KANSAS CITY, MO
HEALTH DEPARTMENT

PUBLIC HEALTH RULES & REGULATIONS
FOR THE OPERATION & MAINTENANCE OF SWIMMING POOLS & BATHING FACILITIES

Revised March 7, 2008

FORWARD

The purpose and intent of this document is to provide a uniform set of rules and regulations governing and controlling swimming and bathing facilities, which shall include special-purpose facilities and technical requirements pertaining to such facilities. There is also vested in the Environmental Health Services Division Manager the power and authority to make specific requirements for each permit holder as in his or her judgment and discretion are just and reasonable. This document shall be known as the "Public Health Rules & Regulations for Operation & Maintenance of Swimming Pools & Bathing Facilities".

The terms "shall" and "must" are used where practice is sufficiently standardized to permit specific delineation of requirements, or where safeguarding of the public health and safety justifies such definite action. Other terms, such as "should", "recommended" and "preferred", indicate desirable procedures or methods, with deviations subject to individual consideration.
The provisions of these rules and regulations are applied to all new public swimming pools and adjoining facilities as hereafter designed. Also, the provisions of these rules and regulations are applied to any alterations or improvements to existing pools including replacement of major devices or equipment relating to the operation of the pools. The purpose of these regulations should be to provide a guide for the design, construction, operation and maintenance of such pools so health and safety hazards will be eliminated.

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CHAPTER 1

Construction Materials and Equipment

STRUCTURE

The registered engineer or architect who seals the plans shall certify that the pool is designed and constructed to withstand all anticipated structural loading for both full and empty conditions. Special consideration shall be given to the hydrostatic problems related to pool design. A hydrostatic relief valve or valves of adequate size and design shall be provided for in-ground pools. Subsurface drainage should be provided and, if provided, shall not be directly connected to a sewer.

Proper design for structural loading will assure a long service life and minimize operational problems. Proper provision for subsurface drainage will prevent damage to the floor due to freezing and damage to the pool structure due to hydrostatic pressure (when the pool is emptied). In pools not equipped with proper subsurface drainage, pollution from sanitary sewer lines that pass near the pool structure is often possible.

MATERIAL

Pools shall be constructed of materials, which provide a watertight surface, shall have a smooth, impervious finish, which can be easily cleaned and is inert and nontoxic. Sand or earth bottoms are not permitted. The pool bottom of the shallow area of the swimming pool shall have a nonslip finish.

If contamination by swimmers and other extraneous sources introduced into the pool cannot be removed from the pool surfaces with a reasonable amount of effort; the pool will be difficult to properly maintain with the resultant danger of unsatisfactory water quality.

SHAPE

The shape of any pool shall be such that the circulation of pool water and/or safe control of bathers are not impaired. An obstruction creating a safety hazard shall not extend into or above the swimming pool.

Satisfactory circulation or purified water through the pool volume from the inlet points toward the pool outlet can be facilitated by proper design of shape and bottom contours. Disinfection can be effective if there are no “dead” spots and no lodging place for deposits.

SLOPE OF BOTTOM

The slope of the bottom of any portion of the pool having a water depth of less than 5 feet shall be uniform and not more than 1 foot in 12 feet. In portions of the pool with a depth greater than 5 feet, the front slope of the deep area shall not exceed 1 foot in 3 feet. The other slopes in the deep area shall not exceed 1 foot in 2 feet. The swimming pool floor below a depth of 5 feet shall be smooth to facilitate cleaning and movement of bottom sediments toward the main drain(s). The swimming pool floor below a depth of 5 feet shall have a definite slope toward the main drain of not less than 2 inches in 10 feet.

In a swimming pool smaller than 800 square feet in area, unless intended solely for diving, the floor slope in the shallow portion shall not exceed 1 foot in 12 feet. The pool bottom in the shallow area of a pool shall be as smooth as practical while having a nonslip finish. Proper design of the slopes of the pool bottom and proper finishing will enhance bathers’ safety while providing for the movement of bottom deposits toward the main drain.

DEPTH OF WATER

The maximum depth at the shallow end of the swimming pool shall not exceed 3 feet 6 inches except for competitive and special purpose swimming pools. The minimum depth of water in a swimming pool shall be 2 ½ feet, except for special purpose pools, zero depth entry pools, or recessed areas in swimming pools, which are set aside primarily for the use of children or people with special needs.

Whenever there is a transition point, devices for fastening safety ropes shall be installed at least 1 foot toward the shallow end of the pool from the transition point and safety ropes and colored buoys shall be provided. Safety ropes shall be at least 3/4ths inches in diameter, polyethylene or similar nontoxic, strong, waterproof material. Colored buoys shall be at least 5" by 9" in size, capable of supporting the weight of the rope without sinking, fixed on a maximum of 5-foot centers, durable, waterproof and nontoxic.

The devices used for attaching the safety rope shall be recessed to prevent a safety hazard. If no transition point is provided, the safety rope shall be installed where the water depth reaches 5 feet. Competitive or special use pools may be exempt from the safety rope requirement at the Department's discretion. Where diving facilities are provided, the design and layout of facilities, associated depths of water required and other dimensions must comply with the specifications.

In order to maintain a proper disinfectant residual, "feather edge" pool design should be avoided. The separation of shallow and deep portions of a pool and maintenance of proper depths in dividing areas is a definite prerequisite of bather safety.

POOL WALLS

Construction ledges shall not extend into the pool unless they are essential for support of the upper wall construction. When construction ledges are built, they shall not exceed 6 inches in width, shall slope at least ½ inch in, 6 inches toward the pool and shall have a nonslip finish. The pool wall shall extend vertically downward from the ledge.

All junctions between the swimming pool walls and the swimming pool floor shall be covered and have a smooth finish. Except in deep areas with angles of greater than 90°, the cove radium shall be at least 1 inch and where the water depth is 6 feet or less, the cove radium shall not exceed 8 inches and the walls shall be vertical. A white or light colored waterproof interior finish, which will withstand repeated brushing, scrubbing and cleaning procedures, shall completely line the pool. The finish shall be non-toxic to man, smooth without cracks or joints and shall be bonded to the supporting media excluding structural expansion joints. Proper design of pool walls and a proper interior finish will enhance bather safety and cleaning of the pool.

WALKWAYS & DECKS

There shall be provided completely around every outdoor swimming pool a clear, unobstructed paved walk or deck not less than 8 feet wide, extending outward from the poolside edge or lip of the coping of the pool. At the deep end of the pool where there is a diving board, the deck shall extend a minimum of 4 feet beyond the diving board.

Indoor pools or pools built in high-rise buildings whose decks are completely enclosed by masonry or other solid type walls may provide narrower decks but in no case shall the clear, unobstructed decks be less than 4 feet wide. The walkway between 2 adjacent swimming pools shall be at least 10 feet wide.

The surface of the walk or deck shall drain away from the pool on a minimum slope of

2 inches per 10 feet in a manner that will not create unsanitary, hazardous or objectionable conditions. No ponding of water shall occur. Provisions for the prevention of deck wash water being introduced into the pool during deck washing shall be made. Alternate systems may be approved at the discretion of the Department.

Deck drains shall be spaced and arranged so that not more than 400 square feet of deck area is tributary to each drain and drains shall not be more than 25 feet apart. If minimum deck widths are provided and proper drainage is assured, decks, which slope one way away from the pool, may be accepted. The deck drains shall not be connected to the recirculation system. All covers on deck drains must be secured. The deck or walkway shall have a paved, impervious, nonslip surface and shall be of material that can be cleaned by hosing. Any opening in the deck or walkway within the swimming pool enclosure shall have a locking type cover, which is flush with the deck or walkway surface.

Dry, clean and safe walks and decks are an important factor in the control of skin diseases such as athlete's foot and in the prevention of accidents. The presence of low spots in the walk or deck allows water to stand, providing an ideal environment for the proliferation of disease organisms and permitting accumulations of dirt which the bathers track into the pool.

Unless curbs surround the outer edge of the walks, especially on outdoor pools, excessive quantities of dirt, litter and surface water may be blown, kicked or washed onto the walks, making the maintenance of a clean pool difficult. Any increase in pool turbidity increases the load on the recirculation system and reduces the effectiveness of disinfection treatment.

Not only is sanitary pool maintenance made difficult but also a safety hazard exists when no limitation is placed on persons in street apparel entering onto the walks surrounding the pool. Since many of the pool patrons will normally use the walks, adequate walk area to prevent overcrowding and accidents is necessary.

LADDERS, STEP-HOLES, & STAIRS

Swimming pools shall have at least two means of egress, located on opposite ends. Pools 30 feet or more wide shall have at least four means of egress which shall be located at each end on opposite sides. A means of egress shall consist of a ladder, step-holes and grab rails or built-in steps. The distance from any point in the swimming pool to a means of egress shall not exceed 50 feet. At least 1 ladder per diving board shall be provided at the deep portion of the swimming pool.

Pool ladders shall be corrosion-resistant and shall be equipped with nonslip treads. All ladders shall be designed so as to provide a handhold. There shall be a clearance of not more than 6 inches or less than 3 inches between any ladder and pool wall, measured from the back edge of the tread. Ladders shall be designed and installed so that no water remains on them when the pool water level is lowered.

If steps are provided in the pool wall(s) or if step-holes are provided, they shall be of such design that they may be readily cleaned and shall be arranged to drain into the pool to prevent the accumulation of dirt. Step-holes shall have a minimum tread depth of 5 inches and a minimum tread width of 14 inches. Where stairs, step-holes or ladders are provided within the pool, there shall be a handrail or grabrail at the top on both sides, which extends over the coping or edge of the deck. Steps shall be of nonslip design and have a minimum rise of 10 inches.

Supports, platforms and steps for diving boards shall be of substantial construction and of sufficient structural strength to safely carry the maximum anticipated loads. Steps shall be of corrosion-resistant material, easily cleanable and of nonslip design. Handrails shall be provided at all steps and ladders leading to diving boards more than 1 meter above the water, except for those ladders set at 15° or less from the vertical. Platforms and diving boards, which are 1 meter or higher shall be protected with guard railings. One-meter diving board guardrails shall be at least 30 inches above the diving board and extend to the pool water's edge line. All platforms or diving boards higher than 1 meter shall have guardrails, which are at least 36 inches above the diving board and extend to the pool waters edge line. Three-meter platforms and boards shall provide an effective side rail barrier.

Steps leading into a swimming pool shall be of contrasting color of nonslip design and shall have uniform size treads of at least 12 inches and a rise of no more than 12 inches. Steps shall be located where the water depth is 3 ½ feet or less and where they will not constitute a hazard to swimmers. One sturdy handrail or grabrail per 12 feet of step width or fraction thereof, extending the length of the steps shall be provided.

Stainless steel ladder rails, diving stand handrails and stair rails shall have a "satin" finish to provide a nonslip surface. All ladders, rails, etc. shall be grounded in conformance with the most current National Electrical Code.

DIVING AREA

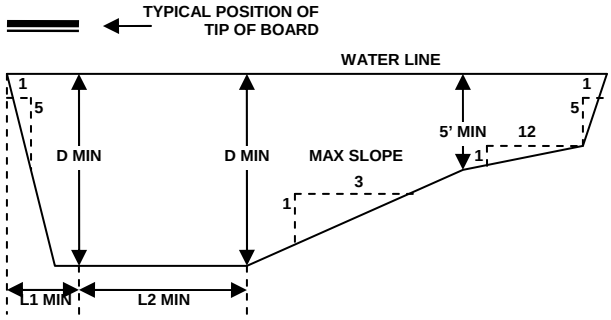
The area of a public swimming pool where diving is permitted shall be, in the case of a rectangular pool, at one end or may be in a recessed area forming one of the legs of a T, L or Z shaped pool separated from the main swimming area by a lifeline or may be a wholly separate structure.

Diving boards, towers and platforms shall have a nonslip finish and if covered with absorbent material, such covers shall be disinfected daily.

Steps shall be of corrosion-resistant material, easily cleanable and of non-slip design. Handrails shall be provided at all steps and ladders leading to diving boards more than 1 meter above the water except those ladders set at 15° or less from the vertical. Platforms and diving boards over 1 meter high shall be protected with guard railings.

At least 4.9 meters (16 feet) of free unobstructed clearance shall be provided above diving boards and platforms.

Minimum Dimensions for Pools with Diving Equipment



Max Board Height Over Water	Max Board Length	Minimum Dimensions			
		D	L1	L2	Pool Width
26" (2/3 M)	10'	8' 6"	2'	10'	20'
30" (3/4 M)	12'	9'	3'	10'	20'
1 M	16'	10'	4'	12'	20'
3 M	16'	12'	6'	12'	24'

Placement of boards shall observe the following minimum dimensions. With multiple board installations, minimum pool widths must be increased accordingly.

1 Meter or less, Board to Pool Side	10'
3 Meter Board to Pool Side	12'
Distance between adjacent boards	10'

FENCING & GATES

The swimming pool shall be completely enclosed by a protective wall, fence or other effective barrier. The entire barrier, including doors and gates, shall be at least 4 feet high measured on the inside and outside, shall not provide ready footing for climbing and shall prevent passage through it. The height of an opening under the bottom of the barrier shall not exceed 4 inches. The dimensions of the openings provided in slatted fences shall not exceed 4 inches.

The number of entrances to the pool shall be kept at a minimum. Each entrance shall be equipped with a door or gate that is self-closing and self-latching. The latch shall be located a minimum of 42 inches above the ground. Any entrance used by bathers should lead to the shallow area of the swimming pool. A service gate or door for maintenance personnel only should be provided at another location. Each gate shall be provided with hardware for permanent locking.

The entrance to a wading pool shall be arranged to control traffic directly between the wading pool and the swimming pool.

Spectator areas shall be completely separated from areas used by bathers by a barrier as described previously. A balcony shall not overhang any portion of the swimming pool water surface. Arrangements shall be made to prevent drainage from the spectator area to flow onto the pool deck.

Any area for dispensing and consuming food or beverages for/by bathers shall be completely separated from the pool deck by a barrier that has a single entrance/exit so arranged that only bathers may use it.

All specifications for enclosures shall be included during plans checking and site location.

A definite safety hazard is created when the swimming pool is not isolated from access by persons such as small children under unsupervised conditions. The regulations are designed to provide protection from such safety hazards and in addition, to prevent any unnecessary load which makes sanitary pool maintenance more difficult from being placed upon the pool. Persons in street apparel, if allowed on the pool's decks, will carry an excessive and unnecessary amount of dirt and litter into the pool area.

POOL ENCLOSURE

Sand beaches, grass areas, gravel, etc., shall not be allowed inside of the pool enclosure unless properly fenced to prevent or control access by bathers. If access is allowed to such area, an arrangement must be provided which requires bathers returning to the pool area to pass through a water spray which effectively covers an area from a height of approximately 4 feet to ground level.

CHAPTER 2

Electrical, Ventilation, and Acoustics

ELECTRICAL INSTALLATION

Artificial lighting shall be provided at all indoor pools, as well as at all outdoor pools where swimming is allowed after sunset. Artificial lighting must also be provided in all pool facility rooms that do not have the adequate natural light.

Where underwater lighting is used, not less than 0.5 watts shall be required per square foot of swimming pool water surface area and a Ground Fault Interrupter (GFI) circuit breaker shall be installed for safety. Such lights shall be spaced to provide illumination so that all portions of the pool including the bottom may be readily seen without glare.

Area lighting shall provide at least 0.6 watts per square foot of deck area if such lighting is used for night swimming. If underwater lights are not provided, at least 2.0 watts per square foot of pool water surface area and deck area shall be provided.

Where portable electric vacuum cleaning equipment is used, grounded outlets and grounded extension cords with waterproof covers in good repair shall be used. Separation between outlets shall be a maximum of 100 feet. Lighting source for outdoor pools must be such as to prevent insects attracted by lights from falling in the water. A competent electrician shall make any repairs to the electrical system.

Satisfactory lighting is essential to the maintenance of a clean pool and pool area and the safety of the pool patrons.

All electrical wiring shall be in accordance with the Kansas City Electrical Code.

VENTILATION

All enclosed places, including the natatorium, indoor dressing rooms, shower rooms and toilet areas shall be equipped with windows or mechanical ventilation systems to reduce condensation and to maintain a comfortable temperature. Indoor pools, including the dressing, shower and toilet rooms shall be mechanically ventilated and equipped to provide a temperature and humidity which are comfortable. Air changes shall be 10 air exchanges (c.f.m.) per hour and heated air should be used for make-up air.

If there is excessive condensation at an indoor pool, necessary action shall be taken by the pool owner to eliminate the condensation problem.

ACOUSTICS

If noise in a natatorium is excessive, necessary corrective action shall be taken by applying suitable and durable sound absorbing material to the walls and ceilings. Acoustical surfaces should not be painted or brushed. All indoor pools shall receive acoustical treatment, which will prevent reverberations of sound that may result in lack of control on the part of the lifeguards, instructors or other responsible individuals. Lifeguards shall not have music playing while on duty or any other distractions.

CHAPTER 3

Recirculation System

A recirculation system consisting of pumps, piping, filters, water conditioning and disinfecting equipment and other accessory equipment shall be provided to clarify, chemically balance and disinfect the swimming pool water. **The construction of new fill and draw pools, or those without any recirculation system, is prohibited.**

TURNOVER RATES

Type of Pool	Filtration Rates of 3 GPM/Ft^2 or Less	Filtration Rates Exceeding 3 GPM/Ft^2
Diving Pool	8 hrs or less	6 hrs or less
Shallow Pool	6 hrs or less	4 hrs or less
Wading Pool	2 hrs or less	2 hrs or less
Other Pools	6 hrs or less	4 hrs or less

The Department reserves the right to require a shorter turnover rate for special purpose pools. All recirculation, filtration, disinfection and water conditioning equipment shall be constructed of reasonable corrosion-resistant materials or shall be treated to minimize corrosion.

The biological and inorganic contamination introduced in a pool's water will quickly result in its becoming hazardous to the bathers unless the water in the pool is being constantly replaced with water of satisfactory quality.

WATER SUPPLY

The water supply for drinking, showers, bathing and culinary purposes and for all plumbing fixtures at swimming pools, special treatment pools, natural bathing areas and bathing beaches, as well as the supply serving any swimming pool proper and any distribution system for such water supply shall be adequate in quantity, safe in quality and shall be located, constructed, operated and maintained as approved by the Department. The United States Public Health Service "Drinking Water Standards" (latest edition) shall be used as criteria for judging acceptable water quality.

The water supply used for drinking, showers, bathing and culinary purposes may be ingested by patrons and, therefore, must be potable to prevent water-borne disease transmission. The water from which a pool is supplied should have substantially all the qualities required for a satisfactory domestic water supply for essentially the same reason.

The water supply serving swimming pool appurtenances, bathing beach appurtenances and swimming pools shall be obtained from a public water supply system if at all possible.

OUTLETS

All pools shall be provided with an outlet at the deepest point to permit the pool to be completely and easily drained. There shall be no flat areas near the outlets. **Openings must be covered by a grating that cannot be removed by a bather and which is securely fastened by either: 1) screws or bolts that are tightened; or 2) some other manner such that the use of a tool is required to remove the grate.** In addition, the secured grate shall be affixed in such a manner that bathers cannot injure their fingers.

The ANSI/APSP-7 2006, *Standard for suction entrapment avoidance in swimming pools, wading pools, spas, hot tubs, and catch basins* or any subsequent revision of this standard, is to be referenced for entrapment avoidance.

In pools with deep water at or near an end, multiple outlets shall be provided where the width of the pool is more than 45 feet. In such cases, outlets shall be spaced not less than 3 feet apart nor more than 30 feet apart nor more than 15 feet from sidewalls and shall be connected in parallel or series. Valves and/or pumps used for draining swimming pools shall be sized to prevent the surcharging of the drain or sewer.

Main drain discharge piping shall be sufficient for removal of the water through it at a rate of at least 50% of the swimming pool design recirculation flow rate. The piping system shall be valved to permit adjustment of flow through it.

INLETS

Each inlet shall be adjustable with regard to flow. Inlets in pools equipped with skimmers shall be adjustable with regard to direction. The velocity of flow through any inlet orifice shall be in the range of 5 to 15 ft/sec. except in pools equipped with skimmers, it shall be in the range of 10 to 15 ft/sec. The preferred velocity through an inlet orifice is 10 ft/sec.

Inlets for filtered water shall be located and directed to produce uniform circulation of water to facilitate the maintenance of a uniform disinfectant residual throughout the entire pool without the existence of dead spots to help carry pool bottom deposits to the outlets and shall produce surface flow patterns which effectively assist skimming. Inlets should be at least 12 inches below the design water level.

Where peripheral inlets are used, they shall be spaced as follows:

Where the distance across the shallow end of the pool is more than 15 feet, multiple inlets spaced at no less than 8 foot intervals, must be provided.

In pools with 1500 square feet, or less, deep end inlets must be installed at least every 8 feet. No less than three must be installed in pools with more than 1500 square feet.

In pools containing 1500 square feet, or more, or having lengths longer than 60 feet, inlets must be provided at least every 15 feet, except in the deep and shallow ends, where 8 foot intervals are required.

In pools of less than 1500 square feet, inlets must be installed to accomplish complete and uniform circulation, disinfection, and surface skimming.

At least one inlet must be located in each recessed stairwell, or other space where circulation might be impaired. Floor mounted inlets must have one inlet for each 300 square feet of floor area and be spaced at no less than 12.5 feet from each other with the exception of shallow and deep ends where 8 foot intervals are required.

Upward or reverse flow circulation systems on, or near, the pool bottom or continuous flume, tubing, multiple jets with close spacing near the surface, are acceptable as long as adequate circulation and sanitation requirements are met.

Exceptions may be granted upon receipt of satisfactory proof that the proposed inlet arrangement will meet the intent of paragraph three and the receipt of approval from the Department.

Inlet gratings shall provide sufficient open area to assure that the intent of paragraph three is met, flow from the supply piping is not restricted, proper circulation of water is achieved and proper skimming occurs.

The adjustments for adjustable type water inlets shall be checked frequently to insure that the rate of flow through each inlet is such that a uniform distribution pattern is established. Uniform distribution of filtered, disinfected return water assures adequate

clarity and disinfectant residual necessary for safe and healthful water throughout all parts of the pool.

HAIR CATCHER

A hair catcher shall be installed except where the filter is on the suction side of the pump. The hair catcher shall be provided with two strainer baskets, shall be located on the suction side of the pump and shall be accessible for easy cleaning. The catcher cover shall be held in place by suitable means, which provide for quick removal of the strainer basket for cleaning purposes. Valves shall be installed adjacent to the strainers in order that the flow may be shut off during cleaning, switching baskets or inspection.

Strainer baskets shall be of non-corrosive material. The width or diameter of the strainer basket's openings shall not exceed 1/8 inch. The area of the strainer basket openings shall be at least four times the area of the pipe in which the strainer is installed. Water shall pass through the strainer from the outside.

The strainer, by preventing hair, lint, etc. from reaching the filters, helps accomplish longer filter runs and facilitates filter maintenance and protects the pump impeller from debris.

PUMPING EQUIPMENT

The recirculation pump and motor shall have sufficient capacity to provide at least the turnover required in previous rules against the maximum head loss which may develop under normal operating conditions in the recirculation system. A valve for regulating the rate of flow shall be provided in the recirculation pump discharge piping.

The pump or pumps must be of sufficient capacity to provide a minimum backwash rate of 15 gallons per square foot of filter area per minute in rapid sand and high rate sand pump or pumps shall supply the required recirculation rate of flow to obtain the turnover rate required at a total dynamic head of at least 70 feet for pressure diatomaceous earth filters unless lower or higher heads are shown by the designer to be hydraulically appropriate. If the pump is located at an elevation higher than the pool water line, it shall be self-priming.

Where vacuum filters are used, a vacuum limit control shall be provided on the pump suction line. A compound vacuum-pressure gauge shall be installed on the pump suction line between the hair and lint strainer and the pump, where possible. A vacuum gauge may be used for pumps with suction lift. A pressure gauge shall be installed on the pump discharge line adjacent to the pump. The pump is the heart of the recirculation system and therefore must be of adequate size.

FILTRATION

Filters shall be provided and shall be capable of treating the design flow rate of water and of producing water of satisfactory clarity. In addition, filters shall comply with the following:

Pressure filters shall be designed, located and constructed to permit removal of filter heads for inspection and replacement or repair of the filter elements or media.

Pressure filters shall be designed for working pressure based on the maximum shut-off head of the pump with a four to one safety factor. In no case shall the maximum shut-off head be considered less than 50 pounds per square inch.

Pressure filters shall be provided with pressure gauges on the inlet and outlet piping. Such gauges shall range to approximately one and one-fourth times the maximum anticipated working pressure and shall be easily readable and accurate within 2 pounds per inch.

Each pressure filter shall be equipped with a manual air-relief line at or near the high point and valved at a location where it will be readily accessible.

Pressure filters shall be provided with an observable free fall or a sight glass shall be installed on the backwash discharge line in order that filter-washing progress may be determined. Where a sight glass is used, it shall be readily removable for cleaning.

The filter backwash disposal facility shall have sufficient capacity to prevent flooding during the backwash cycle.

Filter piping shall be valved so that filters can be isolated for repairs while the other units are in service and valves should be identified by appropriate markings.

Where dissimilar metals that may set up galvanic currents are used in filter installations, provisions shall be made to resist electrolytic corrosion.

RAPID SAND FILTER

The filtration rate shall not exceed 3 gallons per square foot per minute and provisions shall be made to backwash at a rate of not less than 15 gallons per square foot per minute.

Filtering material shall consist of at least 20 inches of screened, sharp filter sand which shall have an effective size of 0.45 to 0.55 millimeters and a uniformity coefficient not greater than 1.60.

Where a gravel support bed is used, it shall have a minimum depth of 10 inches and shall be placed so as to provide uniform water distribution from the under-drain system to support the bed of sand without loss of sand to the pool and to prevent development of jet streams during backwash. A reduction in depth of gravel or an elimination of gravel may be permitted where equivalent performance and service are demonstrated. The under-drain system shall be of material that is corrosion-resistant, enduring and non-clogging. It shall be designed to provide uniform collection or distribution of the flow during filtering and backwashing. It shall be so designed and of such material that the orifices or other openings will maintain approximately constant area. Head lateral under-drain systems shall be designed so that:

The ratio of the area of the final openings of the strainer systems to the area of the filter is about 0.003. The ratio of the area of the laterals to the area of the orifices is about 2. The ratio of the area of the header or manifold to the area of the laterals is between 1.5 and 2.0.

At least 12 inches of freeboard shall be provided between the upper surface of the filter media and the lowest portion of the pipes or drains, which serve as overflows during backwashing.

Each pressure filter tank shall be provided with a means of access or manhole of sufficient size to permit the replacement of the supporting and filtering media and all component parts, which are intended for replacement and/or removal.

Where gravity filters are used, the backwash shall be of sufficient capacity to carry all backwash water, be located so that the lateral travel is no more than 3 feet and shall have a free-board of at least 20 inches above the sand.

HIGH RATE SAND FILTER

High rate sand filters must comply with the following requirements:

Any suitable material may be employed that will withstand normal handling and shipping and which will meet the requirements of corrosion resistance and pressure as outlined herein. The material shall not produce any

toxic effect or impart undesirable tastes, odors or colors to the pool water.

Coating and lining materials must be properly applied and of an approved type.

Corrosion-resistant materials of approved type will be accepted without coating of wetted surfaces.

Non-corrosion resistant materials shall be provided with a properly applied, approved protective coating completely covering all wetted surfaces of internal and non-removable parts except where suitable corrosion allowances are specified.

Dissimilar metals not normally considered compatible on the electromotive scale shall not be in direct contact in the filter construction.

Insulating fittings shall be electrically non-conductive and if made of synthetics (plastics), they shall be of an approved material.

Approved plastic, galvanized steel or cast iron fittings and bronze or iron bodied bronze fitted valves may be used in filters' internal or face piping without protective coating. When such materials are used in the face piping with a steel filter tank, no insulation fittings shall be required.

PRESSURE REQUIREMENTS

Tanks shall be designed for a minimum working pressure of 50 psi with a four to one safety factor. When the maximum shut-off heat of the pump used with the filter tanks exceeds 50 psi, the tank shall be designed for this head with a four to one safety factor.

Tanks shall be tested for soundness and leakage at a pressure of 150 percent of the working pressure. The manufacturer shall furnish design calculations indicating burst pressures of at least 200 psi upon request.

SERVICE REQUIREMENTS

Filter tanks not constructed of corrosion-resistant materials or lined with an approved coating are permitted provided that plate thickness is increased by a corrosion allowance of 1/16th inch of ASTM type mild steel or its equivalent beyond that required by the preceding pressure requirements.

All filter tanks shall be self-supporting and shall provide adequate space for ventilation between the floor and the tank bottom. Tanks over 48 inches in diameter must be provided with adjustable type leveling legs.

Provisions shall be made for completely draining the tank.

Filters shall be equipped with a means of access or a manhole of sufficient size to permit the replacement of the supporting and filtering media and all component parts, which are intended for replacement and/or removal.

All piping, which is an integral part of the filter unit, shall comply with design and construction requirements for water piping of the American Standard National Plumbing Code. ASA-A 40.8 – 1955. Insulating fittings shall be provided when face-piping material is not compatible on the electromotive scale with the material of the filter tank.

Filters operating at the design flow rate and measured from the filter tank discharge shall not exceed 3 psi.

INTERIOR COMPONENTS

All of the components in the upper distribution system shall be non-clogging and constructed so as to resist corrosion and physical deformation or wear. The system shall properly distribute incoming water during the filter cycle so as to prevent any appreciable movement or migration of filter media at the design flow rate. It shall properly collect water during the backwash

cycle and shall have combined open area at least equivalent to that of the backwash effluent piping.

The lower distribution system shall be non-clogging and constructed so as to resist corrosion and physical deformation to wear, shall provide adequate flow and distribution to uniformly expand the filtering bed during backwashing and to uniformly collect the filtered water during the filter cycle. With the exception of filters employing the dome or similar type under-drain having openings 3/16" or longer, all components of the lower distribution system shall be replaceable through the opening provided in the filter tank.

FILTER MEDIA

Filter sand shall be hard siliceous material free of carbonates or other foreign material with an effective particle size of 0.45 to 0.55 mm and a uniformity coefficient not exceeding 1.6. Depth of filter sand shall be a minimum of 20 inches.

Where gravel is used to support the filter sand, it shall be rounded material free of limestone and clay and shall consist of at least four layers properly graded to prevent intermixing. In such a case, the total bed depth shall be not less than 10 inches above the lower distributor openings.

When installed in accordance with the manufacturer's recommendations and when operated in the filter cycle, in accordance with the design rate, or when operated in the backwash cycle at 15 gallons per minute per square foot, the filter media shall conform to the following functional criteria:

The sand shall be of proper graduation and weight so there will be no media lost in the backwash operation using a rate of 15 gallons per minute per square foot of filter area.

The sand shall be thoroughly cleaned when backwashed per the manufacturer's specifications.

The filter media and supporting material, if provided, shall not migrate during the filter cycle and shall remain reasonably flat and level when operated at the design flow rate.

The filter media and supporting material, if provided, shall be non-toxic and shall impart no color, taste or odor to the pool water.

The filter bed shall not break down on channel in the filter cycle when subjected to a 15 psi pressure differential across the filter bed.

AIR RELEASE

Each pressure filter tank shall be equipped with an automatic air release connected at the top of the tank that will expel air, which enters the filter tank. A manual air release valve should also be provided.

DESIGN CRITERIA

The filter design flow rate shall be a maximum of 15 gallons per minute per square foot of filter area.

The design backwash rate shall be a minimum of 15 gallons per minute per square foot.

DIATOMACEOUS EARTH FILTERS

The filtration rate shall not exceed 1 ½ gallons per minute per square foot of filter area on diatomaceous earth filters except that the rate of diatomaceous earth filters maybe increased to 2 gallons per minute per square foot of filter area when continuous feeding of diatomaceous earth is employed. Regenerative diatomaceous earth filters shall not exceed 2 gallons per minute per square foot of filter area.

The determination of the filter area shall be made on the basis of a true and effectively supported septum surface. In the case of

fabric septa, the area computation shall be made on the basis of measurements of the septum support in a reasonably constant plane. Area allowance shall not be granted for folds in the septum fabric, which would easily bridge.

Provisions shall be made for pre-coating with diatomaceous earth. The piping shall be arranged so as to allow recycling of the filter effluent during pre-coating.

Where equipment is provided for the continuous feeding of diatomaceous earth to the filter influent, such equipment shall have a capacity to feed not less than 1 ½ ounces of this material per square foot of filter area over a 24-hour period.

Vacuum filters shall be designed to withstand the pressure developed by the weight of the water contained therein and vacuum type filters shall, in addition, be designed to withstand the crushing pressure developed under a vacuum of 25 inches of mercury with a safety factor of 1.5 in both instances. The septa shall be constructed to be resistant to rupture under conditions of the maximum differential pressure between influent and effluent, which can be developed by the circulating pump and of adequate strength to resist any additional stresses developed by the cleaning operation.

All filters shall be equipped for cleaning by one or more of the following methods: backwashing, air-bump-assist backwashing, spray wash (mechanical or manual) or agitation.

Provisions shall be made for completely draining the filter.

FLOW RATE INDICATOR

A flow rate indicator, reading in gallons per minute, shall be installed and located so that the rate of recirculation and backwash may be read at any time. In a multiple pool system, a rate of flow indicator shall be provided for each pool. It shall be installed on a straight length of pipe at a distance of at least 10 pipe diameters downstream and 5 pipe diameters upstream from any valve, elbow or other source of turbulence, shall be capable of measuring the design flow rate, shall be accurate within 5 percent of the true flow, shall be easy to read and approved by the Department (exceptions to this sentence may be granted based upon submittal of adequate data regarding location, range and design).

HEATERS & TEMPERATURE REQUIREMENTS

The following requirements apply if a swimming pool water heater is installed:

A swimming pool water heater piping system shall be equipped with a bypass so arranged to allow unrestricted recirculation of pool water. The bypass may not be plastic (PVC) pipe.

A heating coil, pipe or steam hose shall not be installed in a swimming pool.

Thermometers shall be provided in the piping to check the temperature of the water returning from the pool and the temperature of the blended water returning to the pool.

Thermometers shall be graduated to indicate the temperature to the nearest 2°F. in the range of 60°F. to 100°F. shall be installed where they will measure temperature of the flowing water can be easily read and will not be subject to damage.

An automatic temperature-limiting device, which will prevent the introduction of water in excess of 100°F to the pool, shall be provided.

A pressure relief valve shall be provided and shall be arranged so that discharge does not present a safety hazard.

Proper venting of gas or other fuel burning water heaters shall be provided.

Indoor pools shall provide an adequate heater. All heating units shall be isolated or protected to prevent injury to bathers.

Plastic piping (PVC) is not approved for the inlet and outlet piping between a water heater and the main recirculation piping.

Heaters should be capable of maintaining an overall pool water temperature between 76°F. and 82°F. Thermostatic control of the temperature is desirable. Heaters should provide ample surface area for heat interchange and may be designed for use with steam or hot water. Provision should be made for easy removal of the heater parts for cleaning.

The rooms shall be ventilated so they do not remain damp and so that no odor nuisance may exist.

Proper water temperature will assure maximum enjoyment of swimming pool facilities. It also helps control bacterial and algae growth and has an effect upon disinfectant residual effectiveness. In addition, it is important that a proper range of temperature differential between air and water is maintained to prevent chilling of bathers.

PIPING SYSTEM

The piping shall be of material approved for potable water use by the American Water Works Association. The piping system shall be properly designed to reduce friction losses to a practical minimum. The piping shall be designed to carry the required quantities of water at velocities not exceeding 5 feet per second in suction piping, 10 feet per second in pressure piping and 3 feet per second in gravity piping unless greater velocities can be hydraulically justified.

The piping shall be protected against erosion, corrosion, mechanical damage and other deterioration. It shall be provided with fittings necessary for disassembly of any part of it. It shall be arranged to allow ready, safe and proper operation and maintenance of the swimming pool facilities. The piping shall be designed to withstand at least four times the operating pressure.

All piping around the pool shall be properly sloped for adequate drainage and supported at sufficiently close intervals so that sagging between supports will not trap water. Provisions shall be made for expansion of pipes.

Cleanouts shall be provided at such points in the recirculation system as will enable obstructions and accumulations to be readily removed. All plastic (PVC) piping must have the National Sanitation Foundation (NSF) seal imprinted on it. Flange joints or union should be used on exposed piping in the filter room. A color code or tags should identify piping.

An ample factor of safety in the pipe sizes of the recirculation system is necessary for the maintenance of the required turnover rate even with allowance for the reduction in the carry capacity of the pipes because of corrosion and scaling.

All piping shall be color coded according to the table below in accordance with the Kansas City, Missouri Plumbing Code. Compliance with the Kansas City Missouri Plumbing Code assures proper function of equipment and fixtures and protection from contamination of a water system, which can occur with improper plumbing.

Piping	Color Code
Portable Water Lines	Dark Blue
Recirculation	
Filtered	Aqua
Skimmer/Gutter Return	Olive Green
Main Drain	Black
Chemical Lines	
Alum	Orange
Chlorine (Gas Solution)	Yellow
Soda Ash	White
Acid	Pink
Waste Lines	
Backwash Waste	Dark Brown
Sewer (Sanitary/Other)	Dark Gray
Acid	Pink
Compressed Air	Dark Green
Gas	Green

SURGE CAPACITY

All pools which are required to provide or do provide perimeter overflow systems shall provide surge capacity of a minimum of .6 gallon per square foot of pool water surface area. The surge capacity provided shall be such that sufficient water volume storage capacity is provided to meet the .6 gallon per square foot of pool water surface area above the normal water level in the system when there are no swimmers in the pool. Surge capacity may be provided in a vacuum filter tank in the pool. Surge capacity may be provided in a vacuum filter tank in the perimeter overflow system in-pool or in a surge tank. Valving shall be provided where necessary to automatically retain water during periods of pool use and to discharge water during periods of nonuse such that the proper operating water level is maintained at all times. A surge tank where provided shall be arranged so that there is a free-fall of 2 pipe diameters or a 6 inch minimum free-fall from the make-up water line to the rim of the tank. The perimeter overflow system discharge piping and the elevation shall be such that at least 100% of the recirculation rate may be accommodated continuously. The outlet piping shall be connected to the suction side of the recirculation pump at a point ahead of the hair and lint strainer with the control device designed to regulate the water level in the tank.

Surge capacity will insure proper skimming under all normal swimming pool usage conditions. It will improve perimeter overflow system efficiency and prevent flooding during periods of pool use. Since a large percentage of pool contamination occurs on or near the water surface, proper skimming at all times is vital to good water quality and proper sanitation.

MAKE-UP WATER

All pools shall be equipped for the addition of make-up water. Make-up water shall be from a potable source. Make-up water shall be added to the pool in a manner, which protects the water sources from contamination using one of the following methods:

Free-fall discharge to a surge tank with an air gap of two times the pipe diameter or 6 inches minimum above the rim of the surge tank is required.

Free-fall discharge direct to the pool with the same air gap minimum and at a location under a low diving board immediately adjacent to a ladder rail, grabrail or lifeguard platform or through piping with approved vacuum breaker protection (vacuum breaker on the discharge side of the control valve with the air inlet at least 6 inches or two times the pipe diameter above the pool coping or the rim of the surge tank).

Water lost through overflow (other than closed system) by leakage or evaporation or carried out by swimmers must be replaced in

sufficient amounts to skim floating contamination from the surface of the pool.

WASTEWATER DISPOSAL

Provisions shall be made for disposing of material cleaned from filters and of backwash water in a manner, which will not create a nuisance. The backwash water shall be disposed of in accordance with applicable local regulations to a storm drain or dry well or where space and conditions permit and where approved by the health authority, water may be disposed of by surface or subsurface irrigation.

When drainage to a sanitary sewer or storm sewer is permitted, an air gap shall be provided which will positively preclude against surge or backflow introducing contaminated water into the swimming pool or the recirculation system.

The disposal of diatomaceous earth must be made in such a manner that no solids appear in the wastewater. Using a separation tank, receiving chamber, or any other method approved by the health authority, may do this.

The provision of proper equipment for handling refuse will help protect pool and beach patrons from exposure to material capable of causing disease and injury.

CHAPTER 4

Disinfectant Systems

Disinfectant systems at any pool shall include a mechanical unit for feed of a disinfectant and may include a mechanical unit for feed of a chemical for pH control. Only by the adequate disinfection of swimming pool water will disease germs introduced into the pool be promptly destroyed.

DISINFECTANT FEEDER

Equipment for supplying chlorine or compounds of chlorine shall be of sufficient capacity so that it is possible to feed the chlorine at eight (8) parts per million for outdoor pools and at three (3) parts per million for indoor pools based upon the required recirculation rate.

The disinfectant feeder shall be of sturdy construction and materials, which will withstand normal wear and attack by disinfectant solutions or vapors. The feeder shall be easily disassembled for cleaning and maintenance and shall be constructed to prevent stoppage from chemicals or foreign materials contained therein.

The disinfectant shall be introduced into the recirculation system ahead of the filters where sand media is employed and into the filter effluent line where other types of media are used.

Where the disinfectant is introduced at the suction side of the recirculation pump, a method shall be provided to prevent air lock in the pump or recirculation system and to prevent excessive flow of disinfectant due to pump suction.

GAS CHLORINATORS

The chlorine supply and gas feeding equipment shall be in a separate, relatively airtight room. The room shall be provided with an exhaust system, which takes its suction not more than 8 inches from the floor and discharge out-of-doors in a direction to minimize exposure to toxic fume. The fan shall be capable of producing one air change per minute. Means for introducing a fresh air supply to the enclosure through appropriate openings such as filters, grill openings, etc., at a high point opposite the exhaust fan intake shall be provided. The room shall have a window at least 18 inches square with artificial illumination so that the essential parts of the chlorinator are readily visible from the operating area outside the room. Electrical switches for lighting and ventilation shall be outside and adjacent to the door. Scales for weighing chlorine cylinders in service shall be provided and should have the platform at floor level. Chlorine cylinders shall be permanently affixed with a chain to prevent falling over.

The chlorine-feeding device shall be designed so that during interruptions of the flow of water supply, gas feed is automatically terminated. Chlorinator vent lines shall be conducted to the outside similar to the chlorinator room exhaust system.

The water supply for the gas feeding equipment shall produce the flow rate and pressure required according to the manufacturer's specifications for proper operation of the equipment. These specifications shall be available on site. The release of chlorine shall be automatically terminated when the recirculation pump is shut off. Where other than swimming pool recirculated water is used, the supply line shall be equipped with an electric shutoff valve wired to the

recirculation pump and shall be equipped with a suitable backflow preventer.

A gas mask designed for use in a chlorine atmosphere and of a type approved by the U.S. Bureau of Mines shall be provided. A record shall be kept of gas mask usage and maintenance to insure that the mask will be serviceable when needed. The gas mask shall be kept in a closed cabinet, accessible without a key, located outside of the room in which the chlorinator is located and preferably outside the entrance to the equipment room. A self-contained breathing apparatus may be provided instead of a gas mask.

A sign stating "CAUTION – CHLORINE GAS" shall be placed on the door to the chlorinator room.

A Chlorine Institute approved safety kit should be stored outside or be near the room where chlorine cylinders are stored and used.

pH CONTROL FEEDERS

A chemical feeder of positive displacement type shall be installed for the purpose of applying chemicals to maintain pH of pool water within the range of 7.2 to 7.6. A solution tank of at least 20 gallons capacity shall be provided.

CHAPTER 5

Operation & Maintenance

SUPERVISION

Every pool shall be under the supervision of a manager who is fully capable of, and shall assume responsibility for, compliance with all Ordinances, Rules & Regulations relating to pool operation, maintenance, and safety of bathers. The manager shall assume responsibility to assure that all requirements are complied with, i.e., daily log, clarity of water, automatic disinfection and pH control, pool cleanliness, lifeguard service when required, and life-saving equipment. Failure to comply could result in closure (see Appendix A).

All pools must be operated by a qualified operator as evidenced by completion of training provided by the Health Department, a current National Swimming Pool Foundation Certified Pool Operator (CPO) certification, a National Recreation and Parks Association Aquatic Facility Operator (AFO) certification, or an equivalent certification approved by the department. The operator may be a facility employee or an employee of a contracted pool management firm.

MAINTENANCE OF POOL & POOL AREA

The swimming pool shall be maintained free from sediment, lint, hair and other miscellaneous items. The walls and bottom of the pool shall be maintained free from dirt and discoloration. The floors shall be kept free from cracks and other defects. The walls, ceilings, floors and equipment shall be painted as often as necessary so as to keep them in good condition. The bottom and sides of the swimming pool shall be brushed or suction cleaned as often as necessary to keep the pool free of solids that settle, as well as free of algae and slime growths.

The pool paint shall be of light color. The most satisfactory colors are white or light blue. Aluminum paint is not satisfactory because it results in dark surfaces under water. The walk areas, overflow gutters, counters, lockers, equipment, furniture, interior partitions and walls shall be kept in good repair, clean, sanitary and free of visible dirt. Decks shall be disinfected daily.

Maintenance of the pool walls and floor free from sediment, cracks, chips, algae and slime prevents undue loss of disinfectant residual due to its reaction with these foreign materials. Light paint gives the appearance of clearer pool water, making the observation of a swimmer in distress easier.

OPERATION OF MECHANICAL EQUIPMENT

RECIRCULATION PUMPS

The pump shall not be throttled on the suction side during normal operation. If the pump bearings are of the lubricated type, manufacturers' bearing lubrication instructions shall be followed. Grease cups of grease-lubricated seals shall be turned according to the manufacturers' instructions. The packing glands shall be lubricated via the grease cup in a similar manner. Packing glands shall be adjusted regularly to maintain leakage of several drops per minute. The pump and motor shall be checked at regular intervals. The direction of rotation of the impeller shall be checked whenever a pump motor is repaired.

SAND FILTERS

The filter air release valve shall be opened daily or more frequently if necessary to remove air which collects in the filter. The filter sand shall be clean. The sand shall be maintained at the design depth. Any new sand must be of the same effective size and uniformity coefficient as the original sand. Filters shall be back-washed at a proper rate of flow. The loss of head at the time of back-washing gravity filters shall not exceed 8 feet. The pressure differential before and after the filter at the time of back-washing standard rate sand filters, should not exceed 5 pounds per square inch. Pressure gauges shall be inspected at least once each year and any inaccurate or inoperative gauge shall be replaced.

DIATOMACEOUS EARTH FILTERS

The dosage of diatomaceous earth pre-coat shall be at least 1 ½ ounces per square foot of element surface area. Pressure diatomaceous earth filters shall be back-washed when the pressure differential between the filter influent and effluent lines reaches 25 pounds per square inch or when the rate of flow drop 5 to 10 per cent below the designed flow rate whichever occurs earlier. Whenever the recirculation pump stops or is shut off, the filter shall be thoroughly back-washed. The elements shall be pre-coated before placing the pump back into operation. Vacuum diatomaceous earth filters shall be washed when the pump suction gauge reads 12 inches of mercury or the flow rate drops 5 to 10 per cent below the designed flow rate or whichever occurs first.

A pressure diatomaceous earth filter unit shall be opened for inspection at least once a year. Any accumulated material adhering to the elements and obstructing the opening shall be removed. Following the pre-coating operation, the initial filter effluent shall be either recirculated through the filter until the filter effluent is clear or the initial filter effluent shall be discharged to waste until properly clarified water is produced. The material (filter septum) which covers the filter elements shall be maintained free of holes, breaks or clogged conditions. When continuous body feed is required (filter loading rate exceeds 1.5 gallons per minute per square foot of filter surface area), it should be applied at a rate of 1 ½ ounces per square foot of surface area per day. An extra supply of septa and at least two week's supply of diatomaceous earth shall be available at all times where diatomaceous earth filters are provided.

DRAINING THE POOL

If the pool is to be drained, as at the end of the swimming season, advantage should be taken of the large volume of water in the pool for use in a prolonged period of filter backwashing. Pressure sand filters that are failing to produce a clear effluent shall be inspected as follows:

Remove the manhole cover and make an inspection of the top of the sand. If it is clean and free from dirt or accumulations, is level and contains no cracks or depressions, replace the cover for a clean level bed is an indication that the operation is satisfactory. If the bed is dirty and there is an accumulation of hair, dirt, etc., in the top few inches, wash the unit with the cover off, observing how the water breaks through the sand surface. A dirty bed indicates that more water is needed for washing to carry away the dirt. To correct the situation, take out the top few inches of dirty sand and replace or clean it.

It is advisable, while the manhole cover is off, to measure from a marked point on the rim to sand surface. When the filter is opened subsequently, a check measurement will show whether sand is being lost or accumulations are building up in the sand.

HAIR & LINT STRAINERS

Hair and lint strainers shall be cleaned frequently to prevent clogging of the suction line and subsequent cavitations. The pump shall be stopped before the strainer is opened to avoid drawing air into the pump and losing the prime. In the case of diatomaceous earth filters, the hair strainer basket shall be cleaned during the time the filter is being backwashed. The reason for this requirement is that diatomaceous earth filters must not be stopped without backwashing.

VALVES

Valves shall be occasionally operated through their entire operating range to prevent corrosion and dirt from sealing them. Valve stem packing glands shall be tightened or repacked as necessary to prevent leakage.

FLOWMETERS

Flow meters shall be maintained in an accurate operating condition. Keeping the glass and the connecting tubes clean is essential.

VACUUM & PRESSURE GAUGES

The lines leading to the gauges shall be bled occasionally to prevent blockage.

GAS CHLORINATORS

Due to the potential danger involved in handling chlorine gas, only a person trained in servicing these units shall make even minor repairs of gas chlorinators. The manager/operator should determine the appropriate emergency personnel to contact in the event of a chlorine gas emergency and have the telephone number of said personnel conspicuously posted.

Chlorine cylinders shall be stored indoors in the area designed for that purpose and away from a direct source of heat. They shall be chained or strapped to a rigid support to prevent accidental tipping. Cylinders shall not be moved unless the protection cap is secured over the valve. A gas mask, approved by the U.S. Bureau of Mines for use in a chlorine atmosphere, must be available in an unlocked container at all times. The gas mask canister shall be replaced regularly as per the manufacturers' recommendations. Chlorinator and cylinders shall be checked daily for leaks. Chlorine will produce a white smoke in the presence of ammonia. In case of a chlorine leak, only trained persons wearing proper safety equipment shall undertake corrective measures. All other persons shall leave the dangerous area until conditions are again safe. Follow proper safety and first aid procedures if someone is exposed.

POSITIVE DISPLACEMENT FEEDERS

Positive displacement feeders shall be periodically inspected and serviced. To minimize sludge accumulation in the unit, the lowest practicable concentration of solution shall be used and in no case shall this concentration exceed 5 per cent. This is about 20 pounds of 70% chlorine powder in 50 gallons of water. If liquid chlorine solution is used, the dilution with water is not critical to the operation of the unit.

During routine operation, it is advisable to feed small amount of mild acid solution (vinegar will serve this purpose) through the unit each week to dissolve sludge accumulation. When both chlorine solution and acid solution are fed to the pool using positive displacement feeders and each feeder has adequate capacity to supply the required amount of either chemical, it is advisable to switch the pump's suction lines weekly. Thus, the hypochlorite feeder would alternately feed acid or sodium bisulfate and the acid feeder would alternately feed hypochlorite.

At the time the pool is closed for the season, spare parts for the feeder shall be ordered.

A supply of “0” rings, valves and attachment fittings and attachment fittings and diaphragms shall be kept available for use when the pool is in operation.

Maintenance of all recirculation, filtration, disinfection and miscellaneous equipment in good repair and proper operating condition is mandatory for such equipment to operate at maximum efficiency. Such efficient operation allows the maintenance of satisfactory water quality.

CLEANING OF POOL

VACUUM CLEANING SYSTEM

A swimming pool cleaning system shall be on the premises at all times. A swimming pool cleaning system shall be provided and shall be capable of moving lint, fine sand and other sediment from the swimming pool floor. It shall be equipped to be readily manipulated from the pool deck to reach any part of the floor and provide for discharging the effluent to waste or the recirculation system upstream from the filter. Properly sized portable vacuum pumps are acceptable.

When the vacuum cleaning system is an integral part of the swimming pool circulation system, a suitable connection shall be provided 8 to 12 inches below the normal water level. Piping from this connection shall be to the suction side of the pump ahead of the hair catcher, shall be at least 1 ½ inches in diameter, be free of air pockets and be equipped with a control valve near the junction with the pump suction line. The size of the vacuum hose shall be at least 1-½ inches.

A valve shall be provided to throttle flow from the pool main drain in order to permit maximum efficiency when a suction cleaner is to be operated by the recirculation pump. The removal of the bottom deposits by the suction cleaner directly reduces turbidity in the pool. The collection bag or lint strainer shall be cleaned frequently. Vacuum cleaning shall not be conducted when the pool is in use. Any visible dirt on bottoms or sides or matter on pool surface must be removed before the pool is used.

In every pool bottom, deposits accumulate which are too heavy or adhesive to be carried to the main drain by the normal recirculation velocities in the pool. Bathers may stir up these bottom deposits, along with those progressing toward the main drain, with a resultant increase in the turbidity of the pool water. Bottom deposits and resultant turbidity reduce the effectiveness of disinfection. The vacuum cleaner will perform at maximum efficiency when the collection bag or lint strainer is clean. Vacuum cleaning, when the pool is in use, is impractical because sediments are being stirred up by the bathers and may present safety hazards when electrical equipment is in operation.

LOCKER ROOM & DECKS

Locker rooms & decks should be properly cleaned and sanitized regularly throughout the day. During heavy pool use, the locker room should be dry swabbed, deodorized, toilets flushed and soap and paper supplies checked every hour.

RULES OF OPERATION

BATHER PREPARATION FACILITIES

Dressing, shower facilities and drinking fountains conforming to the minimum requirements of this regulation shall be provided for all swimming pools except where the users of the swimming pool have access to showers, toilet and dressing facilities in adjacent living quarters or such facilities are otherwise available for use by all people who may use the pool. The facilities shall be under the general supervision of the pool. The term “adjacent

living quarters" shall be interpreted to mean that no bather will have to travel more than 91.4 meters (300 feet) to sanitary facilities. For distances greater than this, the following sanitary facilities shall be provided:

Sanitary Facilities Based on User Load

Facility	Male	Female
Water Closet	1/40	1/20
Lavatory	1/40	1/40
Shower	1/30	1/30
Urinal	1/40	N/A

The provision of bather preparation facilities is very important to the maintenance of satisfactory water quality. Bathers introduce contaminants into the pool water whenever they enter the water. It is, therefore, necessary that the level of these contaminants be kept as low as possible. Bather preparation facilities properly located, constructed and utilized will reduce this contaminant load to a minimum.

The floors of dressing rooms, shower stalls and other interior rooms shall be cleaned with soap or a suitable detergent and disinfected daily or more frequently, as necessary. Lockers shall be washed and disinfected frequently. Toilet rooms and fixtures shall be kept clean, sanitary and in good repair. Floors shall be maintained in a non-slip condition. Soap dispensers shall be filled and operable. An adequate number of covered water receptacles shall be provided in the bathhouse. Clean, disinfected surfaces in the bathhouse help reduce the possibility of transmission of infectious, communicable skin diseases.

Showers and lavatories shall be supplied with water at a temperature of at least 90°F (32°C) and no more than 115°F (46°C) with adjustable temperature controls to prevent scalding. All plumbing shall conform to state and local building codes. Liquid or powdered soap dispensers shall be provided. Glass soap dispensers are not acceptable. Bar soap should not be provided at either showers or lavatories.

FOOT SPRAY

A foot spray, if provided, shall be supplied from the potable water system, have a spray head 18 to 24 inches above the walkway, have a conveniently located valve, be arranged to spray the bathers from knees to feet as they enter the enclosure and have a drain to discharge the water immediately to an outlet without ponding at the drain. A foot spray shall be located where it will be effective without creating a hazard. Foot baths are prohibited.

PERSONAL REGULATIONS/ RULES

Rules governing the use of the pool and instructions to bathers shall be displayed on placards at the entrance to dressing rooms and other appropriate places and shall be enforced by the pool manager/operator. Such posting of rules and other instructions shall provide that:

1. Admission to the pool is refused to all persons having any contagious disease, infectious condition such as colds, fever, ringworm, foot infections, skin lesions, carbuncles, boils, inflamed eyes, ear discharges or any other condition which has the appearance of being infectious. Persons with excessive sunburn, abrasions that have not healed, corn plasters bunion pads, adhesive tape, rubber bandages or bandages of any kind may not be permitted. A person under the influence of alcohol or exhibiting erratic behavior shall not be permitted in the pool area.

2. No food, drink, gum or tobacco will be allowed in other than specifically designated and controlled sections of the pool area.
3. All persons will be required to take a shower in the nude with soap and warm water before being allowed in the pool area.
4. Bathers who leave the pool area for any reason are required to shower before returning to the pool.
5. All persons with long hair are required to wear caps while in the pool.
6. Personal conduct within the pool facility must be such that the safety of self and others is not jeopardized. No running, boisterous or rough play, except supervised water sports, is permitted.
7. Spectators are not allowed in the pool, on the pool deck or in the shower area of the bathhouse.
8. Spitting, spouting of water, blowing the nose or otherwise introducing contaminants into the pool is not permitted.
9. Glass, soap, lotion or other material, which might create hazardous conditions or interfere with efficient operation of the swimming pool, shall not be permitted in the swimming pool or on the pool deck.
10. All apparel worn in the pool shall be clean and sanitary. Street attire or cutoffs not allowed in the pool.
11. Diving is not permitted in shallow water.
12. Caution shall be exercised in the use of diving boards. Management should establish adequate regulations for the safe use of diving boards.
13. Whenever additional rules or regulations are deemed advisable for the protection of the health and safety of the patrons, the management shall put into effect such rules either printed or verbal.
14. All animals, birds and domestic fowl are prohibited from entering the pool area.
15. All pools which do not require a lifeguard shall close at 10:00 p.m. and shall not allow children under the age of 12 without adult supervision.
16. The personal regulations placards posted in conspicuous places are an aid to the manager/operator in the control of the bathers which better allows him to maintain a safe and healthful swimming environment for the pool patrons.
17. The pool lifeline shall not be removed without permission from the pool management.

BATHER LOAD

The number of persons in bathing attire within a swimming pool enclosure, including the bathhouse, shall not exceed the bather load limit established by the Department.

The owner or operator at a conspicuous place within the swimming pool enclosure shall post the bather load limit. The pool owner is responsible for seeing that the maximum capacity is not exceeded.

The formula for bather load allows one (1) person per 30 square feet of pool surface area with depth of 5 feet or over and one (1) person per 15 square feet of surface area with a depth of less than 5 feet. The same formula allows 35% more swimmers if the pool deck area is large.

Bather Load Formula

$$\frac{\text{Shallow end (sq. ft.)}}{15} + \frac{\text{Deep end (sq. ft.)}}{30} = \text{Bather Load}$$

Enforcement of bather load limit helps prevent impaired water quality and safety hazards due to overcrowding.

CHAPTER 6

Water Quality

DISINFECTANT RESIDUAL

Swimming pool water shall be continuously disinfected. The disinfecting materials and methods shall not be dangerous to public health, create objectionable physiological effects, or impart toxic properties to the water. All disinfecting materials shall be used only with the approval of the Director of Health.

The maintenance of pool water pH in the proper range assures optimum bactericidal activity of the disinfecting agent. It also aids in the prevention of eye irritation and prolongs equipment life by reducing the possibilities of corrosion and/or formation of scale. The minimum requirements for testing pools and spas will be at least twice daily using a DPD test kit. Chlorine residual shall be maintained between 1.0 ppm and 3.0 ppm in swimming pools and 2.0 and 5.0 in spas as free available chlorine.

Chlorine in outdoor pools must be shielded from the degrading effects of the sun's ultraviolet (UV) rays. Cyanuric acid is used in outdoor pools to stabilize chlorine. It is recommended that the cyanuric-acid level be 30-50 ppm with a maximum of 60 ppm. When the level exceeds 60 ppm, the cyanuric acid must be diluted by draining about 20% of the pool volume and adding fresh water. Bromine residual shall be maintained between 2.0 and 6.0 ppm as free available bromine.

SUPERCHLORINATION

Superchlorination destroys organic materials which have combined with free chlorine eliminating its effectiveness.

Superchlorination is required when the combined chlorine level exceeds free available chlorine by 0.5ppm. It is accomplished by raising the chlorine level by no more than 10ppm.

pH

The pH of the pool water shall be maintained in a range of 7.2 to 7.6. Soda ash may be used to raise pH. Sodium bisulfate may be used to lower pH. Hydrochloric (muriatic) acid shall only be used for the purpose of decreasing the pH of pool water under the supervision of trained personnel. Protective equipment and clothing, including as a minimum; rubber gloves and goggles, are to be used for handling this chemical, feed lines, etc. Unusual pH control problems including corrosion can be experienced in pool operation.

ALKALINITY

The alkalinity of the pool water should not be less than 80 or more than 100 ppm. The alkalinity in pool water provides a "buffer" to prevent rapid changes in pH. The proper concentration of alkalinity also reduces the scale forming or corrosive properties of the water.

TEMPERATURE

The water temperature of an indoor pool must not differ from the indoor air temperature by more than 5 degrees. Outdoor pool water shall not be less than 70°F or above 95°F. Indoor pool water temperature shall not be less than 70°F or above 85°F. The proper water temperature in a pool lessens the loss of disinfectant

residual and provides a comfortable environment for the swimmers.

TURBIDITY

At all times, when the pool is in use, the water shall be sufficiently clear that the bottom drain at the deepest point is clearly visible. Clear pool water will enable a person in distress at the bottom of the pool to be readily seen and immediate emergency measures instigated.

ALGAE CONTROL

In addition to being unsightly, algae will consume sanitizer, provide an environment for bacterial growth, and can clog filters. Chlorine residuals or superchlorination can control most algae although copper compounds must be used at a concentration of no more than four pounds per million gallons of water to control yellow algae.

Scrubbing the pool bottom and walls must be part of any treatment.

CHAPTER 7

Safety, Markings & Signage

DEPTH MARKERS

Depth of water shall be plainly marked at or above the water surface on the vertical pool wall, as well as horizontally on the deck itself, at maximum and minimum points and at the points of break between the deep and shallow portions and at intermediate increments of depth, spaced at not more than 7.6 meter (25 foot) intervals.

Depth markers shall be in numerals followed by the letters "FT" to indicate feet or "M" to indicate meters, be 10 centimeters (4 inches) minimum height, and be a color contrasting with the background. They may be painted on or set in inlaid tile. Markers shall be on both sides and both ends of the pool. The markings shall be plainly visible to persons in the swimming pool and to persons about to enter the pool.

LIFELINE

Devices for fastening lifelines shall be installed at least 0.6 meter (2 feet) toward the shallow end from the break in grade between the shallow portion and the deep portion of the pool. These devices shall be securely anchored and of corrosion resistant material and of a type which will be recessed or have no projection which will constitute a hazard.

SAFETY EQUIPMENT

Not less than one unit of lifesaving equipment shall be provided. One unit shall be presumed to be adequate for 2,000 square feet of water surface area and one additional unit shall be provided for each additional 2,000 square feet or major fraction thereof of water surface area. One unit shall consist of the following:

- A U.S. Coast Guard approved ring buoy which shall be attached to an adequate length of rope.
- A life pole or shepherd's crook having blunted ends with adequate length to reach the bottom center of the pool.

Lifesaving equipment shall be mounted in conspicuous places, distributed around the edge at lifeguard chairs or elsewhere ready to access with its function plainly marked. It shall be kept in good condition. Bathers or others shall not be permitted to tamper with it, use it for any purpose other than its intended use or remove it from its established location.

FIRST AID EQUIPMENT

Every swimming pool shall be equipped with a long spine board with ties and a collar and with a first aid kit, which contains all of the following materials:

# of Units	Description
2	1" adhesive compress
2	2" bandage compress
2	3" bandage compress
2	4" bandage compress
1	3"x3" plain gauze pad
2	Gauze roller bandage
1	Eye dressing packet
4	½" square yard plain gauze
3	24"x72" plain gauze
4	40" triangular bandage
1	Bandage scissors
2	Disposable gloves
1	CPR face mask
2	Protective face shield

EMERGENCY PHONE

Every swimming pool shall have an emergency telephone or other means of communication available, under control of management, ease of accessibility for emergency use only. Directions to the phone shall clearly be posted. The emergency telephone should be connected to the 911 system, which when dialed will immediately contact emergency aid agencies with jurisdiction within your locality. Directions on use of the phone shall clearly be posted. Every swimming pool should have a readily accessible room or area designated and equipped for emergency care.

All drowning and accidents shall be reported to the Health Department on forms provided.

LIFEGUARD REQUIREMENTS

A responsible individual is necessary at each swimming pool to assure discipline and control of the patrons, proper and continued operation of all equipment and compliance with sampling and reporting requirements of the department. Pools under such supervision will more readily assure both a safe and healthful environment for the pool patrons. Lifeguards must be 16 years of age or older and shall have a current lifesaving certificate, be in good physical condition and competent in techniques. Certification through the American Red Cross, or equivalent, will satisfy this requirement. The certificate of such competency shall be posted.

More than one lifeguard should be on duty at large pools and/or pools with a large number of bathers. The Department recommends lifeguards to be provided at a ratio of 1 per 100 bathers or 1 per 1000 square feet of water surface area, whichever is less.

Lifeguards shall wear distinguishing suits or emblems so persons using the swimming facilities may easily identify them. They shall be suitably dressed to enter the water and act in an emergency. No person shall be employed for this duty that has a known communicable disease.

Lifeguards assigned to the supervision of the pool shall not be subject to duties that would distract their attention from proper observation of persons in the pool area or that would prevent immediate assistance to persons in distress in the water.

LIFEGUARD CHAIRS/PLATFORM REQUIREMENTS

Swimming pools intended to include unorganized use as the primary activity and having an area of more than 2,000 square feet of water surface area shall provide a lifeguard with an elevated platform or chair. In pools with 4,000 square feet or more of pool water surface area, additional lifeguards with elevated chairs or stations shall be provided, located so as to provide a clear, unobstructed view of the pool bottom in the area under surveillance.

One (1) elevated lifeguard chair or platform shall be provided for pools having over 2000 square feet up to 4000 square feet of pool water surface. One (1) additional lifeguard chair or platform shall be provided for each 2000 square feet or major fraction thereof of pool water surface area above 4000 square feet. The lifeguard chair(s) or platform(s) shall be located to allow a clear and unobstructed view of the pool bottom in the area of surveillance.

NON-LIFEGUARDED POOLS

All swimming pools, which do not provide a lifeguard, must post and enforce the **"Warning No Lifeguard on Duty"** sign and must close at or before 10 p.m.

SIGN REQUIREMENTS

Rules governing the use of the pool and instructions to bathers shall be displayed on placards and approved by the department. The following signs are required for operation:

- Rules and Regulations
- No Lifeguard on Duty (if applicable)
- No Diving (sign should be posted on wall and deck)

Pools serving motels, hotels, apartments, etc., having a surface area of less than 2,000 square feet, may waive the lifeguard & platform requirement.

- Depth Markers (signs should be inside on the pool walls and on the deck)
- Emergency Use Only (sign should be posted above safety equipment)
- 9-1-1 (sign should be posted above emergency telephone)
- Hours of Operation
- Bather Load
- Pool Permit

CHAPTER 8

Spas & Hot Tubs

GENERAL DESCRIPTION

Spas and hot tubs are pools designed for recreational and therapeutic use and for physiological and psychological relaxation. These pools are not drained, cleaned and refilled after each use and may include, but are not limited to these types: hydro jet circulation, hot water, cold water, mineral baths, air induction systems or some combination of these.

However, these facilities, like swimming pools, are closed cycle water systems and may be designed with complete water circulation, filtration, heating and, in some cases, disinfectant and overflow systems integrated with the water circulation system. In most cases, both spas and hot tubs equipped with heaters have automatic water temperature controls.

A public spa or hot tub, depending on its size, location and support equipment capacity, can accommodate from one to many bathers.

STRUCTURAL DESIGN

CONSTRUCTION

The structural design and materials used in spas and hot tubs should be in accordance with local building codes and with generally accepted good structural engineering practice. They should provide a sound, durable structure which will safely sustain the weights and pressures (dead load, live loads, liquid, hydrostatic and earth pressures) involved in each case. The spas and hot tubs should be watertight and surfaces should be inert, non-toxic, smooth and easily cleaned. Except for approved wooden tubs, spas and hot tubs should have light-colored interiors.

Roofs or canopies over spas or hot tubs should be constructed so that moisture or condensation from the roof or canopy will not drain into the spa or hot tub.

DIMENSIONAL DESIGN

The maximum operational water depth should be 4’0” (1.2 m) measured from the waterline. Exceptions may be made for spas or hot tubs designed for a special purpose such as instruction, treatment or therapy.

The maximum depth of any seat or sitting bench should be 2’0” (61 cm) measured from the waterline. A minimum height between the top of the spa/hot tub rim and the ceiling should be 7 ½’.

LADDERS, STAIRS, HAND RAILS & LEDGES

Spas and hot tubs should be provided with suitable handholds around their perimeter in areas where water depth exceeds 3’6” and may consist of any one or a combination of the following:

- Coping, ledges, tub lips, flanges or decks along the immediate top edge should provide a suitable slip-resistant handhold located not over 12” (30 cm) above waterline.
- Ladders steps or seat ledges.
- The slope of the floor of the spa or hot tub should not exceed 1’0” (30 cm) of fall in 12’0” (3.7 m).

Steps, step-seats, ladders or recessed treads should be provided where spa and hot tub depths are greater than 24” (61 cm). Contrasting color bands or lines could be

used to indicate breaks in the floor level of the hot tub or spa.

A spa or hot tub should be equipped with at least one handrail (or ladder equivalent) for each 50’ (15.2 m) of perimeter or portion thereof, to designate points of entry and exit, or with a deck designed to facilitate safe entry or exit.

ELECTRICAL DESIGN

The latest National Electrical Code, as published by the National Fire Protection Association, should be used for the wiring and grounding of all electrical equipment associated with a spa or hot tub and the bonding and grounding of all metallic appurtenances. Electrical switches, outlets and equipment shall be at least 15’ from the edge of the spa or hot tub and accessible only to the operator.

INLETS & OUTLETS

An over-the-rim fill spout should have an air gap and be properly shielded so as not to create a hazard. The open end should have no sharp edges and should not protrude more than 2” (5.1 cm) beyond the edge of the spa or hot tub.

The arrangement of water inlets and outlets should produce a uniform circulation of water so as to maintain a uniform disinfectant residual throughout the whirlpool or hot tub.

A means should be provided to completely drain the spa or hot tub and may include: bottom drains, a circulatory system, drain plug, etc.

The total velocity through grate openings should not exceed 2’ per second (61 cm/second). The open area in the grates should be designed to prevent the entrapment of fingers, toes, etc.

Outlets, except skimmers, on pump suction should be covered with suitable protective rates that cannot be removed without tools and that pose no safety hazard.

Piping should be large enough to permit the rated flows for filtering and cleaning without exceeding the pressure developed by the pump at the rated flow.

The water velocity in spa or hot tub discharge piping should not exceed 10’ per second (3.1 m/second). Suction water velocity in any piping should not exceed 6’ per second (1.8 m/second).

Piping subject to damage by freezing should be sloped for adequate drainage and supported at sufficiently close intervals so that sagging between supports will not trap water. Provisions should be made for expansion and contraction of pipes.

Water outlets should be designed so that each pumping system in the spa or hot tub (filter system (s) or booster system (s) if so equipped) provides one of the following alternatives:

- Two outlets whose pipe diameter sizes are equal (this may be two outlet drains or an outlet drain and a skimmer). The system should be designed so that neither one of the two outlets is cut out of the suction line by a valve or other means.
- One antivortex drain. Antivortex drains should not provide a tripping or stubbing hazard.
- A 12” x 12” (30 cm x 30 cm) or larger square grate.
- Other approved means that guard against outlet entrapment as referenced in the ANSI/APSP-7 2006 standard.

CIRCULATION SYSTEMS

The equipment should provide a turnover rate for the entire water capacity at least once every 30 minutes.

Equipment should be designed and fabricated so that the water drains from the equipment, and can be drained from exposed

face piping by removal of drain plugs and manipulating winter drain valves or other methods.

A flow meter should be provided on the effluent side of the filter system and a pressure gauge with an appropriate range should be provided on the influent and effluent side of all filters.

In climates subject to freezing temperatures, the spa or hot tub shell and appurtenances, piping, filter system, pump and motor, and other components should be designed and constructed so as to be protected from damage due to freezing.

The overflow system should be designed and constructed so that the water level of the spa or hot tub is maintained at the operating level of the rim or weir device. When surface skimmers are used as the sole overflow system, one surface skimmer should be provided for each 100 square feet (30.5 m^2) or fraction thereof of the spa or hot tub surface area. When two or more skimmers are used they should be located to maintain effective skimming action over the entire surface area of the spa or hot tub.

Filters should be designed to maintain water quality under anticipated operating conditions. Filters should be designed so those filtration surfaces can be inspected, serviced and easily restored to the original design capacity. A means should be provided to permit release of air, which enters the filter tank. This may be automatic or manual. Any filter and/or separation tank incorporating an automatic internal air release as its principal means of air release should have as a part of its design a means to provide a slow and safe release of pressure. Filter components, which require servicing, should be accessible and available for inspection and repair.

The design and construction of the pump and component parts should provide safe operation and perform the functions for which they are intended. A pump and motor should be provided for circulation of the spa and hot tub water. Performance of all pumps should meet the conditions of flow required for filtering and for cleaning (if applicable) the filters. With all pressure filter systems, a suitable removable strainer or screen should be provided or all circulation pump(s) to remove solids, debris, hair, lint, etc. Water entering the pump should pass through the screen. Proper direction of rotation for the pump should be clearly indicated on the pump.

All valves should be located where they will be readily and easily accessible for maintenance and removal.

DISINFECTANT & CHEMICAL FEEDERS

Automatic disinfectant feeding equipment shall be installed and be capable of providing the required quantity of disinfecting agent into the spa water. No hand feeding.

WATER QUALITY

Summaries of regulations that influence operation are as follows:

- Water Quality – Free Available Chlorine (FAC) from 2.0 - 5.0 ppm as ideal; 10.0 ppm maximum. pH same as swimming pools. Combined chlorine above .5 ppm requires superchlorination.
- Temperature – Maximum of 104°F.
- Draining Spa – Total Dissolved Solids (TDS) above 1,500 ppm or every two weeks.
- Signage – Required to warn bathers who are pregnant, aged and those with high blood pressure or on medication.
- Safety – Stairs, rails, dual outlets, 15-minute timer switch for jets, which will be located such that the user must exit the water to restart, and non-slip decks are specified. New constructed spas/hot tubs required to install anti-entrapment drains.

- Electrical – Ground fault circuit interrupter (GFI) required.
- Clarity – Must see bottom.
- Water testing – Standards for type of test and frequency.
- Records – On operations, water tests, draining, accidents, and be up-to-date.
- Operational gauges and flow meters

BATHER LOAD

The bather load is equal to one person per 10 square feet of surface area. A sign should be mounted adjacent to the spa indicating bather load limit.

HEATING & TEMPERATURE REQUIREMENTS

Spa and hot tub gas heaters must be American Gas Association (AGA) design certified, display a rating data plate and AGA seal, and be certified as meeting the latest American National Standards Institute's (ANSI Z21.56) standard or other applicable and equivalent standards. Electric heaters for spas and hot tubs should be tested by a recognized agency and designed for the purpose intended. Current collectors having a separate ground shall be installed at each inlet and outlet of the electric heater.

The maximum operating temperature of spa and hot tub water should never exceed 104°F (40°C). A thermostatic control for the water temperature, which ensures that this limit will not be exceeded and is accessible only to the operator, is essential. New spas/hot tubs are required to install an in-line thermometer on the water return line.

These maximum water temperature limits should be included in the operator's manual and user labels provided with each spa or hot tub by the manufacturer or installer. The labels should be posted in a prominent place on or in close proximity to the spa or hot tub itself. **Any immersion in hot water at 104°F for longer than 15 minutes, may cause hyperthermia.**

SPECIAL SIGNAGE

A caution sign should be mounted adjacent to the entrance to the spa or hot tub. It should contain the following warnings:

- Pregnant women, elderly persons and persons suffering from heart disease, diabetes or high or low blood pressure should not enter the spa/hot tub without prior medical consultation and permission from their doctor.
- Do not use the spa/hot tub while under the influence of alcohol, tranquilizers or other drugs that cause drowsiness or that raise or lower blood pressure.
- Do not use at water temperatures greater than 104°F.
- Do not use alone.
- Unsupervised use by children is prohibited. Recommend that children under 12 years be restricted from using a spa/hot tub due to the high temperatures.
- Enter and exit slowly.
- Observe reasonable time limits (that is, 10-15 minutes), then leave the water and cool down before returning for another brief stay.
- Long exposure may result in nausea, dizziness or fainting.
- Keep all breakable objects out of the area.

A sign should be posted in the immediate vicinity of the spa or hot tub stating the location of the nearest telephone and indicating that emergency telephone numbers are posted at that location. Those emergency telephone numbers should include the name and phone number of the nearest available police, fire and/or rescue unit, physician, ambulance service and hospital. A sign should also be posted requiring a shower for each user prior to entering the spa or hot tub and prohibiting oils, body lotion and minerals in the water.

CHAPTER 9

Equipment, Storage & Food Prep Areas

EQUIPMENT ROOMS

Equipment necessary for swimming pool operation shall be located outside of the swimming pool deck enclosure and shall be housed in properly lighted and ventilated room or space which affords protection from the weather, is readily accessible and convenient for operation and maintenance, prevents unauthorized access and is properly drained.

The equipment room floor shall have a minimum pitch of 2 inches in 10 feet toward drains and shall be nonslip finish.

Consideration should be given to easy access needed for transporting of heavy supplies and adequate storage space should be provided.

Damp equipment rooms tend to cause excessive deterioration of portions of the recirculation equipment. If the equipment provided for maintaining the proper water condition in a swimming pool is not accessible or convenient the operation of the pool will suffer.

STORAGE AREAS, OFFICES, AND OTHER ROOMS

Suitable space, if not provided in the equipment room, shall be provided for storage of chemicals, tools, equipment, supplies and records where they will be readily available, dry and protected from unauthorized persons. Adequate lighting and ventilation shall be provided. Floors shall be nonslip; sloped to drain at least 2 inches in 10 feet in all rooms used for storage of chemicals.

Storage areas, offices and other rooms adjacent to a swimming pool deck or “wet area” shall be accessible from outside the swimming pool deck or “wet area” to insure elimination of usage of these areas by persons attired for swimming.

FOOD PREPARATION AREAS

All food service establishments operated in conjunction with swimming pools or bathing beaches shall be constructed and operated in accordance with the Kansas City Missouri Food Code.

No food or drink shall be permitted in a swimming pool or on the swimming pool decks. It is permissible to have a separately controlled area for dispensing food and drinks to bathers.

Indiscriminate use of food and drinks and the associated debris creates a safety hazard to pool patrons and makes maintenance of a sanitary facility difficult.

CHAPTER 10

Permits & Licensing

INITIAL APPLICATION

When applying for a new pool permit or planning on renovating an existing swimming pool, an initial application should be filed with this office and a construction permit shall be obtained from Codes Administration.

ANNUAL OPERATING PERMIT

No bathing place or swimming pool shall operate unless the operator has applied for and received an operating permit from the health authority. Permit shall expire on January 1st of each year unless previously revoked for a violation of the statutes and regulations of the health department. The health authority will exercise the right to close bathing places and swimming pools not operated in conformity with these regulations.

The operating permit shall be posted in a conspicuous place, easily visible to the patrons and health inspectors.

PLAN REVIEWS

All new pool construction and modification shall submit blue prints to Codes Administration and made available for review and approval by the Health Department.

INSPECTION FREQUENCY

The Health Department shall prioritize and conduct inspections based upon its assessment of a water recreational facility's history of compliance with this Code, and the facility's potential as a waterborne illness by evaluating:

- Past performance, for nonconformance with the Code;
- Past performance, or repeat violations of Code;
- Past performance, for complaints investigated and found to be valid;
- Bather load capacity

All water recreational facilities shall be inspected at the beginning of the swimming season; initial opening inspection must be scheduled with the Health Department before commencing operation for the year. Thereafter, periodic routine inspections shall be unannounced and conducted in accordance with the Kansas City, Missouri Ordinance Sec. 78-171 through 78-209 entitled "Swimming and Bathing Facilities."

FEES

A fee of $50.00 shall accompany the initial application and also any instance where a permit holder may thereafter apply to Codes Administration for a modification of the particular requirements and conditions embodied in such permit.

CHANGE OF OWNERSHIP

All operating permits are non-transferable. In case of ownership change, the new owner shall apply for a new permit.

APPENDIX A

Facility Closure

The health authority may order the closure of a swimming facility. When the health authority orders the closing, he/she shall issue a written order to the facility owner or operator or his representative. It shall state the reason(s) for the order of closure, along with his findings that the condition(s) giving rise to the order represent a serious threat to the public health and safety. The order shall state that the facility is to be closed immediately and shall specify the corrective action necessary for the reinstatement of the operating permit. The order shall be served upon the owner, operator, representative or a person in charge of the facility. The person on whom the order is served shall close the facility immediately and shall prohibit any person from using it.

After the specified corrective action has been taken, the owner, operator or his representative shall notify the health authority that the facility is ready for reinspection. If upon reinspection the corrective action is approved, the health authority shall order the facilities reopened.

If upon reinspection the corrective action is not approved, the facility shall remain closed until corrective action is approved.

A facility may be closed upon the discretion of the health authority if any condition exists where the threat to public health and safety is not immediately serious but could quickly develop into a serious threat without immediate correction, such as out of compliance chemical readings. In these cases, reinspections may not be conducted and the health authority may verbally grant the owner, operator, representative, or person in charge permission to reopen once corrective action has been taken.

The following are examples of violations that shall be cause for immediate closure.

HAZARDOUS CONDITIONS

Any existing hazardous condition(s) that may create an immediate danger.

EQUIPMENT FAILURE/STRUCTURE

Failure of the swimming pool equipment or structure that may jeopardize the health or safety of the persons using or operating it.

SUPERVISION /LIFEGUARDS

Lack of required supervisory personnel or required lifeguards and certification.

WATER QUALITY

Failure to maintain the required quality: cloudy water, chlorine levels above ten, two or more consecutive out of compliance chlorine or pH readings, or algae.

SELF-CLOSING GATE

Each entrance shall be equipped with a door or gate that is self-closing and self-latching. Each gate shall be provided with hardware for permanent locking. Doors or gates in the swimming pool enclosure shall be kept closed and locked when the swimming pool is not open for use.

TELEPHONES

Each swimming pool shall have an easily accessible emergency telephone, under control of management, for emergency use only. The emergency telephone shall be connected to the **911** system which, when dialed, will immediately contact emergency aid agencies, displaying the address of the emergency to the agency with jurisdiction within your locality, and or to a 24-hour, manned security desk.

LOOSE DRAIN COVER

Openings must be covered by a grating that cannot be removed by a bather and which is securely fastened by either: 1) screws or bolts that are tightened, or 2) some other manner such that the use of a tool is required to remove the grate. In addition, the secured grate shall be affixed in such a manner that bathers cannot injure their fingers.

LACK OF SAFETY EQUIPMENT

All life-saving equipment must include a shepherd's crook, USCG ring buoy with a rope, and an emergency phone and shall be present at the pool. In addition, a properly installed lifeline for pools over five feet in depth shall be present.

IMPROPERLY FUNCTIONING ELECTRICAL/AUTOMATIC SANITIZING SYSTEM

All electrical features shall be in good operating order including the automatic sanitizing system.

APPENDIX B

Definitions

Algae: Microscopic plant-like organisms that contain chlorophyll and include green, blue-green or black-brown and yellow-green (mustard) algae.

Algaecide: A natural or synthetic substance used for killing, destroying or controlling algae.

Alkalinity (Total Alkalinity): A measure of the ability or capacity of water to resist change in pH; also known as the buffering capacity of water. Measured with a test kit and expressed as ppm; consists mainly of carbonates, bicarbonates and hydroxides.

ANSI: American National Standards Institute, 11 West 42nd Street, New York, NY 10036, phone (212) 642-4900.

Available Chlorine: Rating of chlorine containing products for total oxidizing power.

Backwash: The process of cleansing the filter medium and/or elements by the reverse flow of water through the filter.

Bacteria: Single-celled microorganisms of various forms, some of which cause infections or disease.

Bather: Any person using the pool and adjoining decks areas for the purpose of water sports or related activities.

Bather Load: The calculated maximum number of persons that may use the pool facilities at any given time without creating undue health or safety hazards.

Bromine: A chemical element (Br) that exists as a liquid in its elemental form or as part of a chemical compound, which is a biocidal agent, used to disinfect pool or spa water.

Chemical Feeder: A mechanical device for applying chemicals to pool or spa water.

Chlorinator: A device to apply or to deliver a chlorine disinfectant to water at a controlled rate.

Chlorine: A chemical element ($C1_2$) that exists as a gas in its elemental form or as a part of chemical compound which is an oxidant. Chlorine is a biocidal agent used to disinfect pool or spa water.

Circulation Equipment: The mechanical components that are a part of a circulation system of a pool or spa. Circulation equipment may include, but is not limited to, categories of pumps, hair and lint strainers, filters, valves, gauges, meters, heaters, surface skimmers, inlet/outlet fittings and chemical feeding devices. The components have separate functions, but when connected to each other by piping, perform as a coordinated system for purposes of maintaining pool or spa water in a clear, sanitary and desirable condition for use.

Combined Chlorine: The portion of the total chlorine existing in water in chemical combination with ammonia, nitrogen and/or organic compounds mostly comprised of chloramines.

Coping: The cap on the pool or spa wall that provides a finishing edge around the pool or spa; the coping can be formed, cast in place or pre-cast or pre-fabricated from metal or plastic materials.

Cross-connection: A physical connection between the potable water system and a non-potable source such as a pool or spa or a physical connection between a pool or spa and the sanitary sewer or wastewater disposal system.

Cyanuric Acid (Chlorine Stabilizer): A chemical that helps reduce the excess loss of chlorine in water due to the ultraviolet rays of the sun.

Decks: Those areas surrounding a pool which are specifically constructed or installed for sitting, standing or walking inside the pool enclosure.

Deep Areas: Water levels in pools which are five feet or deeper.

Disinfectant: Energy or chemicals used to kill undesirable or pathogenic (disease-causing) organisms and having a measurable residual at a level adequate to make the desired kill.

Disinfectant Residual: The free available sanitizing agent in a body of water.

Diving Board: A recreational mechanism for entering a pool, consisting of a semi rigid board that derives its elasticity through the use of a fulcrum mounted below the board.

Effluent: The water that flows out of a filter, pump or other device.

Facility: The pool or spa, restrooms, dressing rooms, equipment rooms, deck, enclosure and other appurtenances directly serving the pool or spa area.

Feet of Head: A basis for indicating the resistance in a hydraulic system, equivalent to the height of a column of water that would cause the same resistance (100 feet of head equals 43 pounds per square inch).

Flow Rate: The quantity of waters flowing past a designated point within a specified time, such as the number of gallons flowing in one minute (gpm).

Filter: A device that removes undissolved particles from water by recirculating the water through a porous substance.

Free Available Chlorine: That portion of the total chlorine remaining in chlorinated water that is not combined with ammonia or nitrogen compounds and which will react chemically with undesirable or pathogenic organisms.

Handhold/Handrail: A device that is intended to be gripped by a user for the purpose of resting and/or steadying a person and that is typically located within or without the pool or spa or as part of a set of steps or deck-installed equipment.

Health Authority: A Public Health Specialist or any representative from the Kansas City Health Department.

Influent: The water entering a filter or other device.

Inlet: The aperture or fitting through which the water under positive pressure returns into a pool or spa.

Ladders: Pool ladders shall be corrosion-resistant and shall be equipped with slip-resistant treads. All ladders shall be designed as to provide a handhold. There shall be a clearance of not more than 6 inches (15 cm) or less than 3 inches (7.6 cm) between any ladder and pool wall.

Lifeline: A continuous line not less than ¾ inch in diameter, supported by buoys and attached to opposite sides or ends of a pool to mark the transition between the deep and shallow ends or mark exercise or racing lines.

Main Drain: The outlet or outlets in the deep portion of the pool.

Manager/Operator: The person responsible for the actual daily operation or for the supervision of the operation of swimming pool.

National Swimming Pool Foundation: 4775 Granby Circle, Colorado Springs, CO 80919-3131, phone (719) 540-9119.

Natural Bathing Place: Any bathing place at a lake, pond, stream or similar body of water, together with any buildings and appurtenances, which are used by the public for bathing or swimming with the expressed permission of the lessee or any person responsible for the premises or which is openly advertised as a place for bathing or swimming by the public.

Operating Water Level: Two inches above to two inches below the midpoint of the operating range of the device, or manufacturer's maximum stated operating range; OR the manufacturer's maximum stated operating range above the design water level.

Parts Per Million (ppm): A unit of measurement in chemical testing which indicates the parts by weight in relation to one million parts by weight of water. For the purposes of pool or spa water chemistry, ppm is considered to be essentially identical to the term milligrams per liter (mg/L).

Permit to Operate: A certificate issued by the Health Department allowing the operation of a public pool. Permits are issued pending completion of an application, payment of a permit fee and passing an opening inspection.

Person: Any individual, group of individuals, association, trust, partnership, corporation, person doing business under an assumed name, county, municipality, the State of Missouri or any political subdivision or department thereof or any other entity.

pH: A value expressing the relative acidic or basic tendencies of a substance, such as water, as indicated by the hydrogen ion concentration. The pH is expressed as a number on the scale of zero to 14, zero being most acidic, one to seven being acidic, seven being neutral, seven to 14 being basic and 14 being most basic.

Pool Enclosure: The area inside of the fence or the barrier surrounding the swimming pool

Potable Water: Water which is bacteriologically safe and otherwise suitable for drinking and is regulated by the Kansas City Missouri Water Department.

Pressure Differential: The difference in pressure between two parts of a hydraulic system such as the difference in pressure between the influent and effluent of a filter.

PSI: Pounds per square inch.

Pump: A mechanical device usually powered by an electric motor, which causes hydraulic flow and pressure for the purpose of filtration, heating and circulation of pool and spa water.

Recessed Treads: A series of vertically spaced cavities in the pool or spa wall creating tread areas for step holes.

Ring Buoy: A ring-shaped floating buoy, attached to a 20 foot retrieval rope, capable of supporting a drowning person.

Scale: The precipitate that forms on surfaces in contact with water when the calcium hardness, pH or total alkalinity levels are too high.

Skimmer: A device other than an overflow trough for continuous removal of surface water and floating debris from a pool. The part of the skimmer that automatically adjusts to small changes in the water level to assure continuous flow is called the weir.

Slip-Resistant: A surface that has been treated or constructed to significantly reduce the chance of a user slipping.

Spa: A constructed permanent or potable structure that is two feet or more in depth and that has a surface area of 250 square feet or less or a volume of 3250 gallons or less which is intended to be used for bathing or other recreational uses and is not drained and refilled after each use. It may include, but is not limited to, hydrojet circulation, hot water, cold water, mineral baths, air induction bubbles or any combination thereof. Industry terminology for a spa includes, but is not limited to, "hydrotherapy pool," "whirlpool," "hot spa," "hot tub," etc. It can also be used for medical treatment, water therapy or non-recreational functions.

Sprayground: An artificially constructed area, usually a depression, over which water is sprayed, not allowed to pool and drained into a circulation system.

Steps: A riser/tread or series of risers/treads extending down from the deck and terminating at the pool or spa floor. Included are recessed steps that have the risers located outside of user areas.

Superchlorination: The practice of adding a sufficient amount of chlorinating compound to water to destroy chlorine demand compounds and any combined chlorine that is present. Generally, the level of chlorine added is ten times the level of combined chlorine in the water.

Swimming Pool: Includes the term in its ordinary sense and meaning, and also any and all wading pools, spray pools, private pools, semiprivate pools, club pools, public pools or any other artificial bathing place where such could be reasonably so denominated, but not exclusive thereof, whether they are operated or managed on a profit or not-for-profit basis, or for public recreational purposes.

Transition Point: The area of the pool floor where an abrupt change in slope occurs between the shallow and deep areas of the pool.

Turbidity: Cloudy condition of water due to the presence of fine particulate materials in suspension that interferes with the passage of light.

Turnover Rate: The time required to circulate the water volume of the pool through the filtration system.

Ultraviolet (UV) Light: A segment of the electromagnetic spectrum in the range of 100 and 400 nanometers (nm) wavelength. Low pressure mercury vapor lamps emit approximately 92% of their light at 253.7 nm which allows them to serve as highly efficient sources for U.V. inactivation of microorganisms.

Vacuum: The reduction of atmospheric pressure within a pipe, tank, pump or other vessel. Vacuum is measured in inches of mercury. Each inch of mercury is equivalent to 1.13 feet of head. The typical maximum vacuum of 30 inches of mercury is equivalent to 33.9 feet of head.

Valve: Any device in a pipe that will partially or totally obstruct the flow of water (as in a ball, gate or glove valve) or permit flow in one direction only (as in a check or foot valve).

Wading Pool: A pool used and intended for small children; it is not used for swimming or instruction in swimming; the maximum depth is less than 2 ft.

Zero Depth Pool: A pool in which the floor intersects the water surface along at least one side of the pool.