



Environmental Health Division
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SWIMMING FACILITIES Regulation #1

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Intent

The improper design, operation, and maintenance of swimming pool facilities can adversely affect the public health and safety. Proper pool operation protects the bather against infection transmission through the pool, infection transmission through the bathhouse, chemical safety and physical injury within the pool area. In accordance with the authority granted in North Dakota Century Code Chapter 23-35-08 Central Valley Health District hereby provides the minimum standards and criteria for design, operation, and maintenance of swimming pool facilities. These standards apply to the counties that fall within the jurisdiction or control of Central Valley Health District. The purpose of the rules is to protect the health, safety and welfare of the residents and future residents of counties under the jurisdiction of these regulations.

General Provisions

1. "Approving authority" shall mean the Health Officer or the appointed representative from Central Valley Health District.
2. "Bromine" under this regulation is a generic term used to describe a chemical that releases hypobromous acid when dissolved in water.
3. "Calcium Hardness" under this regulation refers to the level of calcium.
4. "Combined chlorine" under this regulation means the chemical species that forms when chlorine chemically bonds to nitrogen-containing compounds to form chloramines.
5. "Free chlorine" under this regulation means the chlorine residual present in the pool that is available as a disinfectant.
6. "Cyanuric Acid" under this regulation refers to a chemical that reduces the loss of chlorine due to the ultraviolet rays from sunlight.
7. "Total chlorine" under this regulation means the sum of the free chlorine and combined chlorine residuals.
8. "Superchlorination" under this regulation means the process of quickly raising the free chlorine residual 5 to 10 parts per million (ppm) then allowing the high residual to dissipate overnight.
9. "NDCC" means the North Dakota Century Code.
10. "pH" under this regulation means the measure of the degree of acidity/alkalinity of a solution.
11. "Total Alkalinity" under this regulation means ability of water to maintain a desirable pH when acid is added to the water.
12. This regulation pertains to the inspection, operation, and monitoring requirements of public and semi-public swimming pools and spa facilities within the boundaries of Central Valley Health District. This regulation made by Central Valley Health District Board of Health is necessary and proper for the preservation of public health and safety.
13. No person, firm or corporation shall engage in the operation of a public or semi-public swimming pool without first obtaining an annual license from the approving authority. The annual license fee shall be set by the approving authority and applications for the swimming pool facility license shall be made annually on a form provided by Central Valley Health District.

14. Plans and specifications required. It is required that plans and specifications be prepared for all water works systems, sewerage works systems, and swimming pools contemplated for use by the general public. It is further required that such plans and specifications, together with other pertinent information, be submitted to the approving authority for review prior to construction of the facility or facilities.
15. This regulation requires that all public and semi-public swimming pool and spa facilities be annually inspected by the approving authority and provide regulations and standards necessary to make these swimming pools safe and healthful.
16. During each month of operation, each semi-public and public swimming pool and spa facility shall submit a water sample from the swimming pool and/or spa facility to a laboratory certified by the North Dakota State Department of Health for a bacteriological analysis. A minimum of one sample per month must be submitted each month that the pool and/or spa facility is open for use by the public. If a water sample tests unsatisfactory, the facility must then submit recheck water samples from that same pool/spa for bacteriological analysis until a satisfactory test is achieved for that month.
17. The approving authority may temporarily close any facility that has been determined to be a health or safety hazard or in the event of a failure to comply with any of the requirements of this chapter. The approving authority may abate or cause the suspension of the use of such a facility until such time as the pool/spa facility is no longer deemed a health or safety hazard.
18. Improperly designed, operated, and maintained swimming pool facilities are a menace to the health and general welfare of the public and are hereby declared a nuisance; and are subject to the requirements specified under NDCC Section 23-35-08 and Section 23-35-09.
19. Any person who violates, or refuses to comply with any provision of these regulations is guilty of a Class B Misdemeanor which can result in a maximum penalty of 30 days in jail and/or a \$500.00 fine as specified under NDCC Section 23-35-13.

Pool Facility Personnel

1. **Certification** -The operation of all swimming pool facilities must be monitored by an employee, board member, or contractor whom has attended pool school or has been certified as a pool operator.
2. **Facility Information** -The facility shall maintain the following information on the premises:
 - a. Manufacturers equipment/operator manual and any service related materials.
 - b. Inspection, maintenance, and date of services records regarding equipment.
3. **Recordkeeping** -A daily operation record shall be kept. Records shall include the free chlorine, total chlorine, pH, amount of chlorine added, and any other chemicals that have been added. The pH and chlorine levels shall be recorded at least twice daily. All records mentioned shall be kept at least three years to facilitate the newer pool operators in the following years. Copies of the bacterial tests shall also be kept with the daily records.

Bathhouse

1. **Protection** -The bathhouse facilities should protect the pool area from prevailing winds.
2. **Floors** -The floors shall be of smooth, nonslip, nonabsorbent material. Floor drains shall be installed in areas subject to standing water.
3. **Space** -Sufficient space must be allowed for dressing and clothing storage.
4. **Floor Covering** -Rubber, nonslip matting may be used if it is disinfected daily. Carpet is not allowed.
5. **Showers** -Showers must be provided with hot and cold running water and shall be located adjacent to the dressing rooms. At least one shower head per 40 patrons is required. All shower heads must be provided with sufficient floor drains to handle the waste water.
6. **Toilet Facilities** -At least one sink with hot and cold running water shall be provided for each 60 patrons. At least one toilet and one urinal per 60 men and one toilet per 40 women shall be provided. Soap dispensers shall be provided for lavatories and showers.
7. **Ventilation & Lighting** -Ventilation shall be provided to eliminate excessive humidity that may cause damage or encourage mold and bacteria growth. Lighting must be at least 10 foot candles at the floor surface. Light fixtures must be UL approved.
8. **Accessibility** -All swimming pool, spas, and bathhouses serving the public shall be designed to be accessible to and usable by the physically handicapped as required by law specified under NDCC Sections 48-02-19 and 23-13-13.

9. **Water Supply** -An approved potable water supply shall be provided. Angle jet or other approved type drinking fountains shall be provided.

Pool Basin/Decking

1. **Materials** -Materials for the pool basin must be non-toxic, durable, water proof, and easily cleanable. Color of the basin must be of light color to facilitate observation of swimmers by lifeguards.
2. **Condition** -The basin must be of sound shape with no cracks or leaks. Paint must be in good condition to protect the basin material from cracks or spalling. No protrusions from the sides of the vertical walls.
3. **Depth Markers** -The depth of water in the pool shall be plainly marked at the points of maximum and minimum depths, at the break between the deep and shallow areas, and at intermediate depths spaced at not more than 25 foot intervals. The markers shall be placed on the pool wall at or above the water level and on the top edge of the deck. The markers shall be at least 4 inches in height.
4. **Recirculation System** -Skimmers and gutters must have proper water height to function properly. Baskets must be kept clean to facilitate water flow and inlets must be kept operational to circulate pool water properly and maintain proper water levels.
5. **Water Depth** -Approximately three-fourths of the pool area should be three to five feet in depth, not including the diving area. The diving area must have adequate depth and clearance for safe diving.
6. **Fencing** -A high fence or other barrier at least six feet high shall completely encircle the pool and deck area and shall be locked when unattended.
7. **Decking** -Decks and sidewalks around the pool shall be at least eight feet wide, including the coping, and extend entirely around the pool. Instructional outdoor pools should have at least 20 foot wide decks to satisfy the needs of the aquatic program. A complete separation of the spectator area from the pool shall be enforced.
8. **Slope** -Walks and decks shall have a slope of 1 to 40 away from the pool to deck drains. Deck drains shall not be connected to the recirculation system. Standing ponded water must be removed to prevent algae and fungal growth.
9. **Texture** -The finish texture of decks must be smooth, nonslip, nonporous material that is comfortable to bare feet. Carpet, floor matting, wooden walkways, or other porous materials which interfere with floor cleaning or provide a place for bacteria and fungi to multiply, are prohibited.

Pool Area

1. **Steps & Exit Ladders** -All steps or stairs entering a public pool shall have a nonslip surface. They shall have sturdy and easily visible handrails on either side and at the top leading out over the water. Exit ladders shall be adequately secured in place.
2. **Diving Boards** -Public pools shall not have diving boards over ten feet in height above the water level. If more than one board is used, they must be a minimum of eight feet apart and at least ten feet from any obstruction, pool walls, and at least 16 feet from any overhead obstructions. All diving boards must be in good physical shape with no cracking and a nonslip surface. Board standards must be secure to the deck.
3. **Pool Rules** -Swimming pool rules must be posted where all swimmers can see them. They should be large enough to view from all areas of the pool.
4. **Lifesaving Equipment** -At least one set of lifesaving equipment shall be provided consisting of:
 - a. One or more poles 15 feet long, having a shepherds crook with an aperture of at least 18 inches between the tip of the hook and the pole.
 - b. Two or more flutter boards.
 - c. Two or more throwing rings having a minimum diameter of 18 inches equipped with 65 feet of one-fourth inch line.
10. **Diving Bay Separation** -A floating lifeline shall be provided at or near the break in grade between the shallow and deep portions of the pool. It shall be at least three-fourth inch in diameter with colored floats, and shall be securely fastened to both sides of the pool with noncorrosive recessed connectors.
5. **Telephone** -A telephone shall be provided adjacent to the pool area for emergency use.

Pool Water Quality

1. **Dirt & Debris** -The pool bottom should be kept free of visible sediment and dirt at all times. The surface of the pool should be kept free of floating debris also.
2. **Algae** -Algae must be taken care of immediately before staining occurs. Algae may be taken care of by superchlorination of the pool and brushing the dead algae off of the pool basin. Left untreated, algae will blossom rapidly and the pool will become cloudy and unusable.
3. **Clarity** -The water should be clear enough to see the bottom drain in the deep end of the pool. If the main drain in the deep end of the pool is not visible due to cloudy water, no swimming is allowed and the pool shall close until the water is clear enough to see the drain.

4. **Grease Line** -If a grease line is visible, the film should be cleaned at the end of the day to prevent permanent staining.
5. **Microbiological Test** -Pool water is required to have a microbiological test performed a minimum of once monthly. The water must meet the same standards (maximum contaminant level, MCL) as drinking water for bacteria content. In the case of a sample that does not meet standards; repeat samples must be taken until an approved sample is tested.
6. **Test kit** -Every pool shall have approved testing equipment for the determination of disinfection residuals (Chlorine) and hydrogen ion (pH) concentration. The disinfectant residual tester shall have a range of at least 0.0 to 3.0 milligrams per liter (parts per million, ppm). The hydrogen ion tester shall be able to indicate the pH between 6.8 and 8.5.
7. **Age of Reagents** -Test kits should have the reagents replaced every six months or at the beginning of each swimming season.
8. **pH** -A pH level of 7.2 to 7.8 shall be maintained. Levels below or above this range may cause corrosion of plumbing and paint. Adding soda ash (calcium carbonate) will raise the pH. Adding muriatic acid (hydrochloric acid) will lower the pH, as will using a dilute form of sulfuric acid or sodium bisulfate.
9. **Chlorine** -A common means of swimming pool disinfection chlorine is a very active chemical. It will react with many substances in water that are both dissolved and suspended. Free chlorine residual should never be below 1 ppm or above 5 ppm. This will assure proper sanitizing of the pool water. If the combined chlorine level is 0.2 ppm, or more, the pool should be superchlorinated.
10. **Bromine** -A form of disinfection seen mainly in spas as it remains stable as the temperature rises. Levels shall be between 2 to 10 ppm. If using chlorine testing kit multiply by 2.25 to obtain actual bromine level in the water.
11. **Alkalinity** -Maintaining a proper alkalinity (see Swimming Pool Conditions Table for ranges) will provide a buffer against rapid pH changes. Feeding muriatic acid or a solution of sodium bisulfate to control alkalinity is recommended. Adding 1.5 pints of muriatic acid per 10,000 gallons of water will lower the total alkalinity by 10 ppm. To increase alkalinity sodium bicarbonate should be added. To raise the total alkalinity by 10 ppm, 1.5 lbs. of sodium bicarbonate per 10,000 gallons is needed. If the pH also needs an upward adjustment soda ash may be added to increase both the alkalinity and pH.
12. **Calcium Hardness** -Hardness in swimming pools is generally not a problem when the total alkalinity and pH are within limits. Levels shall be between 150 to 1,000 ppm. To increase hardness without affecting the alkalinity, add calcium chloride. Adding 0.2 lbs. of calcium chloride to 25,000 gallons will increase hardness by 1 ppm. To lower calcium

hardness anhydrous trisodium phosphate may be used. One pound trisodium phosphate per 10,000 gallons will lower calcium hardness 11 ppm. Use in small increments or clouding may occur. Another method of lowering calcium hardness is to simply drain off part of the pool water and dilute the remaining water with fresh make up water.

13. **Cyanuric Acid** -Cyanuric acid functions as a stabilizer for free chlorine. Cyanuric acid does however reduce the effectiveness of the free chlorine. A level of 30 to 50 ppm shall be maintained. Excessive levels may increase the risk of algae.
14. **Color** -The color of the pool water should be sparkling and clear. Any tint to the water indicates a chemical or algal problem.
15. **Temperature** -The water temperature in a pool should not exceed 80 °F, unless the pool is for therapeutic use. Temperatures over 80 °F may lead to bather discomfort and aid in algae growth. Swimming should not be permitted when the water temperature is below 65 °F. A thermostatic control device must be installed to prevent the temperature from exceeding the maximum.

Disinfection Equipment

1. **Continuous Chlorination** -Equipment shall be provided to adequately disinfect the pool at all times. Chlorine is the most common. Other elements in the halogen group such as iodine or bromine may be used with proper metering and test equipment.
2. **Chlorine Room** -When gas chlorine is used, a separate chlorine room is needed that is reasonably gas tight, corrosion resistant, fire resistant, and mechanically vented.
 - a. The room shall be at ground level to provide easy access. The door shall open to the outside and shall not open into the pool area. The door shall be locked at all times except during servicing by approved personnel. The door shall have an 18 inch window for viewing the interior of the room before entering.
 - b. Exhaust fan inlets must be located near the floor as chlorine gas is heavier than air. The exhaust must be vented to the outside, not by the pool area. All electrical switches must be located on the outside of the enclosure.
 - c. A platform scale shall be provided for the daily weighing of the chlorine cylinder.
 - d. Safety chains shall be provided for securing the chlorine cylinders to prevent tipping over.
 - e. A cylinder wrench for turning off the cylinder should be attached to the top of each cylinder being used.
 - f. An ammonia bottle should be used to detect any small leaks of chlorine gas. A Chlorine Institute safety kit is recommended for all pools using gas chlorine.

Adjusting Water Chemistry

Swimming Pool Conditions

Parameter	Minimum	Ideal	Maximum	Pool Type
Free Chlorine (ppm or mg/L)	1.0	2.0 – 4.0	5.0	Pools, Waterparks
	2.0	3.0 – 5.0	10.0	Spas
Combined Chlorine (ppm or mg/L)	0	0	0.2	Pools, Waterparks
	0	0	0.5	Spas
Total Bromine (ppm or mg/L)	2.0	4.0 – 6.0	10.0	All Types
PHMB (ppm or mg/L)	30	30 – 50	50	All Types
pH	7.2	7.4 – 7.6	7.8	All Types
Total Alkalinity as CaCO ₃	60	80 – 100* 100 – 120**	180	All Types
Total Dissolved Solids (ppm or mg/L)	NA	NA	1,500 over start-up***	All Types
Calcium Hardness as CaCO ₃ (ppm or mg/L)	150	200 – 400	1,000	Pools, Waterparks
	100	150-250	800	Spas
Heavy Metals	None	None	None	All Types
Visible Algae	None	None	None	All Types
Cyanuric Acid (ppm or mg/L)	0	30 – 50	****	All Types
Temperature °F/°C	-	Personal Preference	104 °F (40 °C)	Other Pools
	-	-	104 °F (40 °C)	Spas
Ozone (ppm or mg/L)	-	-	0.1 Over 8-hr. time wtd. Avg.	All Types
ORP	Calibrate to Disinfectant Level			All Types
* For calcium hypochlorite, lithium hypochlorite, or sodium hypochlorite ** For sodium dichlor, trichlor, chlorine, gas, BCDMH *** Start-up includes the TDS contribution of salt found in chlorine generating systems **** Dictated by state or local codes. Typically 100 ppm (mg/L).				

Adjusting Water Balance

To raise pH	add soda ash
To lower pH	add muriatic acid
To raise alkalinity	add sodium bicarbonate or soda ash
To lower alkalinity	add muriatic acid
To raise calcium hardness	add calcium chloride
To lower calcium hardness	add trisodium phosphate or drain off some pool water and dilute with fresh make up water
To raise chlorine	add chlorine
To lower chlorine	add sodium thiosulfate

Refer to the Pool Water Quality section for additional information.

Problems Associated with Improper Water Balance

Low pH	Chlorine dissipates more rapidly, more eye irritation, possible corrosion of pool fixtures and plumbing
High pH	Scaling, slows chlorine activity, can cloud water, detrimental to filters
Low alkalinity	Will not provide buffer for pH
High alkalinity	Can lead to high pH that is difficult to change
Low calcium hardness	Corrosive to plaster and concrete surfaces
High calcium hardness	Scaling, cloudy water, crystals forming on the inside walls of the pool
Low chlorine	Bacterial and algae growth
High chlorine	Eye irritation, pH hard to manage, possible corrosion to plumbing

Chemical Safety

1. Most chemicals may be obtained from your pool supply headquarters. Some may be obtained locally. Muriatic acid may be obtained from a radiator shop and calcium chloride may be obtained from a tire store or farm implement dealer.
2. Caution should be used in storage of swimming pool chemicals. No chemicals may be stored in rooms that use chemical feeders; however, caution must be used to prevent chemicals from coming in contact with each other.
3. Always dilute **ALL** chemicals that are to be added to the pool water. The easiest way to do this is to mix the chemical into five gallons of water. After the chemical has been thoroughly mixed, let the solution set for 15 – 20 minutes. After any solids have precipitated to the bottom of the bucket, pour the liquid into the pool over an equal area, don't pour the entire batch into one spot. The chemical should be spread out over the entire area to facilitate mixing of the chemical with the pool water.
 - a. **NEVER ADD WATER TO ACID, ALWAYS ADD ACID TO THE WATER.** (If water is added to acid, a violent reaction may occur and splash concentrated acid back at you.) Acid may not need to be stirred but the solid chemicals should be stirred to speed up dissolving. The size of a swimming pool determines how much acid can be safely added to the water. Pools with a capacity of 175,000 gallons or less should only receive three gallons or less of acid per 24 hour period.
4. When treating a pool for high alkalinity before swimming has started for the season, add acid on alternate consecutive days and allow the acid to work for 48 hours. It can take up to 48 hours for the acid to work into the water balance. Test your alkalinity before adding any more acid.
5. When mixing calcium chloride, soda ash or calcium hypochlorite; (never together) let the stirred mixture set for a few more minutes and you will notice some mud like solids settle out in the bottom of the pail. This mud is of no use to the pool water. The chemicals needed are within the liquid in the bucket. When pouring the solution into the pool, only pour the liquid portion from the pail. The mud from the bottom of the pail should be discarded. If it is poured into the pool, it may cause cloudiness or plug filters.
6. When adding chemicals to your pool, some cloudiness may occur. This is to be expected until the water has had a chance to work and balance. This should clear up within 24 – 48 hours.

Note: Manual chemical dosing shall only be done when the pool is closed to the public.

Mechanical Equipment

1. **Filters** -All pools must have a filter system installed in the main recirculating system. It may be one of three types, sand, diatomaceous earth, or cartridge. These must be maintained in accordance with the manufacturer's specifications and design limits.
2. **Gauges** -Pressure gauges are required on sand and cartridge filter systems. They must be used to tell when the filter needs to be cleaned or back-flushed. Rate of flow gauges are used to indicate any problems within the pump and circulation inlets and outlets.
3. **Recirculation System** -The recirculation system must have adequate filtration and pumping capacity to provide ONE COMPLETE TURNOVER OF THE POOL WATER EVERY SIX HOURS. The main drain and skimmers must function in accordance with the pools design standards.
4. **Feeders** -All recirculation systems shall include a feeder for the introduction of soda or other chemicals to control the pH of the water. Smaller pools can effectively control pH manually.
5. **Recirculation Pump** -Adequate pumping equipment shall be provided. The pumps shall have sufficient capacity to:
 - a. Provide for the maximum turnover of the pool.
 - b. Provide adequate pressure for backwashing of filters.
 - c. Develop the necessary suction required for cleaning when a suction type bottom vacuum is used.
6. **Valving** -All pool equipment shall be installed and valved in accordance with North Dakota State Plumbing Codes. The valving shall be adequate to perform all of the functions necessary for proper pool functions and maintenance.
7. **Adequate Housekeeping** -The premises shall be cleaned and disinfected on a regular basis to prevent injury from physical objects as well as contaminated surfaces.
8. **Cross Connections** -All plumbing must be installed in accordance with North Dakota State Plumbing Codes. Any hose bibs must have a proper backflow prevention device installed.
9. **Maintenance** -All mechanical equipment, plumbing, filtration equipment, etc., must be maintained in proper working order.

Wading Pools

1. **Separate Area** -Wading pools shall be in a separate enclosed area, physically set apart from the swimming pool. A fence or partition sufficiently high shall separate and prevent waders from entering the main pool area.
2. **Securing Area** -Wading pools shall be in an area that can be locked when not in use.
3. **Accessibility** -The bathhouse shall be easily accessible to the wading pool patrons.
4. **Depth** -The maximum water depth is 24 inches
5. **Regulations** -The following items must function to the same codes as listed for swimming pools, unless specified:
 - a. Recordkeeping
 - b. Pool Rules
 - c. Basin/Decking
 - d. Water Quality
 - e. Disinfectant levels
 - f. Recirculation System –with a one hour turnover rate for wading pools
 - g. Filtration

Spas

1. **Types** -Known as therapeutic, hydrotherapy, spa, or hot tub pools; the regulations for these small heated pools are listed below.
2. **Temperature** -Spa water should not exceed 105 °F. A thermostatic control device must be installed to prevent the temperature from exceeding maximum.
3. **Accessibility** -The bathhouse shall be easily accessible to the spa patrons.
4. **Regulations** -The following items must function to the same codes as listed for swimming pools, unless specified:
 - a. Recordkeeping
 - b. Pool Rules
 - c. Basin/Decking
 - d. Water Quality -calcium hardness levels 100 to 800 ppm, maximum temperature 104 °F
 - e. Disinfectant levels -free chlorine levels 2 to 10 ppm, maximum combined chlorine 0.5 ppm
 - f. Recirculation System -with a 30 minute turnover rate for spas
 - g. Filtration