 mm) beyond the underground installation	6
Nonmetallic raceways listed for direct burial without concrete encasement	18
Other approved raceways ^a	18

For SI: 1 inch = 25.4 mm.

a. Raceways approved for burial only where concrete-encased shall require a concrete envelope not less than 2 inches in thickness.

SECTION E4204

BONDING

E4204.1 Performance. The equipotential bonding required by this section shall be installed to reduce voltage gradients in the prescribed areas of permanently installed swimming pools and spas and hot tubs other than the storable/portable type.

E4204.2 Bonded parts. The parts of pools, spas, and hot tubs specified in Items 1 through 7 shall be bonded together using insulated, covered or bare solid copper conductors not smaller than 8 AWG or using rigid metal conduit of brass or other identified corrosion-resistant metal. An 8 AWG or larger solid copper bonding conductor provided to reduce voltage gradients in the pool, spa, or hot tub area shall not be required to be extended or attached to remote panelboards, service equipment, or electrodes. Connections shall be made by exothermic welding, by listed pressure connectors or clamps that are labeled as being suitable for the purpose and that are made of stainless steel, brass, copper or copper alloy, machine screw-type fasteners that engage not less than two threads or are secured with a nut, thread-forming machine screws that engage not less than two-threads, or terminal bars. Connection devices or fittings that depend solely on solder shall not be used. Sheet metal screws shall not be used to connect bonding conductors or connection devices: [680.26(B)]

1. Conductive pool shells. Bonding to conductive pool shells shall be provided as specified in Item 1.1 or 1.2. Poured concrete, pneumatically applied or sprayed concrete, and concrete block with painted or plastered coatings shall be considered to be conductive materials because of their water permeability and porosity. Vinyl liners and fiberglass composite shells shall be considered to be nonconductive materials.
 - 1.1. 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 Item 1.2.
 - 1.2. Copper conductor grid. A copper conductor grid shall be provided and shall comply with Items 1.2.1 through 1.2.4:
 - 1.2.1. It shall be constructed of minimum 8 AWG bare solid copper conductors bonded to each other at all points of crossing.

1.2.2. It shall conform to the contour of the pool .

1.2.3. It shall be arranged in a 12-inch (305 mm) by 12-inch (305 mm) network of conductors in a uniformly spaced perpendicular grid pattern with a tolerance of 4 inches (102 mm).

1.2.4. It shall be secured within or under the pool not more than 6 inches (152 mm) from the outer contour of the pool shell. [680.26(B)(1)]

2. Perimeter surfaces. The perimeter surface shall extend for 3 feet (914 mm) horizontally beyond the inside walls of the pool and shall include unpaved surfaces, poured concrete surfaces and other types of paving. Perimeter surfaces that extend less than 3 feet (914 mm) beyond the inside wall of the pool and that are separated from the pool by a permanent wall or building 5 feet (1524 mm) or more in height shall require equipotential bonding on the pool side of the permanent wall or building. Bonding to perimeter surfaces shall be provided as specified in Item 2.1 or 2.2 and shall be attached to the pool, spa, or hot tub reinforcing steel or copper conductor grid at a minimum of four points uniformly spaced around the perimeter of the pool, spa, or hot tub. For nonconductive pool shells, bonding at four points shall not be required.

Exceptions:

1. Equipotential bonding of perimeter surfaces shall not be required for spas and hot tubs where all of the following conditions apply:
 - 1.1. The spa or hot tub is listed as a self-contained spa for aboveground use.
 - 1.2. The spa or hot tub is not identified as suitable only for indoor use.
 - 1.3. The installation is in accordance with the manufacturer's instructions and is located on or above grade.
 - 1.4. To top rim of the spa or hot tub is not less than 28 in. (711 mm) above all perimeter surfaces that are within 30 in. (762 mm), measured horizontally from the spa or hot tub. The height of nonconductive external steps for entry

motors unless part of a listed self-contained spa or hot tub. [680.43(D)(2)]

3. Metal raceway and metal piping that are within 5 feet (1524 mm) of the inside walls of the hot tub or spa and that are not separated from the spa or hot tub by a permanent barrier. [680.43(D)(3)]
4. All metal surfaces that are within 5 feet (1524 mm) of the inside walls of the hot tub or spa and that are not separated from the hot tub or spa area by a permanent barrier. [680.43(D)(4)]

Exception: Small conductive surfaces not likely to become energized, such as air and water jets and drain fittings, where not connected to metallic piping, towel bars, mirror frames, and similar nonelectrical equipment, shall not be required to be bonded. [680.43(D)(4) Exception]

5. Electrical devices and controls that are not associated with the hot tubs or spas and that are located less than 5 feet (1524 mm) from such units. [680.43(D)(5)]

E4204.5.1 Methods. All metal parts associated with the hot tub or spa shall be bonded by any of the following methods:

1. The interconnection of threaded metal piping and fittings. [680.43(E)(1)]
2. Metal-to-metal mounting on a common frame or base. [680.43(E)(2)]
3. The provision of an insulated, covered or bare solid copper bonding jumper not smaller than 8 AWG. It shall not be the intent to require that the 8 AWG or larger solid copper bonding conductor be extended or attached to any remote panelboard, service equipment, or any electrode, but only that it shall be employed to eliminate voltage gradients in the hot tub or spa area as prescribed. [680.43(E)(3)]

E4204.5.2 Connections. Connections to bonded parts shall be made in accordance with Section E3406.13.1.

SECTION E4205 GROUNDING

E4205.1 Equipment to be grounded. The following equipment shall be grounded:

1. Through-wall lighting assemblies and underwater luminaires other than those low-voltage lighting products listed for the application without a grounding conductor.
2. All electrical equipment located within 5 feet (1524 mm) of the inside wall of the pool, spa or hot tub.
3. All electrical equipment associated with the recirculating system of the pool, spa or hot tub.
4. Junction boxes.
5. Transformer and power supply enclosures.
6. Ground-fault circuit-interrupters.

7. Panelboards that are not part of the service equipment and that supply any electrical equipment associated with the pool, spa or hot tub. (680.7)

E4205.2 Luminaires and related equipment. Other than listed low-voltage luminaires not requiring grounding, all through-wall lighting assemblies, wet-niche, dry-niche, or no-niche luminaires shall be connected to an insulated copper equipment grounding conductor sized in accordance with Table E3908.12 but not smaller than 12 AWG. The equipment grounding conductor between the wiring chamber of the secondary winding of a transformer and a junction box shall be sized in accordance with the overcurrent device in such circuit. The junction box, transformer enclosure, or other enclosure in the supply circuit to a wet-niche or no-niche luminaire and the field-wiring chamber of a dry-niche luminaire shall be grounded to the equipment grounding terminal of the panelboard. The equipment grounding terminal shall be directly connected to the panelboard enclosure. The equipment grounding conductor shall be installed without joint or splice. [680.23(F)(2) and 680.23(F)(2) Exception]

Exceptions:

1. Where more than one underwater luminaire is supplied by the same branch circuit, the equipment grounding conductor, installed between the junction boxes, transformer enclosures, or other enclosures in the supply circuit to wet-niche luminaires, or between the field-wiring compartments of dry-niche luminaires, shall be permitted to be terminated on grounding terminals. [680.23(F)(2)(a)]
2. Where an underwater luminaire is supplied from a transformer, ground-fault circuit-interrupter, clock-operated switch, or a manual snap switch that is located between the panelboard and a junction box connected to the conduit that extends directly to the underwater luminaire, the equipment grounding conductor shall be permitted to terminate on grounding terminals on the transformer, ground-fault circuit-interrupter, clock-operated switch enclosure, or an outlet box used to enclose a snap switch. [680.23(F)(2)(b)]

E4205.3 Nonmetallic conduit. Where a nonmetallic conduit is installed between a forming shell and a junction box, transformer enclosure, or other enclosure, a 8 AWG insulated copper bonding jumper shall be installed in this conduit except where a listed low-voltage lighting system not requiring grounding is used. The bonding jumper shall be terminated in the forming shell, junction box or transformer enclosure, or ground-fault circuit-interrupter enclosure. 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. [680.23(B)(2)(b)]

E4205.4 Flexible cords. Other than listed low-voltage lighting systems not requiring grounding, wet-niche luminaires that are supplied by a flexible cord or cable shall have all exposed noncurrent-carrying metal parts grounded by an insulated copper equipment grounding conductor that is an integral part of the cord or cable. This grounding conductor

ductors. If present, the grounding connection within a luminaire shall be similarly treated to protect such connection from the deteriorating effect of pool water in the event of water entry into the luminaire. [680.23(B)(4)]

Luminaires shall be bonded to and secured to the forming shell by a positive locking device that ensures a low-resistance contact and requires a tool to remove the luminaire from the forming shell. [680.23(B)(5)]

E4206.5.1 Servicing. All wet-niche luminaires shall be removable from the water for inspection, relamping, or other maintenance. The forming shell location and length of cord in the forming shell shall permit personnel to place the removed luminaire on the deck or other dry location for such maintenance. The luminaire maintenance location shall be accessible without entering or going into the pool water. [680.23(B)(6)]

E4206.6 Dry-niche luminaires. Dry-niche luminaires shall have provisions for drainage of water. Other than listed low-voltage luminaires not requiring grounding, a dry-niche luminaire shall have means for accommodating one equipment grounding conductor for each conduit entry. Junction boxes shall not be required but, if used, shall not be required to be elevated or located as specified in Section E4206.9 if the luminaire is specifically identified for the purpose. [680.23(C)(1) and (C)(2)]

E4206.7 No-niche luminaires. No-niche luminaires shall be listed for the purpose and shall be installed in accordance with the requirements of Section E4206.5. Where connection to a forming shell is specified, the connection shall be to the mounting bracket. [680.23(D)]

E4206.8 Through-wall lighting assembly. A through-wall lighting assembly shall be equipped with a threaded entry or hub, or a nonmetallic hub, for the purpose of accommodating the termination of the supply conduit. A through-wall lighting assembly shall meet the construction requirements of Section E4205.4 and be installed in accordance with the requirements of Section E4206.5. Where connection to a forming shell is specified, the connection shall be to the conduit termination point. [680.23(E)]

E4206.9 Junction boxes and enclosures for transformers or ground-fault circuit interrupters. Junction boxes for underwater luminaires and enclosures for transformers and ground-fault circuit interrupters that supply underwater luminaires shall comply with the following: [680.24(A)]

E4206.9.1 Junction boxes. A junction box connected to a conduit that extends directly to a forming shell or mounting bracket of a no-niche luminaire shall be:

1. Listed as a swimming pool junction box; [680.24(A)(1)]
2. Equipped with threaded entries or hubs or a nonmetallic hub; [680.24(A)(1)(1)]
3. Constructed of copper, brass, suitable plastic, or other approved corrosion-resistant material; [680.24(A)(1)(2)]
4. Provided with electrical continuity between every connected metal conduit and the grounding terminals by means of copper, brass, or other approved corrosion-resistant metal that is integral with the box; and [680.24(A)(1)(3)]

nals by means of copper, brass, or other approved corrosion-resistant metal that is integral with the box; and [680.24(A)(1)(3)]

5. Located not less than 4 inches (102 mm), measured from the inside of the bottom of the box, above the ground level, or pool deck, or not less than 8 inches (203 mm) above the maximum pool water level, whichever provides the greatest elevation, and shall be located not less than 4 feet (1219 mm) from the inside wall of the pool, unless separated from the pool by a solid fence, wall or other permanent barrier. Where used on a lighting system operating at the low-voltage contact limit or less, a flush deck box shall be permitted provided that an approved potting compound is used to fill the box to prevent the entrance of moisture; and the flush deck box is located not less than 4 feet (1219 mm) from the inside wall of the pool. [680.24(A)(2)]

E4206.9.2 Other enclosures. An enclosure for a transformer, ground-fault circuit-interrupter or a similar device connected to a conduit that extends directly to a forming shell or mounting bracket of a no-niche luminaire shall be:

1. Listed and labeled for the purpose, comprised of copper, brass, suitable plastic, or other approved corrosion-resistant material; [680.24(B)(1)]
2. Equipped with threaded entries or hubs or a nonmetallic hub; [680.24(B)(2)]
3. Provided with an approved seal, such as duct seal at the conduit connection, that prevents circulation of air between the conduit and the enclosures; [680.24(B)(3)]
4. Provided with electrical continuity between every connected metal conduit and the grounding terminals by means of copper, brass or other approved corrosion-resistant metal that is integral with the enclosures; and [680.24(B)(4)]
5. Located not less than 4 inches (102 mm), measured from the inside bottom of the enclosure, above the ground level or pool deck, or not less than 8 inches (203 mm) above the maximum pool water level, whichever provides the greater elevation, and shall be located not less than 4 feet (1219 mm) from the inside wall of the pool, except where separated from the pool by a solid fence, wall or other permanent barrier. [680.24(B)(2)]

E4206.9.3 Protection of junction boxes and enclosures. Junction boxes and 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 or adjacent to fixed structures. [680.24(C)]

E4206.9.4 Grounding terminals. Junction boxes, transformer and power supply enclosures, and ground-fault circuit-interrupter enclosures connected to a conduit that extends directly to a forming shell or mounting bracket of a no-niche luminaire shall be provided with grounding ter-

part of a cord and plug-connected lighting assembly. The assembly shall:

1. Have a luminaire lamp that is suitable for the use at the supplied voltage;
2. Have an impact-resistant polymeric lens, luminaire body, and transformer enclosure;
3. Have a transformer meeting the requirements of section E4206.1 with a primary rating not over 150 volts; and
4. Have no exposed metal parts. [680.33(A)]

E4207.3.2 Over the low-voltage contact limit but not over 150 volts. A lighting assembly without a transformer or power supply, and with the luminaire lamp(s) operating at over the low-voltage contact limit, but not over 150 volts, shall be permitted to be cord and plug-connected where the assembly is listed as an assembly for the purpose and complies with all of the following:

1. It has an impact-resistant polymeric lens and luminaire body.
2. A ground-fault circuit interrupter with open neutral conductor protection is provided as an integral part of the assembly.
3. The luminaire lamp is permanently connected to the ground-fault circuit interrupter with open-neutral protection.
4. It complies with the requirements of Section E4206.4.
5. It has no exposed metal parts. [680.33(B)]

E4207.4 Receptacle locations. Receptacles shall be located not less than 6 feet (1829 mm) from the inside walls of a storable pool, storable spa or storable hot tub. In determining these dimensions, the distance to be measured shall be the shortest path that the supply cord of an appliance connected to the receptacle would follow without passing through a floor, wall, ceiling, doorway with hinged or sliding door, window opening, or other effective permanent barrier. (680.34)

E4207.5 Clearances. Overhead conductor installations shall comply with Section E4203.6 and underground conductor installations shall comply with Section E4203.7.

E4207.6 Disconnecting means. Disconnecting means for storable pools and storable/portable spas and hot tubs shall comply with Section E4203.3.

E4207.7 Ground-fault circuit interrupters. Ground-fault circuit interrupters shall comply with Section E4206.2.

E4207.8 Grounding of equipment. Equipment shall be grounded as required by Section E4205.1.

E4207.9 Pool water heaters. Electric pool water heaters shall comply with Section E4206.12.

SECTION E4208 SPAS AND HOT TUBS

E4208.1 Ground-fault circuit-interrupters. The outlet(s) that supplies a self-contained spa or hot tub, or a packaged

spa or hot tub equipment assembly, or a field-assembled spa or hot tub with a heater load of 50 amperes or less, shall be protected by a ground-fault circuit-interrupter. (680.44)

A listed self-contained unit or listed packaged equipment assembly marked to indicate that integral ground-fault circuit-interrupter protection is provided for all electrical parts within the unit or assembly, including pumps, air blowers, heaters, lights, controls, sanitizer generators and wiring, shall not require that the outlet supply be protected by a ground-fault circuit interrupter. [680.44(A)]

E4208.2 Electric water heaters. Electric spa and hot tub water heaters shall be listed and shall have the heating elements subdivided into loads not exceeding 48 amperes and protected at not more than 60 amperes. The ampacity of the branch-circuit conductors, and the rating or setting of over-current protective devices, shall be not less than 125 percent of the total nameplate load rating. (680.9)

E4208.3 Underwater audio equipment. Underwater audio equipment used with spas and hot tubs shall comply with the provisions of Section E4206.10. [680.43(G)]

E4208.4 Emergency switch for spas and hot tubs. A clearly labeled emergency shutoff or control switch for the purpose of stopping the motor(s) that provides power to the recirculation system and jet system shall be installed at a point that is readily accessible to the users, adjacent to and within sight of the spa or hot tub and not less than 5 feet (1524 mm) away from the spa or hot tub. This requirement shall not apply to single-family dwellings. (680.41)

SECTION E4209 HYDROMASSAGE BATHTUBS

E4209.1 Ground-fault circuit-interrupters. Hydromassage bathtubs and their associated electrical components shall be supplied by an individual branch circuit(s) and protected by a readily accessible ground-fault circuit-interrupter. All 125-volt, single-phase receptacles not exceeding 30 amperes and located within 6 feet (1829 mm) measured horizontally of the inside walls of a hydromassage tub shall be protected by a ground-fault circuit interrupter(s). (680.71)

E4209.2 Other electric equipment. Luminaires, switches, receptacles, and other electrical equipment located in the same room, and not directly associated with a hydromassage bathtub, shall be installed in accordance with the requirements of this code relative to the installation of electrical equipment in bathrooms. (680.72)

E4209.3 Accessibility. Hydromassage bathtub electrical equipment shall be accessible without damaging the building structure or building finish. Where the hydromassage bathtub is cord- and plug-connected with the supply receptacle accessible only through a service access opening, the receptacle shall be installed so that its face is within direct view and not more than 12 inches (305 mm) from the plane of the opening. (680.73)

E4209.4 Bonding. Both metal piping systems and grounded metal parts in contact with the circulating water shall be bonded together using an insulated, covered or bare solid copper bonding jumper not smaller than 8 AWG. The bond-