

**TOWN OF CHESTER
BUILDING DEPARTMENT
(845)-469-7000 EXT 7**

IN-GROUND POOL INSPECTIONS:

IN-GROUND POOL BUILDING PERMITS WILL ONLY BE ISSUED PROVIDED THE REQUIRED FENCING IS PAID IN FULL WITH COPY OF RECEIPT OR CONTRACT PRIOR TO POOL CONSTRUCTION. HOMEOWNERS MUST TAKE OUT THE BUILDING PERMIT ONLY.

Construction and installation of BOTH fence and pool shall be accomplished **within a 60-day period**. Processing of a Building Permit Application for an in-ground pool must include a plan indicating the location of the installed fence.

1. Pre-construction site visit
2. Excavation for the pool structure WITH temporary fence installed.
3. Steel Sheet or reinforced concrete inspection
4. Backfill inspection after concrete lock has been poured
5. Rough Plumbing with trenches open
6. Rough Electrical Inspection (by Electrical Inspection Agency)
7. Final Electrical Inspection (by Electrical Inspection Agency)
8. FINAL INSPECTION WITH PERMANENT FENCE INSTALLED

ABOVE-GROUND POOL INSPECTIONS:

**Construction and installation shall be accomplished within a 60-day period
HOMEOWNER MUST TAKE OUT BUILDING PERMIT ONLY**

After installation of above-ground pool and electric has been installed and inspected by an Electrical Inspection Agency. Please call for Final Inspection.

****I HAVE READ AND UNDERSTAND TOWN OF CHESTER ZONING RULES AND REGULATIONS FOR IN-GROUND AND ABOVE-GROUND POOLS.** PLEASE CALL FOR THE INSPECTIONS LISTED ABOVE BETWEEN 7:30am-4:30pm MONDAY-THURSDAY.

HOMEOWNER

DATE

BUILDING PERMIT NUMBER

PLEASE SIGN AND RETURN THIS DOCUMENT WITH BUILDING PERMIT APPLICATION AND YOUR RECEIPT FOR FENCE PAID IN FULL.

TOWN OF CHESTER

APPROVED ELECTRICAL INSPECTORS

COMMONWEALTH ELECTRICAL INSPECTORS AGENCY, INC.

Fred Cocks – 845-783-9309

James Cocks – 845-783-0551

Ron Henry – 845-541-1871

ELECTRICAL UNDERWRITERS OF NEW YORK LLC – 845-569-1759

Ernie Bello

John Taylor

NEW YORK CERTIFIED ELECTRICAL INSPECTORS LLC – 745-294-7695

Jerry Caliendo

NY ELECTRICAL INSPECTIONS & CONSULTING LLC – 845-343-6934

John W. Wierl

SWITCH-ON ELECTRIC – 845-733-4926

Frank X. Schmaus

SWANSON CONSULTING INC. – 845-496-4443

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INSPECTIONS ON TIME - 845-233-6711

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NORTHEAST ELECTRICAL INSPECTIONS LLC – 518-852-0826

David Near

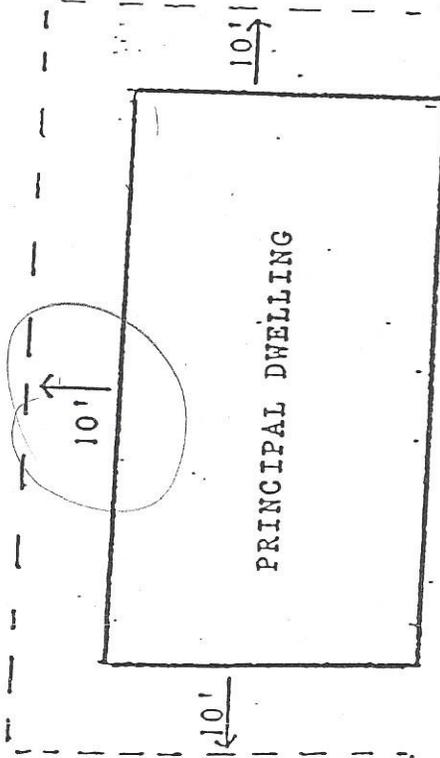
Swimming Pools in the Town of Chester:

Town Code 98-16

2020 Residential Code
of New York State &
2020 Energy Code of
New York State

Any pool must be located within the dotted area only and shall be at least twenty-five (25) feet away from any septic tank and its fields. Filter pumps and other mechanical devices shall be located at least 20 feet from property line.

REAR YARD



SIDE YARD

10'

10'

10'

SIDE YARD

10'

10'

10'

SIDE YARD

15'

15'

15'

In-ground pool fencing requirements must be met with a minimum height of 4' high (chain link or other equivalent) with self-closing and latching gates and lock. Electrical work must comply with National Electric Code specifications. Above-ground pool fencing is decision of Building Inspector. Fence detail must be submitted when Permit is applied for.

FRONT YARD

Traveled Right of Way

*Note: Structures must not be placed in Easements or Right of Ways.

Chapter 98. Zoning

Article III. Regulations Pertaining to All Districts

§ 98-16. Swimming pools.

No commercial or private swimming pool shall be constructed, installed or maintained on any premises unless it complies with the following provisions:

- A. The term "swimming pool" shall mean any permanently constructed variety which will cause the retention of water to a depth of two feet or more below the level of the surrounding land, or an above-surface pool which will cause the retention of water to a depth of two feet or more, designed, used and maintained for swimming or bathing purposes and which is not readily portable.
- B. Private pools shall be constructed or installed within the confines of the rear or side yard of a premises.
 - (1) Construction of swimming pools may be allowed in the front or side yard, but not within the required such front or side yard, on lots containing five acres or more. However, such swimming pool and any accessory structure shall not be visible from the road on which the parcel fronts.
- C. The pool shall be located at least 15 feet from any rear or side line of a premises and shall be at least 25 feet away from any septic tank and its fields.
- D. No person, membership club or organization shall construct or have constructed a swimming pool without having first applied for and secured approval by the issuance of a permit from the Building Inspector. Upon application for permit, there shall be submitted plans and specifications detailing the pool dimensions, depth, volume in gallons and the distance of the pool from all lot lines and, if any, septic tanks and their fields; a pool fencing proposal shall also accompany these specifications.
- E. After issuance of permit, construction or installation shall be accomplished within a sixty-day period; otherwise, the permit will have expired. The Building Inspector may authorize in writing an additional extension period not to exceed 20 days. If construction of a below-surface pool is not completed within the sixty-day period or extension thereof, any excavation shall be completely filled and the surface restored to its original state.
- F. All material used in the construction of a swimming pool shall be of durable quality and waterproof and designed so as to facilitate its emptying and cleaning. Filter pumps and other mechanical devices shall be located at least 20 feet away from any adjoining

premises so as not to interfere with the comfort, health and safety of the occupant of the adjoining premises.

- G. A fence or enclosure of substantial design contiguous to the pool area and not less than 4 feet in height shall be constructed to completely surround a swimming pool having a depth of two feet or more below ground level. The fence shall be constructed during the sixty-day or extension period. The gate or door opening providing access into the pool area shall be of the same height as the fence or enclosure and shall be equipped with a self-closing and latching device. Any access ladder or steps used in connection with an above-surface-type swimming pool shall be removed when not in use.
- H. Any lighting and electrical fixtures, wiring and installation shall be in accordance with the standard practices as required by the National Electric Code.
- I. Above-surface pools shall be exempt from the fencing requirement unless the Building Inspector shall determine that safety conditions warrant the installation of complete or partial fencing not to exceed the maximum requirements for below-surface pools. Any appeal from a decision of the Building Inspector on fencing shall be made to the Zoning Board of Appeals and shall follow the procedure required in seeking a variance.
- J. If any swimming pool is abandoned or permanently discontinued, the owners of the land upon which it is located shall completely fill the pool area and return the surface to its original state.
- K. All swimming pools shall be provided with drainage to a drainage easement or swale or storm drain, but in no case to a sanitary sewer or toward the direction of a septic field. Below-surface pools shall be provided with washed gravel or crushed stone on the exterior of the pool sides where deemed necessary by the Building Inspector for proper drainage.
- L. No pool located on a lot which is served by a public or central water system shall have its initial filling or seasonal refilling provided from the central water supply system.
- M. Aboveground pools shall be leveled and not located on fill areas.
- N. Safety covers capable of being adequately secured shall be required on all pools during normal off-season periods.

BUILDING PLANNING

than one-half of the floor area of the room, provided that the mezzanine meets all of the following requirements:

1. Except for enclosed closets and bathrooms, the mezzanine is open to the room in which such mezzanine is located.
2. The opening to the room is unobstructed except for walls not more than 42 inches (1067 mm) in height, columns and posts.
3. The exceptions to Section R325.5 are not applied.

R325.4 Means of egress. The means of egress for mezzanines shall comply with the applicable provisions of Section R311.

R325.5 Openness. Mezzanines shall be open and unobstructed to the room in which they are located except for walls not more than 36 inches (914 mm) in height, columns and posts.

Exceptions:

1. Mezzanines or portions thereof are not required to be open to the room in which they are located, provided that the aggregate floor area of the enclosed space is not greater than 10 percent of the mezzanine area.
2. In buildings that are not more than two stories above *grade plane* and equipped throughout with an automatic sprinkler system in accordance with Section R313, a mezzanine shall not be required to be open to the room in which the mezzanine is located.

[NY] **R325.6 Habitable attic.** A habitable attic shall be considered a story above grade plane.

SECTION R326

SWIMMING POOLS, SPAS AND HOT TUBS

[NY] **R326.1 General.** The provisions of this section shall control the design and construction as well as substantial modification of swimming pools, spas and hot tubs installed in or on the lot of dwellings regulated under this code, and detached one- and two-family dwellings classified as Group R-3 and constructed under the *Building Code of New York State*.

Exception: Communal pools for the shared use of multiple townhouse units shall be regulated by the *Building Code of New York State*.

[NY] **R326.1.1 Compliance with other sections.** Swimming pools, spas and hot tubs shall comply with this section and other applicable sections of this code. The requirements of this section and of the other applicable sections of this code shall be in addition to, and not in replacement of or substitution for, the requirements of other applicable federal, state and local laws and regulations, including, but not necessarily limited to the requirements of Section 8003 (Federal swimming pool and spa drain cover standard) of Title 15 of the United States Code (CPS 15 USC 8003), where applicable.

[NY] **R326.2 Definitions.** For the purpose of these requirements, the terms used shall be defined as follows and as set forth in Chapter 2.

BARRIER, PERMANENT. A fence, the walls of a permanent structure, any other structure or combination thereof which completely surrounds the swimming pool and sufficiently obstructs access to the swimming pool.

BARRIER, TEMPORARY. An approved temporary fence, permanent fence, the walls of a permanent structure, any other structure, or any combination thereof that sufficiently prevents access to the swimming pool by any person not engaged in the installation or construction of the swimming pool during its installation or construction.

HOT TUB. See "Spa."

RESIDENTIAL. That which is situated on the premises of dwellings regulated under this code, and detached dwellings classified as R-3 and constructed under the *Building Code of New York State*.

SPA. A portable or nonportable structure intended for recreational or therapeutic bathing, in which all controls, water-heating and water-circulating equipment are an integral part of the product. Spas are shallow in depth and are not designed for swimming or diving.

SUBSTANTIAL DAMAGE. For the purpose of determining compliance with the pool alarm provisions of this section, damage of any origin sustained by a swimming pool, whereby the cost of restoring the swimming pool to its before-damaged condition would equal or exceed 50 percent of the market value of the swimming pool before the damage occurred.

SUBSTANTIAL MODIFICATION. For the purpose of determining compliance with the pool alarm provisions of this section, any repair, alteration, addition or improvement of a swimming pool, the cost of which equals or exceeds 50 percent of the market value of the swimming pool before the improvement or repair is started. If a swimming pool has sustained substantial damage, any repairs are considered substantial modification regardless of the actual repair work performed.

SUCTION OUTLET. A fitting, fitting assembly, cover/grate, sump, and related components that provide a localized low-pressure area for the transfer of water from a swimming pool.

SWIMMING POOL. Any structure, basin, chamber or tank which is intended for swimming, diving, recreational bathing or wading and which contains, is designed to contain, or is capable of containing water more than 24 inches (610 mm) deep at any point. This includes in-ground, above-ground and on-ground pools, indoor pools, hot tubs, spas, and wading pools.

SWIMMING POOL, INDOOR. A swimming pool which is totally contained within a structure and surrounded on all four sides by the walls of the enclosing structure.

SWIMMING POOL, OUTDOOR. Any swimming pool which is not an indoor pool.

[NY] **R326.3 Compliance with other standards.**

[NY] **R326.3.1 In-ground pools.** In-ground pools shall be designed and constructed in conformance with ANSI/

APSP/ICC 5 (American National Standard for Residential Inground Swimming Pools, 2011).

[NY] **R326.3.2 Above-ground and on-ground pools.** Above-ground and on-ground pools shall be designed and constructed in conformance with ANSI/APSP/ICC 4 (American National Standard for Aboveground/Onground Residential Swimming Pools, 2012).

[NY] **R326.3.3 Permanently installed spas and hot tubs.** Permanently installed spas and hot tubs shall be designed and constructed in conformance with ANSI/APSP/ICC 3 (American National Standard for Permanently Installed Residential Spas and Swim Spas, 2014).

[NY] **R326.3.4 Portable spas and hot tubs.** Portable spas and hot tubs shall be designed and constructed in conformance with ANSI/APSP/ICC 6 (American National Standard for Residential Portable Spas and Swim Spas, 2013).

[NY] **R326.4 Barriers, application.** The provisions of this section shall control the design of barriers for swimming pools, spas and hot tubs. These design controls are intended to provide protection against potential drowning and near-drowning by sufficiently preventing access to swimming pools, spas and hot tubs by persons outside the property, persons within the dwelling, and persons in other parts of the property not contained within the pool enclosure.

[NY] **R326.4.1 Temporary barriers.** An outdoor swimming pool shall be surrounded by a temporary barrier during installation or construction that shall remain in place until a permanent barrier in compliance with Section R326.4.2 is provided.

Exceptions:

1. Above-ground or on-ground pools where the pool structure constitutes a barrier in compliance with Section R326.4.2.9.
2. Spas or hot tubs with a safety cover which complies with ASTM F1346, provided that such safety cover is in place during the period of installation or construction of such hot tub or spa. The temporary removal of a safety cover as required to facilitate the installation or construction of a hot tub or spa during periods when at least one person engaged in the installation or construction is present is permitted.

[NY] **R326.4.1.1 Height.** The top of the temporary barrier shall be at least 48 inches (1219 mm) above grade measured on the side of the barrier which faces away from the swimming pool.

[NY] **R326.4.1.2 Replacement by a permanent barrier.** A temporary barrier shall be replaced by a complying permanent barrier within either of the following periods:

1. 90 days of the date of issuance of the building permit for the installation or construction of the swimming pool; or

2. 90 days of the date of commencement of the installation or construction of the swimming pool.

[NY] **R326.4.1.2.1 Replacement extension.** Subject to the approval of the *building official*, the time period for completion of the permanent barrier may be extended for good cause, including, but not limited to, adverse weather conditions delaying construction.

[NY] **R326.4.2 Permanent barriers.** Swimming pools shall be completely enclosed by a permanent barrier complying with Sections R326.4.2.1 through R326.4.2.6.

[NY] **R326.4.2.1 Barrier height and clearances.** The top of the barrier shall be no less than 48 inches (1219 mm) above grade measured on the side of the barrier that faces away from the swimming pool. The vertical clearance between grade and the bottom of the barrier shall be not greater than 2 inches (51 mm) measured on the side of the barrier that faces away from the swimming pool. Where the top of the pool structure is above grade, the barrier may be at ground level, or mounted on top of the pool structure. Where the barrier is mounted on top of the pool structure, the barrier shall comply with Sections R326.4.2.2 and R326.4.2.3.

[NY] **R326.4.2.2 Solid barrier surfaces.** Solid barriers which do not have openings shall not contain indentations or protrusions except for normal construction tolerances and tooled masonry joints.

[NY] **R326.4.2.3 Closely spaced horizontal members.** 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 (1143 mm), 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 (44 mm) in width. Where there are decorative cutouts within vertical members, spacing within the cutouts shall be not greater than $1\frac{3}{4}$ inches (44 mm) in width.

[NY] **R326.4.2.4 Widely spaced horizontal members.** Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is 45 inches (1143 mm) or more, spacing between vertical members shall be not greater than 4 inches (102 mm). Where there are decorative cutouts within vertical members, spacing within the cutouts shall be not greater than $1\frac{3}{4}$ inches (44 mm) in width.

[NY] **R326.4.2.5 Chain link dimensions.** Maximum mesh size for chain link fences shall be a $2\frac{1}{4}$ inch (57 mm) square, unless the fence has vertical slats fastened at the top or the bottom which reduce the openings to not more than $1\frac{3}{4}$ inches (44 mm).

[NY] **R326.4.2.6 Diagonal members.** Where the barrier is composed of diagonal members, the maximum opening formed by the diagonal members shall be not greater than $1\frac{3}{4}$ inches (44 mm).

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[NY] **R326.4.2.7 Gates.** Gates shall comply with the requirements of Sections R326.4.2.1 through R326.4.2.6, and with the following requirements:

[NY] **R326.4.2.7.1 Self-closing and opening configuration.** All gates shall be self-closing. In addition, if the gate is a pedestrian access gate, the gate shall open outward, away from the pool.

[NY] **R326.4.2.7.2 Latching.** All gates shall be self-latching, with the latch handle located within the enclosure (i.e., on the pool side of the enclosure) and at least 40 inches (1016 mm) above grade. In addition, if the latch handle is located less than 54 inches (1372 mm) from grade, the latch handle shall be located at least 3 inches (76 mm) below the top of the gate, and neither the gate nor the barrier shall have any opening greater than 0.5 inch (12.7 mm) within 18 inches (457 mm) of the latch handle.

[NY] **R326.4.2.7.3 Locking.** All gates shall be securely locked with a key, combination or other child-proof lock sufficient to prevent access to the swimming pool through such gate when the swimming pool is not in use or supervised.

[NY] **R326.4.2.8 Dwelling wall as barrier.** A wall or walls of a dwelling may serve as part of the barrier, provided that the wall or walls meet the applicable barrier requirements of Sections R326.4.2.1 through R326.4.2.6, and one of the following conditions shall be met:

1. a) Doors with direct access to the pool through that wall shall be equipped with an alarm that produces an audible warning when the door and/or its screen, if present, are opened. The alarm shall be listed in accordance with UL 2017. The audible alarm shall activate within 7 seconds and sound continuously for a minimum of 30 seconds after the door and/or its screen, if present, are opened and be capable of being heard throughout the house during normal household activities. The alarm shall automatically reset under all conditions. The alarm system shall be equipped with a manual means, such as touch pad or switch, to temporarily deactivate the alarm for a single opening. Deactivation shall last for not more than 15 seconds; and
- b) Operable windows in the wall or walls used as a barrier shall have a latching device located no less than 48 inches above the floor. Openings in operable windows shall not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the window is in its largest opened position; and
- c) Where the dwelling is wholly contained within the pool barrier or enclosure, alarms shall be provided at every door with direct access to the pool; or

2. Other approved means of protection, such as self-closing with self-latching devices, so long as the degree of protection afforded is not less than the protection afforded by Item 1 described above.

[NY] **R326.4.2.8.1 Alarm deactivation switch location.** Where an alarm is provided, the deactivation switch shall be located 54 inches (1372 mm) or more above the threshold of the door. In dwellings required to be Accessible units, Type A units, or Type B units, the deactivation switch shall be located 48 inches (1219 mm) above the threshold of the door.

[NY] **R326.4.2.9 Pool structure as barrier.** Where an above-ground pool structure is used as a barrier, or where the barrier is mounted on top of the pool structure, the structure shall be designed and constructed in compliance with ANSI/APSP/ICC 4 and meet the applicable barrier requirements of Sections R326.4.2.1 through R326.4.2.8. Where the means of access is a ladder or steps, one of the following conditions shall be met:

1. The ladder or steps shall be capable of being secured, locked or removed to prevent access. When the ladder or steps are secured, locked or removed, any opening created shall not allow the passage of a 4-inch-diameter (102 mm) sphere; or
2. The ladder or steps shall be surrounded by a barrier which meets the requirements of Sections R326.4.2.1 through R326.4.2.8.

[NY] **R326.4.3 Indoor swimming pool.** Walls surrounding an indoor swimming pool shall comply with Section R326.4.2.8.

[NY] **R326.4.4 Prohibited locations.** Barriers shall be located so as to prohibit permanent structures, equipment or similar objects from being used to climb the barrier.

[NY] **R326.5 Entrapment protection for swimming pool and spa suction outlets.** Suction outlets shall be designed to produce circulation throughout the pool or spa. Single-outlet systems, such as automatic vacuum cleaner systems, or multiple suction outlets, whether isolated by valves or otherwise, shall be protected against user entrapment.

[NY] **R326.5.1 Compliance.** Suction outlets shall be designed and installed in accordance with the requirements of CPSC 15 USC 8003 and ANSI/APSP/ICC 7, where applicable.

[NY] **R326.6 Suction outlets.** Suction outlets shall be designed to produce circulation throughout the pool or spa. Single-outlet systems, such as automatic vacuum cleaner systems, or multiple suction outlets, whether isolated by valves or otherwise, shall be protected against user entrapment.

[NY] **R326.6.1 Compliance alternative.** Suction outlets may be designed and installed in accordance with ANSI/APSP/ICC 7.

[NY] R326.6.2 **Suction fittings.** Pool and spa suction outlets shall have a cover that conforms to ANSI/ASME A112.19.8, or an 18 inch by 23 inch (457 mm by 584 mm) drain grate or larger, or an approved channel drain system.

Exception: Surface skimmers.

[NY] R326.6.3 **Atmospheric vacuum relief system required.** Pool and spa single- or multiple-outlet circulation systems shall be equipped with atmospheric vacuum relief should grate covers located therein become missing or broken. This vacuum relief system shall include at least one approved or engineered method of the type specified herein, as follows:

1. Safety vacuum release system conforming to ASME A112.19.17; or
2. An approved gravity drainage system.

[NY] R326.6.4 **Dual drain separation.** Single or multiple pump circulation systems have a minimum of two suction outlets of the approved type. A minimum horizontal or vertical distance of 3 feet (914 mm) shall separate the outlets. These suction outlets shall be piped so that water is drawn through them simultaneously through a vacuum-relief-protected line to the pump or pumps.

[NY] R326.6.5 **Pool cleaner fittings.** Where provided, vacuum or pressure cleaner fitting(s) shall be located in an accessible position(s) at least 6 inches (152 mm) and not more than 12 inches (305 mm) below the minimum operational water level or as an attachment to the skimmer(s).

[NY] R326.7 **Swimming pool and spa alarms, applicability.** A swimming pool or spa installed, constructed or substantially modified after December 14, 2006, shall be equipped with an approved pool alarm. Pool alarms shall comply with ASTM F2208 (Standard Specification for Pool Alarms), and shall be installed, used and maintained in accordance with the manufacturer's instructions and this section.

Exceptions:

1. A hot tub or spa equipped with a safety cover which complies with ASTM F1346.
2. A swimming pool (other than a hot tub or spa) equipped with an automatic power safety cover which complies with ASTM F1346.

[NY] R326.7.1 **Multiple alarms.** A pool alarm must be capable of detecting entry into the water at any point on the surface of the swimming pool. If necessary to provide detection capability at every point on the surface of the swimming pool, more than one pool alarm shall be provided.

[NY] R326.7.2 **Alarm activation.** Pool alarms shall activate upon detecting entry into the water and shall sound poolside and inside the dwelling.

[NY] R326.7.3 **Prohibited alarms.** The use of personal immersion alarms shall not be construed as compliance with this section.

[NY] SECTION R327
ENERGY STORAGE SYSTEMS

[NY] R327.1 **General.** *Energy storage systems* installed in *buildings or structures* that are subject to the provisions of this code shall be installed and maintained in accordance with Sections R327.2 through R327.11. The temporary use of an owner's or occupant's electric powered vehicle as an *energy storage system* shall be in accordance with Section R327.12.

Energy storage system installations exceeding the permitted aggregate ratings in Section R327.5 shall be installed in accordance with Section 1206.2 through 1206.17.7.7 of the *Fire Code of New York State*.

[NY] R327.2 **Equipment listings.** *Energy storage systems listed and labeled* solely for utility or commercial use shall not be used for residential applications.

Exceptions:

1. Where *approved*, repurposed unlisted battery systems from electric vehicles are allowed to be installed outdoors or in detached dedicated cabinets located not less than 5 feet (1524 mm) from exterior walls, property lines and public ways.
2. *Energy storage systems* less than 1 kWh (3.6 megajoules).

[NY] R327.3 **Installation.** *Energy storage systems* shall be installed in accordance with the manufacturer's instructions and their *listing*.

[NY] R327.3.1 **Spacing.** Individual units shall be separated from each other by at least 3 feet (914 mm) of spacing unless smaller separation distances are documented to be adequate based on large-scale fire testing complying with Section 1206.6 of the *Fire Code of New York State*.

[NY] R327.4 **Location.** *Energy storage systems* shall only be installed in the following locations:

1. Detached garages and detached *accessory structures*.
2. Attached garages separated from the *dwelling unit* living space and *sleeping units* in accordance with Section R302 of this code.
3. Outdoors on exterior walls located a minimum 3 feet (914 mm). from doors and windows.
4. Utility closets and storage or utility spaces within *dwelling units* and *sleeping units*

[NY] R327.5 **Energy ratings.** Individual *energy storage system* units shall have a maximum rating of 20 kWh. The aggregate rating shall not exceed:

1. 40 kWh within utility closets and storage or utility spaces.
2. 80 kWh in attached or detached garages and detached *accessory structures*.
3. 80 kWh on exterior walls.
4. 80 kWh outdoors on the ground.

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. Swimming, wading, or immersion pools that are intended to be stored when not in use, that are constructed on or above the ground and that are capable of holding water with a maximum depth of 42 inches (1067 mm), or a pool, spa, or hot tub that is constructed on or above the ground 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 or hot tubs that are installed in corrosive environments described in Section E4202.2.1 shall comply with Table E4202.1, Sections

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E4202.2 and E4205 and Chapter 38 except as otherwise stated in this section. Wiring methods used in conjunction with permanently installed swimming pools, spas or hot tubs that are not installed in corrosive environments shall comply with Chapter 38. Storable swimming pools shall comply with Section E4207. Hydromassage bathtubs shall comply with Section E4209. [680.7; 680.14 (A) and (B); 680.21(A); 680.23(B) and (F); 680.25(A); 680.42; 680.43; and 680.70]

E4202.2 Corrosive environment. Areas where pool sanitation chemicals are stored, areas with circulation pumps, automatic chlorinators or filters, open areas under decks adjacent to or abutting the pool structure and similar locations shall be considered to be corrosive environments. The air in such areas shall be considered to be laden with acid, chlorine and bromine vapors or any combination of acid, chlorine or bromine vapors; and any liquids or condensation in those areas shall be considered to be laden with acids, chlorine and bromine vapors, or any combination of acid, chlorine or bromine vapors. [680.14 (A)]

E4202.2.1 Wiring methods. Wiring methods in the areas described in Section E4202.2 shall be listed and identified for use in such areas. Rigid metal conduit (RMC), intermediate metal conduit (IMC), rigid polyvinyl chloride conduit (RNC) and reinforced thermosetting resin conduit shall be considered to be resistant to the corrosive environment specified in Section E4202.2. [680.14 (B)]

E4202.3 Flexible cords. Flexible cords used in conjunction with a pool, spa, hot tub or hydromassage bathtub shall be installed in accordance with the following:

1. For other than underwater luminaires, fixed or stationary equipment shall be permitted to be connected with a flexible cord to facilitate removal or disconnection for maintenance or repair. For other than storable pools, the flexible cord shall not exceed 3 feet (914 mm) in length. Cords that supply swimming pool equipment shall have a copper equipment grounding conductor not smaller than 12 AWG and shall terminate in a grounding-type attachment plug. [680.8(A), (B), and (C); 680.21(A)(5)]
2. 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. Such grounding conductor shall be connected to a grounding terminal in the supply junction box, transformer enclosure, or other enclosure and shall be not smaller than the supply conductors and not smaller than 16 AWG. [680.23(B)(3)]
3. A listed packaged spa or hot tub installed outdoors that is GFCI protected shall be permitted to be cord-and-plug-connected provided that such cord does not exceed 15 feet (4572 mm) in length. [680.42(A)(2)]

TABLE E4202.1^a
PERMITTED WIRING METHODS IN CORROSIVE ENVIRONMENTS

WIRING LOCATION OR PURPOSE (Application allowed where marked with an "A")	IMC ^b , RMC ^b , RNC ^c	LFMC	LFNMC	MC ^g	FLEX CORD
Panelboard(s) that supply pool equipment: from service equipment to panelboard	A ^f	—	A	—	—
Wet-niche and no-niche luminaires: from branch circuit OCPD to deck or junction box	A	—	A	—	—
Wet-niche and no-niche luminaires: from deck or junction box to forming shell	A ⁱ	—	A	—	A ^d
Dry niche: from branch circuit OCPD to luminaires	A	—	A	—	—
Pool-associated motors: from branch circuit OCPD to motor ^h	A	A ^c	A ^c	A	A ^d
Packaged or self-contained outdoor spas and hot tubs with underwater luminaire: from branch circuit OCPD to spa or hot tub	A	A	A	—	A ^d
Packaged or self-contained outdoor spas and hot tubs without underwater luminaire: from branch circuit OCPD to spa or hot tub	A	A	A	—	A ^d
Indoor spas and hot tubs, and other pool, spa or hot tub associated equipment: from branch circuit OCPD to equipment	A	A	A	—	A ^d
Connection at pool lighting transformers or power supplies	A	A ⁱ	A	—	—

For SI: 1 foot = 304.8 mm.

- a. For all wiring methods, see Section E4205 for equipment grounding conductor requirements.
- b. See Section E4202.2.1 for use of metal conduits in corrosive environments.
- c. Limited to where necessary to employ flexible connections at or adjacent to a pool motor.
- d. Flexible cord shall be installed in accordance with Section E4202.2.
- e. Nonmetallic conduit shall be rigid polyvinyl chloride conduit Type PVC or reinforced thermosetting resin conduit Type RTRC.
- f. Aluminum conduits shall not be permitted in the pool area where subject to corrosion.
- g. Where installed as direct burial cable or in wet locations, Type MC cable shall be listed and identified for the location.
- h. See Section E4202.3 for listed, double-insulated pool pump motors.
- i. Limited to use in individual lengths not to exceed 6 feet. The total length of all individual runs of LFMC shall not exceed 10 feet.
- j. Metal conduit shall be constructed of brass or other approved corrosion-resistant metal.

4. A listed packaged spa or hot tub rated at 20 amperes or less and installed indoors shall be permitted to be cord-and-plug-connected to facilitate maintenance and repair. (680.43 Exception No. 1)
5. For other than underwater and storable pool lighting luminaire, the requirements of Item 1 shall apply to any cord-equipped luminaire that is located within 16 feet (4877 mm) radially from any point on the water surface. [680.22(B)(5)]

E4202.4 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 of the grounding type, located not less than 6 feet (1829 mm) from the inside walls of pools and outdoor spas and hot tubs, and ground-fault circuit-interrupter protected.

E4203.1.2 Other receptacles. 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)(3)]

E4203.1.3 Where required. Not less than one 125-volt, 15- or 20-ampere receptacle supplied by a general-purpose branch circuit shall be located not less than 6 feet (1829 mm) from and not more than 20 feet (6096 mm) from the inside wall of permanently installed 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)]

E4203.1.4 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)]

E4203.1.5 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)]

E4203.1.6 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. (680.13)

E4203.4 Luminaires, equipment and ceiling fans. Lighting outlets, luminaires, equipment and ceiling-suspended paddle fans shall be installed and located in accordance with Sections E4203.4.1 through E4203.4.7. [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.
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)]

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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 5 feet (1.5 m) from the inside walls of the pool. [680.22(B)(6)]

E4203.4.4 Existing lighting outlets and luminaires. Existing lighting outlets and luminaires that are located within 5 feet (1524 mm) horizontally from the inside walls of pools and outdoor spas and hot tubs shall be permitted to be located not less than 5 feet (1524 mm) vertically above the maximum water level, provided that such luminaires and outlets are rigidly attached to the existing structure and are protected by a ground-fault circuit interrupter. [680.22(B)(3)]

E4203.4.5 Indoor spas and hot tubs.

1. Luminaires, lighting outlets, and ceiling-suspended paddle fans located over the spa or hot tub or within 5 feet (1524 mm) from the inside walls of the spa or hot tub shall be not less than 7 feet, 6 inches (2286 mm) above the maximum water level and shall be protected by a ground-fault circuit interrupter. [680.43(B)(1)(b)]

Luminaires, lighting outlets, and ceiling-suspended paddle fans that are located 12 feet (3658 mm) or more above the maximum water level shall not require ground-fault circuit interrupter protection. [680.43(B)(1)(a)]

2. Luminaires protected by a ground-fault circuit interrupter and complying with Item 2.1 or 2.2 shall be permitted to be installed less than 7 feet, 6 inches (2286 mm) over a spa or hot tub.
 - 2.1. Recessed luminaires shall have a glass or plastic lens and nonmetallic or electrically isolated metal trim, and shall be suitable for use in damp locations.
 - 2.2. Surface-mounted luminaires shall have a glass or plastic globe and a nonmetallic body or a metallic body isolated from contact. Such luminaires shall be suitable for use in damp locations. [680.43(B)(1)(c)(1) and (2)]

E4203.4.6 GFCI protection in adjacent areas. Luminaires, lighting outlets and ceiling-suspended paddle fans that are installed in the area extending between 5 feet (1524 mm) and 10 feet (3048 mm) from the inside walls of pools and outdoor spas and hot tubs shall be protected by ground-fault circuit interrupters except where such luminaires, lighting outlets and ceiling-suspended paddle fans are installed not less than 5 feet (1524 mm) above the maximum water level and are rigidly attached to the structure. [680.22(B)(4)]

E4203.4.7 Low-voltage gas-fired luminaires, decorative fireplaces, fire pits and similar equipment. Listed low-voltage gas-fired luminaires, decorative fireplaces, fire pits and similar equipment that use low-voltage ignitors that do not require grounding, and that are supplied by listed transformers or power supplies that comply with Section E4206.1 with outputs that do not exceed the low-voltage contact limit, shall be permitted to be located less than 5 feet (1524 mm) from the inside walls of the pool. Metallic equipment shall be bonded in accordance with the requirements in Section E4204.2. Transformers and power supplies supplying this type of equipment shall be installed in accordance with the requirements of Section E4206.9.1. Metallic gas piping shall be bonded in accordance with the requirements of Sections E3609.7 and 4204.2(7). [680.22 (B) (7)]

E4203.5 Other outlets. Other outlets such as for remote control, signaling, fire alarm and communications shall be not less than 10 feet (3048 mm) from the inside walls of the pool. Measurements shall be determined in accordance with Section E4203.1. [680.22(D)]

E4203.6 Overhead conductor clearances. Except where installed with the clearances specified in Table E4203.6, the following parts of pools and outdoor spas and hot tubs shall not be placed under existing service-drop conductors, overhead service conductor, or any other open overhead wiring; nor shall such wiring be installed above the following:

1. Pools and the areas extending not less than 10 feet, (3048 mm) horizontally from the inside of the walls of the pool.
2. Diving structures and the areas extending not less than 10 feet (3048 mm) horizontally from the outer edge of such structures.

TABLE E4203.6 [Table 680.8(A)]
OVERHEAD CONDUCTOR CLEARANCES

	INSULATED SUPPLY OR SERVICE DROP CABLES, 0-750 VOLTS TO GROUND, SUPPORTED ON AND CABLED TOGETHER WITH AN EFFECTIVELY GROUNDED BARE MESSENGER OR EFFECTIVELY GROUNDED NEUTRAL CONDUCTOR (feet)	ALL OTHER SUPPLY OR SERVICE DROP CONDUCTORS (feet)	
		Voltage to ground	
		0-15 kV	Greater than 15 to 50 kV
A. Clearance in any direction to the water level, edge of water surface, base of diving platform, or permanently anchored raft	22.5	25	27
B. Clearance in any direction to the diving platform	14.5	17	18

For SI: 1 foot = 304.8 mm.

3. Observation stands, towers, and platforms and the areas extending not less than 10 feet (3048 mm) horizontally from the outer edge of such structures.

Overhead conductors of network-powered broadband communications systems shall comply with the provisions in Table E4203.6 for conductors operating at 0 to 750 volts to ground.

Utility-owned, -operated and -maintained communications conductors, community antenna system coaxial cables and the supporting messengers shall be permitted at a height of not less than 10 feet (3048 mm) above swimming and wading pools, diving structures, and observation stands, towers, and platforms. [680.8(A), (B), and (C)]

E4203.7 Underground wiring. Underground wiring shall not be installed under the pool except where this wiring is necessary to supply pool equipment permitted by this chapter. Underground wiring shall be installed in rigid metal conduit, intermediate metal conduit, rigid polyvinyl chloride conduit, reinforced thermosetting resin conduit or Type MC cable, suitable for the conditions subject to that location. The minimum cover depth shall be in accordance with Table E3803.1. (680.11)

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 to be bonded shall be considered to 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 are separated from the pool by a permanent wall or building 5 feet (1524 mm) or more in height shall require equipotential bonding only 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 above-ground 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. The top rim of the spa or hot tub is not less than 28 inches (711 mm) above all perimeter surfaces that are within 30 inches (762 mm), measured horizontally from the spa or hot tub. The height of nonconductive external steps for entry to or exit from the self-contained spa is not

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used to reduce or increase this rim height measurement.

2. The equipotential bonding requirements for perimeter surfaces shall not apply to a listed self-contained spa or hot tub located indoors and installed above a finished floor.
 - 2.1. Structural reinforcing steel. Structural reinforcing steel shall be bonded in accordance with Item 1.1.
 - 2.2. Alternate means. Where structural reinforcing steel is not available or is encapsulated in a nonconductive compound, a copper conductor(s) shall be used in accordance with Items 2.2.1 through 2.2.5:
 - 2.2.1. At least one minimum 8 AWG bare solid copper conductor shall be provided.
 - 2.2.2. The conductors shall follow the contour of the perimeter surface.
 - 2.2.3. Splices shall be listed.
 - 2.2.4. The required conductor shall be 18 to 24 inches (457 to 610 mm) from the inside walls of the pool.
 - 2.2.5. The required conductor shall be secured within or under the perimeter surface 4 to 6 inches (102 mm to 152 mm) below the subgrade. [680.26(B)(2)]
3. Metallic components. All metallic parts of the pool structure, including reinforcing metal not addressed in Item 1.1, shall be bonded. Where reinforcing steel is encapsulated with a nonconductive compound, the reinforcing steel shall not be required to be bonded. [680.26(B)(3)]
4. Underwater lighting. All metal forming shells and mounting brackets of no-niche luminaires shall be bonded. [680.26(B)(4)]

Exception: Listed low-voltage lighting systems with nonmetallic forming shells shall not require bonding. [680.26(B)(4) Exception]
5. Metal fittings. All metal fittings within or attached to the pool structure shall be bonded. Isolated parts that are not over 4 inches (102 mm) in any dimension and do not penetrate into the pool structure more than 1 inch (25.4 mm) shall not require bonding. [680.26(B)(5)]
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. [680.26(B)(6)]

Exception: Metal parts of listed equipment incorporating an approved system of double insulation shall not be bonded. [680.26(B)(6) Exception]

- 6.1. Double-insulated water pump motors. Where a double-insulated water pump motor is installed under the provisions of this item, 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. [680.26(B)(6)(a)]
- 6.2. 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. [680.26(B)(6)(b)]
7. All fixed metal parts including, but not limited to, metal-sheathed cables and raceways, metal piping, metal awnings, metal fences and metal door and window frames. [680.26(B)(7)]

Exceptions:

1. Those separated from the pool by a permanent barrier that prevents contact by a person shall not be required to be bonded. [680.26(B)(7) Exception No. 1]
2. Those greater than 5 feet (1524 mm) horizontally from the inside walls of the pool shall not be required to be bonded. [680.26(B)(7) Exception No. 2]
3. Those greater than 12 feet (3658 mm) 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. [680.26(B)(7) Exception No. 3]

E4204.3 Pool water. 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 9 square inches (5800 mm²) 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 Section E4204.2.

E4204.4 Bonding of outdoor hot tubs and spas. Outdoor hot tubs and spas shall comply with the bonding requirements of Sections E4204.1 through E4204.3. Bonding by metal-to-metal mounting on a common frame or base shall be permitted. The metal bands or hoops used to secure wooden staves shall not be required to be bonded as required in Section E4204.2. [680.42 and 680.42(B)]

E4204.5 Bonding of indoor hot tubs and spas. The following parts of indoor hot tubs and spas shall be bonded together:

1. All metal fittings within or attached to the hot tub or spa structure. [680.43(D)(1)]
2. Metal parts of electrical equipment associated with the hot tub or spa water circulating system, including pump 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 E3406.14.1.

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. Where branch-circuit wiring on the supply side of enclosures and junction boxes connected to conduits run to underwater luminaires are installed in corrosive environments as described in Section E4202.2, the wiring method of that portion of the branch circuit shall be as required in Section E4202.2.1 or shall be liquid-tight flexible nonmetallic conduit (LFNMC). Where not installed in corrosive environments, branch circuits shall comply with Chapter 38. Wiring methods shall contain 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 over-current device in such circuit.

The insulated copper equipment grounding conductor shall be connected to all through-wall lighting assemblies, wet-niche, dry-niche, or no-niche luminaires other than listed low-voltage luminaires not requiring grounding. 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)(1), (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)]

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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 shall be connected to a grounding terminal in the supply junction box, transformer enclosure, or other enclosure. The grounding conductor shall not be smaller than the supply conductors and not smaller than 16 AWG. [680.23(B)(3)]

E4205.5 Pool motors. Wiring methods installed in the corrosive environment described in Section E4202.2.1 shall comply with Section E4202.2.2 or shall be Type MC cable listed for that location. Wiring methods installed in corrosive environments described in Section E4202.2.1 shall contain an insulated copper equipment conductor sized in accordance with Table E3908.12 but not smaller than 12 AWG.

Where installed in noncorrosive environments, branch circuit wiring methods shall comply with Chapter 38. [680.21(A)(1)].

E4205.6 Feeders. These provisions shall apply to any feeder on the supply side of panelboards supplying branch circuits for pool equipment covered in this chapter and on the load side of the service equipment. Where feeders are installed in corrosive environments as described in Section E4202.2, the wiring method of that portion of the feeder shall comply with Section E4202.2.1 or shall be liquid-tight flexible nonmetallic conduit (LFNMC). Wiring methods installed in corrosive environments as described in Section E4202.2.1 shall contain an insulated copper equipment grounding conductor sized in accordance with Table E3908.12, but not smaller than 12 AWG.

Where installed in noncorrosive environments, feeder wiring methods shall comply with Chapter 38. [680.25(A)].

E4205.7 Cord-connected equipment. Where fixed or stationary equipment is connected with a flexible cord to facilitate removal or disconnection for maintenance, repair, or storage, as provided in Section E4202.3, the equipment grounding conductors shall be connected to a fixed metal part of the assembly. The removable part shall be mounted on or bonded to the fixed metal part. [680.7(C)]

E4205.8 Other equipment. Other electrical equipment shall be grounded in accordance with Section E3908. (Article 250, Parts V, VI, and VII; and 680.6)

E4205.9 Grounding and bonding terminals. Grounding and bonding terminals shall be identified for use in wet and corrosive environments. Field-installed grounding and bonding connections in a damp, wet or corrosive environment shall be composed of copper, copper alloy or stainless steel and shall be listed for direct burial use. (680.7)

SECTION E4206 EQUIPMENT INSTALLATION

E4206.1 Transformers and power supplies. Transformers and power supplies used for the supply of underwater luminaires, together with the transformer or power supply enclosure, shall be listed, labeled and identified for swimming pool and spa use. The transformer or power supply shall incorporate either a transformer of the isolated-winding type with an ungrounded secondary that has a grounded metal barrier between the primary and secondary windings, or a transformer that incorporates an approved system of double insulation between the primary and secondary windings. [680.23(A)(2)]

E4206.2 Ground-fault circuit interrupters. Ground-fault circuit interrupters shall be self-contained units, circuit-breaker types, receptacle types or other approved types. (680.5)

E4206.3 Wiring on load side of ground-fault circuit interrupters and transformers. For other than grounding conductors, conductors installed on the load side of a ground-fault circuit interrupter or transformer used to comply with the provisions of Section E4206.4, shall not occupy raceways, boxes, or enclosures containing other conductors except where the other conductors are protected by ground-fault circuit interrupters or are grounding conductors. Supply conductors to a feed-through type ground-fault circuit interrupter shall be permitted in the same enclosure. Ground-fault circuit-interrupters shall be permitted in a panelboard that contains circuits protected by other than ground-fault circuit interrupters. [680.23(F)(3)]

E4206.4 Underwater luminaires. The design of an underwater luminaire supplied from a branch circuit either directly or by way of a transformer or power supply meeting the requirements of Section E4206.1, shall be such that, where the fixture is properly installed without a ground-fault circuit interrupter, there is no shock hazard with any likely combination of fault conditions during normal use (not relamping). In addition, ground-fault circuit-interrupter protection for personnel shall be installed in the branch circuit supplying luminaires operating at voltages greater than the low-voltage contact limit to protect personnel performing lamping, relamping or servicing. The installation of the ground-fault circuit interrupter shall be such that there is no shock hazard with any likely fault-condition combination that involves a person in a conductive path from any ungrounded part of the branch circuit or the luminaire to ground. Compliance with this requirement shall be obtained by the use of a listed underwater luminaire and by installation of a listed ground-fault circuit-interrupter in the branch circuit or a listed transformer or power supply for luminaires operating at more than the low-voltage contact limit. Luminaires that depend on submersion for safe operation shall be inherently protected

against the hazards of overheating when not submerged. [680.23(A)(1), (A)(3), (A)(7) and (A)(8)]

E4206.4.1 Maximum voltage. Luminaires shall not be installed for operation on supply circuits over 150 volts between conductors. [680.23(A)(4)]

E4206.4.2 Luminaire location. Luminaires mounted in walls shall be installed with the top of the fixture lens not less than 18 inches (457 mm) below the normal water level of the pool, except where the luminaire is listed and identified for use at a depth of not less than 4 inches (102 mm) below the normal water level of the pool. A luminaire facing upward shall have the lens adequately guarded to prevent contact by any person or shall be listed for use without a guard. [680.23(A)(5) and (A)(6)]

E4206.5 Wet-niche luminaires. Forming shells shall be installed for the mounting of all wet-niche underwater luminaires and shall be equipped with provisions for conduit entries. Conduit shall extend from the forming shell to a suitable junction box or other enclosure located as provided in Section E4206.9. Metal parts of the luminaire and forming shell in contact with the pool water shall be of brass or other approved corrosion-resistant metal. [680.23(B)(1)]

The end of flexible-cord jackets and flexible-cord conductor terminations within a luminaire shall be covered with, or encapsulated in, a suitable potting compound to prevent the entry of water into the luminaire through the cord or its conductors. 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 Sections E4206.9.1 through E4206.9.5. [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)]
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

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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 terminals in a quantity not less than the number of conduit entries plus one. [680.24(D)]

E4206.9.5 Strain relief. The termination of a flexible cord of an underwater luminaire within a junction box, transformer or power supply enclosure, ground-fault circuit interrupter, or other enclosure shall be provided with a strain relief. [680.24(E)]

E4206.10 Underwater audio equipment. Underwater audio equipment shall be identified for the purpose. [680.27(A)]

E4206.10.1 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. [680.27(A)(1)]

E4206.10.2 Wiring methods. Rigid metal conduit of brass or other identified corrosion-resistant metal, rigid polyvinyl chloride conduit, rigid thermosetting resin conduit or liquid-tight flexible nonmetallic conduit (LFNC-B) shall extend from the forming shell to a suitable junction box or other enclosure as provided in Section E4206.9. Where rigid nonmetallic conduit or liquid-tight flexible nonmetallic conduit is used, an 8 AWG solid or stranded insulated copper bonding jumper shall be installed in this conduit with provisions for terminating 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 suitable potting compound to protect

such connection from the possible deteriorating effect of pool water. [680.27(A)(2)]

E4206.10.3 Forming shell and metal screen. The forming shell and metal screen shall be of brass or other approved corrosion-resistant metal. Forming shells shall include provisions for terminating an 8 AWG copper conductor. [680.27(A)(3)]

E4206.11 Electrically operated pool covers. The electric motors, controllers, and wiring for pool covers shall be located not less than 5 feet (1524 mm) from the inside wall of the pool except where 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 electric motor and controller shall be connected to a branch circuit protected by a ground-fault circuit interrupter. The device that controls the operation of the motor for an electrically operated pool cover shall be located so that the operator has full view of the pool.

Exceptions:

1. Motors that are part of listed systems with ratings not exceeding the low-voltage contact limit and that are supplied by listed transformers or power supplies that comply with Section E4206.1 shall be permitted to be located less than 5 feet (1524 mm) from the inside walls of the pool.
2. Motors that are part of listed systems with ratings not exceeding the low-voltage contact limit and that are supplied by listed transformers or power supplies that comply with Section E4206.1 shall not be required to be connected to a branch circuit protected by a ground fault circuit-interrupter. [680.27(B)(1) and (B)(2)]

E4206.12 Electric pool water heaters. Electric pool water heaters 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 overcurrent protective devices shall be not less than 125 percent of the total nameplate load rating. (680.9)

E4206.13 Pool area heating. The provisions of Sections E4206.13.1 through E4206.13.3 shall apply to all pool deck areas, including a covered pool, where electrically operated comfort heating units are installed within 20 feet (6096 mm) of the inside wall of the pool. [680.27(C)]

E4206.13.1 Unit heaters. Unit heaters shall be rigidly mounted to the structure and shall be of the totally enclosed or guarded types. Unit heaters shall not be mounted over the pool or within the area extending 5 feet (1524 mm) horizontally from the inside walls of a pool. [680.27(C)(1)]

E4206.13.2 Permanently wired radiant heaters. Electric radiant heaters shall be suitably guarded and securely fastened to their mounting devices. Heaters shall not be installed over a pool or within the area extending 5 feet (1524 mm) horizontally from the inside walls of the pool and shall be mounted not less than 12 feet (3658 mm) vertically above the pool deck. [680.27(C)(2)]

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E4206.13.3 Radiant heating cables prohibited. Radiant heating cables embedded in or below the deck shall be prohibited. [680.27(C)(3)]

**SECTION E4207
STORABLE SWIMMING POOLS,
STORABLE SPAS, AND STORABLE HOT TUBS**

E4207.1 Pumps. A cord and plug-connected pool filter pump for use with storable pools shall incorporate an approved system of double insulation or its equivalent and shall be provided with means for grounding only the internal and nonaccessible noncurrent-carrying metal parts of the appliance.

The means for grounding shall be an equipment grounding conductor run with the power-supply conductors in a flexible cord that is properly terminated in a grounding-type attachment plug having a fixed grounding contact. Cord and plug-connected pool filter pumps shall be provided with a ground-fault circuit-interrupter that is an integral part of the attachment plug or located in the power supply cord within 12 inches (305 mm) of the attachment plug. (680.31)

E4207.2 Ground-fault circuit interrupters required. Electrical equipment, including power-supply cords, used with storable pools shall be protected by ground-fault circuit interrupters. 125-volt, 15- and 20-ampere receptacles located within 20 feet (6096 mm) of the inside walls of a storable pool, storable spa, or storable hot tub shall be protected by a ground-fault circuit interrupter. 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. (680.32)

E4207.3 Luminaires. Luminaires for storable pools, storable spas, and storable hot tubs shall not have exposed metal parts and shall be listed for the purpose as an assembly. In addition, luminaires for storable pools shall comply with the requirements of Section E4207.3.1 or E4207.3.2. (680.33)

E4207.3.1 Within the low-voltage contact limit. A luminaire installed in or on the wall of a storable pool shall be 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-

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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 one-family dwellings. (680.41)

SECTION E4209 HYDROMASSAGE BATHTUBS

E4209.1 General. Installations of hydromassage bathtubs shall be required to comply only with Section E4209. The branch circuit wiring method(s) supplying a hydromassage bathtub shall comply with Chapter 38.

E4209.2 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)

E4209.3 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)

E4209.4 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)

E4209.5 Bonded parts. The following parts shall be bonded together:

1. Metal fittings within or attached to the tub structure that are in contact with the circulating water.
2. Metal parts of electrical equipment associated with the tub water circulating system, including the pump and blower motors.
3. Metal-sheathed cables and raceways and metal piping that are within 5 feet (1524 mm) of the inside walls of the tub and that are not separated from the tub area by a permanent barrier.

4. Exposed metal surfaces that are within 5 feet (1524 mm) of the inside walls of the tub and not separated from the tub area by a permanent barrier.
5. Electrical devices and controls that are not associated with the hydromassage tubs and that are located within 5 feet (1524 mm) from such units.

Exceptions:

1. Double-insulated motors and blowers shall not be bonded.
2. Small conductive surfaces not likely to become energized, such as air and water jets, supply valve assemblies and drain fittings not connected to metal piping, and towel bars, mirror frames and similar nonelectric equipment not connected to metal framing shall not be required to be bonded.

E4209.6 Method of bonding. Metal parts required to be bonded by this section shall be bonded together using a solid copper bonding jumper, insulated, covered or bare, not smaller than 8 AWG. The bonding jumper(s) shall be required for equipotential bonding in the area of the hydromassage bathtub and shall not be required to be extended or attached to any remote panelboard, service equipment, or electrode. In all installations, a bonding jumper long enough to terminate on a replacement nondouble-insulated pump or blower motor shall be provided and shall be terminated to the equipment grounding conductor of the branch circuit of the motor where a double-insulated circulating pump or blower motor is used. (680.74)

CHAPTER 43

CLASS 2 REMOTE-CONTROL, SIGNALING AND POWER-LIMITED CIRCUITS

SECTION E4301 GENERAL

E4301.1 Scope. This chapter contains requirements for power supplies and wiring methods associated with Class 2 remote-control, signaling, and power-limited circuits that are not an integral part of a device or appliance. Other classes of remote-control, signaling and power-limited conductors shall comply with Article 725 of NFPA 70. (725.1)

E4301.2 Definitions.

CLASS 2 CIRCUIT. That portion of the wiring system between the load side of a Class 2 power source and the connected equipment. Due to its power limitations, a Class 2 circuit considers safety from a fire initiation standpoint and provides acceptable protection from electric shock. (725.2)

REMOTE-CONTROL CIRCUIT. Any electrical circuit that controls any other circuit through a relay or an equivalent device. (Article 100)

SIGNALING CIRCUIT. Any electrical circuit that energizes signaling equipment. (Article 100)

SECTION E4302 POWER SOURCES

E4302.1 Power sources for Class 2 circuits. The power source for a Class 2 circuit shall be one of the following:

1. A listed Class 2 transformer.
2. A listed Class 2 power supply.
3. Other listed equipment marked to identify the Class 2 power source.
4. Listed audio/video information technology (computer) communications and industrial equipment limited power circuits.
5. A dry-cell battery provided that the voltage is 30 volts or less and the capacity is equal to or less than that available from series connected No. 6 carbon zinc cells. [725.121(A)]

E4302.2 Interconnection of power sources. A Class 2 power source shall not have its output connections paralleled or otherwise interconnected with another Class 2 power source except where listed for such interconnection. [725.121(B)]

SECTION E4303 WIRING METHODS

E4303.1 Wiring methods on supply side of Class 2 power source. Conductors and equipment on the supply side of the power source shall be installed in accordance with the appropriate

requirements of Chapters 34 through 41. Transformers or other devices supplied from electric light or power circuits shall be protected by an over-current device rated at not over 20 amperes. The input leads of a transformer or other power source supplying Class 2 circuits shall be permitted to be smaller than 14 AWG, if not over 12 inches (305 mm) long and if the conductor insulation is rated at not less than 600 volts. In no case shall such leads be smaller than 18 AWG. (725.127 and 725.127 Exception)

E4303.2 Wiring methods and materials on load side of the Class 2 power source. Class 2 cables installed as wiring within buildings shall be listed as being resistant to the spread of fire and listed as meeting the criteria specified in Sections E4303.2.1 through E4303.2.3. Cables shall be marked in accordance with Section E4303.2.4. Cable substitutions as described in Table E4303.2 and wiring methods covered in Chapter 38 shall also be permitted. (725.130 (B); 725.133; 725.135 (A), (C), (G) and (M); 725.154; Table 725.154; Figure 725.154 (A); and 725.179)

TABLE E4303.2
CABLE USES AND PERMITTED SUBSTITUTIONS
[Figure 725.154(A)]

CABLE TYPE	USE	PERMITTED SUBSTITUTIONS ^a
CL2P	Class 2 Plenum Cable	CMP, CL3P
CL2R	Class 2 Plenum Cable	CMP, CL3P, CL2P, CMR, CL3R
CL2	Class 2 Cable	CMP, CL3P, CL2P, CMR, CL3R, CL2R CMG, CM, CL3
CL2X	Class 2 Cable, Limited Use	CMP, CL3P, CL2P, CMR, CL3R, CL2R, CMG, CM, CL3, CL2, CMX, CL3X

a. For identification of cables other than Class 2 cables, see NFPA 70.

E4303.2.1 Type CL2P cables. Cables installed in ducts, plenums and other spaces for environmental air shall be Type CL2P cables listed as suitable for the use and listed as having adequate fire-resistant and low smoke-producing characteristics. [725.179(A)]

E4303.2.2 Type CL2 cables. Cables for general-purpose use, shall be listed as resistant to the spread of fire and listed for the use. [725.179 (C)]

E4303.2.3 Type CL2X cables. Type CL2X limited-use cable shall be listed as suitable for use in dwellings and raceways and shall be listed as resistant to flame spread. [725.179 (D)]

E4303.2.4 Type CL2R cables. Cables installed in a vertical run in a shaft or installed from floor to floor shall be listed as suitable for use in a vertical run in a shaft or from floor to floor and shall be listed as having fire-resistant

Self-closing self-latching

Spring loaded hinges or approved closer

POOL SIDE

18" protective cover

2 X 4

Max. 4" 3 7/8" preferred

SWING OF GATE OPEN OUTWARD AWAY FROM POOL SIDE

ALLOW 1/4" MIN. SPACING ON EACH SIDE FOR CLEARANCE AND ROUND RAIL CAP

protective cover

5/4 X 6 CAP

2 X 4 RAIL

EYE HOOK

2 X 4 TRIM

48"

1/4" TURN BUCKLE

2 X 4

48"

OUTSIDE POOL VIEW

3" DOWN FROM TOP OF GATE

2 X 2 PICKET

protective cover

EYE HOOK

2 X 4 RAIL

Top of Pool Deck

18"

18"

44"

48"

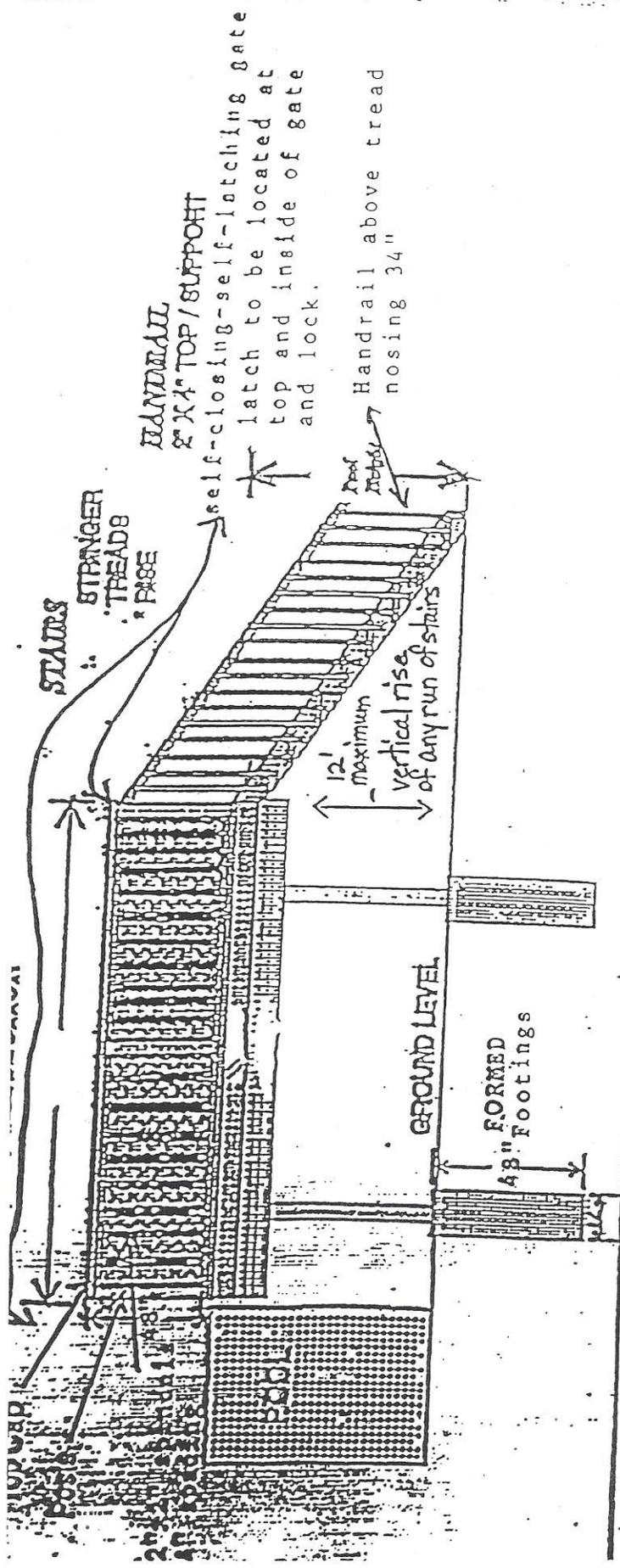
4"

2 X 4

POOL SIDE VIEW

CROSS SECTION

GATE DETAIL FOR ABOVE GROUND POOL DECK



HANDRAIL

2" X 4" TOP / SUPPORT

self-closing-self-latching gate latch to be located at top and inside of gate and lock.

Handrail above tread nosing 34"

12" maximum vertical rise of any run of stairs

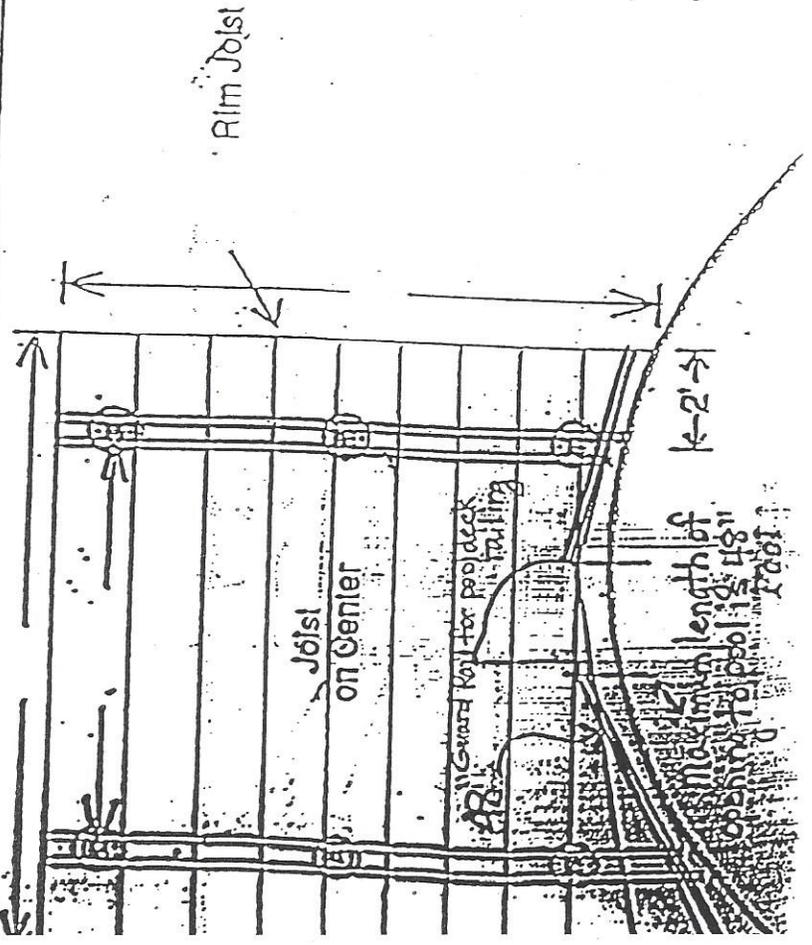
GROUND LEVEL

48" FORMED Footings

*NOTE: ALL MATERIAL PRESSURE TREATED, HARWARD GALVANIZED

DOORS IN DWELLINGS ADJACENT TO POOL DECKS AND IN-GROUND POOLS SHALL BE SELF-CLOSING AND/OR SELF-LATCHING DEPENDING ON TYPE OF DOOR.

THIS SKETCH IS FOR REFERENCE ONLY AND NOT TO BE USED AS PLAN FOR PERMIT APPLICATION REQUIREMENTS.



World Safest...



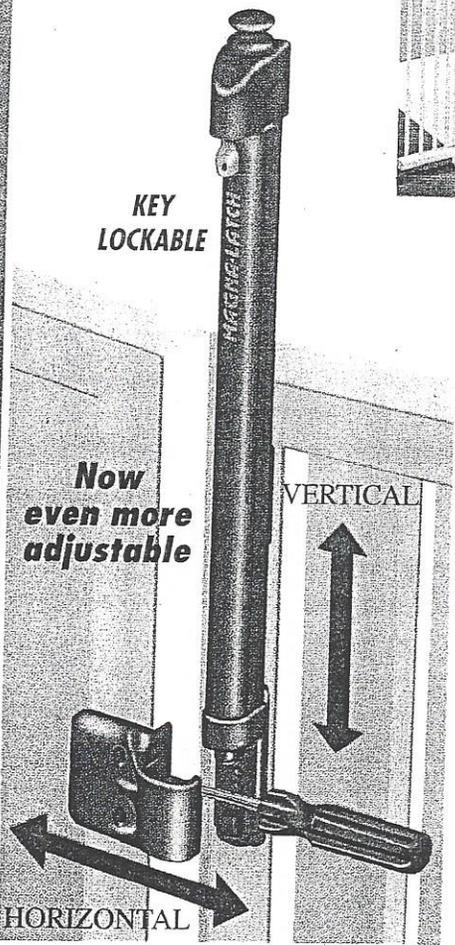
Endorsed by Laurie Lawrence, former Australian Olympic Swimming Coach and leading child water safety advocate

Independently tested to meet Pool Barrier Safety Codes

Series 2

MAGNA-LATCH®
MAGNETIC SAFETY GATE LATCH

- Now adjusts horizontally *and* vertically
- Now with unique "Quick-Slide" mounting brackets for fast alignment
- Now 20% stronger construction
- Now even quicker & easier to install
- Now with high-tech, self-drilling screws
- Now safe & easy "gate gap" adjustment



Features

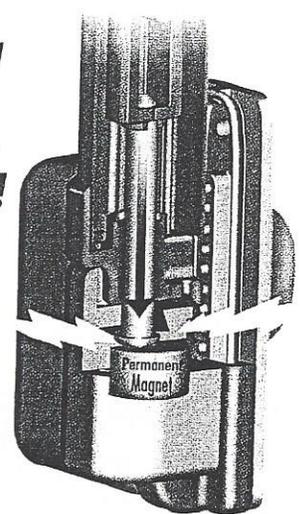
- Patented magnetic self-latching
- Exceeds international barrier/safety codes
- Quality molded polymers & stainless steel
- Key lockable (Top Pull & Vertical Pull)
- Quality Assurance ISO 9001 manufacturer
- Engineered for ease of installation
- Latches in the "locked" position
- Won't disengage from shaking & pulling
- Unprecedented adjustability
- Tested to 400,000 cycles

Benefits

- No mechanical jamming during closure
- Unprecedented reliability & safety
- No rust, binding or staining
- Added safety and peace-of-mind
- Lifetime warranty
- Reduced installation time (costs)
- Exceptional safety & reliability
- Exceptional safety & reliability
- Easy to install and maintain
- Proven to last the test of time



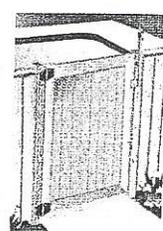
Magnetic triggering means no resistance to closure!



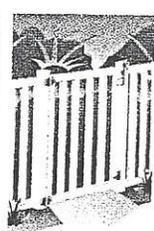
Quality Endorsed Company
ISO 9001



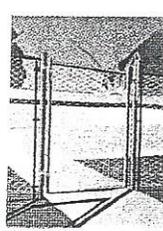
METAL GATE
Top Pull model



WOOD GATE
Top Pull model



VINYL GATE
Vertical Pull model



CHAINLINK GATE
Top Pull model

THE 'SERIES 2' latches carry all the unique qualities of the original MAGNA•LATCH: no mechanical resistance to closure, strong and reliable, key lockable, safety code compliant...

The world's safest gate latch just became even safer...and more adaptable and durable!

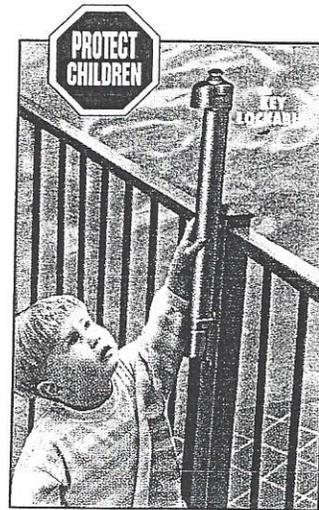
The 'Series 2' Magna•Latch has been re-designed for supreme reliability and installation convenience. Not only does it look more stylish and modern, it's notably stronger, fits to a wider range of gates and is significantly more adjustable than previous designs.

Importantly, the Series 2 latches (TP and VP models only) offer **unprecedented horizontal and vertical adjustment**. The latch can now be adjusted at *any time* during or after installation to help overcome gate sag or natural ground movement.

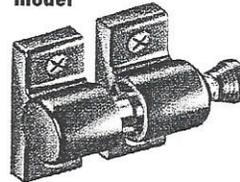
Vertical adjustment is quick and easy because the latch body now slides up and down dovetail-style tracks for easier, sturdier installation.

Horizontal adjustment is achieved by adjusting a screw within the 'Striker Body', so that the striker can be adjusted across gaps of between 3/8"–17/16" (9–37mm).

The Striker Body is secured to the gate using five screws (instead of the older two-screw fixing), giving the latches extra impact resistance and durability on larger gates and also against heavy pedestrian traffic.



SIDE PULL model

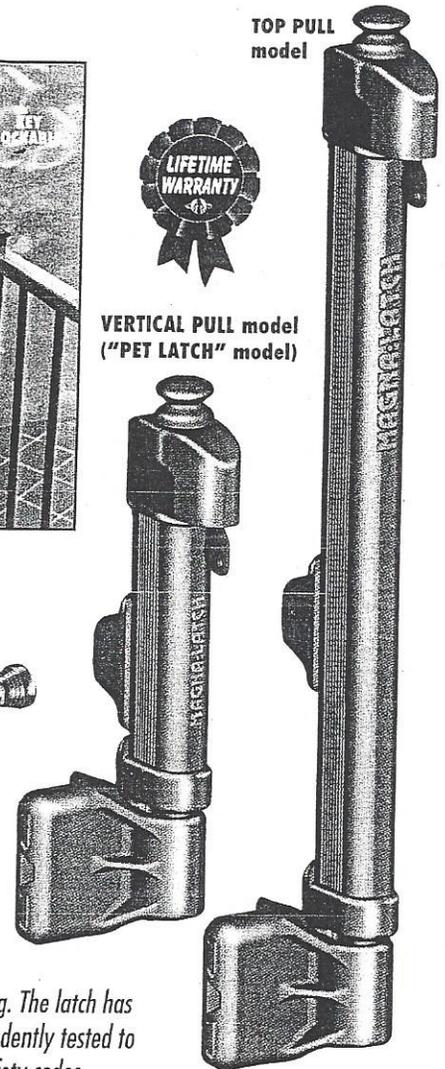


MAGNA•LATCH has been tested to more than 400,000 cycles. Most swimming pool barrier codes require gates to be self-closing and self-latching. The latch has been designed and independently tested to meet strict international safety codes.

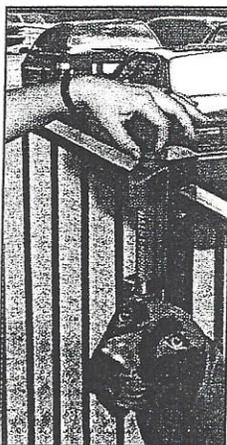
TOP PULL model



VERTICAL PULL model ("PET LATCH" model)

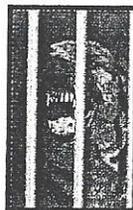


MAGNA•LATCH



Pet Security Gate Latch

MAGNA•LATCH is also suitable for house and garden gates where pet security and pet access control are important.

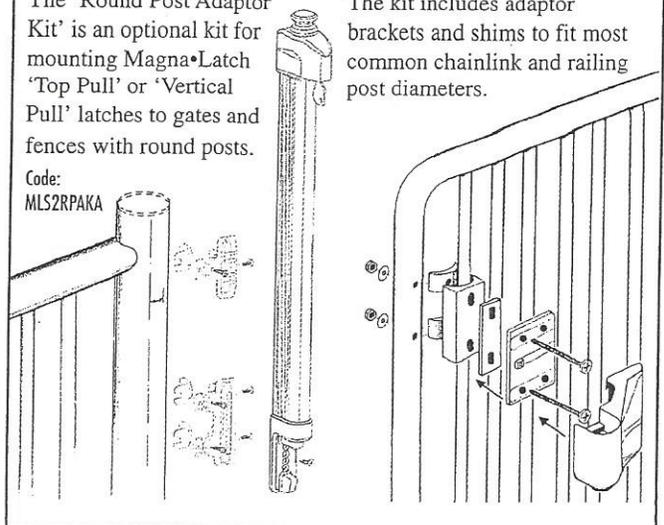


Prevent pets from escaping and deter intruders like this from reaching them ➔

ROUND POST ADAPTOR KIT

The 'Round Post Adaptor Kit' is an optional kit for mounting Magna•Latch 'Top Pull' or 'Vertical Pull' latches to gates and fences with round posts.

Code: MLS2RPAKA



The kit includes adaptor brackets and shims to fit most common chainlink and railing post diameters.

Post diameters: 17/8" (48mm), 2" (50mm), 23/8" (60mm), 27/8" (73mm)
Gate diameters: 13/8" (35mm), 15/8" (41mm), 17/8" (48mm), 2" (50mm)

**WORLD'S
BEST GATE
HINGES**

QUALITY GATE HINGES MADE TO LAST

TRU•CLOSE safety gate hinges are molded from special glass-fiber reinforced polymer materials. These UV-stabilized materials provide strong, rust-free hinges that won't bind, sag or stain! And they *never* require lubrication. The unique, spring-loaded adjustor within most TRU•CLOSE hinges allows instant incremental tension adjustment using only a screwdriver. Quick, easy and safe! Gates of different sizes and weights incur different loads, so the ability to adjust tension quickly is critical, especially in child safety areas. TRU•CLOSE hinges come in 'Regular' and 'Heavy Duty' models to fit most gate sizes and all gate materials.

TRU•CLOSE®
ADJUSTABLE, SELF-CLOSING GATE HINGES

NO RUST **NO BINDING**

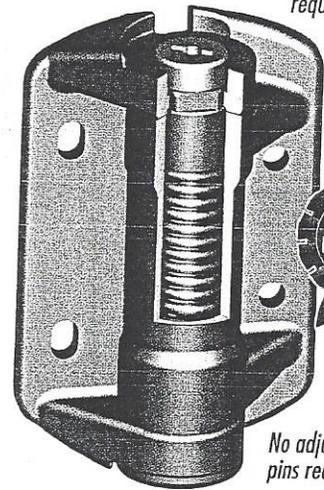
NO SAGGING **NO STAIN**

PATENTED TENSION ADJUSTMENT!



- Simply remove endcap
- Depress and turn internal adjustor as required

Meets Pool Barrier Codes



LIFETIME WARRANTY

No adjustor pins required

Features

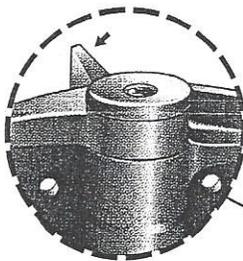
- Molded, reinforced polymer construction
- Unique, patented tension adjustment
- Internal stainless steel spring closer
- Weather-resistant, "self-lubricating" materials
- Regular & Heavy Duty hinge ranges
- Alignment Legs (for extra fitting strength)
- Quality Assurance ISO 9001 manufacturer
- Tested to 50,000 cycles (Reg.), 200,000 (HD)

Benefits

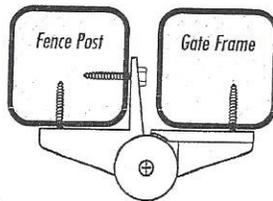
- NO rust, binding, sagging or staining!
- Quick, easy and safe adjustment
- No need for unsightly external spring
- Smooth, even closure. No lubricating.
- Models to fit all gates & applications
- Models to fit all gate materials
- Lifetime warranty
- Proven to last the test of time

MODEL DESIGN OPTIONS

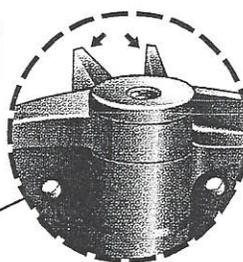
OPTIONAL Single LEG (L1)



ALIGNMENT LEGS ("L" models)
'QUIK-FIT' Alignment Legs for fast installation and added fitting strength. Available with two legs or one leg models.



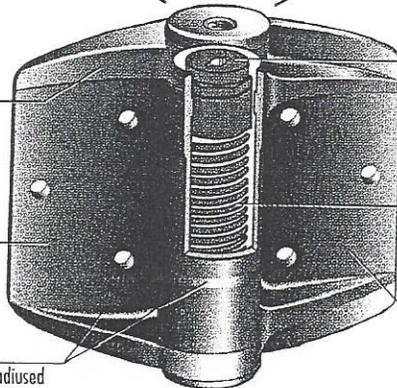
OPTIONAL 2 LEGS (L2)



REINFORCING RIBS
Molded ribs provide superior torsional and lateral leaf strength

STYLISH 'FLAT' FINISH
Textured black or white finish gives a stylish, modern look

STRENGTH & STYLE
Subtle design features such as radiused corners and waisting provides strength and attractive design.



PATENTED ADJUSTOR
Depress for tension. Rises back into sleeve to retain tension.

INTERNAL STAINLESS STEEL SPRING
Provides even closing tension for gates.

MOLDED HINGE BODY
Strong & rust-free. UV-stabilized polymers with glass-fiber reinforcement.

TRU•CLOSE SYSTEM

OLD-FASHIONED EXTERNAL SPRING



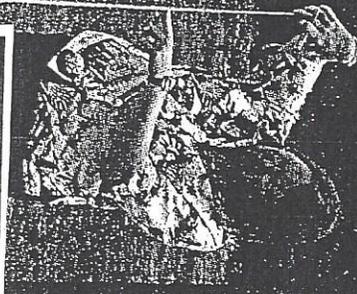
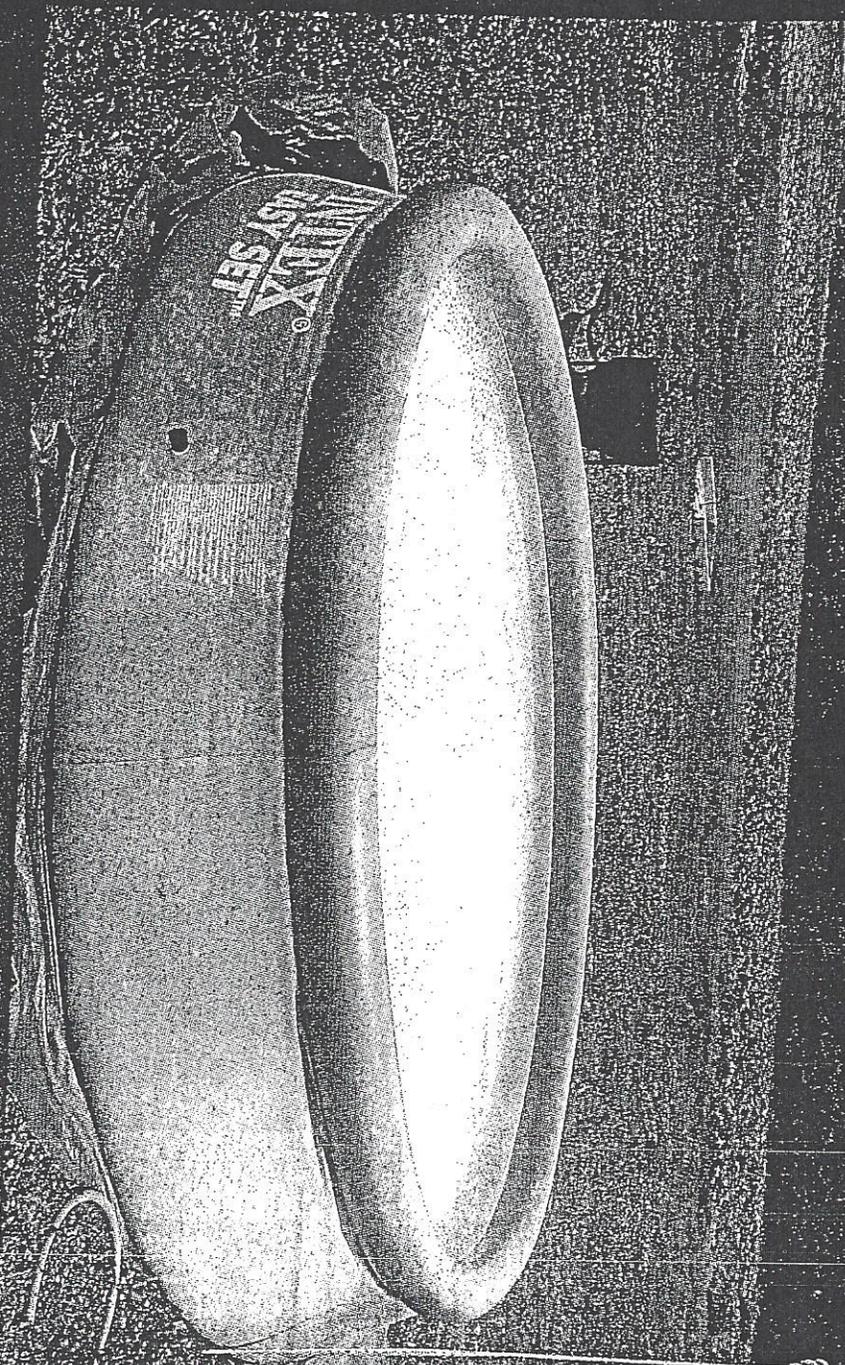
NO MORE UNSIGHTLY EXTERNAL SPRINGS!



TRU•CLOSE = REDUCED COSTS & INCREASED SAFETY

With TRU•CLOSE there is no need to pay for or install any other external closing mechanism. It's also safer to adjust and safer for children.

KIDDIE POOL CRACKDOWN



State pool rules

Building permits are required for all pools that can contain water more than 2 feet deep. Above-ground pools that are 24 to 48 inches high must be fenced in. Fences must stand at least 48 inches high. Fences must have tight horizontal and vertical rails, such as chain-link and sturdy picket fences. Fence gates must have self-locking latches. Above-ground pools 48 inches or higher must either be fenced in or use removable ladders or ladders that lock. Filters must be plugged directly into ground-fault-interrupter outlets. Extension wires cannot be used.

For the Times Herald-Record of KATHI FERRIS

Building inspector blitz shuts down backyard pools

PAGES 2-3