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Chapter Comm 90

DESIGN AND CONSTRUCTION OF PUBLIC SWIMMING POOLS AND WATER ATTRACTIONS

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Note: Chapter HSS 171 as it existed on November 30, 1989 was repealed and a new chapter HSS 171 was created effective December 1, 1989; Chapter HSS 171 was renumbered Chapter ILHR 90, Register, March, 1994, No. 459, eff. 4-1-94; Chapter ILHR 90 was renumbered to be chapter Comm 90 under s. 13.93 (2m) (b) 1., Stats., and corrections made under s. 13.93 (2m) (b) 6. and 7., Register, May, 1998, No. 509.

Note: See ch. HFS 172 for rules relating to safety, maintenance and operation of public swimming pools.

Subchapter I — Administration

Comm 90.01 Authority and purpose. This chapter is promulgated under the authority of s. 145.26, Stats., to regulate the design and construction, alteration or reconstruction of public swimming pools, including whirlpools and water attractions, and the alteration of public swimming pool equipment in order to protect the health and safety of the public.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; am. (1), Register, March, 1994, No. 459, eff. 4-1-94; am. Register, November, 2000, No. 539, eff. 12-1-00; CR 02-002: am. Register April 2003 No. 568, eff. 5-1-03.

Comm 90.02 Scope. (1) APPLICABILITY. This chapter consists of minimum requirements that apply to the design and construction of all new public swimming pools, water attractions and associated slides; and to the reconstruction or alteration of any existing public swimming pool, water attraction and associated slide.

Note: Also refer to administrative rules administered by the department of health and family services, specifically ch. HFS 172, for additional requirements regarding public swimming pools, water attractions and associated slides.

Note: For accessibility information, refer to the final accessibility guidelines for recreational facilities, Federal Register, Vol. 67, No. 170, as published Tuesday September 3, 2002. Requirements relating to swimming pools, wading pools and spas are found under ADAAG 15.8.

(2) PETITION FOR VARIANCE. The department shall consider and may grant a variance to a provision of this chapter in accordance with ch. Comm 3.

Note: Chapter Comm 3 requires the submittal of a petition for variance form (SBD-9890) and a fee, and that an equivalency is established in the petition for variance that meets the intent of the rule being petitioned. Chapter Comm 3 also requires the department to process regular petitions within 30 business days and priority petitions within 10 business days.

Note: Form SBD-9890 is available at no charge from the department at the Safety and Buildings Division, P.O. Box 2509, Madison WI 53701, telephone 608/266-1818 and 608-264-8777 (TTY).

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; r. and recr. (2), Register, March, 1994, No. 459, eff. 4-1-94; r. and recr. (2), Register, November, 2000, No. 539, eff. 12-1-00; CR 04-052: am. (1) Register January 2005 No. 589, eff. 2-1-05.

Comm 90.03 Definitions. In this chapter:

(1) "Accessible" means easily and readily exposed for inspection and the replacement of materials or parts with the use of tools.

(2) "Approved" means acceptable to the department based on its determination of conformance with this chapter and good public health practices.

(3) "Bed and breakfast establishment" has the meaning found in s. 254.61 (1), Stats.

Note: Section 254.61 (1), Stats., reads:

"Bed and breakfast establishment" means any place of lodging that:

- (a) Provides 8 or fewer rooms for rent to no more than a total of 20 tourists or transients;
- (b) Provides no meals other than breakfast and provides the breakfast only to renters of the place;
- (c) Is the owner's personal residence;
- (d) Is occupied by the owner at the time of rental;
- (e) Was originally built and occupied as a single-family residence or, prior to use as a place of lodging, was converted to use and occupied as a single-family residence; and
- (f) Has had completed, before May 11, 1990, any structural additions to the dimensions of the original structure, including by renovation, except that this limit does not apply to any of the following:

1. A structural addition, including a renovation, made to a structure after May 11, 1990, within the dimensions of the original structure.
2. A structural addition, made to a structure that was originally constructed at least 50 years before an initial or renewal application for a permit under s. 254.64 (1) (b) is made and for which no use other than as a bed and breakfast establishment is proposed. The structural addition under this subdivision shall comply with the rules under s. 101.63 (1) and (1m).

(4) "Breakpoint" means the line of separation between the shallow portion and the deep portion of a pool, defined by a sharp change in the slope of the bottom.

(5) "Children's slide" means a slide which has a maximum height of 4 feet (1.2 m) as measured vertically from the slide entrance to the slide terminus and located in \leq 24 inches (61 cm) of water.

(6) "Deck" means the unobstructed walking surface immediately adjacent to the pool.

(7) "Deep portion" means the deep side of the breakpoint or that portion of a pool having a design water depth greater than 5 feet (1.52 m).

(8) "Department" means the department of commerce.

(9) "Drop slide" means a slide where the terminus is located 20 inches (50.8 cm) or more above the water level.

(10) "Flume" means that part of a slide within which sliding takes place.

(11) "Interactive play attraction" means a water attraction, including but not limited to manufactured devices using sprayed, jetted or other water sources contacting the users and not incorporating standing or captured water as part of the user activity area.

Note: Splash pads and spray pads are examples of interactive play attractions.

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(12) “Mobile pool base” means the location where a mobile pool is stored or serviced and where a source of potable water and a plumbing drainage system are available.

(13) “NSF” means the national sanitation foundation.

(14) “Open swim” means allowing persons, other than those residing in living units, to use the pool or water attraction.

(15) “Owner” or “operator” means a municipality, corporation, company, association, firm, partnership or individual owning, controlling or operating any public swimming pool.

(16) “Patron” means a user of the pool.

(17) “Play feature” means a physical object installed in a pool or water attraction that is intended for recreational use.

(18) “Pool” has the meaning set forth in s. 145.26 (1), Stats. Types of pools are as follows:

Note: Section 145.26 (1), Stats., reads: “In this section, “public swimming pool” means a fixed or mobile structure, basin, chamber or tank and appurtenant buildings and equipment that serve or are installed for use by the state, a political subdivision of the state, a motel, a hotel, a resort, a camp, a club, an association, a housing development, a school, a religious, charitable or youth organization, an educative or rehabilitative facility or another entity. “Public swimming pool” does not mean a fixed or mobile structure, basin, chamber or tank that only serves fewer than 3 individual residences.”

Note: For the purposes of this section, a housing development may mean either an apartment complex, condominium complex or housing complex having a “home-owners’ association.”

(a) “Combination pool” means a pool used for swimming and diving.

(b) “Diving pool” means a pool used exclusively for diving.

(c) “Exercise pool” means a pool of shallow depth usually associated with a health spa and which may or may not have a current.

(d) “Limited purpose pool” means a pool used for a purpose not otherwise defined, such as for apparatus swimming, underwater photography training or another special use by the public.

(e) “Mobile pool” means a pool constructed on a mobile structure which is capable of being transported from place to place.

(f) “Therapy pool” means a pool used for medically administered therapy.

(g) “Wading pool” means a shallow pool having a maximum depth of 24 inches (61 cm) and intended for children’s play.

Note: A zero–depth entry wading pool is an example of a wading pool.

(h) “Whirlpool” means a relatively small pool which uses high temperature water and which may include a water agitation system. A whirlpool may also be referred to as a spa.

(i) “Zero–depth entry pool” means a water attraction having a sloped entrance to where the water depth is zero inches at the shallowest point.

(19) “Pool slide” means a slide where the drop from the slide terminus to water is less than 20 inches (50.8 cm) and the flume carries less than 100 gpm of water.

(20) “Private guest room” means a room or rooms that provide sleeping accommodation offered for pay to tourists or transients.

(21) “Public swimming pool” has the meaning found in s. 145.26 (1), Stats.

Note: Section 145.26 (1), Stats., reads: “In this section, “public swimming pool” means a fixed or mobile structure, basin, chamber or tank and appurtenant buildings and equipment that serve or are installed for use by the state, a political subdivision of the state, a motel, a hotel, a resort, a camp, a club, an association, a housing development, a school, a religious, charitable or youth organization, an educative or rehabilitative facility or another entity. “Public swimming pool” does not mean a fixed or mobile structure, basin, chamber or tank that only serves fewer than 3 individual residences.”

(22) “Recirculation system” means the outlets, inlets, equipment and piping of pools and water attractions designed to circulate water at a predetermined quantity and velocity in order to treat and purify the water.

Note: Backwash piping is not part of the recirculation system.

(23) “Reconstructed or altered pool” means a pool that requires replacement of or modification to the pool shell, recirculation system and appurtenances so that the pool may continue

to be operated free from health or safety hazards. It does not include the replacement of equipment or piping previously approved by the department, provided that the type and size of equipment are not changed, nor does it include normal maintenance or repair.

Note: See listing in Appendix A–90.03 (23).

(24) “Reverse flow” means a design in which the water enters at or near the pool bottom and leaves at or near the waterline.

(25) “Run–out slide” means a waterslide where the rider does not enter into a plunge pool, but has a deceleration area that permits the rider to come to a stop before exiting the slide flume.

(26) “Shallow portion” means the shallow side of the breakpoint or that portion of a pool having a design water depth of 5 feet (1.52 m) or less.

(27) “Skimmer” means a device installed in a pool wall at the water level which is connected to the recirculation piping and is intended to skim debris from the surface of a pool.

(28) “Slip–resistant” means a material that when wet has a coefficient of friction greater than 0.5.

(29) “Splash zone” means the area where water falls on the floor of an interactive play attraction.

(30) “Swimming pool complex” means two or more pools as defined under sub. (18) and located within an enclosure or room.

(31) “Swimout” means an underwater seat area that is placed completely outside the perimeter of the pool.

(32) “Terminus section” means the last 10 feet (3.05 m) of a slide flume discharging into a pool.

(33) “Suction outlet” means a discharge port installed in the wall or floor of a pool which connects by way of piping to a pump. A suction outlet does not include a skimmer.

(34) “Tourist rooming house” has the meaning found in s. 254.61 (6), Stats.

Note: Section 254.61 (6), Stats., reads: “Tourist rooming house” means any lodging place or tourist cabin or cottage where sleeping accommodations are offered for pay to tourists or transients. “Tourist rooming house” does not include:

(a) A private boarding or rooming house, ordinarily conducted as such, not accommodating tourists or transients.

(b) A hotel.

(c) Bed and breakfast establishments.

(35) “Toxic” has the meaning specified under s. Comm 81.01 (258).

Note: Section Comm 81.01 (258) reads: “Toxic” means a probable human oral lethal dose of 15 or less grams of solution per kilogram of body weight.

(36) “Transfer system” means a device or combination of devices that include a platform, steps and other structures or devices to facilitate pool access.

(37) “Turnover time” means the time for a given volume of water to pass through the recirculation system.

(38) “Water attraction” means a public facility with design and operational features that provide patron recreational activity other than conventional swimming and involves partial or total immersion of the body. Types of water attractions are as follows:

(a) “Activity pool” means a water attraction with a depth of greater than 24 inches (61 cm) designed primarily for play activity that uses constructed features and devices including, but not limited to, pad walks, flotation devices and similar attractions. The installation of a basketball hoop or volleyball net does not transform a pool into a water attraction.

(b) “Leisure river” means a stream of near–constant depth in which the water is moved by pumps or other means of propulsion to provide a river–like flow that transports users over a defined path. A leisure river may include play features and devices. A leisure river may also be referred to as a tubing pool or a current channel.

(c) “Plunge pool” means a pool with a depth of greater than 24 inches (61 cm), located at the exit end of a waterslide flume and intended and designed to receive slide users emerging from the flume.

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(d) “Vanishing edge pool” means a water attraction that has no above-water line wall on one or more sides and no accompanying deck.

(e) “Vortex pool” means a circular pool that is equipped with a method of transporting water in the pool for the purpose of propelling users at speeds dictated by the velocity of the moving stream.

(f) “Wave pool” means a water attraction designed to simulate breaking or cyclical waves for the purposes of surfing or general play.

(39) “Water attraction complex” means a facility where a water attraction is located within an enclosure or room with another water attraction or public swimming pool.

(40) “Waterslide” means a slide where a water flow of 100 gpm or more is intended to carry a rider down a flume.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; r. (1), r. and recr. Register, March, 1994, No. 459, eff. 4-1-94; cr. (2e), (12e), (18m) and (18s), Register, June, 1999, No. 522, eff. 7-1-99; correction in (2e) made under s. 13.93 (2m) (b) 7., Stats., Register, September, 2000, No. 537; cr. (18w), Register, November, 2000, No. 539, eff. 12-1-00; correction in (18w) made under s. 13.93 (2m) (b) 7., Stats., Register June 2002 No. 558; CR 04-052: r. and recr. Register January 2005 No. 589, eff. 2-1-05.

Comm 90.04 Plan review and approval. The design for the construction, alteration or reconstruction of a public swimming pool, or a water attraction or an associated slide, shall be submitted to the department for review in accordance with this section.

Note: The department forms required in this chapter are available on request from the Department of Commerce, Safety and Buildings Division, P.O. Box 7162, Madison, WI 53707-7162; phone (608) 266-3151 and (608) 264-8777 (TTY); or may be downloaded from the Safety and Buildings’ web site at www.commerce.wi.gov.

Note: For submittal of plumbing plans, see s. Comm 82.20.

(1) REVIEW. All designs under the scope of this chapter shall be submitted to the department for review and receive approval from the department prior to the start of construction.

(a) *Plans and specifications.* 1. At least 4 sets of plans and one copy of specifications shall be submitted for review. These sets of plans and copies shall be clear, legible and permanently marked.

2. Plans submitted for review shall be accompanied by sufficient information for the department to determine if the installation and its performance will meet the requirements of this chapter.

3. a. Plans and specifications, including adequate supporting design data, shall be prepared by a Wisconsin registered architect or professional engineer and bear that person’s seal and signature.

b. Structural review of pool slides shall be based on conformance with the design requirements of slides and tower structures under ch. Comm 62.

4. Pursuant to s. Comm 2.07 (3), the department shall review and make a determination on an application for plan review within 15 business days.

(b) *Revised submittals.* All changes or modifications, involving the provisions of this chapter, shall be approved in writing by the department prior to installation.

(c) *Revocation of approval.* The department may revoke any approval, issued under the provisions of this chapter, for any false statements or misrepresentation of facts on which the approval was based.

(d) *Expiration of approval.* Plans approved by the department shall expire 2 years after the date indicated on the approval letter, if construction has not commenced within that 2-year period.

(e) *Limitations.* A conditional approval of a plan by the department shall not be construed as an assumption by the department of any responsibility for the design. The department does not hold itself liable for any defects in construction or for any damages that may result from the specific installation.

(f) *Fees.* Fees for plan review submittals shall be as specified in ch. Comm 2.

(2) ALTERNATE PUBLIC SWIMMING POOL OR PUBLIC WHIRLPOOL DESIGN REVIEW. The provisions of this chapter are not intended to prevent innovative designs for public swimming pools or whirlpools. The department may issue an approval of an alternate public swimming pool or whirlpool design if the design complies with the intent of this chapter.

(a) *Alternate public swimming pool or whirlpool designs.* For an alternate public pool or whirlpool design, an approval shall be required before statewide installation and use.

1. Alternate public pool or whirlpool designs submitted for review shall be accompanied by sufficient information for the department to determine if the design and its performance will meet the requirements of this chapter.

2. Pursuant to s. Comm 2.07 (3), the department shall review and make a determination on an application for an alternate public swimming pool or whirlpool submittal within 90 days.

3. The department may include specific conditions in issuing an approval for an alternate public swimming pool or whirlpool design, including an expiration date for the approval. Violations of the conditions under which an approval is issued shall constitute a violation of this chapter.

4. If, upon review, the department determines that an alternate public swimming pool or whirlpool design does not comply with the intent of this chapter, the request for approval shall be denied in writing.

5. If a public pool or whirlpool design receives alternate approval, a plan for the site-specific public swimming pool or whirlpool complying with the alternate design approval shall be submitted in accordance with sub. (1).

(b) *Revisions.* If an approved alternate public swimming pool or whirlpool design is modified or additional assertions of function or performance are made, the approval shall be considered null and void, unless the design is resubmitted to the department for review and approval is granted.

(c) *Revocation of approval.* The department may revoke an approval issued under this section for any false statements or misrepresentation of facts or data on which the approval was based, or as a result of design failure.

(d) *Limitations.* An approval issued by the department for an alternate public swimming pool or whirlpool design may not be construed as an assumption of any responsibility for defects in design, construction or performance of any installation or for any damages that may result.

(e) *Fees.* Fees for the review of an alternate public swimming pool design under this section and any onsite inspections shall be submitted in accordance with ch. Comm 2. Fees for any miscellaneous inspections shall be as specified in s. Comm 2.04 (2).

(3) EXPERIMENTAL PUBLIC SWIMMING POOL OR PUBLIC WHIRLPOOL DESIGN REVIEW. The provisions of this chapter are not intended to prevent innovative designs for public pools or whirlpools. The department may issue an approval of an experimental public swimming pool or whirlpool design for the purpose of proving compliance with the intent of this chapter.

(a) *Experimental public swimming pool or whirlpool designs.* 1. Experimental public swimming pool or whirlpool designs submitted for review shall be accompanied by sufficient information as requested by the department.

2. Pursuant to s. Comm 2.07 (3), the department shall review and make a determination on an application for an experimental public swimming pool or whirlpool submittal within 90 days.

3. The department may include specific conditions in issuing an approval for an experimental public swimming pool or whirlpool design, including an expiration date for the approval. Viola-

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tions of the conditions under which an approval is issued shall constitute a violation of this chapter.

4. If, upon review, the department determines that an experimental public swimming pool or whirlpool design is not acceptable, the request for approval shall be denied in writing.

5. If a public swimming pool or whirlpool design receives experimental approval, a plan for the site-specific public swimming pool or whirlpool complying with the experimental design approval shall be submitted in accordance with sub. (1).

6. The department may limit the number of applications for review of experimental systems.

(b) *Revisions.* If an approved experimental public swimming pool or whirlpool design is modified or additional assertions of function or performance are made, the approval shall be considered null and void, unless the design is resubmitted to the department for review and approval is granted.

(c) *Revocation of approval.* The department may revoke an approval issued under this section for any false statements or misrepresentation of facts or data on which the approval was based, or as a result of design failure.

(d) *Limitations.* An approval issued by the department for an experimental public swimming pool or whirlpool design may not be construed as an assumption of any responsibility for defects in design, construction or performance of any installation or for any damages that may result.

(e) *Fees.* Fees for the review of an experimental public swimming pool design under this section and any onsite inspections shall be submitted in accordance with ch. Comm 2. Fees for any miscellaneous inspections shall be as specified in s. Comm 2.04 (2).

Note: Plans and specifications are to be submitted to the Department of Commerce, Safety & Buildings Division, 201 W. Washington Avenue, P.O. Box 7162, Madison, Wisconsin 53707-7162.

(4) DETAILS. The plans and specifications shall include all of the following:

(a) *General.* The following information shall be included on the plans or in a separate report:

1. The name and address of the owner.
2. The location of the facility by street address or, if none is available, by quarter-quarter section, section, town, range, township and county.

(b) *Site.* Site information including, but not limited to, location of all wells and utilities, topography and natural water features.

(c) *Plot plan.* 1. A general map and detailed scaled drawings showing the site plan or floor plan of pertinent portions of the pool or water attraction structure, pool or water attraction orientation, including the location of all slides, interactive play attractions and play features. The designed pool water elevation shall be shown on the detailed drawing.

2. All water supply facilities, sources of drinking water, public or private sewers and relative elevations of paved or other walkways and the equipment room floor.

3. When public water and sewer systems are proposed to serve the public swimming pool, the elevations of storm and sanitary sewer inverts and street grade.

(d) *Construction plans.* Detailed scaled and dimensional drawings for each individual pool which shall include at least the following:

1. A layout plan showing longitudinal and transverse cross-sections of the basin. Include location and type of inlets, overflows, pool drains, vacuum fittings, deck drains, drinking fountains or sources of drinking water, piping, hosebibbs, fences, telephones, design of deck, curb or walls enclosing the pool, paved walkways, overflow gutters or devices, ladders, stairs, diving boards, slides and underwater lights.

2. A flow diagram showing the location, plan, elevation and isometrics of filters, pumps, chemical feeders, ventilation

devices, heaters, surge tanks including operating levels, backflow preventers, valves, piping, flow meters, gauges, thermometers, test cocks, sight glasses and the drainage system for the disposal of pool and filter wastewater.

3. The plan drawings for all available sanitary facilities and any bathhouse facilities provided including dressing rooms, lockers and basket storage, showers and all other plumbing fixtures.

4. The specifications for all pool equipment, floor construction and lighting equipment.

5. The design information used to determine the surface area and volume of the pool or water attraction.

(e) *Specifications.* Complete technical specifications for the construction of the pool and all appurtenances to accompany the drawings under par. (d), including at least the following:

1. All construction details not shown on the plans.
2. Detailed requirements for the type, size, operating characteristics and rating of all mechanical and electrical equipment.
3. Detailed information about plumbing fixtures and piping, when applicable.
4. The sources of all water supplies.
5. Filter media such as diatomaceous earth, sand, gravel or other approved material.
6. Any other information necessary to determine compliance with this chapter.

(5) CONSTRUCTION SUPERVISION AND CERTIFICATION. (a) *Supervision.* 1. For the purposes of this paragraph, "supervision" means the performance of an architect's or engineer's service of reasonable on-site observation to determine that the completed construction is in substantial compliance with approved plans and specifications, but does not include the supervision of construction by a contractor.

2. Every public swimming pool shall be constructed under the supervision of a Wisconsin registered architect or professional engineer. The architect or engineer shall be responsible for the facility being in substantial conformance with the plans and specifications approved by the department.

3. Before the start of construction, the owner or that person's authorized agent shall designate to the department in writing the name and registration number of the supervising architect or engineer.

4. This supervision is a professional service, as distinguished from supervision of construction by a contractor. No change in plans or specifications which involves any provision of this chapter may be made unless the change is signed, sealed and dated by the architect or engineer under whose supervision the change was made and approved by the department.

(b) *Certification.* On completion of the construction, the supervising architect or engineer shall file a written statement with the department on the form the department provides at the time of approval, certifying that, to the best of his or her knowledge and belief, construction has been performed in substantial compliance with the plans and specifications approved by the department.

(6) CONSTRUCTION INSPECTION. Every new installation or modification constructed under the authority of this chapter shall be inspected as required in this subsection.

(a) The construction or modification of any public swimming pool or water attraction shall be inspected by an authorized representative of the department.

Note: See Appendix A-90.04 (6)-1 for listing of additional authorized representatives of the department.

(b) A rough-in inspection shall be conducted when the piping system is roughed-in and before concrete is poured.

1. When the installation is ready for inspection, the registered architect, professional engineer or pool contractor constructing or modifying any swimming pool shall make a telephone request for inspection with the representative of the department.

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2. Except as provided under subd. 3., work may not proceed beyond the point of inspection, as described under subd. 1., until the inspection has been completed.

3. If the inspection is not made by the end of the normal business day following the day of notification, not including Saturday, Sunday or legal holidays, the installation work may proceed.

(c) A final inspection shall be made when the construction or modification is complete.

Note: A final inspection includes, but is not limited to, sanitary facilities, pools, fences and decks.

1. The registered architect, professional engineer or pool contractor constructing or modifying any swimming pool shall make a request for the final inspection.

2. A telephone request for the final inspection shall be made at least 24 hours prior to the requested time for the inspection.

Note: Inspections are only available during standard business hours.

(d) The registered architect or professional engineer responsible for the supervision of the construction or modification of any public swimming pool shall provide the necessary equipment and personnel required for the inspection as requested by the authorized representative of the department.

(e) If the authorized representative of the department finds that the work or installation does not comply with this code, necessary corrections shall be made to achieve compliance. The authorized representative of the department shall be notified for re-inspection when the corrections are completed.

(7) AUTHORIZED INSPECTION AGENT. (a) Upon request from a governmental unit, the department may delegate to the governmental unit, the responsibility to conduct construction inspections of any public swimming pool or water attraction in accordance with this section.

(b) The delegation of inspection authority by the department shall be contingent upon a request by the governmental unit demonstrating sufficient capabilities to complete the construction inspections.

(c) The department shall provide the governmental unit with a written decision of authorization or denial relative to the request under this section concerning construction inspection.

(d) The department shall include as part of governmental unit audits conducted an evaluation of the construction inspection functions that are authorized to the governmental unit under this section.

(e) When a governmental unit wishes to discontinue the authorized construction inspection function under this section, written notification shall be made to the department at least 30 days prior to the discontinuance.

(f) The authorization to conduct construction inspections may be revoked by the department after providing the governmental unit with justification.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; correction in (1) (d) made under s. 13.93 (2m) (b) 7., Stats., Register, January, 1990, No. 409; am. (1) (d), Register, March, 1994, No. 459, eff. 4-1-94; am. (4) (c), Register, June, 1999, No. 522, eff. 7-1-99; r. and recr. (1) to (3), Register, November, 2000, No. 539, eff. 12-1-00; CR 02-002: am. (5) (a), cr. (6) and (7) Register April 2003 No. 568, eff. 5-1-03; CR 04-052: am. (intro.), (1) (intro.), (a) 3. and 4., (4) (a), (b) and (e), r. and recr. (4) (c) and (d) and (6) (c) Register January 2005 No. 589, eff. 2-1-05; **CR 06-119: am. (1) (a) 4., (2) (a) 2. and (3) (a) 2. Register July 2007 No. 619, eff. 8-1-07.**

Comm 90.045 Enforcement. Any person who violates this chapter or any plan or specification included as part of an approval that is issued under this chapter shall be fined not less than \$25 nor more than \$250 for each violation. Each day of continued violation is a separate offense.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; CR 04-052: renum. from Comm 90.21 Register January 2005 No. 589, eff. 2-1-05.

Subchapter II — Public Swimming Pools

Comm 90.05 Location and structural stability of a pool. (1) LOCATION. Each public swimming pool shall be

located at a site conducive to good operation, maintenance, safety and freedom from contamination. The site shall have suitable drainage and be separate from sources of harmful environmental factors. Swimming pools may not be located in the regional floodplain of a river, stream or flow-through lake. For areas bounding a landlocked lake, the highest historic water level shall be used.

(2) GENERAL STRUCTURAL STABILITY. All pools shall be designed to be structurally sound and shall be constructed of suitable and durable materials which are inert, nontoxic to humans and watertight. All structural material as well as all equipment used in the operation of pools shall be subject to approval by the department. In reviewing materials and equipment for approval, the department may use the national sanitation foundation (NSF) standards and lists of approved equipment.

Note: The national sanitation foundation's swimming pool equipment standards may be consulted at the department's bureau of integrated services or at the secretary of state's office or the legislative reference bureau. Copies may be obtained from the National Sanitation Foundation, NSF Building, P.O. Box 1468, Ann Arbor, Michigan 48106.

(3) STRESS RELIEF. Provision shall be made for the relief of stresses which may occur as a result of unbalanced hydrostatic pressures and to protect the pool structures from stresses which may develop due to freezing.

(4) METAL POOLS. All metal pools shall be protected against corrosion by galvanic action or aggressive water by provision of appropriate grounding devices, bonding, insulation or sacrificial rods or other units.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89.

Comm 90.06 Water supply for a pool. (1) GENERAL. The water supplied to a public swimming pool shall be from a potable water source approved by the department of natural resources and shall comply with s. HFS 172.10.

(2) CROSS-CONNECTION CONTROL. (a) As specified in s. Comm 82.41, all portions of the water distribution system serving the pool and all auxiliary facilities shall be protected against backflow. Water introduced into the pool, either directly or to the recirculation system, shall be supplied through a minimum air-gap equal to 2 pipe diameters or 6 inches, whichever is less, or by another method approved by the department.

(b) The use of a toxic solution, such as but not limited to heat transfer fluid in a single-wall heat exchanger for pool water, is prohibited.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; renum. (2) to be (2) (a) and am., cr. (2) (b), Register, November, 2000, No. 539, eff. 12-1-00.

Comm 90.07 Permissible patron load. (1) COMBINATION, SWIMMING-ONLY OR EXERCISE POOLS. The number of people permitted to be in the water of a swimming-only, combination or exercise pool at any one time shall be computed on the basis of allowing 15 square feet (1.4 square meters) per patron for the shallow portion of the pool and 25 square feet (2.3 square meters) per patron for the deep portion of the pool. Three hundred square feet (27.9 square meters) of pool water surface around each diving board and diving platform shall be excluded in computing the permissible patron load. An additional 10 patrons for each diving board shall be included in the computation.

(2) WADING POOL. The permissible patron load for wading pools shall be computed by allowing 15 square feet (1.4 square meters) per patron.

Note: See s. Comm 90.19 (4) (d) for the permissible patron load for whirlpools.

(3) The permissible patron load shall be posted in a conspicuous location for viewing by all patrons.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; CR 04-052: cr. (3) Register January 2005 No. 589, eff. 2-1-05.

Comm 90.08 Pool basin. (1) DEPTHS. Water depth at the end wall in the shallow portion of a combination, limited purpose, exercise or swimming-only pool shall be between 30 (76 cm) and 42 inches (106.7 cm) unless a variance in depth is approved by the department. Water depth in the diving well of a combination pool or in a diving pool shall comply with the profiles in Figure 1 and

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the dimensions in Table 90.08. Water depth at the breakpoint in a combination pool shall be between 4.5 feet (1.37 m) and 5.5 feet (1.68 m).

(2) **BOTTOM SLOPE.** (a) The bottom slope in the shallow portion of a combination pool shall be constant, may not be greater than 1.0 inch per foot (2.54 cm/30.48 cm) and shall slope to the main drain. The bottom slope of the deep portion of a combination pool or diving pool shall comply with the profiles in Figure 1 and the dimensions in Table 90.08 and shall slope to the main drain.

(b) The bottom slope in a limited purpose, exercise or swimming-only pool shall be constant, may not be greater than 1.0 inch per foot (2.54 cm/30.48 cm) and shall slope to the main drain, except that the department may allow a change in the bottom slope provided that the change is to a shallower slope but not less than 0.25 inch per foot.

(3) **BOUNDARY LINE.** The boundary line between the shallow and deep portions of a combination pool shall be marked with a 4 inch wide stripe of contrasting color on the floor and walls of the pool.

(4) **SAFETY ROPE.** A safety rope with floats shall stretch over

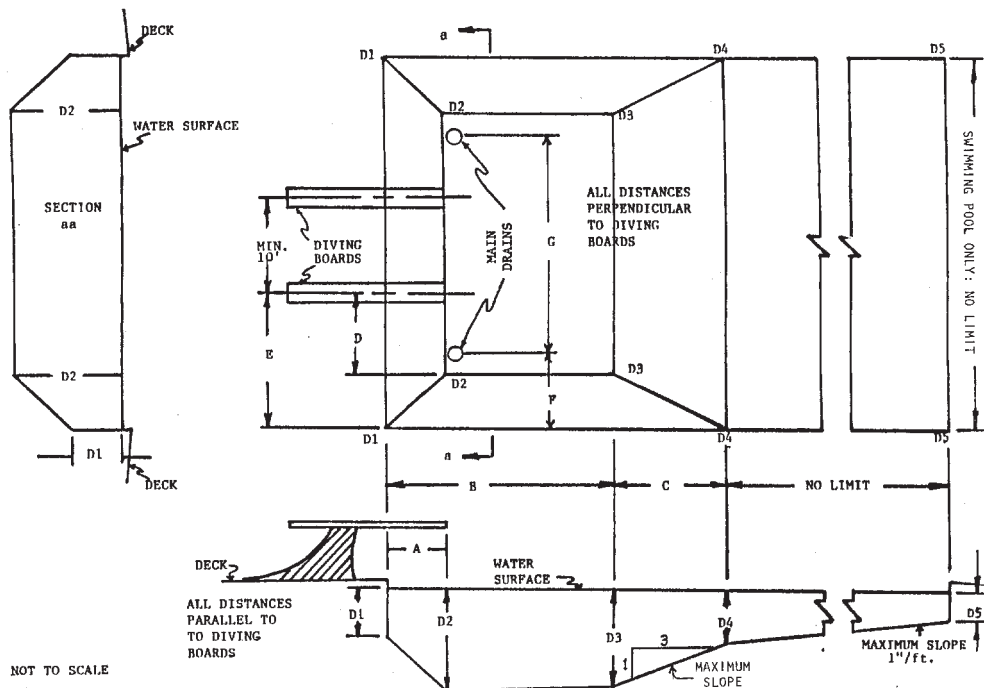
the water surface from one side of the pool to the opposite side at the breakpoint or at a depth between 4.5 feet (1.37 m) and 5.5 feet (1.68 m), except that the rope may be temporarily removed during supervised special purpose use.

(5) **VERTICAL WALL AND FLOOR JUNCTURE.** Walls in the shallow portion of a diving, combination, limited purpose, exercise or swimming pool shall be vertical. Between each wall and the floor there shall be a curved junction having a radius of between one inch (2.54 cm) and 3 inches (7.62 cm).

(6) **HEAD ROOM.** There shall be a completely unobstructed vertical distance of 16 feet (4.88 m) above any diving board measured from the center of the front end of the board. This area shall extend horizontally at least 8 feet (2.44 m) behind, 8 feet (2.44 m) to each side of, and 16 feet (4.88 m) ahead of the measuring point located 16 feet (4.88 m) above the board.

(7) **SAFETY LEDGE.** When included, a safety ledge shall be at a constant depth of 30 inches (0.76 m) to 60 inches (1.52 m) and shall be 6 inches (15.24 cm) in width, with a downward slope of 1/2 inch (1.27 cm) from the wall. All corners shall be rounded.

FIGURE 1
PLAN AND PROFILE FOR
SWIMMING POOL AND DIVING BOARD INSTALLATION



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TABLE 90.08
POOL DIMENSIONS RELATED TO FIGURE 1.

TYPE OF SWIMMING POOL INSTALLATION		DEPTHS					LENGTHS						
		**					A	B	C	D	E	F	G
		D-1	D-2	D-3	D-4	D-5							
SWIMMING POOL ONLY	MIN.	*	X	X	X	2'6"	X	X	X	X	X	*	*
	MAX.	*	X	X	X	3'6"	X	X	X	X	X	10'0"	20'0"
WITH 26" (2/3 METER) DIVING BOARD	MIN.	5'0"	9'0"	8'6"	4'6"	2'6"	2'6"	18'0"	10'0"	5'0"	10'0"	*	*
	MAX.	D-2	*	D-2	5'6"	3'6"	3'0"	*	*	*	*	10'0"	20'0"
WITH 30" (3/4 METER) DIVING BOARD	MIN.	5'0"	10'0"	9'6"	4'6"	2'6"	3'0"	20'0"	12'0"	5'0"	10'0"	*	*
	MAX.	D-2	*	D-2	5'6"	3'6"	4'0"	*	*	*	*	10'0"	20'0"
WITH ONE METER DIVING BOARD	MIN.	5'0"	11'0"	10'6"	4'6"	2'6"	4'0"	20'0"	15'0"	8'0"	10'0"	*	*
	MAX.	D-2	*	D-2	5'6"	3'6"	5'0"	*	*	*	*	10'0"	20'0"
WITH THREE METER DIVING BOARD	MIN.	5'0"	12'0"	11'6"	4'6"	2'6"	5'0"	22'0"	18'0"	10'0"	15'0"	*	*
	MAX.	D-2	*	D-2	5'6"	3'6"	6'0"	*	*	*	*	10'0"	20'0"

* When a maximum or a minimum dimension is not indicated, there is no limiting dimension.

** D-1 shall be at the end wall or not more than 6 inches from the wall.

X These measurements are not applicable to pools for swimming only.

Public pools with diving boards more than 3 meters high and pools designed for platform diving shall comply with the dimensional requirements of the national collegiate athletic association or the amateur athletic union as determined by the department.

Convert feet to meters by multiplying the number of feet by 0.3048.

(8) POOL SHAPE. (a) *Contour and obstructions.* 1. A swimming pool shall have a shape that does not impair the circulation of pool water and swimmers' safety. Except for a safety ledge, a safety rope, a ladder or access side rails, and those obstructions listed in subd. 2., there shall be no underwater or overhead projections or obstructions that might endanger patron safety or interfere with proper pool operation.

2. Pool basin obstructions, including roof support columns, shall be no more than 2 feet in diameter, of a contrasting color, protrude at least 5 feet above the pool bottom and no less than 3 feet above the water level.

(b) *Bench area.* 1. When a bench area is provided to permit bathers to be seated in the water, it shall be in a recessed area to eliminate any protrusion beyond the pool wall.

2. The height of the bench may not exceed 18 inches (0.5 m); the width of the bench seat may not exceed 18 inches (0.5 m); the depth of the water above the bench seat may not exceed 2 feet (61 cm).

3. The surface of the bench seat shall be of a color in distinct contrast to the color of the surrounding pool basin or shall have a 2-inch (5.1 cm) leading edge of contrasting color.

4. The words "bench below" shall be placed on the deck at the edge of the pool at the bench area in a contrasting color in distinct contrast to the deck background and at least located at 10-foot (3.05-m) intervals.

(9) DIVING EQUIPMENT. Supports, platforms, steps, and ladders for diving equipment shall be of sufficient structural strength to safely carry the anticipated loads. Steps and ladders shall be of corrosion-resistant material, easily cleanable, and with treads of slip-resistant design. Handrails shall be provided at all steps and ladders leading to diving boards more than one meter above the water. Platforms and diving equipment that are one meter or higher shall be protected with guard rails. One meter diving equipment guard rails shall be at least 30 inches (75 cm) above the diving board and extend to the edge of the pool wall. All platforms and diving equipment higher than one meter shall have guard rails which are at least 36 inches (90 cm) above the diving board and extend to the edge of the pool wall.

(10) LADDERS, RECESSED TREADS, RECESSED STAIRS AND HANDRAILS. (a) *General.* At least 2 points of egress shall be provided from any swimming, diving, limited purpose, exercise, combina-

tion or plunge pool. The maximum separation between points of egress, measured along the pool's perimeter, shall be 75 feet (22.86 m).

(b) *Ladders.* At least one ladder, recessed or protruding, shall be placed in the deep portion of the pool and one at or near the end wall of the shallow portion. Ladders shall be made of corrosion-resistant material and treads shall have slip-resistant surfaces. There shall be a clearance of not more than 6 inches (15 cm) nor less than 3 inches (7.6 cm) between any ladder and the pool wall.

(c) *Recessed treads.* The vertical rise between treads recessed in a pool wall shall be uniform and may not exceed 10 inches (25 cm) measured at the centerline of the treads. The maximum rise between the pool edge and the uppermost recessed tread shall be 10 inches (25 cm). Recessed treads shall have a minimum toe-to-heel depth of 5 inches (13 cm) and a minimum width of 12 inches (30 cm). The treads shall have slip-resistant surfaces and shall drain back into the pool.

(d) *Recessed stairs.* 1. Recessed stairs may be substituted for ladders only at or near the shallow end wall. Recessed stairs shall not extend into the pool basin except that the department may permit stairs to be located in a corner.

2. Cantilevered coping of one inch or less at the top of the stair at deck level shall not be considered an obstruction or hazard to patrons.

3. Stairs shall have a uniform rise of not more than 10 inches and uniform treads of not less than 10 inches. Treads shall have a minimum unobstructed surface area of 240 square inches. All corners shall be rounded to a radius of 1/2 inch. Treads may not project beyond the face of the riser and shall have a slip-resistant surface.

(e) *Handrails.* Handrails extending from below the water surface to the deck, curb or coping shall be provided on each side of ladders and recessed treads, except that grab rails may be substituted for handrails where recessed treads or recessed vertical ladders are provided. Recessed stairs shall have a handrail on each side with a maximum separation of 8 feet (2.44 m) measured at deck level. Stair handrails shall be securely anchored and shall be installed in such a way that they may only be removed with tools. The leading edge of deck mounted handrails shall be located within 3 inches (7.62 cm), horizontally measured, from the vertical plane of the bottom riser.

Note: See s. Comm 90.19 (5) (d) for whirlpool handrail requirements.

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(11) ELEVATED DECK STAIRWAY, HANDRAILS AND GUARDRAILS. (a) *Stairway.* The stairway providing access to an elevated deck and the required handrails shall comply with chs. Comm 61 to 65.

(b) *Guardrails.* Guardrails shall be securely mounted at all open sides of an elevated pool and deck if it is more than 12 inches (30 cm) in height. Guardrail construction and installation shall comply with chs. Comm 61 to 65.

(12) ACCESS RAMPS. (a) *Deck access ramp.* Where a ramp is used as an access to an elevated deck, the ramp shall be designed and constructed as required for a barrier-free environment under chs. Comm 61 to 65.

(b) *Pool access ramp.* Where a ramp is used to gain access into a swimming pool, the ramp shall:

1. Have a minimum width of 36 inches (0.914 m) measured between handrails;
2. Be no greater than one foot of rise in 10 feet of run;
3. Have at least 5 feet (1.52 m) of level clearance at the bottom end;

4. Have a slip-resistant surface of the same material used for the pool bottom; and

5. Have handrails installed on both sides. The open side or sides of a ramp shall have a handrail with an intermediate parallel guardrail located at mid-height between the handrail and the ramp surface. The handrail shall be between 30 inches and 34 inches (76 cm and 86 cm) above the ramp surface and shall be securely anchored in the deck and in the bottom of the pool.

Note: Guidelines for pool designers are available from the National Center for Accessibility, Guidelines on Swimming Pool Accessibility, September 1996 (publication number QA95007001). Phone 1-800-424-1877.

(13) WALL AND BOTTOM FINISH. The finish for the walls and bottom of the pool shall be made of materials that are inert, reasonably durable, nontoxic to humans and do not produce taste or odor in the water. The finish shall be reasonably smooth, easily cleaned and white or light in color. Wood is not acceptable as an interior surface.

(14) DEPTH MARKINGS. Depth markers shall be located along the pool perimeter on the edge of the deck and on the vertical pool wall at or above the water surface at all pools, except at wading pools or on the vertical walls of whirlpools and pools where no vertical wall is exposed above the waterline. The depth of water shall be plainly marked at maximum and minimum points, at points of change in slope and at equal intermediate intervals of 25 feet or less. Depth marker numerals on the edge of the deck shall be at least 6 inches high. Markers on the vertical wall shall be at least 3 inches high. All markers shall be of a color contrasting with the background.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; am. (8) (a) 1., (b) 2. and 4., (10) (d), (12) and (14), cr. (8) (a) 2., Register, November, 2000, No. 539, eff. 12-1-00; CR 02-002: am. (8) (b) 4. Register April 2003 No. 568, eff. 5-1-03; corrections in (11) and (12) (a) made under s. 13.93 (2m) (b) 7., Stats., Register April 2003 No. 568; CR 04-052: am. (8) (b) 2. to 4. Register January 2005 No. 589, eff. 2-1-05.

Comm 90.09 Pool deck and deck equipment.

(1) AREA. (a) *General.* 1. Except for subd. 2., there shall be an unobstructed deck at the same level as the top of the pool wall. The deck shall extend completely around the pool. There shall be at least 6 feet of unobstructed deck between any 2 adjacent pools except that the minimum deck width between a wading pool and any other pool shall be 12 feet. Deck equipment permitted under this chapter is not considered an obstruction.

2. Deck obstructions, including roof support columns, shall be no greater than 2 feet in diameter and of a contrasting color so as to provide adequate clearance, safety, visibility and access.

(b) *Combination, diving, swimming-only, exercise and wading pools.* When the permissible patron load is 200 or less, the deck around a combination, diving, swimming-only, exercise or wading pool shall have a minimum width of 6 feet (1.8 m). An additional foot (0.3 m) shall be added to the deck width for each additional 200 patrons or fraction thereof. The department may

vary the deck width requirement for exercise pools under certain conditions of usage.

(c) *Limited purpose pools.* Except when the conditions stated in par. (e) 2. apply, the deck for limited purpose pools shall have a minimum width of 6 feet (1.8 m) on at least 2 contiguous sides. The point of entry into the pool shall be on one of those sides. The deck on the other 2 contiguous sides shall be a minimum of 3 feet (0.9 m) wide.

Note: See s. Comm 90.19 (6) for whirlpool deck widths.

(d) *Deck width near diving equipment.* A minimum deck width of 4 feet (1.2 m) shall be provided on the sides and at the back of any piece of diving equipment.

(e) *Accessibility.* 1. All pools shall be easily accessible by emergency medical rescuers or other rescue personnel and equipment to effectively treat, load and transport victims.

2. Swimmers shall enter the enclosed area around a combination, swimming-only, or exercise pool at a point where the deck is adjacent to the shallow portion of the pool unless the pool deck width at the entrance is at least 10 feet (3.1 meters). This requirement does not preclude provision of emergency exits at other locations. The deck width at the point of access to the pool from a bathroom or dressing room shall be at least 15 feet (4.6 meters). Area, routing and drainage separation shall be provided between the areas used by patrons and those used by spectators.

(2) DRAINAGE. (a) *General.* Decks shall be sloped to effectively drain either to perimeter areas or to deck drains. Openings in deck drains and channel grates shall be 1/2-inch (1.27 cm) or less in width or diameter. Decks shall be sloped between 1/8-inch (0.31 cm) and 1/2-inch (1.27 cm) per foot (30.5 cm).

(b) *Outdoor pools.* The decks of outdoor pools shall slope away from the pool to the ground surface or to deck drains. Deck drains shall discharge either to the storm sewer with a positive air-gap connection, to the storm sewer so as to provide equivalent protection as determined by the department, or to the ground surface at a point where the water will not create a hazard or nuisance and with a positive air-gap connection if subject to inundation.

Note: See Appendix for further explanatory material.

(c) *Indoor pools.* Deck drains shall be provided for indoor pools and shall discharge to a sanitary sewer through a positive air-gap. Deck drains need not be trapped or vented. The department may allow the deck to drain to a pool gutter provided a valved bypass pipe is installed to allow the gutter to discharge directly to a sanitary sewer through a positive air-gap.

(3) SURFACE. The deck surface shall have a slip-resistant texture causing no discomfort to bare feet. Deck surfacing may include concrete, tile or other impervious manufactured surfacing. If other manufactured surfacing is to be used, a sample of the material, the specifications, the installation procedures to be followed and the manufacturer's trade name shall be submitted to the department. Only materials approved by the department may be used. No carpeting or wood or similar non-impervious material may be installed within the deck area.

(4) DRINKING WATER. (a) Except as provided under par. (b), one or more drinking fountains installed in accordance with ch. Comm 82 shall be provided in the immediate pool area.

(b) For a bed and breakfast establishment, tourist rooming house, or private guest room, a source of potable drinking water supplied by a fixture plumbed and drained according to ch. Comm 82 or commercially bottled drinking water shall be provided within the pool enclosure or the establishment.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; r. and recr. (5), Register, June, 1999, No. 522, eff. 7-1-99; am. (1) (a), cr. (1) (a) 2., Register, November, 2000, No. 539, eff. 12-1-00; CR 04-052: r. (2), renum. (3) to (5) to be (2) to (4), am. (2) (b) Register January 2005 No. 589, eff. 2-1-05.

Comm 90.10 Outdoor pool enclosure. **(1)** Except as provided in sub. (2), an enclosure at least 5 feet high constructed to make access difficult shall completely surround every outdoor pool and its adjacent deck area. Access shall be through self-closing and latching gates at the shallow end of the pool. Any opening

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except a controlled access may not exceed 3 1/2 inches in width or diameter. The enclosure shall be designed, where a bathhouse is provided, so that patron access to the pool shall be through the bathhouse. Controlled openings for maintenance purposes are permitted if they can be locked.

(2) A plunge pool or a wave-generating pool does not require a separate enclosure if, along with other water attraction facilities, it is enclosed in an area under the control of an operator providing safety and supervision measures as required in s. HFS 172.05.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; correction in (1) made under s. 13.93 (2m) (b) 7., Stats., Register, June, 1999, No. 522; am. (1), Register, November, 2000, No. 539, eff. 12-1-00; CR 02-002: am. (2) Register April 2003 No. 568, eff. 5-1-03.

Comm 90.11 Recirculation system for a pool.

(1) **GENERAL.** Each pool shall have a separate recirculation system except that the department may approve the use of a common surge tank. When a room housing the filtration equipment and pool water heater is provided, it shall be well lighted, well ventilated, well drained, and easily accessible for operation and maintenance of equipment. Provision for complete drainage of the recirculation system shall be made. Any connection to a storm sewer or a sanitary sewer shall be through a positive air-gap. All materials covered under ANSI/NSF 50 shall conform to ANSI/NSF 50 or an equivalent standard.

Note: An installation where the backwash is discharged through a manifold system is not considered to be the interconnection of recirculation systems.

(2) **OVERFLOW SYSTEMS.** Overflow gutters or skimmers shall be provided on all pools and shall be designed and installed to provide continuous skimming.

(3) **GUTTERS.** (a) *Extent.* Gutters shall extend completely around the pool except at recessed steps, ladders or ramps. A water attraction may be exempt from the continuous gutter requirement with the approval of the department.

(b) *Slope and drains.* The gutter lip shall be level within a tolerance of plus or minus 1/8 of an inch (0.31 cm). Gutter bottoms may be flat or sloping. At least one gutter drain shall be provided for each 15 feet (4.6 m) of gutter or fraction thereof. Gutter drains shall be located not more than 15 feet (4.6 m) apart.

(c) *Size and shape.* The interior width of the gutter may not be less than 3 inches (7.6 cm). The gutter and its means of drainage shall be capable of continuously removing at least 125% of the recirculation rate when the water level is at the lip of the gutter. Gutters shall be designed to serve as a handgrip and to prevent entrapment of arms or legs.

(d) *Outlet fittings and pipe.* The gutter outlets shall be connected with pipes having a diameter of at least 2 inches (5 cm). The net area of the opening in the grating of outlet fittings shall be at least 1.5 times the area of the outlet pipe.

(e) *Surge tank.* All overflow gutters shall be connected to the recirculation system through a surge tank having an effective capacity of at least one gallon per square foot of pool water surface except that the department may permit usage of the gutter to satisfy surge capacity requirements when the gutter's hydraulic design is shown to provide the required pool water flow rate without surcharging. Gutter drain piping may not be included in calculating surge storage capacity. If an overflow pipe is provided, it shall be of adequate capacity to convey excess water to the storm sewer.

(f) *Roll-out type pool.* Roll-out or rim flow type pools with the water level at the deck edge and having a gutter with integral surge capacity shall be designed to meet the safety and hydraulic provisions in this section and subsection that apply to gutter-type pools. The design of the curb and handgrip shall conform to accepted standards of construction and shall be evaluated by the department in relation to the proposed use of the pool.

(4) **SKIMMERS.** (a) *General.* Skimmers of a type approved by the department may be installed on a pool in lieu of gutters, but only on a pool that has a water surface area no greater than 3,500 square feet (325 m²) unless it is a reverse flow pool in which case

it may have a water surface area up to 5,000 square feet (464.5 m²). The minimum skimmer operating level shall be no more than 9 inches (23 cm) below the level of the deck.

(b) *Number, location and quality.* Where skimmers are used, at least one skimmer, built into the pool wall, shall be provided for each 400 square feet (37.2 m²) of water surface or fraction thereof for outdoor pools, for each 500 square feet (46.5 m²) of water surface or fraction thereof for indoor pools except whirlpools and for each 100 square feet (9.3 m²) of water surface or fraction thereof for whirlpools. Skimmers shall be sturdy and shall be constructed of corrosion-resistant materials. The skimmer basket and flow control shall be easily accessible. The access cover shall be securely fastened. Skimmers shall be located to provide constant and effective skimming over the entire surface of the pool.

(c) *Flow-through rate.* Skimmers shall be designed for a flow-through rate of at least 30 gallons per minute and shall develop sufficient water surface velocity through the skimmer mouth to cause floating material to flow into the skimmer system. The combined capacity of all skimmers in a pool shall be equal to or greater than the total required recirculation rate.

(d) *Weir adjustment and control.* A skimmer weir shall adjust automatically and shall operate freely and continuously with variations of at least 4 inches in water level. All skimmers shall be provided with individual flow controls. All skimmed water shall pass through an easily removable and cleanable basket or screen before encountering control valves and entering the pump suction.

(e) *Air-lock prevention.* If a skimmer is connected directly to the recirculation pump suction pipe, the skimmer system shall include a device to prevent an air-lock in the suction line. If equalizer pipes are used, they shall pass an adequate amount of water to meet pump suction requirements in the event that the water in the pool drops below the weir level. If any other device or arrangement is used to prevent an air-lock in the suction line, a sufficient amount of water shall flow to maintain pump suction. Equalizer pipes shall be designed to carry the designed flow of the skimmers. The equalizer pipes shall be located at least one foot below the lowest overflow level of the skimmer. A valve or equivalent device that will remain tightly closed under normal operating conditions but will automatically open when the water level drops below the minimum operating level of the skimmer weir shall be provided on each equalizer pipe.

(5) **CONTINUOUS SKIMMING.** All pools shall be designed to provide continuous skimming. For pools with gutters, makeup water supply equipment shall be provided to automatically maintain continuous skimming. For pools with skimmers, the water level shall be maintained midway between the bottom and the top edges of the skimmer opening.

(6) **RECIRCULATING MAIN DRAIN.** (a) *Installations and fittings.* At least one recirculating main drain shall be installed in the pool bottom except that the main drain required in a reverse flow pool under sub. (10) (d) need not be connected to the recirculation system. Main drain fittings shall be of the grate type and shall be set flush with the floor. The fittings shall be designed to carry 100% of the recirculation rate at a velocity not greater than 1.5 feet (45.7 cm) per second through the clear area of the grate. Outlet grates shall be anchored. Openings in grates shall be 0.5 inch (1.3 cm) or less in width or diameter. Grates shall not be removable except with tools.

(b) *Piping.* 1. The piping from the recirculation main drain shall be designed to carry 100% of the recirculation rate at a velocity not greater than 8 feet (2.4 m) per second. The piping shall contain a manual control valve located so that it is easily accessible.

2. a. Where the outlet piping is located in the bottom of the main drain, there shall be a minimum space of at least one pipe diameter between the outlet pipe termination and the grate.

b. Where the outlet piping is located in the side of the main drain, there shall be a minimum space of at least one pipe diameter between the center line of the outlet pipe termination and the grate.

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Note: See Appendix for further explanatory material.

(c) *Operation.* For all pools except reverse flow pools, 20 to 25% of the recirculated water shall be drawn through the main drain.

(7) **STRAINERS AND SCREENS.** Suitable strainers or screens shall be provided through which all water shall pass before entering the pump suction. The strainers or screens shall be of rigid construction, fabricated of a corrosion-resistant material and sufficiently strong to prevent collapsing when clogged. The openings in the strainer or screen shall be no greater than 1/8 inch (0.31 cm) in any dimension. The total clear area of all openings shall be at least 4 times the area of the connecting pipe. If the strainer is of the pot design, it shall have a quick-opening cover. One spare strainer basket shall be provided for each strainer. No bypass around the strainer or screen is permitted. The line containing the strainer shall be properly valved to allow for servicing.

(8) **PUMPING EQUIPMENT.** (a) *Recirculation.* The recirculation pump or pumps shall have a capacity that is adequate for circulating the volume of water necessary to provide a complete turnover of diving pool, swimming pool and combination pool water in a 6-hour period. Unless specifically stated in Table 90.11 or elsewhere in this chapter, water turnover times for other pools shall be approved by the department. Provision shall be made to ensure that the pump does not become air-bound. Where necessary, self-priming pumps shall be installed. The pump or pumps shall be capable of providing the design flow rates at a total dynamic head of 50 feet (15.25 m) of pressure for all vacuum filters, 70 feet (21.35 m) of pressure for sand or cartridge filters and 80 feet (15.25 m) of pressure for diatomaceous earth filters, unless lower or higher heads are shown by the designer to be hydraulically appropriate.

**Table 90.11
THERAPY/EXERCISE POOL TURNOVER TIME**

Temperature in °F. (°C.)	Load (gals/person) ^a	Minimum Turnover Time (hours)
72–93 (22–33 °C.)	≥ 2,500	4
72–93 (22–33 °C.)	≥ 450	2
72–93 (22–33 °C.)	< 450	1
>93–104 (>33–40 °C.)	N/A	0.5

N/A = not applicable.

^a The number of is equal to posted patron load.

Note: A therapy area within a multi-section pool having a temperature of ≤ 93 °F. would be considered an activity pool.

(b) *Backwashing.* The pump or pumps shall be capable of providing the necessary quantity of water for backwashing filters.

(9) **FILTRATION.** (a) *General.* 1. A swimming pool water treatment system shall have one or more filters. Filters shall conform to ANSI/NSF 50 or shall be approved by the department. Filters shall be installed with adequate clearance and facilities for easy and safe filter media inspection, maintenance, disassembly and repair.

2. Pressure filter shells and piping shall be designed and constructed for a minimum working pressure of 50 pounds per square inch with a safety factor of 4. When the maximum shut-off head of the pump used with the filter tank exceeds 50 pounds per square inch, the tank shall be designed for this head with a safety factor of 4.

3. Vacuum-type filter shells shall be designed to withstand pressure developed by the weight of the water contained in the shell with a safety factor of 1.5. In addition, filters that are closed during any part of the operating cycle shall be designed to with-

stand a vacuum equal to 25 inches of mercury with a safety factor of 1.5.

4. A manual of instruction shall be provided to the owner with each filter or group of filters which shall include all drawings, illustrations, operating procedures, charts and parts lists. Data plates of a permanent nature, inscribed and located so that they can be easily read and understood, shall be securely attached to the filter shell. The plates shall provide the following information:

- Manufacturer's name and address;
- Filter model number;
- Filter serial number;
- Effective filter area in square feet;
- Design flow rate in gallons per minute;
- Maximum working pressure; and
- Date of manufacture.

5. Each valve shall have a permanent identifying label or tag attached to it.

6. Each filter unit shall have a suitable opening to permit the installation and easy removal of internal filter components such as the upper and lower distribution systems, filter media, cartridges, filter elements and septums. When multiple filter units are used, filters and associated piping shall be equipped with sufficient valves to permit isolation of individual filters for repair while other filters are in service. When diatomaceous earth filters are employed, sufficient valving shall be provided to permit recycling during the precoat operation.

7. Filters shall be provided with the following appropriately located accessories where applicable: a pressure gauge or gauges, a vacuum gauge or gauges, a backwash sight glass on the waste discharge line and an air relief valve or valves at the high point of the filter.

8. A means of continuously measuring rate-of-flow shall be provided in all recirculation systems and in the backwash system on pressure sand filters. The rate-of-flow indicator shall be of a type approved by the department. The indicator shall be capable of measuring at least 1.5 times the design flow rate, and shall be accurate within 10% of true flow. The indicator shall be installed where it is readily accessible for reading and maintenance and in accordance with the manufacturer's recommendation.

9. A device for regulating the rate-of-flow shall be provided in the recirculation pump discharge piping.

(b) *Sand filters – pressure type.* 1. The design filtration rate of rapid-rate sand filters may not exceed 3 gallons per minute per square foot (0.09 m²) of bed area. With high-rate sand filters the rate may not exceed 15 gallons per minute per square foot (0.09 m²) of bed area.

2. The initial head loss through any filter with a permanent media when operating at the design flow rate may not exceed 3 pounds per square inch (6.5 cm²) or the psi recommended by the filter manufacturer. The head loss shall be the difference between the pressure at the inlet piping and the pressure at the outlet piping or whatever head loss measure is recommended by the manufacturer.

3. The upper distribution system shall be hydraulically designed to distribute incoming water during the filter cycle so that any movement or migration of the filter media at the design flow rate is prevented and to properly collect water during the backwash cycle. The total opening area of the system shall be equal to or greater than the area of the backwash effluent piping. The backwash water collection openings shall be located not less than 18 inches (45.7 cm) above the design level of the filter media. The maximum horizontal travel of suspended particles to reach the draw-off point may not be more than 3 feet (0.91 m). Vertical filters shall have a straight side shell height of 12 inches (30.5 cm) above the filter bed.

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4. The lower distribution system shall be designed to permit adequate flow and distribution of wash water to uniformly expand the filter media during the backwashing and to uniformly collect the filtered water during the filter cycle. If a perforated plate is used, it shall be placed horizontally across the bottom of the filter or arched so that it will cover the entire cross-sectional area of the filter shell. The ratio of total underdrain orifice area to total area of bed shall be between 0.25% and 0.40%. The distribution system shall be designed to prevent clogging and shall be constructed of materials resistant to corrosion, physical deformation and wear.

5. Sand shall be hard siliceous material free of carbonates or other foreign material with an effective particle size of between 0.45 and 0.60 millimeters and a uniformity coefficient not exceeding 1.75. The filter sand bed shall have a minimum depth of 20 inches (50.8 cm).

6. Where gravel is used to support the filter media, the gravel shall be rounded washed material free of limestone and fines and be placed in layers properly graded to prevent intermixing. The total gravel bed depth may be not less than 10 inches (25.4 cm). A reduction in depth of gravel or its elimination is permitted where equivalent performance and service by other means can be demonstrated.

7. With sand media the minimum backwash rate may not be less than 15 gallons (56.8 L) per minute per square foot (0.09 m²) of filter bed area or so great as to cause loss of the media.

8. The backwash water from pressure sand filters shall be discharged in accordance with Table Comm 82.38-1.

Note: See Appendix A-90.20(13) for pertinent sections of ch. Comm 82, Table 82.38-1.

(c) *Vacuum-type sand filters.* Vacuum sand filters may be used if they comply with NSF specifications and the following requirements:

1. The design filtration rate of vacuum-type sand filters shall be no more than 15 gallons (56.8 L) per minute per square foot (0.09 m²);

2. Pool water shall be evenly distributed over the entire surface of the filter bed;

3. The filter media shall consist of hard siliceous sand material free of carbonates or other foreign material, with an effective particle size of 0.45 millimeters and a uniformity coefficient of 1.4 maximum. The filter sand bed shall have a minimum depth of 20 inches (50.8 cm). The gravel used to support the filter media shall be rounded, washed material, free of limestone and fine particles, and placed in layers properly graded to prevent intermixing;

4. The lower water collection and distribution system shall be designed to uniformly collect the filtered water from the entire filter bed during the filter cycle;

5. The backwash rate shall be a minimum of 15 gallons (56.8 L) per minute per square foot (0.09 m²) of filter surface;

6. Backwash water shall be discharged to a storm sewer or to ground surface as specified in par. (b) 8.; and

7. All appurtenances and tank construction shall conform to applicable parts of this subsection.

Note: The national sanitation foundation's swimming pool equipment standards may be consulted at the department's bureau of integrated services or at the secretary of state's office or the legislative reference bureau. Copies may be obtained from the National Sanitation Foundation, NSF Building, P.O. Box 1468, Ann Arbor, Michigan 48106.

(d) *Diatomaceous earth filters – pressure and vacuum types.*

1. The design filtration rate for pressure or vacuum filters shall be 1 to 1.5 gallons (3.8 to 5.7 L) per minute per square foot (0.09 m²) of effective filter area, with a turnover rate of 6 hours or less.

2. The initial head loss between the filter inlet and discharge openings of a pressure filter, when operating with the required precoat and at the design flow rate, may not exceed 3 pounds per square inch (6.5 cm²).

3. The filter and piping shall be so designed that during pre-coating the effluent will be refiltered or be wasted unless it can be

demonstrated that the filter septums are constructed so that no perceptible suspended solids are present in the filtered water.

4. a. The effective filter area of a septum shall be the part that is active during filtration. Septum supports do not reduce the effective filter area provided that the dimension of the cross section does not exceed 1/4 inch (0.64 cm). The design distance between the side walls of the filter shell and the septum surfaces and between surfaces of the septum shall be at least one inch. Elements and element assemblies shall be firmly installed in the tank.

b. Elements shall be capable of withstanding a test pressure differential of 20 pounds per square inch in vacuum filters and 75 pounds per square inch in pressure filters.

5. A suitable baffle or similar device shall be installed in the filter tank to prevent undesirable water currents. The design and arrangement of the interior filter components shall provide for uniform distribution of the filter aid over the entire septum area.

6. a. For pressure-type filters, precoat feed equipment shall be provided to apply not less than 0.1 pound of filter aid per square foot of filter area after each backwash.

b. Feeding equipment capable of continuously applying the filter manufacturer's recommended amount of filter aid shall be provided. An adequately sized positive displacement-type feeder for the addition of filter aid shall be provided for pressure-type filters. A slurry tank, capable of holding a one-day supply of a 5% mix of filter aid slurry shall be provided. The slurry tank shall have an agitator. Vacuum filters shall be equipped in the same way as pressure filters or with a mechanical dry filter aid feeder. Recirculated pool water or water from an acceptable source shall be used to flush the slurry feeder pump head. The flushing system shall be designed to flush the slurry feeder pump head once every 15 minutes for a sufficiently long duration to effectively flush out the pump head.

7. Filter and piping design shall permit cleaning by one or more of the following methods: backwashing, air bump assist backwashing, spray rinse or agitation. Means shall be provided for removal of the waste water, dislodged filter aid and dirt from the filter tank.

8. Waste water shall be discharged in accordance with ch. Comm 82 Table 82.38-1. The connection to the sewer or discharges to grade shall be by means of a positive air-gap where inundation of the outlet is possible.

Note: See Appendix A-90.20(12)-2 for pertinent sections of ch. Comm 82, Table 82.38-1.

9. If separation tanks are installed, they shall be provided with an air relief valve. A cautionary statement warning the user not to start up the filter pump without opening the air release valve shall be permanently affixed to the separation tank within the area of the air relief valve and shall be easily readable.

10. Accessories shall be provided in accordance with par. (a) 7. The vacuum gauge shall be located between the filter and the recirculation pump. A vacuum limit switch interconnected with the recirculation pump controls shall be provided.

(e) *Cartridge filters.* 1. The design filtration rate for cartridge filters of the depth type shall be 3 or fewer gallons per minute (11.4 or fewer liters per minute) per square foot (0.09 m² meters) of cartridge cylinder surface area. For surface types, the filtration rate shall be no greater than 0.375 gallons (1.42 liters) per minute per square foot (0.09 m²) of the pleated area of the cartridge.

2. The initial head loss through filters may not exceed 3 pounds per square inch (6.5 cm²) at the design flow rate.

3. The filters shall be designed and fabricated in accordance with the applicable portions of par. (a).

4. Cleaning of the cartridges shall be accomplished according to manufacturer's recommendations either in place or by cartridge removal, depending on the type of unit installed.

5. All waste water, including solids, resulting from cartridge cleaning shall be discharged to a sanitary sewer or disposed of on

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the owner's property in a manner that does not create a health hazard or nuisance.

6. A duplicate set of cartridges shall be available for replacement as needed.

7. Cartridge filters may not be used on swimming pools larger than 70,000 gallons.

(10) INLETS. (a) *Type.* Inlet fittings shall be adjusted so that they produce a uniform flow rate to ensure that treated water is effectively distributed throughout the pool. Directional flow inlets shall be used with skimmer-type pools and shall be designed to cause a rotation of the water surface and to prevent areas of inadequate circulation within the pool. Water velocity through any inlet shall be in the range of 5 to 20 feet per second. In pools with skimmers, water velocity shall be in the range of 10 to 20 feet per second.

(b) *Number.* At least one inlet shall be provided for each 15 feet of pool perimeter or fraction thereof.

(c) *Location.* Wall inlets shall be located at least 12 inches below the design water surface. They shall be spaced not more than 15 feet apart, with one inlet within 5 feet of each corner of the pool. Inlet piping shall be sized on the basis of the flow it must carry. If a pool is over 60 feet in width, inlets shall be located in the bottom of the pool and shall be uniformly spaced not more than 20 feet apart in a row within 15 feet of each wall.

(d) *Reverse flow pool.* The requirements under pars. (a), (b) and (c) do not preclude the use of a reverse flow pool. For a reverse flow pool, bottom inlets shall be provided as in par. (c). A main drain shall be provided in a reverse flow pool for complete drainage.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; CR 02-002: am. (3) (a) Register April 2003 No. 568, eff. 5-1-03; CR 04-052: am. (1), (8) (a), (9) (a) 1, and (b) 8, and (9) (d) 8, renum. (6) (b) (intro.) to be (6) (b) 1., cr. (6) (b) 2. and Table 90.11, Register January 2005 No. 589, eff. 2-1-05.

Comm 90.12 Disinfection of pool water. (1) EQUIPMENT. (a) *General.* Equipment shall be provided for continuous disinfection of pool water. For a water attraction, an electronic system for the continuous monitoring and feeding of a disinfectant into the recirculation system shall be installed.

Note: See s. HFS 172.09 (1) for disinfectant approval and usage.

Note: Where an electronic monitoring system in connection with the operation of automatic chemical feeding equipment is not required, its installation is strongly recommended.

(b) *Feeders.* Disinfectant feeders shall be approved by the department. These feeders shall be automatic, easily adjustable, capable of providing the required chemical residuals, have flow control valves upstream and downstream from the feeder, be easily disassembled for cleaning and maintenance, and be durable and capable of accurate feeding with a rate-of-flow meter installed to accurately measure the flow through the feeder system. Feeders shall be installed according to the manufacturer's directions, shall be used only with the disinfectant recommended by the manufacturer, shall be properly vented and shall incorporate antisiphon safeguards to prevent disinfectant feeding in the event of the failure of recirculation equipment. Feeder pumps shall be electrically connected to the recirculating pump control circuit.

(c) *Capacity.* Disinfectant feeding equipment shall be capable of supplying disinfectant in the pool water at a concentration of not less than 10 ppm (mg/l) of chlorine or bromine for indoor pools and 20 ppm (mg/l) of chlorine or bromine for outdoor pools.

(d) *Point of addition.* Disinfectant shall be fed into the pool water recirculating system at a point downstream from any heater, or at another point of introduction based on the feeder manufacturer's recommendations and the resulting residual disinfectant level in the pool water.

(e) *Data plate.* An easily accessible and readable data plate shall be permanently secured to the disinfectant feeder. The data plate shall contain the following information:

1. Manufacturer's name and address;
2. Feeder model and serial number;
3. Maximum output rate;
4. Chemicals recommended;
5. A statement that the use of chemicals other than those recommended may be hazardous; and
6. A statement about whether or not the unit has been evaluated for swimming pools or for spas.

(2) GAS CHLORINATION. (a) *Housing.* Where gaseous chlorine equipment is provided, the mechanical proportioning device, scales and cylinders of chlorine shall be housed above grade, in a reasonably gas-tight, corrosion-resistant and mechanically vented room with a door opening outward to the outside. The mechanical exhaust system shall be capable of providing at least one air change per minute and shall consist of an airtight duct beginning not more than 8 inches above the floor and terminating at a safe point of discharge at least 8 feet above the outside surrounding grade. An air duct or louvered intake opening shall be provided to supply fresh air to the chlorine room. The room shall have an observation window at least 18 inches square and shall have artificial lighting. Electrical switches for the control of lighting and ventilation shall be located on the outside of the room.

(b) *Cylinder storage.* Chlorine cylinders shall be securely fastened in place. Keys or valves shall be provided on the chlorine cylinder being used so the supply can be shut off quickly in case of an emergency.

(c) *Gas feeding safety.* 1. The chlorine feeding device shall be designed so that during accidents or interruptions of the flow of the water supply, gas feeding is automatically stopped. The release of chlorine shall be terminated when the recirculation pump is not in operation.

2. Where a vacuum-type gas chlorinating system is used, the ejector may be installed in the pool water return piping located in the filter room. The ejector shall be operated by means of recirculated pool water or, if water other than recirculated pool water is used to inject chlorine, the water supply line shall be equipped with an electric shutoff valve wired to the recirculation pump and shall be provided with a backflow preventer approved by the department.

3. Chlorinator vent lines shall be directed to the building exterior and away from the pool area.

(3) DRY CHLORINE COMPOUNDS. (a) *Solution.* A minimum of 2 solution tanks, one for mixing the chlorine compound with water and the other for collecting and feeding the decanted solution, shall be provided.

(b) *Tank capacity.* The minimum capacity of a solution tank shall be adequate to provide one day's maximum usage.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; CR 02-002: am. (1) (a) Register April 2003 No. 568, eff. 5-1-03; CR 04-052: am. (1) (d) Register January 2005 No. 589, eff. 2-1-05.

Comm 90.13 Piping for a pool. (1) SIZE. The size of pool piping, fittings and valves shall be based on all of the following:

(a) The maximum water velocity for pressure piping shall be 10 foot/second (3.05 m/sec.), except for copper piping where the maximum velocity shall not exceed 8 foot/second (2.44 m/sec.).

(b) The maximum water velocity for suction piping shall be 6 foot/second (1.8 m/sec.) and 1½ foot/second (0.5 m/sec.) flow rate through the suction grates.

(c) Gutter drain lines shall be sized to be capable of continuously removing at least 125% of recirculated water.

(2) MATERIAL. The recirculation piping and fittings shall be constructed of nontoxic material and shall be resistant to corrosion and able to withstand operating pressures. Acceptable materials for pool recirculation system piping are plastic, copper, galva-

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nized steel, cast iron, ductile iron and any other material suitable for water supply.

(3) **EXPANSION AND CONTRACTION.** The design of the piping system shall permit expansion and contraction as needed.

(4) **FITTINGS.** All pool fittings shall be of corrosion-resistant materials.

(5) **PIPE CODING.** All exposed piping shall be color coded or provided with permanent labels or tags for easy identification.

(6) **HOSEBIBBS.** At least one hosebibb shall be provided in the equipment room. An additional hosebibb shall be provided in each toilet facility, and at intervals along the deck so as to permit adequate cleaning using a maximum of 100 feet (30.5 m) of hose. A hosebibb in the equipment room or dressing, shower and toilet facility may be used for deck cleaning if located where a door opens directly to the deck and so that no more than 100 feet (30.5 m) of hose, when laid across the deck surface, is needed to reach all areas of the deck. All hosebibbs shall be protected against backsiphonage by proper installation of approved backflow prevention devices, as required in s. Comm 82.41.

(7) **INSTALLATION AND DRAINING OF PIPES.** All equipment and piping shall be designed and fabricated to drain completely by removal of drain plugs, manipulating winter drain valves or by other approved means. All piping shall be supported continuously or at sufficiently close intervals to prevent sagging. All suction piping shall be sloped in one direction, preferably toward the pump. If the pool is to be maintained full of water during a period of freezing temperatures, all submerged inlets, vacuum cleaner fittings and other openings into the pool shall be provided with insertable plugs or valves to allow the connected piping to be drained to a point below the frost line. The engineer or architect shall furnish draining instructions to the owner together with drawings showing pipe and valve locations tagged by the contractor which clearly define the required procedure.

(8) **SEWERS AND SEWER CONNECTIONS.** (a) *Restrictions.* 1. Exposed drain lines may not pass over the pool, a surge tank, an open filter or the deck.

2. Clear water drain lines may not discharge to a sanitary sewer. Clear water drain lines shall discharge to a storm sewer or to the ground surface at a point where a nuisance or health hazard will not be created, except that clear water drain lines may not connect to a storm sewer if surcharge of the drain line can cause contamination of the pool water or flooding of the equipment room.

(b) *Pumpout.* A pool pumpout line or a portable pump for draining the pool shall be provided if gravity drainage is not possible.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; CR 04-052: r. and recr. (1), am. (6) Register January 2005 No. 589, eff. 2-1-05.

Comm 90.14 Pool water heaters and thermometer.

(1) **INSTALLATION OF HEATERS.** When provided, pool water heat-

ers shall be installed in accordance with ss. Comm 84.20 (5) (p) and 84.10 (5).

(2) **THERMOMETER.** A thermometer accurate to within plus or minus 2°F. (1°C.) in the operating range shall be installed in the pool water recirculation piping to monitor pool temperature and shall be accessible for reading.

(3) **EQUIPMENT.** Heaters shall be installed and tested in accordance with ch. Comm 64, and either ch. Comm 65 for gas-fueled applications or ch. Comm 16 for electric applications.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; CR 04-052: am. (1) and (2), cr. (3) Register January 2005 No. 589, eff. 2-1-05.

Comm 90.15 Lifeguard chair requirements for pools. Each swimming-only, diving, or combination swimming and diving pool, other than one reserved for training or competitive purposes, that has at least 2000 square feet (186 m²) of water surface shall have at least one elevated lifeguard chair. For pools larger than 2000 square feet (186 m²), one lifeguard chair shall be provided for the first 2000 square feet and an additional chair shall be provided for each additional 2000 square feet. If more than one lifeguard chair is required and the pool width is 45 feet (13.72 m) or more, the lifeguard chairs shall be located on opposite sides of the pool. The chairs shall be in locations that provide a clear, unobstructed view of the pool bottom in the area under surveillance. One chair shall be located near the diving well.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89.

Comm 90.16 Dressing areas, showers, toilet facilities and drinking fountains required.

(1) **GENERAL REQUIREMENTS.** Toilet and handwash facilities, and public drinking fountains shall be located so that they are accessible by a length of paved walking surface no greater than 300 feet (98.4 m) from the nearest rim of the most distant pool. Showers and dressing facilities shall be conveniently located on the premises and accessible by a length of paved walking surface. All applicable building requirements of chs. Comm 61 to 65 shall apply to the construction of indoor pool housing and bathhouses.

Note: See Appendix A-90.16 (1) for further information regarding indoor pools.

(2) **LAYOUT.** (a) *General.* Dressing areas, showers, and toilet facilities to be used simultaneously by both sexes shall be divided into two parts designated by sex and separated by a tight opaque wall. Entrances and exits shall be mazed to break line of sight as specified in ch. Comm 62.

(b) *Floors and drains.* Floors shall have a smooth, hard, non-absorbent, slip-resistant surface. A smooth, hard, non-absorbent surface shall extend upward on the walls at least 6 inches (15.2 cm). Junctions between walls and floors shall be coved. When floor drains are installed, drain openings shall be ½ inch (1.27 cm) or less in width or diameter.

(c) *Drainage of unroofed areas.* Floor drains in unroofed dressing areas shall be connected to a storm sewer or discharged to grade through an air-gap or the floor shall slope to the outer perimeter ground surface.

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Table 90.16
MINIMUM NUMBER OF SANITARY FIXTURES REQUIRED AT PUBLIC POOLS AND WATER ATTRACTIONS

Pool Facility, Indoor or Outdoor ^a (example of location)	Cumulative Area of Surface Water (in sq. feet)	Number of							
		Public Toilets		Public Urinals	Public Lavatories		Public Showers		Public Drinking Fountains ^b
		F	M	M	F	M	F	M	
1. Swimming pools, wading pools and whirlpools in conjunction with living units having plumbing, except for items 2. to 5. No open swim or lessons permitted. (i.e., apartments, hotels, motels, condos and mobile home parks)	<2000	One unisex		0	One unisex		0	0	1 ^a
	2000 – 7500	1	1	0	1	1	1	1	1
	>7500	See note below for requirements.							
2. Swimming pools, wading pools and whirlpools without living units, except for items 3. to 5.; and swimming pools, wading pools and whirlpools with living units where open swim or lessons are permitted; and water attractions where lessons are conducted. (i.e., municipal pools and campgrounds)	<2000	1	1	0	1	1	1	1	1
	2000 – 3999	3	1	2	1	1	2	2	1
	4000 – 5999	4	2	2	2	2	4	4	1
	6000 – 7499	4	2	2	2	2	5	5	1
	7500 – 8999	8	2	2	3	2	5	5	2
	9,000 – 9,999	10	2	3	4	3	6	6	2
	10,000 – 12,999	12	3	3	4	3	6	6	2
	≥ 13,000 – 15,000	14	3	4	5	4	7	7	3
>15,000	See note below for requirements.								
3. Water attractions and water attraction complexes, with living units. No open swim or lessons permitted. Use 300 sq. ft. for slides without basins (i.e., activity pools, waterslide plunge pools, leisure river or tubing pools, and wave pools)	<7500	1	1	0	1	1	1	1	1
	7500 – <10,000	4	1	1	2	2	2	2	2
	10,000 – <15,000	8	2	2	2	2	2	2	2
	15,000 – <22,500	12	3	3	3	3	3	3	3
	22,500 – <30,000	12	3	3	3	3	3	3	3
	30,000 – <37,500	16	4	4	4	4	4	4	4
	≥ 37,500	See note below for design.							
4. Water attractions and water attraction complexes, without living units. No lessons are permitted. Use 300 sq. ft. for slides without basins (i.e., activity pools, waterslide plunge pools, leisure river or tubing pools, and wave pools)	<7500	2	1	1	1	1	1	1	1
	7500 – <10,000	6	2	1	2	2	2	2	2
	10,000 – <15,000	8	2	2	2	2	2	2	2
	15,000 – <22,500	12	3	3	3	3	3	3	3
	22,500 – <30,000	16	4	4	4	4	4	4	4
	30,000 – <37,500	20	5	5	5	5	5	5	5
	≥ 37,500	See note below for design.							
Pool Facility, Indoor or Outdoor ^a (example of location)	Patrol Load	Number of							
		Public Toilets		Public Urinals	Public Lavatories		Public Showers		Public Drinking Fountains ^b
		F	M	M	F	M	F	M	
5. Therapy/Exercise pools.	Up to 10	1	1	0	1	1	1	1	1
	11 – 20	2	1	1	1	1	2	2	1
	21 – 30	2	1	1	2	2	3	3	1
	> 30	Per department approval.							

F = female; M = male; < = less than; > = greater than

^a For pools with spectator areas, see Appendix A-90.16 (1) regarding chs. Comm 61 to 65 that contain the requirements for sanitary facilities.

^b Also refer to s. Comm 90.09 (4) for more information regarding source of drinking water.

Notes:

For water attractions in excess of 37,500 sq. ft. use the following additions—

For each 7,500 square feet, add one sanitary unit: 0.7 male water closets, 1.0 male urinal, 0.85 lavatories for males, 1.0 showers for males, 0.6 drinking fountains, 4.0 female water closets, 1.0 lavatories for females and 1.0 showers for females.

For pools in excess of 7,500 sq. ft. and Type 1. above; and for pools in excess of 15,000 sq. ft. and Type 2. above, use the following additions – For each 4,000 square feet, add one sanitary unit: 1.0 male water closets, 1.0 male urinal, 1.0 lavatory for males, 4 showers for males, 4 female water closets, 1.0 lavatory for females, 4 showers for males and 1.0 drinking fountain.

For the requirements listed for additional sanitary facilities, each fraction represents an additional fixture.

(d) *Hosebibs*. Hosebibs shall be installed in the toilet facility as required in s. Comm 90.13 (6).

(e) *Walls and partitions*. Walls and partitions shall have a smooth, hard, nonabsorbent surface to a height of at least 4 feet (122 cm) above the floor, except for structural elements. Except for structural elements, a space of 10 to 12 inches (25.4 to 30.5 cm) shall be provided between the floor and the bottom of partitions forming compartments within dressing, shower and toilet rooms.

(f) *Lockers*. Lockers shall be set either on solid masonry bases at least 4 inches (10.2 cm) high or on legs extending at least 10 inches (25.4 cm) above the floor.

(g) *Soap*. A soap dispensing system shall be provided at lavatories and showers served by sanitary drains. Dispensers shall be made of durable material and shall be solidly mounted. Glass dispensers may not be used.

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(h) *Water heaters.* Water heating equipment of adequate capacity shall supply water at a temperature between 90°F. (32°C.) and 115°F. (45°C.) to all showers and lavatories. Water heating equipment shall be in accordance with ch. Comm 84.

Note: Section Comm 82.40 (8) (g) requires thermostatic or other temperature control for showers in public buildings.

(i) *Ventilation.* All pool areas, bathhouses, dressing rooms, shower and toilet rooms shall be adequately ventilated, either by natural or mechanical means, to eliminate the accumulation of condensate and odor.

Note: See also ch. Comm 64.

(j) *Required number of sanitary fixtures.* The required minimum number of toilets, lavatories, showers and drinking fountains at pools shall be based on Table 90.16.

Note: Separate toilet facilities should be provided for spectators as specified in chs. Comm 61 to 65. See Appendix A-90.16 (1) for further information.

(k) *Diaper changing station.* Each restroom shall be equipped with a least one user-accessible diaper changing station.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; am. (1), Register, September, 2000, No. 537, eff. 10-1-01; CR 01-139: am. (1) Register June 2002 No. 558, eff. 7-1-02; CR 04-052: r. and recr. (1) and Table 90.16, r. (2), renun. (3) to be (2) and am., cr. (2) (k) Register January 2005 No. 589, eff. 2-1-05.

Comm 90.17 Electrical wiring and lighting. (1) GENERAL. All electrical wiring and equipment shall be installed in compliance with ch. Comm 16.

(2) **LIGHTING.** All pools and adjacent associated paved areas that are intended to be used after daylight hours shall be provided with area lighting. There shall be adequate lighting of the appropriate design and in the proper locations to illuminate the pool and associated areas in accordance with chs. Comm 61 to 65. Submarine lighting may be used.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; CR 01-139: am. (2) Register June 2002 No. 558, eff. 7-1-02.

Subchapter III — Wading Pools and Whirlpools

Comm 90.18 Wading pools. (1) GENERAL. Wading pools shall be in compliance with the applicable requirements of ss. Comm 90.05 to 90.17 and with this section.

(2) **DESIGN.** (a) *Turnover time.* The maximum turnover time for wading pools shall be 2 hours.

(b) *Recirculation system.* All wading pools shall be provided with a continuous filtration and disinfection system. Each wading pool shall be provided with its own separate system unless otherwise approved by the department.

(c) *Inlets and outlets.* 1. At least 2 submerged inlets shall be provided in a wading pool. One inlet shall be provided for each 20 feet (6 m) of perimeter or fraction thereof.

2. When skimmers are used, one shall be provided for each 400 square feet (37.16 m²) of surface area or fraction thereof. An overflow gutter may be installed on one or more of the side walls in lieu of skimmers. The gutter shall have an adequate length and capacity which will provide an overflow rate and circulation pattern to assure effective and continuous skimming.

3. A waste outlet shall be provided at the deepest point of the pool to permit complete emptying.

4. Inlet and outlet grating shall have slotted openings 1/4 inch (0.64 cm) or less in width.

(d) *Water depth.* The maximum depth of the water may not exceed 24 inches (61 cm). The water depth at the perimeter may not exceed 18 inches (46 cm).

(e) *Filling options.* A whirlpool or wading pool may be filled using pool water from an adjacent pool. The water shall meet the requirements as specified under s. HFS 172.09 (2) prior to use.

Note: See Appendix A-90.18 (2)-1 and 90.18 (2)-2 for filling options.

(3) **OBSTRUCTIONS.** Obstructions extending from the walls or the bottom of the wading pool are not permitted except with the approval of the department based on design safety.

(4) **FINISH.** The finish of the walls and bottom of the wading pool shall conform to s. Comm 90.08 (13).

(5) **BOTTOM SLOPE.** The bottom of a wading pool shall slope toward the drains with a minimum slope of 0.25 inches per foot (0.62 cm/0.31 meter) and a maximum slope of 1.0 inch per foot (2.54 cm/0.31 meter).

(6) **DECKS.** (a) *Deck dimensions.* In addition to the provisions under s. Comm 90.19 (1), a wading pool shall be provided with a minimum of 6 feet (1.8 m) of continuous, unobstructed deck around 50 percent of the wading pool perimeter.

(b) *Deck drainage.* All areas of the deck surrounding a wading pool, including any area between the edge of the wading pool and a wall, shall be constructed to completely drain and be easily cleaned. For decks surrounding wading pools that are 20 inches (50.8 cm) or less in width, decks may drain into the wading pool.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; CR 04-052: am. (2) (a), cr. (2) (e) and (6) Register January 2005 No. 589, eff. 2-1-05.

Comm 90.19 Whirlpools. (1) GENERAL. The owner or operator of a whirlpool shall comply with this section and the applicable parts of ss. Comm 90.04 to 90.14, 90.16 and 90.17.

(2) **PERIPHERAL STRUCTURE.** (a) *Roofs and ventilation.* The ceiling or canopy over a whirlpool shall be constructed so that moisture or condensation from the ceiling or canopy does not drain into the whirlpool. The whirlpool room shall be adequately ventilated to prevent excessive condensation, as required under chs. Comm 61 to 65.

(b) *Obstructions and ceiling height.* 1. Pursuant to s. Comm 90.09 (1) (e), there shall be no obstacle or protrusion within a whirlpool or extending from a whirlpool room wall or ceiling which would interfere with the use of the whirlpool or make access difficult.

2. The minimum headroom measured as the height between the top of the whirlpool rim and the ceiling shall be as required under chs. Comm 61 to 65.

(c) *Cleanable walls and ceiling.* The walls and ceiling enclosing a whirlpool shall be constructed of waterproof material that can be easily cleaned. Any wall receiving splashed water from the whirlpool shall be waterproof to a height of no less than 3 feet above the deck.

(d) *Observation window.* Except for a private guest room with a telephone, an observation window shall be provided if the whirlpool is located in a separate, enclosed room so as to allow the owner or operator a clear observation of the whirlpool area from outside the room.

(e) *Lighting.* The room or area in which a whirlpool is located shall be well-lighted to permit observation and the cleaning of surfaces.

(3) **LOCATION.** A whirlpool located in proximity to a swimming-only pool, combination pool or exercise pool may be located:

(a) At any point on the deck along the perimeter of the swimming-only pool, combination pool or exercise pool where the water depth in the swimming-only pool, combination pool or exercise pool equals the water depth in the whirlpool plus or minus 6 inches (15 cm); or

(b) At a point along the perimeter of the swimming-only pool, combination pool or exercise pool where the water depth in the swimming-only pool, combination pool or exercise pool is greater than 4.5 feet (1.4 m), provided that the deck width separating the pool and whirlpool is a minimum of 11 feet (3.4 m).

Note: See also sub. (6) (c).

(4) **DIMENSIONAL DESIGN.** (a) *Water depth.* The maximum water depth of a whirlpool shall be 4 feet (1.22 m) measured from the water line. An exception may be made for a whirlpool designed for a special purpose such as instruction, treatment or therapy.

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(b) *Depth above the seat.* The maximum water depth above any seat or sitting bench in the whirlpool shall be 2 feet (61 cm) measured from the water line.

(c) *Bottom slope.* The bottom slope of a whirlpool may not exceed 1 inch (2.54 cm) per foot (30 cm) and shall slope to the main drain.

(d) *Maximum number of bathers.* There shall be no more than one bather for every 10 square feet of whirlpool surface area.

(5) RECESSED STAIRS AND HANDRAILS. (a) *General.* If a whirlpool is more than 24 inches (61 cm) deep, recessed stairs shall be provided. The stairs do not have to be completely recessed but may not extend into the basin beyond the seat.

(b) *Number required.* Whirlpools shall have stairs, if required, at least every 50 feet (15.24 m) of perimeter or fraction thereof.

(c) *Risers and treads.* Recessed stairs shall have a minimum unobstructed horizontal tread depth of 10 inches (25 cm), with riser heights no greater than 12 inches (30 cm), and shall be uniform except that when the bottom tread is used for a seat, the bottom riser may be a maximum of 14 inches (36 cm) above the whirlpool floor. The minimum width of the stairs shall be 15 inches (38 cm).

(d) *Stairway handrails.* Handrails shall be securely mounted on each side of a stairs. The leading edge of deck-mounted handrails shall be located within 3 inches (7.62 cm), horizontally measured, from the vertical plane of the bottom riser. The handrails shall be separated by a maximum of 3 feet (0.9 m). The mounted handrails shall not infringe upon the deck width requirement under sub. (6) (a).

(e) *Slip-resistant surface.* Stair treads shall have a slip-resistant surface.

(6) DECKS. (a) *Dimensions and whirlpool location.* Except for subs. 1. and 2., a continuous, unobstructed deck at least 5 feet wide and at the same level as the top of the pool wall shall be provided around at least 50% of a whirlpool. The deck width at any point of egress for a whirlpool shall be a minimum of 5 feet as measured parallel to the direction of travel from the stairs.

1. A rim no greater than 3 inches in height and at least one inch in width may be provided around the perimeter of a whirlpool.

2. When a whirlpool is located in a corner of a room, deck width shall be calculated by using the following:

a. The angle between the 2 room walls shall be at least 90°.

b. A deck width of at least 2 feet on both sides measured along the center line of the pool perpendicular to the bisector of the angle of the 2 room walls.

c. No other wall or obstruction shall be located within 5 feet of the whirlpool rim.

Note: For further clarification, see Appendix A-90.19 (6).

(b) *Drained and cleanable.* All areas of the deck surrounding the whirlpool, including any area between the edge of the whirlpool and a wall, shall be constructed to completely drain and be easily cleaned, pursuant to sub. (2) (c). Deck areas around a whirlpool that are 20 inches (50.8 cm) or less in width may drain into the whirlpool.

(c) *Deck width between pools.* The deck width between a whirlpool and any other pool shall be at least 6 feet, except when a common wall not more than 18 inches wide, designed to prevent someone from standing on it, separates a whirlpool and a swimming pool. A minimum 11 feet deck width shall be provided between any pool and a whirlpool when the whirlpool is located near the portion of the other pool where the depth is greater than 4.5 feet.

Note: See also sub. (3).

(d) *Slip-resistant surfaces.* Decks, ramps and similar surfaces surrounding a whirlpool shall have slip-resistant surfaces to prevent injury or discomfort to bare feet when used as intended.

Note: For location of indoor and outdoor pools near walls see Appendix A-90.19 (6).

(7) TEMPERATURE REQUIREMENTS. The maximum water temperature of a whirlpool shall be 104°F. (40°C.). Thermostatic controls shall be provided to prevent the water temperature from exceeding this maximum. The controls shall be accessible only to the operator. An accessible and easily readable thermometer, accurate to within plus or minus 2°F. (1°C.) in the operating range, shall be installed in the filtered and heated water return line.

(8) INLETS AND OUTLETS. (a) *General.* The arrangement of whirlpool inlets and outlets shall produce a uniform circulation of water so that a disinfectant residual is uniformly maintained throughout the whirlpool.

(b) *Inlets.* Each whirlpool shall have at least 2 filtered water inlets located opposite each other and at least 12 inches (30.5 cm) below the water surface.

Note: See s. Comm 90.11 (10), Inlets.

(c) *Outlets.* Outlets shall be installed so as to produce circulation throughout the whirlpool. The outlets shall meet all of the following requirements:

1. A main drain shall be installed in the bottom of each whirlpool as specified in s. Comm 90.11 (6).

2. A minimum of two suction outlets shall be provided. Multiple sets of pump suction shall be allowed into two or more suction outlets as long as they are hydraulically balanced and approved by the department.

3. Each suction outlet shall be installed with a minimum separation of 3 feet.

4. Suction outlets shall be located to conform with any of the following:

a. Suction outlets shall be located on 2 separate vertical walls.

b. One suction outlet shall be located on the bottom of the whirlpool and one suction outlet shall be located on one of the vertical walls.

5. When suction outlets are used, no piping or valve arrangement is allowed that will isolate one suction fitting as the sole source of fluid to the pump. The single pipe to a pump suction inlet may be valved to allow shut off of the flow to the pump.

6. Suction outlets shall be located within 3 inches of the bottom of a whirlpool.

(9) CIRCULATION SYSTEMS. (a) *General.* All whirlpools shall be provided with one or more pumps, one or more filters, a disinfection system and equipment of adequate size to recirculate, filter and disinfect the entire volume of whirlpool water within 30 minutes or less and to provide water at the quality level established in ss. HFS 172.09 and 172.10.

(b) *Water agitation systems.* A whirlpool water agitation system, when provided, shall be separate from the water recirculation and treatment system. A manually controlled timer for the agitation system shall be provided within the whirlpool enclosure. The timer shall be out of reach of any person in the whirlpool. Suction outlets for a water agitation system shall be designed for a maximum velocity of 1.5 feet per second through the outlet grating. There shall be a minimum of 2 outlets per suction system line. The outlets shall be separated by at least 3 feet and shall be connected with pipe equal in diameter to the pump suction pipe.

(c) *Overflow systems.* 1. An overflow system shall be provided for the whirlpool. That system shall be designed and constructed so that the water level in a whirlpool is maintained at the operating level of the overflow rim or weir device of the system.

2. When surface skimmers are used as the sole overflow system, one surface skimmer shall be provided for every 100 square feet (9.3 m²) or fraction thereof, of the whirlpool surface area. When 2 or more skimmers are used, they shall be located to maintain effective skimming action over the entire surface area of the whirlpool.

3. No more than 80% of the required recirculated water flow rate may be drawn through a skimmer or skimmers. The remaining 20% shall be drawn through the bottom drain.

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(d) *Filters.* The filters for the whirlpool shall be in compliance with all applicable paragraphs of s. Comm 90.11 (9).

(e) *Valves.* All valves in the whirlpool recirculation system shall be located where they will be easily accessible for maintenance and removal.

(f) *Air induction systems.* An air induction system, when provided, shall totally prevent water backup that could cause electrical shocks. Air intake sources shall not bring contaminants such as deck water, dirt or other foreign material into the whirlpool.

(g) *Equipment room.* If a room housing the filtration equipment and pool water heater is provided, it shall be large enough to permit easy access to all equipment for both operation and maintenance. Whirlpool equipment rooms shall be adequately ventilated and well drained.

History: Cr. Register, November, 1989, No. 407, eff. 12-1-89; r. and recr. (2) (d), (6) (a) and (8) (c) and am. (6) (c), Register, June, 1999, No. 522, eff. 7-1-99; am. (2), r. and recr. (6) (a), renum. (8) (c) 3. to be (8) (c) 4. a., renum. (8) (c) 4. a. to be (8) (c) 3., Register, November, 2000, No. 539, eff. 12-1-00; correction in (2) (a) made under s. 13.93 (2m) (b) 7., Stats., Register June 2002 No. 558; CR 02-002: am. (2) (b) 2. Register April 2003 No. 568, eff. 5-1-03; CR 04-052: am. (6) (b) and (9) (g) Register January 2005 No. 589, eff. 2-1-05.

Subchapter IV — Water Attractions

Comm 90.20 Water attractions. (1) GENERAL. Any new construction or alteration of a water attraction or water attraction complex shall be designed and installed as specified under this subchapter.

(2) BASIC PRINCIPLES. (a) *General.* This subchapter is founded upon basic principles of generally accepted engineering practices. Some of the details of design, construction and installation may vary, but the basic engineering principles desirable and necessary to protect the health and safety of pool users and patrons shall be utilized by the department for situations not addressed in this subchapter.

Note: This subchapter is a modification of ANSI/NSPI-9, Standard for Aquatic Recreation Facilities (draft), with permission, National Spa and Pool Institute, 2111 Eisenhower Avenue, Alexandria, VA 22314; phone (703) 838-0083; webpage <http://www.nspi.org>.

(b) *Materials.* All water attractions and appurtenances shall be constructed of materials that meet all of the following:

1. In the finished state and application, all materials shall be nontoxic to humans and the environment.
2. All materials shall be impervious and non-abrasive.
3. All materials shall withstand the design stresses so intended.
4. All materials shall provide a watertight structure and have easily cleanable surfaces.

(c) *Structural design.* The structural design and materials used shall be in accordance with generally accepted industry standards and sound engineering practice.

(d) *Protection.* 1. In areas subject to freezing, the pool shell and appurtenances, piping, filter system, pump and motor, and

other components shall be designed and constructed to provide protection from damage due to freezing.

2. Provisions shall be made for the relief of stresses which may occur as a result of unbalanced hydrostatic pressures.

(e) *Surfaces.* All surfaces intended to provide patron footing within pool basins shall be slip-resistant.

(f) *Colors and finishes.* 1. Except as provided in subd. 2., all interiors shall be of light colors, patterns or finishes that will not obscure the existence or presence of objects or surfaces within a pool basin.

Note: Light in color is defined as having a value of 6.5 or greater on the Munsell color-order system.

2. All demarcation lines shall be of contrasting color to the pool interior, but may not be of a thickness or color to obscure the existence or presence of objects or surfaces within the pool basin.

(g) *Diving facilities.* Water attractions which include diving apparatus shall conform with the requirements of s. Comm 90.08.

(h) *Barriers to access.* 1. All water attractions shall be protected by a fence, wall, building, enclosure or solid wall of durable material or any combination thereof.

2. One barrier may surround a pool complex or water attraction complex.

3. For all natural or artificial barriers, the following shall apply:

- a. Be constructed so as to afford no external handholds or footholds.
 - b. Be at least 5 feet (1.5 m) in height and located at least 3 feet (91.4 cm) from any rise in elevation.
 - c. Be equipped with a self-closing and positive self-latching closure mechanism at a height of at least 45 inches (114 cm) above the ground.
 - d. Be provided with closure-mechanism hardware for locking and located on the pool side and located at least 3 inches (7.6 cm) below the top of the gate or barrier.
 - e. The gate or barrier shall have no openings greater than 4 inches (10.2 cm).
4. Alternate means of barriers to access may be provided when approved by the department.

(3) DIMENSIONAL DESIGN. (a) *Obstructions.* All water attractions shall be free of protrusions, extensions, means of entanglement or other obstructions that may cause the entrapment or injury of the patron.

1. At no time shall interior basin walls be submerged during operation.

2. All walls in basins shall not exceed 18 inches (0.5 m) in width.

(b) *Dimensional tolerances.* All construction deviations from design dimensions shall conform to Table 90.20-1.

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Table 90.20-1
PERMITTED CONSTRUCTION TOLERANCES FOR
WATER ATTRACTIONS

Design Requirement	Permitted Construction Tolerance (in inches, unless otherwise noted)
Length, overall	±3 (7.6 cm)
Width, overall	±3 (7.6 cm)
Depth, deep area ^{a, b}	±3 (7.6 cm)
Depth, shallow area ^{b, c}	±2 (5.1 cm)
Floor nozzle flushness	±1/8 (3 mm)
Stair treads and risers	± 1/2 (13 mm)
Waterline, pools with adjustable weir skimmers	± 1/4 (6 mm)
Waterline, pools with non-adjustable skimming systems (i.e., gutters and zero-depth overflow trenches)	±1/8 (3 mm)
Walls	±3 degrees
Other dimensions not specified above	±2 (5.1 cm)

^a As measured at a location measured from the pool wall equal to 60% of the nominal pool depth and at the location of the depth marking.

^b For dimension requirements for diving wells, see s. Comm 90.08.

^c As measured 3 feet (91.4 cm) from the pool wall at the location of the depth marking.

(c) *Floor slopes.* 1. All pool basins shall slope to the drain or the water evacuation area.

2. For water attractions with water depths less than 5 feet (1.5 m), floor slopes shall not exceed 1:12, except in limited areas where the function of the water attraction requires greater slopes.

3. For water attractions with water depths of 5 feet (1.5 m) or more, floor slopes shall be measured from the point of the first slope change to the point of the deep end and shall not exceed 1:3.

(d) *Wall to floor radius.* Pool walls may be joined to the floor with a tangent radius. For areas of the water attractions having depths of less than 5 feet (1.5 m), the maximum radius shall be 6 inches (15.2 cm).

(e) *Water depths.* 1. The water depth of all water attractions shall be established by the designer or manufacturer in consider-

ation of the function of the pool, except where otherwise required by this chapter.

Note: For water depth requirements when a pool slide is installed, refer to s. Comm 90.30.

2. Activity pools having a patron accessible depth greater than 5 feet (1.5 m) shall have a boundary line as specified in s. Comm 90.08 (3).

3. Markings for water depth shall be indicated in feet, inches, or feet and inches and when abbreviated so indicated as “FT” or “IN”. Markings shall be plainly and conspicuously marked on the vertical pool wall, above the waterline where possible, and on the top of the coping or edge of the deck or walk next to the pool.

Note: Additional depth markings may also be indicated in metric.

4. When additional markings are indicated in metric, “meters” shall be abbreviated as “M”.

5. a. All depth markers installed on vertical pool walls shall be located so as to be read from the waterside.

b. Depth markers installed on decks shall be located no greater than 18 inches (0.5 m) from the pool edge and positioned so as to be read while standing on the deck facing the water along the affected perimeter.

c. All depth markers installed on horizontal surfaces shall be of slip-resistant materials.

d. Depth markers shall be installed at the maximum and minimum water depths and at all points of slope change as specified in s. Comm 90.08 (3).

e. Depth markers shall be installed around the perimeter of the water attraction at intervals no greater than 25 feet (7.6 m) and at lesser intervals when indicating a change in water depth not to exceed 2 feet (61 cm). Depth markers for irregularly shaped water attractions shall designate depths at all major deviations in depth as well as conform to the provisions in this paragraph.

f. The minimum height of depth marker characters shall be 4 inches (10.2 cm). Characters shall be clearly visible and of permanent contrasting color to the background on which they are applied.

g. Water attractions having depths of 5 feet (1.5 m) or less shall indicate the diving prohibition by markers located on the deck at intervals of no greater than 25 feet (7.6 m).

(f) *Design requirements.* Design requirements as listed in Table 90.20-2 shall be applied to all water attractions under the scope of this subchapter, unless otherwise acceptable to the department.

Table 90.20-2
DESIGN REQUIREMENTS BY WATER ATTRACTION TYPE

Parameter	Water Attraction Type ^a				
	Activity	Leisure River	Plunge	Vortex	Wave
Access entry provisions	Limited by design	Limited by design	Slide only	Limited by design	Beach end
Maximum floor slope	1:12	1:12	1:7	1:12	1:12
Maximum allowed depth	NR	42 in. (1.1 m)	NR	42 in. (1.1 m)	NR

NR = Not Required.

^a For pools not listed herein, contact the department.

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(4) TURNOVER TIMES. The maximum turnover times for water attractions subject to this subchapter shall be as listed in Table 90.20-3.

Note: For further explanatory information, refer to Appendix A-90.20 (4).

**Table 90.20-3
MAXIMUM TURNOVER TIME
BY WATER ATTRACTION TYPE ^a**

Water Attraction Type ^b	Turnover Time (in hours) ^c
Activity	4
Interactive play attraction	0.5
Leisure river	2
Plunge	1
Runout slide	1
Vortex	1
Wave	2

^a Calculate an average turnover time for combination vessels.

^b For pool types not listed herein, contact the department.

^c Based on flow and pressure drop with a clean filter condition.

(5) POOL DECK SURFACES AND EQUIPMENT. (a) *Deck surfaces.*

1. Deck surfaces shall be provided at all perimeter areas of water attractions where specified as entry or exit points.

2. Deck surfaces shall be of non-toxic, natural or man-made, impervious materials.

Note: Other regulatory agencies may have more stringent requirements.

3. Decks, ramps, coping and similar step surfaces shall be of materials that are slip-resistant and easily cleanable.

(b) *Deck requirements.* 1. Decks shall be designed and installed in accordance with generally accepted engineering practices.

2. Special features in or on decks such as markers, logos, and brand insignias shall be of materials that are slip-resistant and easily cleanable.

3. a. Stair risers for the deck shall be uniform and have a minimum height of 4 inches (10.2 cm) and a maximum height of 7 inches (17.8 cm). The minimum tread depth shall be 11 inches (27.9 cm). A handrail shall be provided for all stairs having 3 or more risers including the riser to the deck.

b. The height of all handrails shall be located between 30 and 34 inches (76 and 86 cm) above the deck stairs. Handrails shall be located at the outside edge of stairs.

4. a. Except as provided in subd. 4. b. and c., a minimum usable deck width for any deck provided for public use shall be 6 feet (1.8 m).

b. The unobstructed deck width provided around deck equipment shall be a minimum of 4 feet (1.2 m).

Note: For this subdivision, deck equipment includes handrails, structural support columns, lifeguard chairs and play equipment.

c. The unobstructed deck between a water attraction with a basin with a water depth exceeding 24 inches (61 cm) and any wading pool or interactive play attraction shall be a minimum of 12 feet (3.6 m) visible travel length.

5. a. The minimum slope of a pool deck shall be 1/8 inch per foot (1:96) for textured, hand-finished concrete decks and 1/4 inch per foot (1:48) for exposed aggregate concrete decks.

b. Decks shall be sloped to effectively drain either to perimeter areas or deck drains.

6. Except for ramps, the maximum slope of all decks shall be 1/2 inch per foot (1:24).

7. a. The maximum gap between pool decks and other decks or walkways, including joint material, shall be 3/8 inches (9.52 mm) of horizontal clearance with a maximum difference in vertical elevation of 1/4 inch (6 mm).

b. Any gap wider than as specified in subd. 7. a. shall be filled with suitable caulking material in accordance with the material supplier's specifications.

8. Deck edges that may be contacted by pool patrons shall be radiused, tapered or otherwise relieved to minimize sharpness.

(c) *Concrete decks.* 1. Concrete decks shall be designed and installed in accordance with generally acceptable engineering practices. This provision shall include, but is not limited to, the design and quality of a subbase when required, concrete mix design, reinforcing, and joints.

2. Construction joints where pool coping meets concrete decks shall be watertight.

3. Construction joints where pool coping meets concrete decks shall be installed to protect the coping and its mortar bed from damage as a result of the anticipated movement of adjoining decks.

4. Control joints in concrete decks shall be provided to minimize the potential for cracks due to a change in elevations, separation of surfaces or movement of the slab.

5. The area where pool decks join existing concrete work shall be protected by an expansion joint to protect the pool from the pressures of relative movements.

(d) *Deck equipment.* 1. Testing of circulation system piping shall be performed before the pool deck is poured.

2. Valves installed in or under a pool deck shall be covered and readily accessible for operation, service and maintenance.

3. At least one hosebibb shall be provided in the equipment room. An additional hosebibb shall be provided in each toilet facility, and at intervals along the deck so as to permit adequate cleaning using a maximum of 100 feet (30.5 m) of hose. A hosebibb in the equipment room or dressing, shower and toilet facility may be used for deck cleaning if located where a door opens directly to the deck and so that no more than 100 feet (30.5 m) of hose, when laid across the deck surface, is needed to reach all areas of the deck. All hosebibbs shall be protected against back-siphonage by proper installation of approved backflow prevention devices, as provided in ch. Comm 82.

4. Water-powered devices, such as but not limited to water-powered lifts, shall have a dedicated hose bibb. Hoses for water-powered devices shall be so located so as not to create a tripping hazard.

(6) CIRCULATION SYSTEMS. (a) *System.* 1. a. A circulation system consisting of pumps, piping, return inlets and suction outlets, filters and other necessary equipment shall be provided for complete circulation of water.

b. The circulation system shall be separate for each basin.

Note: A manifold discharge pipe connecting backwash piping is not considered an interconnection of the recirculation system.

c. Except as provided in subd. 1. d., the circulation system shall not include slide or spray feature circulation.

d. A maximum of 10 percent of the recirculation system rate may be provided for the lubrication of slides or spray features.

2. The equipment shall be designed to turn over the entire pool water capacity as specified in Table 90.20-3. The system shall be designed to give the proper turnover time based on the manufacturer's recommendations regarding maximum pressure and flow of the filter in clean media condition. Water clarity shall be maintained in accordance with par. (d).

3. Circulation system components that require replacement or servicing shall be easily cleanable and readily accessible for inspection, repair or replacement. Circulation system components shall be installed as specified by the manufacturer.

4. Except as provided in subd. 5., circulation systems and equipment within the scope of ANSI/NSF 50, shall conform to ANSI/NSF 50, ETL sanitation listed or the equivalent.

Note: For more information on ETL listings, contact Intertek Testing Services (ITS), ETL Sanitation Listed, 8431 Murphy Drive, Middleton, WI 53562; phone: (608) 836-4400; fax: (608) 831-9279; web page: www.etlsemko.com.

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5. Systems and equipment within the scope of ANSI/NSF 50 shall not be required to bear the NSF endorsement seal if the manufacturer certifies the products are in compliance with ANSI/NSF 50.

6. All circulation system piping shall comply with ANSI/NSF 50 or be of a material suitable for water supply piping as specified in ch. Comm 84. All exposed piping shall be color coded or provided with permanent labels or tags for easy identification.

7. Circulation system piping, other than that integrally included in the manufacture of the pool, shall be subject to an induced static hydraulic pressure test at 50% higher than design operation pressure for a one-hour period, but no less than 25 psi. The test shall be performed before the deck is poured and the pressure shall be maintained through the deck pour.

(b) *Water velocity.* 1. Water velocity in pool piping shall not exceed any of the following applicable velocities:

a. A maximum of 10 feet/second (3.05 m/sec) for pressure piping, other than copper piping.

b. A maximum of 8 feet/second (2.44 m/sec) for copper pressure piping.

c. A maximum of 6 feet/second (1.8 m/sec) for suction piping.

d. A maximum of 1.5 feet/second (0.4 m/sec) for flow through for suction grates.

2. The circulation system piping and related fittings shall be nontoxic and of material capable to withstand operating temperatures, pressures and conditions.

3. Piping subject to damage by freezing shall be sloped to drain or be installed in such a manner to allow for winterizing.

4. Equipment shall be installed to allow draining.

(c) *Gauges.* 1. All filtration pumps shall be equipped with a vacuum or compound gauge on the suction side of the pump, a pressure gauge located downstream of the pump and upstream of the throttling valve.

2. Flow meters measuring the rate of flow through the filter system with an appropriate range readable in gallons per minute (gpm) and accurate within 10% actual flow shall be provided.

3. Where zones with various turnover times are serviced by a single filtration system, flow meters shall be provided in the supply piping as required at locations to permit monitoring of the flow characteristics to each zone.

Note: Pump curves are used to confirm the flow characteristics.

(d) *Filters.* 1. Filters shall comply with s. Comm 90.11 (9) and this paragraph.

2. Filters shall be designed and installed so that filtration surfaces are readily accessible for inspection, repair and replacement.

(7) PUMPS AND MOTORS. (a) *Ratings and specifications.* 1. A pump and motor shall be provided for circulation of the pool water. Performance of all pumps shall meet the design conditions of flow required for recirculation and backwashing and all of the following, unless otherwise approved by the department.

a. The pump or pumps shall be capable of providing the design flow rate at a total dynamic head of 50 feet for all vacuum filters.

b. The pump or pumps shall be capable of providing the design flow rate at a total dynamic head of 70 feet for all pressure sand or cartridge filters.

c. The pump or pumps shall be capable of providing the design flow rate at a total dynamic head of 80 feet for all diatomaceous earth filters.

2. All electrical components and installations shall comply with the requirements of article 680 of the National Electrical Code (NEC) as adopted and modified in ch. Comm 16.

(b) *Intake strainers.* For all pressure filter systems, a cleanable strainer or screen shall be provided upstream of the circulation pump.

(c) *Location.* Pumps and motors shall be readily accessible for inspection, repair and replacement as specified by the manufacturer.

(d) *Safety.* The design, construction and installation of the pumps and component parts shall provide safe operation as specified by the manufacturer.

(e) *Mechanical seals.* Where a mechanical pump seal is provided, components of the seal shall be corrosion-resistant and capable of operating under conditions normally encountered in pool operation.

(f) *Design and operation.* All pumps shall be designed by the manufacturer for the intended use.

(g) *Flooded inlet provisions.* Pumps located below the waterline shall have valves installed on suction and discharge lines. Pumps shall be so located for ease in maintenance and removal.

(8) RETURN INLETS AND SUCTION OUTLETS. (a) *Performance.* Suction outlets and return inlets shall be provided and so arranged as to produce a uniform circulation of water and maintain uniform distribution of disinfectant throughout the water attraction. The circulation system shall be designed to accommodate 100% of the turnover time.

(b) *Flow distribution.* 1. Suction system flow through the main drain and skimming systems each shall be designed to accommodate 100% of the circulated flow.

2. When multiple systems are used in a single water attraction to meet this requirement, each subsystem shall proportionately comply with par. (a).

3. Suction systems shall be designed with flow rates not exceeding the maximum design flow during normal operation.

4. Except for reverse flow systems, 20 to 25% of the recirculated water shall be drawn through the main drain or drains.

(c) *Inlets.* 1. All water attractions shall have a minimum of two return inlets regardless of water attraction size.

2. a. Basins, other than leisure rivers, shall have the number of return inlets based on at least one additional return inlet per 300 square foot (27.9 m²) water surface area, or fraction thereof.

b. Leisure rivers shall have a minimum of one filtered water return point for every 1,000 lineal feet (300.5 m), or fraction thereof.

3. Return inlets shall be sized and located to provide uniform distribution throughout the water attraction.

4. a. Return inlets from the circulation system shall be designed so as not to constitute a hazard to patrons.

b. Bottom returns shall be flush with the basin bottom or designed to prevent injury to patrons.

c. Bottom returns shall be located to have an area of influence described by a radius of 10 feet (3.05 m).

5. a. Wall inlets shall be located to provide uniform distribution throughout the water attraction.

b. One wall inlet shall be located for each 10 feet (3.05 m) of stair well width.

(d) *Grates.* 1. Grates of protective devices for suction outlets shall conform to all of the following:

a. Grates on protective devices shall be designed to withstand the anticipated loading of flow velocity.

b. Grates on protective devices shall be installed as specified by the manufacturer.

2. Drain openings in grates shall be ½ inch (1.27 cm) or less in width or diameter.

(f) *Entrapment avoidance.* The suction outlets shall be designed to protect against a suction entrapment, evisceration and hair entanglement hazard.

(g) *Testing and certification.* Suction outlets, other than skimmers, that measure less than 18 inches by 18 inches (324 sq. in.) (45.7 cm by 45.7 cm) (0.21 m²) or do not have at least one dimen-

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sion that is at least 24 inches (61 cm) shall be provided with covers tested by a nationally recognized testing laboratory to comply with ASME/ANSI A112.19.8M.

(h) *Outlets.* 1. Except as provided in subd. 2., a minimum of 2 hydraulically-balanced, covered, suction outlets, per pump suction line shall be provided.

2. A single outlet shall be allowed provided the outlet has at least one dimension that is at least 36 inches (91.4 cm).

3. Multiple sets of pump suction pipes shall be allowed to merge into two or more common suction outlets provided the outlets are hydraulically balanced.

4. The distance between the suction fittings shall be at least 3 feet (91.4 cm) if the suction outlets are less than 18 inches by 18 inches (324 sq. in.) (45.7 cm by 45.7 cm) (0.21 m²) or do not have at least one dimension that is at least 24 inches (61 cm).

Note: See Appendix A-90.20(8) for drain layout details.

5. When dual suction outlets are provided, no piping or valve arrangement may be allowed that will isolate one suction fitting as the sole source of fluid to the pump. The single pipe to a pump suction inlet may be valved to shut off the flow to the pump.

6. a. All grates shall have a maximum grate opening to prevent the passage of a ½ inch (1.27 cm) ball.

b. For wave pools, barriers shall be provided on caissons which prevent the passage of a 4-inch (10.2 cm) ball.

7. Main drain suction outlets shall be installed at the lowest point or points of the water attraction.

(i) *Alternate designs.* Other means, such as vacuum elimination devices, that produce equivalent protection against suction entrapment, evisceration and hair entrapment may be allowed.

Note: For additional information, refer to CPSC Guidelines for Entrapment Hazards: Making Pools and Spas Safer, (publication no. 363), U.S. Consumer Product Safety Commission, Office of Information and Public Affairs, Washington, D.C. 20207; webpage: www.cpsc.gov; e-mail: info@cpsc.gov.

(j) *Vacuum fittings.* The installation and use of vacuum fittings for new construction shall be prohibited.

(k) *Drain provisions.* There shall be a sump with a 6-inch (15.2 cm) minimum depth or a drain at the lowest portion or portions of all water attractions for the purpose of complete draining. The drain grate shall comply with par. (d).

(9) PERIMETER OVERFLOW SYSTEMS. (a) *Function.* All basins shall be provided with surface skimming systems and shall be designed and constructed to skim the water surface within the operational parameters of the system's rim or weir device.

(b) *Hazards.* 1. Skimming devices shall be designed and installed so as not to constitute a hazard to patrons.

2. A skimmer cover located on a walking surface shall be securely seated, slip-resistant, of sufficient strength to withstand normal deck use and not constitute a tripping hazard.

(c) *Automatic skimming devices.* 1. Where automatic surface skimming devices are used as the sole overflow system, at least one surface skimming device shall be provided for each 500 sq. feet (45 m²) or fraction thereof of the water surface area. Recessed areas such as stairs, swimouts and spas shall not be considered in the calculation. When skimmers are used, they shall be located to maintain effective skimming action.

2. All circulation systems shall be designed to handle 100% of the rated circulation volume through skimmers.

3. The flow rate shall be no less than 3 gpm per skimmer per inch of weir width (11.4 L/min. per 25 mm of weir).

Note: The provisions under par. (c) are not intended to apply to constructed weirs.

(d) *Surface skimming.* 1. Acceptable provisions for surface-skimming systems shall be in accordance with Table 90.20-4.

**Table 90.20-4
ACCEPTABLE SURFACE SKIMMING SYSTEMS**

Pool Type	Surface Skimming Systems Accepted
Activity	May combine auto skimmers, zero depth trench, gutters as needed
Leisure river	Single or multiple skimmer devices for skimming flow ^a
Plunge	May combine auto skimmers, zero depth trench and perimeter devices
Sand bottom	In accordance with the functional class of the pool
Vortex	Skimmers are not allowed in the side area ^a
Wave	Zero depth trenches, such as but not limited to, skimmers, gutters and other perimeter devices

^a Water movement in a water attraction moves surface water to a surface skimming point.

2. When gutter skimming systems are used, they shall be connected to a circulation system with an adequate surge capacity to permit all phases of operation.

(10) ELECTRICAL AND ILLUMINATION REQUIREMENTS. (a) *Components.* All electrical wiring and equipment shall be installed in compliance with ch. Comm 16.

(b) *Artificial lighting.* When operating at night or when open during periods of low natural illumination, artificial lighting shall be provided so that all areas of the pool, including the bottom main drains, are visible.

(c) *Emergency illumination.* Water attractions and water attraction complexes that operate during periods of low illumination shall be provided with sufficient emergency lighting to permit safe evacuation of the water attraction and water attraction complex, and securing of the area in the event of a power failure.

(11) HEATERS. (a) *Energy sources.* Heating equipment using fossil fuels or alternative energy sources shall comply with chs. Comm 64 and 65.

(b) *Equipment standards.* Heaters shall be installed and tested to comply with the requirements under ch. Comm 65 for gas applications or ch. Comm 16 for electrical applications. Heat pumps shall comply with the requirements under ch. Comm 65 and be accepted by a recognized testing facility. Heaters shall be sized and rated for specific use as specified by the manufacturer.

(c) *Heater installation.* Heaters shall be installed in accordance with s. Comm 90.14.

(12) WATER SUPPLY. (a) *Source water quality.* The source water supply serving the pool shall meet the requirements as listed in ch. Comm 82, Table 82.70-1.

Note: Refer to Appendix A-90.20 (12) for pertinent sections of ch. Comm 82, Table 82.70-1.

(b) *Makeup water quality.* Makeup water to maintain the water level in all water attractions and water used as a vehicle for disinfectants or other pool chemicals, for pump priming or for other such additions shall be as provided in ch. Comm 82, Table 82.70-1.

Note: See Appendix A-90.20 (12) for approved sources of private water supplies as specified in ch. Comm 82, Table 82.70-1.

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(c) *Backflow protection.* Connections to water supply systems shall be as specified in ch. Comm 82.

(d) *Over rim filler.* 1. An over-the-rim spout, if used, shall be located under a diving board, adjacent to a ladder or otherwise properly shielded so as not to create a hazard.

2. The spout open end shall have no sharp edges and shall not protrude more than 2 inches (5.1 cm) beyond the interior wall.

3. The spout shall be separated from the pool water by an air gap at least 6 inches (15.2 cm) or 1.5 pipe diameters from the pipe outlet to the rim, whichever is greater.

(e) *Water level.* 1. All water attractions shall be installed such that the water level is within the specifications of the designer or manufacturer.

2. For zero-depth entry without a surge tank, automatic fill shall be required.

(f) *Pipe labeling.* Pipe shall be labeled in accordance with ch. HFS 172 and s. Comm 90.13 (5).

(13) WASTE WATER DISPOSAL. Pool discharges shall be in accordance with ch. Comm 82, Table 82.38-1 and s. Comm 82.33.

Note: See Appendix A-90.20 (13) for pertinent sections of ch. Comm 82, Table 82.38-1.

(14) SANITIZING EQUIPMENT AND CHEMICAL FEEDERS. (a) *Equipment standards.* 1. Sanitizing equipment shall comply with the requirements of ANSI/NSF 50 or ETL equivalent, and be capable of introducing a sufficient quantity of a sanitizer to maintain the appropriate levels in accordance with ch. HFS 172.

Note: For more information on ETL listings, contact Intertek Testing Services (ITS), ETL Sanitation Listed, 8431 Murphy Drive, Middleton, WI 53562; phone: (608) 836-4400; fax: (608) 831-9279; web page: www.etslsmko.com.

2. Each water attraction shall include automation equipment to control the sanitizer feed and the pH adjusting chemicals. Such equipment shall be designed and installed to function in compliance ch. HFS 172.

3. Skimmer baskets shall not be used as chemical feeders.

4. Chemical feed pumps shall be wired and installed so that they cannot operate without a return flow to properly disburse the chemical throughout the system as designed.

(b) *Chemical feeder and control systems.* 1. All chemical feed and control systems shall be installed as specified by the manufacturer. The manufacturer's data control plate shall be affixed in compliance with s. Comm 90.12 (1) (e).

2. All chemical feed systems shall be installed so as to only operate when there is return flow to properly disburse the chemical throughout the water attraction as designed.

(15) SAFETY EQUIPMENT. (a) *Handholds.* 1. All pools shall be provided with a handhold around their perimeter in areas where depths exceed 5 feet (1.5 m). Handholds shall be provided no farther apart than 3½ feet (9.6 m) to include, but not be limited to, any one or a combination of the items listed in subd. 2.

2. Coping, ledge or deck along the immediate top edge of the pool or a gutter lip immediately below the water level that provides a slip-resistant, flush surface of at least 4 inches (10.2 cm) minimum horizontal width or a raised hand-held edge and located at or not more than 12 inches (30.5 cm) above the waterline, ladders, stairs or seat ledges.

(b) *Safety rope with floats.* 1. For activity pools, a safety rope with floats shall be located to separate pool areas not intended for general swimming, and located at the breakpoint.

2. All safety ropes with floats shall be located no greater than one foot (0.3 m) to the shallow side of the breakpoint.

3. For water attractions with a drop slide or walking pad, all safety ropes with floats shall be located so as not to constitute a safety hazard. This requirement applies to pad walks and slides in plunge pools.

4. A safety rope with floats shall be located in wave pools to restrict access to the caisson wall.

5. When provided, a rope and float line shall be securely fastened to wall anchors of corrosion-resisting materials and of a type that shall be recessed or have no projection that will constitute a hazard when the line is removed.

6. When provided, a rope and float line shall be of sufficient size and strength to provide temporary support and a handhold for the user.

(c) *Emergency shutoff.* Wave pools, vortex pools and leisure rivers shall have a safety stop button located in the proximity of the pool for the purpose of stopping the water action.

(16) RESTROOM AND SANITARY FACILITIES. Sanitary facilities shall be provided in accordance with s. Comm 90.16.

(17) PATRON LOAD. Patron load for the purpose of operational posting shall be determined by the maximum number of patrons for an individual water attraction calculated as 15 square feet (4.5 m) of water surface area for each patron. For the purpose of this requirement, the splash zone of any water attraction shall be included in the calculation of the water surface.

(18) ENTRIES, EXITS, POOL STAIRS, SWIMOUTS, UNDERWATER BENCHES AND SPECIAL FEATURES. (a) *Entry and exit locations.* 1. Locations for entry and exit shall be in accordance with Table 90.20-5 or as otherwise acceptable to the department.

Note: For accessibility information, refer to the final accessibility guidelines for recreational facilities, Federal Register, Vol. 67, No. 170, as published Tuesday, September 3, 2002. Requirements relating to swimming pools, wading pools and spas are found under ADAAG 15.8.

Note: Also refer to ch. HFS 172 for pool entrance and exit configurations relating to lifeguard and staffing functions.

**TABLE 90.20-5
ENTRY AND EXIT LOCATIONS**

Pool Type	Entry and Exit Points
Activity	Ingress/egress at any point in the pool but no greater than 40 feet (12.2 m) from any point.
Leisure river	Minimum of one entry; any number of controlled exits. ^a
Plunge	Entry prohibited from deck areas. Egress by ladders, steps or ramps as determined by designer, but at least a minimum of 50 feet (15.25 m) from any point.
Sand bottom	Ingress/egress in accordance with functional pool classification.
Vortex	Minimum of one entry/exit point.
Wave	Patron access prohibited at all areas except beach end. Side and end wall passage located to accommodate guard needs.
Other pools	Contact the department.

^a Controlled exits consist of stairs, steps and ladders.

2. Where the distance from the pool floor to the top of the wall is 24 inches (61 cm) or less, such areas shall be considered as providing their own natural entry or exit point.

3. All means of entry or exit shall be provided at the designed ingress and egress points of all pools and may consist of pool stairs, ladder, a ramp or a zero-depth entry.

4. When provided, a secondary means of entry or exit shall consist of one of the following: steps, stairs, ladders with grab rails, treads, ramps, zero-depth entries, swimouts, transfer walls or other designs that provide the minimum utility as specified in this section.

5. When diving facilities are part of the attraction, entries, exits, pool stairs, ladders, underwater benches, special features and other accessories shall be located outside the minimum diving water envelope.

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(b) *Zero–depth and sloping pool entries.* 1. All sloping entries used as a pool entrance shall not exceed 1:12 feet (83 mm/m).

2. All sloping entries shall be permitted to be used in conjunction with steps and benches.

3. All zero–depth and sloping entry surfaces shall be of slip–resistant materials to a water depth of at least 18 inches (0.5 m).

(c) *Stairs and ladders.* 1. All treads shall have slip–resistant surfaces.

2. The design and construction of stairs into the shallow end and recessed pool stairs shall conform to the requirements of this paragraph.

3. All risers at the centerline shall have a maximum uniform height of 10 inches (25.4 cm).

4. When stairs are located in a water depth over 4 feet (1.2 m), the lowest tread shall be no less than 4 feet (1.2 m) below the deck.

5. The bottom riser height shall be allowed to vary from the other risers as may be required to meet the floor.

6. The leading edge of all steps shall be distinguished by a color contrasting with the color of the steps and pool floor.

7. Protruding corners shall be rounded to a minimum radius of ½ inch (1.27 cm).

(d) *Handrails.* 1. Handrails shall be located between 30 and 34 inches (76 and 86 cm) above the ramp or step surface.

2. Handrails shall be made of corrosion–resistant materials.

3. Handrails shall be installed so they cannot be removed without the use of tools.

4. The leading edge of handrails or handholds facilitating stairs and pool entry or exit points shall be located on the bottom tread.

5. The outside diameter of handrails shall be a minimum of 1¼ inches (2.8 cm) and not to exceed 1–15/16 inches (4.92 cm).

6. The leading edge of deck–mounted handrails shall be located within 3 inches (7.6 cm) horizontally from the vertical plane of the bottom riser.

(e) *Pool ladder design and construction.* 1. All ladder and staircase treads shall have slip–resistant surfaces.

2. Ladders shall provide two handholds or two handrails.

3. There shall be a clearance of 3 inches (7.6 cm) minimum and 6 inches (15.2 cm) maximum between the pool wall and the ladder.

4. The clear distance between ladder handrails shall be 17 inches (33.2 cm) minimum and 24 inches (61 cm) maximum.

5. There shall be a uniform distance between ladder treads reflecting a 7–inch (17.8 cm) minimum distance and 12–inch (30.5 cm) maximum distance.

6. Ladder treads shall have a minimum horizontal uniform depth of 2 inches (5.1 cm).

(f) *Recessed treads.* 1. All recessed treads shall have slip–resistant surfaces.

2. Recessed treads shall have a uniform vertical spacing of no less than 7 inches (17.8 cm) and no greater than 12 inches (30.5 cm) measured at the centerline.

3. The vertical distance between the pool coping edge, deck or step surface and the uppermost recessed tread shall be 9 inches (22.9 cm) maximum.

4. Recessed treads shall have a depth of no less than 5 inches (12.7 cm) and width of no less than 12 inches (30.5 cm).

5. Recessed treads shall drain into the pool.

6. Recessed treads shall be provided with a handrail, grab rail or handhold on each side of the treads.

(19) UNDERWATER SEATS, BENCHES AND SWIMOUTS. (a) *Swimouts.* 1. Swimouts shall be located in a recessed area to eliminate any protrusion beyond the pool wall.

2. The horizontal surface of swimouts shall be no greater than 20 inches (50.8 cm) below the waterline.

3. A minimum unobstructed surface equal to that required for the top tread of the pool stairs shall be provided in the swimout.

4. When used as an entry or exit access, swimouts shall be provided with a step to meet the pool stair requirements.

5. The leading edge of swimouts shall be visually set apart with a marking color to contrast with the swimout.

6. Swimouts shall be allowed in the deep or shallow areas of the pool.

(b) *Underwater seats and benches.* 1. Underwater seats and benches shall be located in a recessed area to eliminate any protrusion beyond the pool wall.

2. The height of any underwater seat or bench may not exceed 18 inches (0.5 m); the width of the bench seat may not exceed 18 inches (0.5 m); the depth of the water above the bench seat may not exceed 2 feet (61 cm) or a 2–inch (5.1 cm) leading edge of contrasting color.

3. The surface of all underwater seats and benches shall be of a color in distinct contrast to the color of the surrounding pool basin or have a 2–inch (5.1 cm) leading edge or contrasting boundary line.

4. The words “bench below” shall be placed on the deck at the edge of the pool at the bench area in a color in distinct contrast to the deck background.

5. Underwater seats and benches shall not be used as a required access entry or exit point.

6. Underwater seats shall not be located in a deep area of the pool where diving equipment is installed.

7. Underwater seats and benches are allowed in conjunction with pool stairs.

History: Cr. Register, November, 1989, No. 407, eff. 12–1–89; CR 02–002: am. (1), cr. (4) Register April 2003 No. 568, eff. 5–1–03; CR 04–052: r. and recr. Register January 2005 No. 589, eff. 2–1–05.

Comm 90.205 Play features. (1) GENERAL. (a) Structures and devices not intended for patron contact such as climbing, walking and hanging shall be either designed or supervised to prevent such contact.

(b) Rafts, tubes, noodles and other personal use devices shall not be subject to this section.

Note: For obstructions in wading pools, refer to s. Comm 90.18.

(2) IN–WATER PLAY FEATURES. (a) In–water play features permanently installed shall be subject to this subsection.

Note: Examples of in–water play features include, but are not limited to, floating boats and trucks, floatable walks, floatables, spray pad features not in conjunction with a pool or water attraction with a recirculation system and other permanently installed features.

(b) 1. Floating features may not be installed in pools with water depths of less than 36 inches (91.4 cm).

2. Except as provided in subd. 3., a minimum 3 feet (91.4 cm) of water depth shall be maintained at least 6 feet (1.8 m) from any tethered play feature.

3. A tethered play feature may be located at least 6 feet (1.8 m) of a wall when that portion of the wall is padded to a point 6 feet (1.8 m) from the play feature.

Note: Padding need only cover the wall above the waterline.

(c) Floating play features shall be anchored in such a manner to restrict their movement to a range as established by the designer.

(d) The means of anchoring of tethered play features shall be configured in such a manner as to minimize circumstances of possible entrapment of patrons, bodies, hair, limbs or appendages when in contact with any element of the play feature or its anchors.

Note: The use of jacketed chains or cables meets this requirement.

(e) All in–water play features shall be designed and installed to prevent injury to the user and constructed so as not to create a safety hazard.

(f) 1. When more than one pad walk is located in the same pool basin, a minimum separation of 10 feet (3.05 m) between pad walks shall be provided.

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2. All deck or basin obstructions within 4 feet (1.2 m) of a pad walk shall be padded or encased so as to protect pool patrons from abrasion, laceration or contusion.

(g) A minimum separation of 10 feet (3.05 m) between two floatables, other than two pads within a pad walk, shall be provided.

(3) ON-DECK PLAY FEATURES. Play features permanently installed on decks shall be designed and installed to prevent injury to the user and constructed so as not to create a safety hazard.

Note: Examples of on-deck play features include basketball hoops, volleyball nets and other water games.

History: CR 04-052: cr. Register January 2005 No. 589, eff. 2-1-05.

Comm 90.206 Interactive play attractions. (1) GENERAL. Interactive play attractions may be included with pool complexes, water attraction complexes, or as a single water attraction.

Note: When an interactive play attraction is added to a single pool, the facility becomes a water attraction complex as specified in s. Comm 90.20.

(2) DESIGN AND MATERIALS. (a) The structural design and materials used shall be in accordance with generally accepted industry practice. All parts of an interactive play attraction shall be designed and constructed so as to not pose a safety hazard.

(b) All materials for walking surfaces shall be slip-resistant.

(c) 1. The splash zone shall be sloped to drain to the surge tank or pool within the same basin.

2. The maximum floor slope to drain of the splash zone shall be 1:12.

3. All exterior walking surfaces shall be sloped to drain away from the splash zone.

4. The minimum floor slope shall be 1/8 inch per foot.

(d) A minimum deck separation of 12 feet (3.6 m) shall be provided between basins with water depths greater than 24 inches (61 cm) and the splash zone.

Note: Other deck requirements for water attractions do not apply to interactive play attractions.

(3) WATER SUPPLY, PIPING, CIRCULATION AND FILTRATION. (a) *General.* All other applicable provisions under s. Comm 90.20 not specified in this section shall apply.

(b) *Water supply.* 1. The recirculation system shall be separate and not be interconnected with the feature pump system, unless otherwise approved by the department.

2. All nozzles that spray from the ground shall be flush with the floor so as to not create a tripping hazard.

3. The total water volume of a balance tank including associated piping shall be at a minimum of four times the combined flow rate of all the attraction pumps and of a sufficient volume so as to allow operation through all cycles of filtration operation

4. The recirculation system shall be separate from that of any other basin.

5. All aboveground piping shall automatically drain. Gravity drains shall be of a capacity of at least 125% of the discharge.

6. All filters shall comply with s. Comm 90.11 (9).

7. The turnover time shall be as listed in Table 90.20-3.

8. The suction intake of the recirculation pump shall be located in the lowest point of the balance tank.

(4) OTHER REQUIREMENTS. (a) Patron access points shall be provided as specified in s. Comm 90.20 (2) (g) and (15) (c).

(b) Fencing of an interactive play attraction is not required.

(c) Any plants or vegetation may not be located in the splash zone area.

History: CR 04-052: cr. Register January 2005 No. 589, eff. 2-1-05.

Subchapter V — Slides

Comm 90.30 Slides. (1) GENERAL. All slides installed as an appurtenance to a public swimming pool or water attraction

shall be designed, manufactured and installed so as to provide a safe and healthy environment for the rider and other occupants of the facility.

Note: For accessibility information, refer to the final accessibility guidelines for recreational facilities, Federal Register, Vol. 67, No. 170, as published Tuesday, September 3, 2002.

(2) DESIGN AND MANUFACTURING. (a) Pool slides, drop slides and waterslides over 6 feet (1.8 m) in height from the slide entrance to the deck of the pool or water attraction, and incorporating towers to support riders shall be submitted to the department for structural review in accordance with s. Comm 90.05 (2).

(b) Pool slides, drop slides and waterslides shall be submitted for functional review in accordance with s. Comm 90.05 (2).

(c) The total water volume of a separate balancing tank serving runout slides shall be a minimum of two times the combined flow rate of the pumps or of a sufficient volume based on velocity and time of the propulsion system and backwash requirements.

(d) Pool slides, drop slides and waterslides shall be so designed that parts with external surfaces that may come in contact with a person using the slide are assembled, arranged and finished so that they are smooth and continuous with and will not cut, pinch, puncture, or cause an abrasion to any person.

(e) All slide flumes shall be designed and constructed so as each person using the waterslide remains inside the flume path during normal use.

(f) All curves, turns, and tunnels on the path of a flume shall be designed and constructed as not to present a hazard to any person using the slide under normal use.

(g) Pool slides, drop slides and waterslides shall be designed to support the intended use.

(h) All stairs, platforms and elevated decks associated with pool slides, drop slides and waterslides shall conform to ch. Comm 62 for guards, handrails and headroom.

(i) For slides without a lifeguard staffing plan, the maximum deck obstruction-width permitted shall be limited to 10% of the pool perimeter with a maximum individual obstruction-width of 20 feet (6.1 m) and a minimum pool perimeter separation between obstructions of at least 20 feet (6.1 m).

(3) INSTALLATION. All slides shall be installed so as to comply with the installation parameters as specified in Table 90.30 -1 and the following requirements where applicable:

(a) For children's slides, the following obstructions shall be permitted without a lifeguard staffing plan:

1. The side view of the obstruction, as viewed from any point, shall be less than 50 square feet (15.25 sq. m).

2. The square footage of the obstruction shall be measured to a height of 6 feet (1.8 m) above the water line.

3. Individual obstructions shall have at least a 10-foot (3.05-m) horizontal separation.

4. No more than 20% of the pool basin shall be occupied by obstructions.

(b) For waterslides and runout slides, all closed curved flumes shall be a minimum of 32 inches (81.3 cm) in diameter.

(c) For all other slides listed in Table 90.30 -1, the slide terminus shall be designed to not allow riders to cross into the path of another rider.

(d) Pool slides, drop slides and waterslides and the structural supports shall be located to provide at least 10 feet (3.05 m) of clearance from any uninsulated overhead electric power line energized to more than 50 volts, but less than or equal to 50,000 volts. For lines energized to more than 50,000 volts, the minimum clearance shall be increased 0.4 inch for each 1,000 volts over 50,000.

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Table 90.30-1
INSTALLATION PARAMETERS BY SLIDE TYPE ^a

Slide Type	Maximum Slide Height Measured Vertically From the Slide Entrance (in feet)	Slide Terminus Drop to Water Level (in inches)	Water Depth Allowed for Slide Installation (in feet)	Minimum Clear Space In Front of Slide Terminus and Pool Wall (in feet)	Minimum Distance from Slide Flume or Entry to Side Obstructions, unless protected (in feet)	Minimum Separation Distance Between Slides in Same Structure Measured from Side of Sliding Surface, unless protected (in feet)	Maximum Overhang Distance for Deck-mounted Slides (Slide terminus extension into pool) (in feet)
Children's slide	≤ 4 to slide terminus	≤ 6	≤ 2	≥ 7.5	≥ 4	As per manufacturer's recommendation	N/A
Pool slide	≤ 4 to deck	≤ 6	≤ 2	≥ 7.5	≥ 4	As per manufacturer's recommendation	N/A
Pool slide, discharging into water ≤ 2 feet deep	> 4 and ≤ 6 to deck	≤ 6	≤ 2	≥ 10	≥ 5	As per manufacturer's recommendation	2
Pool slide, discharging into water ≤ 2 feet deep	> 6 to deck	Not permitted.					
Pool slide, installed in water ≥ 3 feet deep	≤ 6	≤ 6	≥ 3	≥ 15	≥ 5	≥ 5	≤ 2
Pool slide, installed in water ≥ 3 feet deep	> 6	≤ 6	≥ 3	≥ 20	≥ 5	≥ 5	No maximum
Drop Slide, short drop	No limitation	20 to < 30 ^b	3.5 to 6 ^b	≥ 15	≥ 5	≥ 5	No maximum
Drop Slide, long drop	No limitation	30 to 60	6 to 12 ^b	≥ 15	≥ 5	≥ 5	No maximum
Waterslide ^c	No limitation	≤ 6 or as per manufacturer's recommendation	≥ 3	≥ 20	≥ 5	≥ 5	No maximum
Runout Slide	No limitation	N/A	N/A	For deceleration area, as per manufacturer's recommendation	≥ 5	≥ 3	--

N/A = not applicable; ≥ = greater than or equal to; ≤ = less than or equal to.

^a Slide installation as per manufacturer's requirements if more stringent. For slide types not specifically listed in this table, contact the department.

^b Interpolation would be used for increasing drop and increasing depth proportionally.

^c Water slides with a drop shall comply with drop slide requirements in this table.

^d No minimum separation distance where slide exit prevents exiting over adjacent slide path.

(4) SLIDE FLUME WATER. (a) Except for waterslides, water for flume lubrication shall be a maximum of 10% of the recirculation flow.

(b) The balance tank for runout slide flume lubrication systems shall be at a minimum of two times the combined flow rate of the water attraction pump and of a sufficient volume so as to allow operation through all cycles of filtration operation.

History: CR 04-052: cr. Register January 2005 No. 589, eff. 2-1-05.

Subchapter VI — Incorporation of Standards

Comm 90.40 Incorporation of standards by reference. (1) CONSENT. Pursuant to s. 227.21 (2), Stats., the attorney general and the revisor of statutes have consented to the incorporation by reference of the standards listed in sub. (3).

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Note: Copies of the adopted standards are on file in the offices of the department and the legislative reference bureau. Copies of the standards may be purchased through the respective organizations listed in Tables 90.40-1 to 90.40-2.

(2) ALTERNATE STANDARDS. (a) 1. Alternate standards that are equivalent to or more stringent than the standards referenced in this code may be used in lieu of the referenced standards when approved by the department or if written approval is issued by the department in accordance with par. (b).

2. Upon receipt of a fee and a written request, the department may issue an approval for the use of the alternate standard.

3. The department shall review and make a determination on an application for approval within 40 business days of receipt of all forms, fees and documents required to complete the review.

Note: Fees for review of standards under this paragraph are listed in ch. Comm 2.

(b) Determination of approval shall be based on an analysis of the alternate standard and the standard referenced in this code, prepared by a qualified independent third party or the organization that published the standard contained in this code.

(c) The department may include specific conditions in issuing an approval, including an expiration date for the approval. Violations of the conditions under which an approval is issued shall constitute a violation of this code.

(d) If the department determines that the alternate standard is not equivalent to or more stringent than the referenced standard, the request for approval shall be denied in writing.

(e) The department may revoke an approval for any false statements or misrepresentations of facts on which the approval was based.

(f) The department may reexamine an approved alternate standard and issue a revised approval at any time.

(3) ADOPTION OF STANDARDS. The standards referenced in Tables 90.40-1 to 90.40-2 are hereby incorporated by reference into this chapter.

Note: The tables in this section provide a comprehensive listing of all of the standards adopted by reference in this code. For requirements or limitations in how these standards are to be applied, refer to the code section that requires compliance with the standard.

Table 90.40-1

ANSI	
American National Standards Institute, Inc.	
11 W 42nd Street	
New York, New York 10036	
Phone: (212) 642-4980	
Web: www.ansi.org/public/std_info.html	
Standard Reference Number	Title
ANSI/NSF 50-2001	Circulation System Components and Related Materials for Swimming Pools, Spas/Hot Tubs

Table 90.40-2

ASME	
American Society of Mechanical Engineers	
3 Park Avenue	
New York, New York 10016-5990	
Phone: (800) 843-2763	
Web: www.asme.org/catalog/	
Standard Reference Number	Title
ANSI/ASME A112.19.8M-19 87 (R1996)	Suction Fittings for Use in Swimming and Wading Pools, Spas, Hot Tubs, and Whirlpool Bathtub Appliances

History: CR 04-052: cr. Register January 2005 No. 589, eff. 2-1-05.