

*Emergency Register, ch. IHR 70 eff. 10-1-93 and*

Chapter HSS 171

DESIGN AND CONSTRUCTION  
OF PUBLIC SWIMMING POOLS

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Note: Chapter HSS 171 as it existed on November 30, 1989 was repealed and a new chapter HSS 171 was created effective December 1, 1989.

**HSS 171.01 Authority and purpose.** This chapter is promulgated under the authority of s. 140.05 (1), (3) and (17), Stats., to regulate the design and construction of public swimming pools, including whirlpools and water recreation attractions, in order to protect the health and safety of the public.

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History: Cr. Register, November, 1989, No. 407, eff. 2-1-89.

**HSS 171.02 Scope.** (1) **APPLICABILITY.** This chapter consists of minimum requirements that apply to the design and construction of all new public swimming pools and to the reconstruction or alteration of any existing public swimming pool.

(2) **APPROVED COMPARABLE COMPLIANCE.** (a) The department may approve an alternative to a method, practice, material, equipment or design required under this chapter that will not be contrary to public health, safety or welfare, when the department is provided with satisfactory proof that the alternative will achieve results which are closely equivalent to the results of literal application of the requirement under this chapter.

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(b) An alternative approved by the department under par. (a) may be made conditional for:

1. A defined period of time; or
2. Experimental or trial purposes.

History: Cr. Register, November, 1989, No. 407, eff. 2-1-89.

**HSS 171.03 Definitions.** In this chapter:

(1) "Agent" means the city, county or village designated by the department under s. 50.535 (2), Stats., and ch. HSS 192 to issue permits to and make investigations or inspections of public swimming pools.

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

(3) "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.

(4) "Deck" means the approved, unobstructed walking surface around the pool.

(5) "Deep portion" means the deep side of the breakpoint or that portion of a pool having a design water depth greater than 5.5 feet (1.7 m).

(6) "Department" means the Wisconsin department of health and social services.

(7) "Mobile pool base" means the location where a mobile pool is stored or serviced and where a source of potable water and an approved sewerage system are available.

(8) "NSF" means the national sanitation foundation.

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

(10) "Patron" means a user of the pool.

(11) "Pool" means a structure, basin, chamber or tank used for wading, swimming, diving, water recreation, therapy or bathing. Types of pools are as follows:

(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 small in area and of shallow depth usually associated with a health spa.

(d) "Limited purpose pool" means a pool used for a purpose not otherwise defined, such as for apparatus swimming, diving and underwater photography training, medically administered therapy, another special use by the public or for use by physically or mentally handicapped persons.

(e) "Mobile pool" means a pool constructed on a mobile structure which can be transported from place to place.

(f) "Reverse flow pool" means a pool of a design in which the water enters at or near the bottom and leaves at or near the water line.

(g) "Swimming-only pool" means a pool used for swimming purposes only.

(h) "Wading pool" means a shallow pool used primarily by children.

(i) "Waterslide plunge pool" means a pool located at the exit end of a waterslide flume and intended and designed to receive sliders emerging from the flume.

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(j) "Wave pool" means a pool designed for generating waves for recreational purposes.

(k) "Whirlpool" means a relatively small pool which uses high temperature water and which may include a water agitation system. A "whirlpool" is sometimes called a spa.

(12) "Preliminary plan review" means a review of plans and specifications that are not intended for final approval action, or an office conference relating to these plans and specifications, with the intent of informing the engineer or architect of code requirements that may involve mathematical or hydraulic computations. Preliminary plan review does not include an office or telephone consultation requesting rule clarification.

(13) "Public swimming pool" means a pool used for one or more purposes described in sub. (11) except for a pool serving fewer than 3 individual residential quarters such as homes or apartments. A public swimming pool includes a pool serving or installed for the state or any political subdivision of the state, including a school district; a pool serving or installed at a motel, hotel, resort, camp, club, association, housing development or school, or a religious, charitable or youth organization; a mobile pool; and a pool at an educational or rehabilitative institution. Included in the meaning of a "public swimming pool" are buildings, equipment and appurtenances, irrespective of whether or not a fee is charged for their use. A public swimming pool does not include a public swimming beach. In this subsection, "beach" means any designated body of water not contained in a pool structure, basin, chamber or tank and used for one or more purposes described in sub. (11), and the shore leading to that body of water.

(14) "Recirculation system" means the pool outlets and inlets and the equipment and piping designed to circulate swimming pool water at a predetermined quantity and velocity in order to treat and purify the water.

(15) "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.

(16) "Revised submittal" means revised plans or specifications submitted to the department which either show changes in the pool shell or recirculation system design which necessitate additional mathematical or hydraulic computations or such a large number of other changes that, in the opinion of the department, they cannot be dealt with by specification addenda.

(17) "Shallow portion" means the shallow side of the breakpoint or that portion of a pool having a design water depth of 5.5 feet or less.

(18) "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 the surface water of a pool.

(19) "Water recreation attraction" means a public bathing or swimming facility with design and operational features that provide patron recreational activity which is different from that associated with a conventional swimming pool and purposefully involves immersion of the body partially or totally in the water.

Note: Examples of water recreation attractions are waterslide plunge pools, lazy river or tubing pools and wave pools.

History: Cr. Register, November, 1989, No. 407, eff. 2-1-89.

**HSS 171.04 Plans and specifications.** (1) **APPROVAL.** (a) Every owner, personally or through his or her engineer or architect, shall submit to the department plans and specifications covering construction, alteration or reconstruction of public swimming pools or installation or alteration of their equipment prior to the start of construction or installation. No deviation from the plans and specifications or conditions of approval may be made without prior approval of the department.

(b) Within 30 days after receiving complete plans and specifications for approval, the department shall either approve the plans and specifications or deny approval of the plans and specifications.

(c) Priority plan review may be requested by the owner or his or her representative. An appointment shall be made with the department for the department to examine the plans in less than the normal processing time. Delivery of the plans for priority review shall be made in person.

(d) Fees for plan review shall be as prescribed in s. 140.051 (3), Stats. The proper fee shall be submitted with the plans and specifications under par. (a).

(2) **PREPARATION.** (a) *Prepared within Wisconsin.* Except as provided in par. (b), plans and specifications for all public swimming pools and their equipment, 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) *Prepared outside Wisconsin.* Plans, specifications and calculations prepared by an architect or engineer not registered in Wisconsin shall be reviewed if they are provided in the following form:

1. The plans, specifications and calculations bear the signature and seal or stamp of an architect or engineer registered in a state other than Wisconsin; and

2. The plans, specifications and calculations have attached a certificate dated, signed and sealed or stamped by an architect or engineer registered in Wisconsin which states that the attached plans, specifications and calculations were prepared in a state other than Wisconsin by an architect or professional engineer registered in that state, specifically describes the work performed by the Wisconsin registered architect or engineer in reviewing the plans, states that the design is structurally safe, and states that the plans and specifications comply with this chapter.

(3) **SUBMISSION.** Three identical sets of plans and specifications shall be submitted to the department, 2 of which shall be retained by the department and one returned by the department to the owner.

Note: The plans and specifications should be sent to Bureau of Environmental Health, P.O. Box 309, Madison, WI 53701.

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

(a) *General.* On the plans or in a separate report:

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

(b) *Site.* Site information;

(c) *Plot plan.* A general map and detailed drawings showing the floor plan of pertinent portions of the structure, pool orientation, pool surface area and volume. In addition, water supply facilities, public or private sewers and relative elevations of paved or other walkways and the equipment room floor, and the designed pool water level shall be shown in the detailed drawing. 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 shall be shown;

(d) *Construction plans.* Detailed scaled and dimensional drawings which shall include:

1. A pool layout plan showing longitudinal and transverse cross-sections of the pool through the main drain outlet; location and type of inlets, overflows, pool drains, vacuum fittings, deck drains, drinking fountains, piping, hosebibbs, fences and telephones; design of the deck, the curb or walls enclosing the pool, paved walkways, overflow gutters or devices; and the location and design of ladders, stairs, diving boards and artificial lights;

2. A flow diagram showing the location, plan and elevation of filters, pumps, chemical feeders, ventilation devices, heaters, surge tanks including operating levels, backflow preventers, valves, piping, flow meters, pressure gauges, thermometers, test cocks, sight glasses and the drainage system for disposal of pool and filter washwater; and

3. The location, plan and elevation drawings for any bathhouse facilities provided, including dressing rooms, lockers and basket storage, and showers, toilets and other plumbing fixtures; partitions and devices for routing of swimmers; storage facilities for first-aid and maintenance equipment; floor construction; and means of lighting and ventilation; and

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

1. All construction details not shown on the drawings;
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, such as in bathhouses or when floor drains are used as deck drains;

4. The sources of all water supplies, with the total alkalinity, pH and iron and manganese content of the supply indicated on submitted drawings or specifications;

5. Filter media such as diatomaceous earth, sand, gravel or other approved material; and

6. Miscellaneous appurtenances.

(5) CONSTRUCTION SUPERVISION AND CERTIFICATION. (a) *Supervision.*

1. In 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. "Supervision" 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.

History: Cr. Register, November, 1989, No. 407, eff. 2-1-89; correction in (1) (d) made under s. 13.93 (2m) (b) 7, Stats., Register, January, 1990, No. 409.

**HSS 171.05 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 Environmental Health or at the Secretary of State's Office or the Revisor of Statutes 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. 2-1-89.

**HSS 171.06 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. HSS 172.10.

(2) **CROSS-CONNECTION CONTROL.** All portions of the water distribution system serving the pool and auxiliary facilities shall be protected against backflow and backsiphonage. 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 (15.3 cm), whichever is less, or by another method approved by the department.

History: Cr. Register, November, 1989, No. 407, eff. 2-1-89.

**HSS 171.07 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. HSS 171.19 (4) (d) for the permissible patron load for whirlpools.

History: Cr. Register, November, 1989, No. 407, eff. 2-1-89.

**HSS 171.08 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 the dimensions in Table 171.08. 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 171.08 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.





TABLE 171.08: POOL DIMENSIONS  
RELATED TO FIGURE 1

TYPE OF SWIMMING POOL INSTALLATION		DEPTHS					LENGTHS						
		** D-1	D-2	D-3	D-4	D-5	A	B	C	D	E	F	G
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.* 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, there shall be no underwater or overhead projections or obstructions that might endanger patron safety or interfere with proper pool operation.

(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 length of the bench may not exceed 10 feet; the height of the bench may not exceed 18 inches (46 cm); the depth of the bench seat may not exceed 16 inches (40.6 cm); the depth of the water above the bench seat may not exceed 2 feet (0.61 m).

3. The surface of the bench seat shall be of a color in distinct contrast to the color of the surrounding pool basin.

4. The words "bench area below" shall be placed on the deck at the edge of the pool at the bench area in minimum 6 inch letters of a color in distinct contrast to the deck background.

(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, combination 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.* 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 or another location in a pool where the stairs are not an obstruction or hazard to patrons. Stairs shall have a uniform rise of not more

than 10 inches (25 cm) and uniform treads of not less than 10 inches (25 cm). Treads shall have a minimum unobstructed surface area of 240 square inches (1548 cm<sup>2</sup>). 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.

Note: See s. HSS 171.19 (5) for whirlpool stair requirements.

(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. HSS 171.19 (5) (d) for whirlpool handrail requirements.

(11) **ELEVATED DECK STAIRWAY, HANDRAILS AND GUARDRAILS.** (a) *Stairway*. The stairway providing access to an elevated deck and the required handrails shall comply with ss. ILHR 51.16 and 51.161.

(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 s. ILHR 51.162.

(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 s. ILHR 52.04.

(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.

(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. 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 (7.6 m) or less. Depth marker numerals on the edge of the deck shall be at least 6 inches (15.24 cm) high. Markers on the vertical wall shall be at least 3 inches (7.62 cm) high. All markers shall be of a color contrasting with the background.

History: Cr. Register, November, 1989, No. 407, eff. 2-1-89.

**HSS 171.09 Pool deck and deck equipment.** (1) **AREA.** (a) *General.* 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 (1.8 m) 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 (3.7 m). Deck equipment permitted under this chapter is not considered an obstruction.

(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 (.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 (.9 m) wide.

Note: See s. HSS 171.19 (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 bathhouse 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) **POOL SLIDES.** All playground-type slides which may be installed at swimming pools shall be manufactured in accordance with the standard for swimming pool slides issued by the U.S. consumer product safety commission and shall be labeled to that effect, and shall be installed in accordance with that standard and with the manufacturer's instructions.

Note: The Consumer Product Safety Commission's swimming pool slide construction standard is found in 16 CFR Part 1207, Safety Standard for Swimming Pool Slides. This document may be consulted at the offices of the Department's Bureau of Environmental Health, the Secretary of State's office, or the Revisor of Statutes Bureau, or as part of the U.S. Code of Federal Regulations at any public library or college or university library.

(3) **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 (.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, 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.

(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.

(4) **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.

(5) **DRINKING FOUNTAIN.** One or more drinking fountains installed in accordance with ch. ILHR 82 shall be provided in the immediate pool area.

History: Cr. Register, November, 1989, No. 407, eff. 2-1-89.

**HSS 171.10 Outdoor pool enclosure.** (a) Except as provided in par. (b), an enclosure at least 5 feet (1.5 m) 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 except a controlled access may not exceed 5 inches (12.7 cm) 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.

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

History: Cr. Register, November, 1989, No. 407, eff. 2-1-89.

**HSS 171.11 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. If 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.

(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 recreation at-

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traction 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 (.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 m<sup>2</sup>) 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 m<sup>2</sup>). 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 m<sup>2</sup>) of water surface or fraction thereof for outdoor pools, for each 500 square feet (46.5 m<sup>2</sup>) of water surface or fraction thereof for indoor pools except whirlpools and for each 100 square feet (9.3 m<sup>2</sup>) 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.* 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.

(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 (.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 elsewhere in this chapter, water turnover rates 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 for all vacuum filters, 70 feet for pressure sand or cartridge filters and 80 feet for pressure diatomaceous earth filters, unless lower or higher heads are shown by the designer to be hydraulically appropriate.

(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 NSF standards and 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.

Note: The National Sanitation Foundation's swimming pool equipment standards may be consulted at the Department's Bureau of Environmental Health or at the Secretary of State's Office or the Revisor of Statutes Bureau. Copies may be obtained from the National Sanitation Foundation, NSF Building, P.O. Box 1468, Ann Arbor, Michigan 48106.

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 withstand 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:

- a. Manufacturer's name and address;
  - b. Filter model number;
  - c. Filter serial number;
  - d. Effective filter area in square feet;
  - e. Design flow rate in gallons per minute;
  - f. Maximum working pressure; and
  - g. 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 (.09 m<sup>2</sup>) of bed area. With high-rate sand filters the rate may not exceed 15 gallons per minute per square foot (.09 m<sup>2</sup>) 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 cm<sup>2</sup>) 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 (.91 m). Vertical filters shall have a straight side shell height of 12 inches (30.5 cm) above the filter bed.

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 mil-

limeters 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 ( $.09 \text{ m}^2$ ) of filter bed area or so great as to cause loss of the media.

8. The backwash water from pressure sand filters, except those serving whirlpools, shall be discharged to a storm sewer through a positive air-gap connection or to the ground surface at a point where it will not create a nuisance or health hazard. The backwash water from sand filters serving whirlpools shall be discharged to a sanitary sewer through a positive air-gap connection.

9. Equipment shall be provided for feeding a coagulant into the rapid rate filter influent after backwashing. This equipment shall be capable of applying not less than 2 ounces of coagulant per square foot of filter bed area.

(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 ( $.09 \text{ m}^2$ );

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 ( $.09 \text{ m}^2$ ) 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 Environmental Health or at the Secretary of State's Office or the Revisor of Statutes 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 ( $.09 \text{ m}^2$ ) 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 ( $6.5 \text{ cm}^2$ ).

3. The filter and piping shall be so designed that during precoating 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 ( $.64 \text{ cm}$ ). 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 to a sanitary sewer, except that discharge to a storm sewer or the ground surface may be permitted if approved by the department. The connection to the sewer shall be of the positive air-gap type.

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 (.09 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 (.09 meters) of the pleated area of the cartridge.

2. The initial head loss through filters may not exceed 3 pounds per square inch (6.452 cm<sup>2</sup>) 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 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. 2-1-89.

**HSS 171.12 Disinfection of pool water.** (1) **EQUIPMENT.** (a) *General.* Equipment shall be provided for continuous disinfection of pool water. For water recreation attraction, an electronic system for the continuous monitoring and feeding of a disinfectant into the recirculation system shall be installed.

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

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Note 2: 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, except that the department may approve 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.

**HSS 171.13 Piping for a pool.** (1) **SIZE.** The size of pipe, fittings and valves of the complete pool piping system shall be based on flow velocities of 6 feet (1.83 m) or less per second under suction and 8 feet (2.44 m) or less per second under pressure. Gutter drain lines around the pool shall be capable of continuously removing at least 125% of the recirculation water. All wastewater piping shall be sized to freely carry the maximum flow without surcharge or back pressure.

(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, galvanized 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.** A hosebibb or hosebibbs shall be provided in the equipment room, the dressing, shower and toilet facility, and at whatever intervals along the deck are necessary 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 so that no more than 100 feet (30.5 m) of hose is needed to reach the entire deck. All hosebibbs served by a potable water supply shall be protected against backsiphonage by proper installation of approved backflow prevention devices.

(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.

**HSS 171.14 Pool water heaters and thermometer.** (1) *Installation of heaters*. When provided, pool water heaters shall be installed in accordance with s. ILHR 84.20 (5) (n).

(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 return piping where it can be easily read.

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

**HSS 171.15 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 m<sup>2</sup>) of water surface shall have at least one elevated lifeguard chair. For pools larger than 2000 square feet (186 m<sup>2</sup>), 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.

**HSS 171.16 Dressing, shower and toilet facilities at pools.** (1) **GENERAL REQUIREMENTS.** All pools shall be provided with conveniently located dressing, shower and toilet facilities except as stated in sub. (2). All applicable building requirements of chs. ILHR 50 to 54, 63 and 64 apply to the construction of indoor pool housing and bathhouses.

(2) **WAIVER.** The requirements for separate dressing, shower and toilet facilities under this section may be waived when dressing, shower and toilet facilities in motels, hotels, apartment houses or complexes and campgrounds are readily available to pool patrons by paved walkways. A request for a waiver shall be submitted to the department in writing and shall include the specific maximum distances to toilet and shower facilities and the specific number of toilet and shower facilities available to pool patrons. If a waiver is granted, the department may require that

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a minimum number of toilet and shower facilities for each sex be located near the pool for the convenience of pool patrons.

(3) *LAYOUT.* (a) *General.* Dressing, shower, and toilet facilities to be used simultaneously by both sexes shall be divided into 2 parts designated by sex and separated by a tight opaque wall. Entrances and exits shall be screened to break line of sight. The facilities shall be laid out so that the patrons on leaving the dressing room en route to the pool pass by the toilets and through the showers.

(b) *Floors and drains.* Floors shall be of smooth material that is impervious to water, with a nonslip surface and sloping 1/4 inch (0.64 cm) per foot (0.305 m) toward drains. Junctions between walls and floors shall be coved. Drain openings shall be 1/2 inch (1.27 cm) or less in width or diameter.

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

(d) *Hosebibbs.* Hosebibbs shall be installed in the dressing, shower and toilet areas as required in s. HSS 171.13 (5).

(e) *Walls and partitions.* Walls and partitions shall be reasonably smooth and made of durable material. A space of 10 to 12 inches (25.4 to 30.5 cm) shall be left 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 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. Dispensers shall be made of durable material and shall be solidly mounted. Glass dispensers may not be used.

(h) *Water heaters.* Water heating equipment of adequate capacity to supply water at a temperature between 90°F. (32°C.) and 110°F. (43°C.) to all showers and lavatories shall be provided.

Note: See also ch. ILHR 63, pt. V.

(i) *Ventilation.* All indoor pool areas, bathhouses, dressing rooms, shower rooms 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. ILHR 64, pt. III.

(j) *Required number of fixtures.* The required minimum number of toilet, lavatory and shower fixtures at pools shall be based on the permissible patron load determined under s. HSS 171.07 and on a 1:1 ratio of males to females, except that when pool use is limited to one sex, 100% of the required fixtures shall be provided for persons of that sex. The required number of fixtures shall be as provided in Table 171.16, except that for indoor school pools there shall be one shower for every 3 swimmers in the class with the largest number of students.

TABLE 171.16  
REQUIRED NUMBER OF FIXTURES AT POOLS

Number of Patrons	Number of Toilets		Number of Urinals	Number of Lavatories		Number of Showers	
	Males	Females		Males	Females	Males	Females
1-100	1	2	1	1	1	2	2
101-200	1	3	2	2	2	4	4
201-400	2	4	2	2	2	7	7
401-700	2	4	3	3	3	10	10
700+	3	5	3	3	3	12	12

Note: Separate toilet facilities should be provided for spectators.

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

**HSS 171.17 Electrical wiring and lighting.** (1) **GENERAL.** All electrical wiring and equipment shall be installed in compliance with ch. ILHR 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 enough lights of the appropriate design and in the proper locations to illuminate the pool and associated areas in accordance with ch. Ind 19. Submarine lighting may be used.

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

**HSS 171.18 Wading pools.** (1) **GENERAL.** Wading pools shall be in compliance with the applicable requirements of ss. HSS 171.05 to 171.17 and with this section.

(2) **DESIGN.** (a) *Turnover time.* The maximum turnover time for wading pools shall be 2 hours. In this subsection, "turnover time" means the time required to completely recirculate all the water in a pool.

(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 m<sup>2</sup>) 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 (.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).

(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.

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(4) **FINISH.** The finish of the walls and bottom of the wading pool shall conform to s. HSS 171.08 (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 (.62 cm/.31 meter) and a maximum slope of 1.0 inch per foot (2.54 cm/.31 meter).

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

**HSS 171.19 Whirlpools.** (1) **GENERAL.** The owner or operator of a whirlpool shall comply with this section and the applicable parts of ss. HSS 171.04 to 171.14, 171.16 and 171.17.

(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 s. ILHR 64.05.

(b) *Obstacle and ceiling height.* Pursuant to s. HSS 171.09 (1) (e), there shall be no obstacle or protrusion within a whirlpool or extending from whirlpool room walls or ceiling which would interfere with the use of the whirlpool or make access difficult. The minimum height between the top of the whirlpool rim and the ceiling shall be 6'8" (2.0 m), as required under s. ILHR 51.164.

(c) *Cleanable walls and ceiling.* The walls and ceiling enclosing a whirlpool shall be constructed of nonabsorbent material that can be easily cleaned. The area of any wall receiving splashed water from the whirlpool shall be waterproof.

(d) *Observation window.* If the whirlpool is located in a separate, enclosed room, an observation window shall be provided 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 ft. (1.4 m), provided that the deck width separating the pool and whirlpool is a minimum of 11 ft. (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.

(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 s. HSS 171.19 (6) (a).

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

(6) **DECKS.** (a) *Dimensions.* 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 50% or more of the perimeter of a whirlpool. The deck width at any point of egress from a whirlpool shall be a minimum of 5 feet (1.5 m) as measured in a perpendicular direction of travel from the edge of the deck at the point of egress.

(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 ss. HSS 171.09 (2) and 171.19 (2) (c). Deck areas around a whirlpool that are one foot or less in width may drain into the pool.

(c) *Deck width between pools.* The deck width between a whirlpool and any other pool shall be at least 6 feet (1.8 m), except when a common wall not more than 18 inches (40.6 cm) wide, designed to prevent someone from standing on it, separates a whirlpool and a swimming pool. A minimum 11 ft. (3.4 m) 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 ft. (1.4 m).

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.

(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. HSS 171.11 (10), Inlets.

(c) *Main drains.* At least one main drain shall be installed in the bottom of each whirlpool in accordance with s. HSS 171.11 (6). In addition, whirlpool outlet systems shall be designed so that each system provides one or more of the following alternatives in order to prevent entrapment of patrons:

1. Two outlets of equal diameter separated by at least 3 feet (0.9 m) of straight pipe. The system shall be designed so that neither one of the 2 outlets shall be cut out of the suction line by a valve or other means;
2. An antivortex drain cover. The antivortex drain cover may not cause a tripping or stubbing hazard to the feet;
3. A 12 inch by 12 inch (30.5 cm x 30.5 cm) or larger square grate; or
4. Other approved means that guard against entrapment at the outlet.

(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. HSS 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 m<sup>2</sup>) 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.

(d) *Filters.* The filters for the whirlpool shall be in compliance with all applicable paragraphs of s. HSS 171.11 (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. A floor drain shall be installed in the room. Whirlpool equipment rooms shall be adequately ventilated.

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

**HSS 171.20 Water recreation attractions.** (1) **GENERAL.** Water recreation attractions shall be designed and constructed in accordance with sound engineering practice. Design engineers may consult with the department regarding design variations and areas where potential problems may exist. The department may require a water recirculation rate for specific water recreation attractions which is greater than that stated in this chapter. Operators of water recreation attractions shall comply with this section and all other applicable requirements in this chapter.

(2) **WATER SLIDE PLUNGE POOLS.** (a) *General.* A water slide facility shall consist of a plunge pool, one or more flumes, a water storage reservoir, and filtration, disinfection and chemical treatment facilities. The construction of the flume and tower shall be in compliance with ch. ILHR 34.

(b) *Definitions.* In this subsection:

1. "Flume" means the elevated chute used as a water slide.
2. "Terminus section" means the last 10 feet (3 m) of the flume discharging into the plunge pool.

(c) *Flume terminus section.* The terminus section of a flume shall be oriented with respect to the plunge pool wall to prevent a slider from crossing into the path of another slider entering the pool from another flume terminus section.

(d) *Clearances.* The distance between the side of a flume terminus section and a plunge pool side wall and the distance between terminus sections shall be at least 5 feet except that the department may accept another separating distance if it is determined to be adequate for the prevention of collision between sliders or sliders and structures. The distance between the exit end of a flume and the opposite side of the plunge pool, excluding steps, shall be at least 20 feet.

(e) *Elevation.* The terminus section of the flume shall slope no more than 1 foot (30.5 cm) in 10 feet (3.0 m) and shall terminate at least 6 inches (15 cm) below the pool water surface, except that the department may permit another flume elevation relative to the pool water level at the entrance into the pool water based on alternative slide and terminus section designs and the velocity of the slider coming out of the terminus section.

(f) *Plunge pool depth.* The water depth in plunge pools at the end of the flume terminus section shall be a minimum of 3 feet and shall be maintained in front of the terminus section for a distance of at least 20 feet,

from which the plunge pool floor may have a constant slope upward of not more than 1 foot in 12 feet to a minimum water depth of 2 feet.

(g) *Decks.* 1. A water slide facility shall have a deck along the exit side of the plunge pool which shall be at least 10 feet (3 m) wide. The deck along the remaining sides shall be at least 4 feet (1.22 m) wide, except that a deck is not required along the side where the terminus section of a flume enters the plunge pool.

2. Decks shall have a slip-resistant surface and shall slope to deck drains or to the ground surface away from the pool.

(h) *Stairways.* Stairway steps into the plunge pool shall comply with s. HSS 171.08 (10).

(i) *Walkways.* A 4 ft. (1.22 m) minimum width walkway shall be provided between the plunge pool deck and the steps leading to the top of the flume or flumes. Walkways shall be paved, slip-resistant and well-drained.

(j) *Enclosure.* 1. An enclosure shall be installed around the plunge pool, deck and flumes.

2. An uncovered surge tank shall be separately enclosed to prevent access by patrons from the plunge pool area.

3. Enclosures shall comply with s. HSS 171.10.

(k) *Emergency access.* The deck area, stairway, walkway and enclosure of the water slide facility may not in any way restrict or prevent access into the pool area by emergency rescuers.

(l) *Recirculation system.* 1. The entire recirculation system shall be designed to recirculate, filter and disinfect the total volume of water contained in the plunge pool and surge tank at least once every hour and shall be capable of providing water at the quality level established in s. HSS 172.10. The recirculation system shall comply with the applicable subsections of ss. HSS 171.11, 171.12 and 171.13.

2. The water level in a plunge pool shall be maintained at the lip of a gutter or midway between the bottom and top edges of the skimmer opening to ensure continuous skimming.

3. A surge tank shall be installed to receive the overflow water from a plunge pool through the gutter system or over weirs which separate the plunge pool from the surge tank. The surge tank shall have sufficient volume to contain at least 2 minutes of combined flow from all water treatment and flume pumps and enough water to ensure that the plunge pool will be maintained at a constant water depth required for continuous skimming. The water to supply the slide flume or flumes shall be pumped from the surge tank.

4. Where skimmers are used as an outlet from the plunge pool to pool water treatment equipment, a minimum of 2 shall be installed.

Note: See s. HSS 171.11 (4) for requirements for skimmers.

5. Where a gutter overflow system is used, a gutter is not required along a wall between a plunge pool and a surge tank if weirs are provided in the wall to permit overflow from the plunge pool to the surge tank.

6. The surge tank shall be easily accessible for cleaning and maintenance. The surge tank shall be made secure to prevent access by unauthorized personnel.

7. Any opening or connection between the plunge pool and surge tank shall be designed and constructed to prevent entrapment of swimmers.

(m) *Toilet and shower facilities.* A dressing area and toilet and shower facilities shall be provided for each sex. The required number of toilet and shower facilities shall be as provided in Table 171.16 in relation to the permissible patron load determined under s. HSS 171.07, plus one additional patron for each 5 linear feet of walkway leading from the plunge pool area to the slide access stairway, one additional patron for each 3 vertical steps leading to the slide flume entrance and one additional patron for each 20 linear feet of slide flume.

(n) *Other pools used as plunge pools.* Another pool may be used as a plunge pool provided that:

1. It has been constructed in compliance with the applicable parts of ss. HSS 171.05, 171.08, 171.09, 171.11, 171.12, 171.13, 171.15, 171.17 and 171.20;

2. The construction of the flume and tower complies with ch. ILHR 34.

3. If water is pumped from a swimming pool to the slide flume, the pump intake is enclosed in a manner to prevent injury or entrapment of swimmers;

4. The amount of water pumped out of the pool does not cause the pool water level to drop below the gutter lip or the skimmer operating level;

5. The pool water overflow system has the capacity to handle any surge of water into the pool after the flume pump is turned off at a time when the permissible patron load is at its maximum;

6. Maximum pool attendance does not exceed the permissible patron load determined under s. HSS 171.07;

7. The portion of a pool used as the plunge area for a waterslide is separated from the remainder of the pool in a manner approved by the department; and

8. The slide structure is isolated by a fence to prevent access to the slide except through a controlled entrance.

(3) *WAVE POOLS.* (a) *General.* The operator of a wave pool shall comply with this subsection and all other requirements of this chapter that apply to the design and construction of wave pools.

(b) *Recirculation rate.* The recirculation system of a wave pool shall be designed to recirculate the total volume of pool water in 2 hours or less.

(c) *Inlets.* Wave pool inlets shall be located in the pool floor no more than 20 feet apart. Inlets shall be located within 15 feet of pool walls.

(d) *Overflow system.* 1. The overflow system for wave pools shall incorporate the use of overflow gutters, trench drains and scupper drains designed to prevent entrapment of swimmers. The total capacity of the gutter, trench, scupper drains and related piping shall be designed to carry 100% of the required recirculation rate. A minimum of 4 scupper drains located at a maximum interval of 25 feet between drains shall be installed in the end wall of the wave pool at the quiescent water level.

2. When the pool bottom has a continuous upward slope from a maximum depth to a zero depth, a trench drain system shall be installed in the floor of the pool to be used as an overflow drain system discharging to the surge tank. The trench drain shall extend entirely along the shallow end



of the pool at an elevation equal to the quiescent water level. The pool bottom slope shall be continued beyond the trench drain for a minimum of 15 feet at which point the deck shall slope away from the pool to deck drains or perimeter drainage. The trench drain shall be covered with grating having openings not exceeding 0.375 inches (0.95 cm) in width.

(e) *Entrapment prevention.* Any opening or connection between the wave pool and surge tank or between the wave pool and the wave generating system shall be designed and constructed to prevent entrapment of swimmers.

(f) *Emergency shut-off.* The wave generating system shall be provided with an emergency shut-off control located at each lifeguard chair.

(g) *Lifeguard chairs.* A minimum of 4 lifeguard chairs shall be provided. Two chairs shall be located along the deck edge on each side of the wave pool where the water depth is 3 feet or greater.

(h) *Points of egress.* A minimum of 4 points of egress shall be provided and located around the wave pool where the water depth is 3 feet or greater. Ladder installation shall comply with s. HSS 171.08 (10).

(i) *Depth marking.* Depth markings shall be provided as required in s. HSS 171.08 (14) except that markings need not be located at the zero depth portion of the wave pool.

(j) *Safety railing.* A safety railing, or other effective barrier, at least 42 inches in height and with at least one intermediate height rail or rope, shall be installed on the deck along the perimeter of a wave pool to prevent swimmers from entering the pool at any location other than at the zero water depth end.

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

**HSS 171.21 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.