

SWIMMING POOL AND SPA RULES AND REGULATIONS



Public Health
Prevent. Promote. Protect.

Cavalier County Health District

EFFECTIVE: July 1, 2013

**CAVALIER COUNTY HEALTH DISTRICT
901 3rd Street, Suite 11
Langdon, ND 58249
(701) 256-2402**

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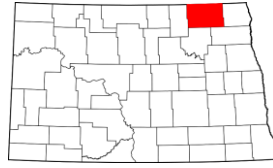
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NOTICE OF RULES AND REGULATIONS FOR POOLS AND SPAS WITHIN CAVALIER COUNTY



The following rules and regulations pertain to the inspection, operation, and monitoring requirements of public and semi-public pools and spa facilities within the boundaries of Cavalier County Health District. These rules and regulations made by CCHD are necessary and proper for the preservation of public health and safety. All public and semi-public pool facilities are required to adhere to these rules and regulations set forth by CCHD.

This manual has been prepared to aid swimming pool operators in the daily operations of swimming pools/spas following good public health practices. The primary goal of these rules and regulations is to ensure a safe and sanitary swimming pool/spa facility to protect the public against: (1) Infections transmitted through the pool; (2) Infections transmitted through the bathhouse facilities (3) Physical injury within and about the pool area.

Definite epidemiology evidence has been recorded to show the transmission of infectious disease through pool waters. Definite proof of the transmission of eye infections, impetigo, etc., through the common bathroom is also known. Dermatitis, such as athlete's foot, is commonly transmitted through bathing facilities.

We believe that, if the operational practices outlined below and throughout this manual are observed, your swimming pool can serve as a safe and healthful source of recreation. Note: Improperly designed, operated, and maintained swimming pools 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 North Dakota Century Code (*NDCC*) *Section 23-35-08 and Section 23-35-09*.

CAVALIER COUNTY POOLS AND SPAS:

SECTION 1. Pool management and personnel shall be knowledgeable about the CCHD Swimming Pool and Spa Rules and Regulations. A copy of the most current CCHD Pool and Spa Rules and Regulations document shall be maintained on the premises at all times that the pool is open.

SECTION 2. These rules and regulations require that all public and semi-public swimming pool and spa facilities shall be inspected at least two times per season (outdoor public pools) or two times per year for indoor semi-public pools) by the approving authority, and provides regulations and standards necessary to make swimming pools and spas safe and healthful.

SECTION 3. Pool facility management and personnel shall be knowledgeable about the pool and its functions for public health and safety.

SECTION 4. The operation of the pool facility shall be monitored by an employee, board member, or contractor whom has CPO (Certified Pool Operator) training or "pool training/education" (excluding CPR or lifeguard training) validated by the approving authority, and based on the pool's inspection report(s). Proof of certification must be readily available at the facility.

SECTION 5. Blueprint design plans and construction specifications shall be submitted to the approving authority for review and approved prior to the construction of any semi-public or public pool or spa. Note: All swimming pools, 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 *North Dakota Century Code (NDCC) Section 48-02-19 and Section 23-13-1*.

All public and semi-public swimming pools and spas shall meet minimum standards set forth in the following sections. Pools and spas in operation before January 1, 2009 may be exempted from certain items detailed in the parts of this code that deal with the actual physical facility at the discretion of the approving authority, but shall abide by all requirements in all other sections. Pools and spas that are built after January 1, 2009 shall abide by all requirements in all sections of this code. Pools and spas built before January 1, 2009 that upgrade their filtration or disinfection systems or any plumbing or mechanical parts of the circulation system or that do work that modifies 50 percent or more of the surface area of the pool basin or decking shall make the necessary modifications to bring the pool or spa into complete compliance with all requirements in all sections of this code.

SECTION 6. A person shall not operate or maintain a public or semi-public swimming pool without first obtaining a license to operate such pool.

- The license must be obtained **before the pool and/or spa opens for the year (or before construction and opening of a new pool/spa)** by Cavalier County Health District/Lake Region District Health Unit, and is valid for one year unless revoked for cause. The license must be posted in a visible place at the facility.

SECTION 7. Pool facility management and personnel shall conduct pool operations and maintenance of the pool and/or spa, conduct routine bacteriological sampling of the pool/spa; and maintain on the premises records of monthly microbiological analyses, all pool-related records; plus documentation of daily operation and maintenance practices for a minimum of three years.

- During its months of operation, each public and semi-public swimming pool and spa facility shall submit water samples from the swimming pool(s) and/or spas, to a laboratory certified by the North Dakota State Department of Health (NDDoH), for a bacteriological analysis. Documentation from the testing laboratory shall be sent to Lake Region District Health Unit within one week of receiving the bacteriological water results.
- A minimum of one sample per month shall be submitted for each month that the pool and/or spa are open for use by the public. Any detection of coliform bacteria, a bacteria count greater than 200 ml. from a standard plate count, or a voided presumptive bacteria test will require super-chlorination/shock treatment and re-sampling of the same pool or spa water weekly until a satisfactory report is achieved for that month.

SECTION 8. 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 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.

Safe and sanitary standards may result in the approving authority and/or owner/operator/manager to close the pool temporarily. Those standards include:

- Pool water is not of sufficient clarity/water is cloudy; main drain located at the deep end of the pool is not clearly visible from the pool deck.
- Maintenance problems exist in/within the pool area (e.g. Body fluid contamination; chlorine or pH levels not within the acceptable range; mechanical equipment is not in working sufficiently).
- Bacteriological water samples are reported back as "unsatisfactory".
- Weather conditions are not safe for swimmers

DEFINITIONS

“Approving authority” shall mean the Health Officer or his designate.

“Bromine” under this regulation is a generic term used to describe a chemical that releases hypobromous acid when dissolved in water.

“Calcium hardness” refers to the level of calcium.

“Cartridge filter” is defined as a type of pool water filter that uses paper or fabric-like cartridges as its filtering medium.

“Combined chlorine” refers to the formation of chlorine chemically bonding to nitrogen-containing compounds to form chloramines.

“Diatomaceous earth filter” is a type of pool water filter that uses diatomaceous earth or volcanic ash as a filter medium. It may be either pressure or vacuum type. It is commonly called a D.E. filter.

“Free chlorine” is defined as the chlorine that is available to kill bacteria or algae. It is the most active form of chlorine that is free to kill bacteria and algae.

“pH” is defined as the measure of the acidity of water. The pH scale runs from 0 to 14 with 7 being the midpoint or neutral. A pH of less than 7 is on the acid side of the scale, while a pH of more than 7 is on the basic (alkaline) side of the scale.

“ppm” is the abbreviation for “parts per million” and is equal to 1/10,000 of 1%. Parts per million is calculated in weight units. In dilute water solution, the weight-volume relationship of milligrams per liter (mg/l) may be substituted.

“Pool facility” means any structure, basin, chamber, or tank containing an artificial body of water for swimming, diving, recreational bathing, and therapy. This includes spas, hot tubs, whirlpools, special-use pools, and therapy pools.

“Public swimming pool” means any swimming pool usually open to any member of the public. This includes, but is not limited to municipal, apartment, lodging facilities, and recreational facilities.

“Residential swimming pool” means any swimming pool located on private property under the control of the homeowner or his agent. The use is limited to swimming or bathing by members of the homeowners or renters family or their invited guests.

“Sand filter” is defined as a type of pool water filter that uses sand, or sand and gravel as a filter medium.

“Spa” means any whirlpool, hot tub, jacuzzi, health pool, or treatment pool.

“Semi-public swimming pool” means any swimming pool, other than a residential pool or a public pool, which is intended to be used by numbers of persons for swimming or bathing regardless of whether a fee is charged for such use. This definition includes swimming pools located in hotels, motels, health clubs, condominiums, and apartment house complexes.

“Super-chlorination or Breakpoint Chlorination” is defined as and accomplished by increasing the chlorine dosage to a point where all ammonia compounds and other undesirable organic materials are completely burned out (oxidized) and removed by chlorine reaction. Chlorine added thereafter will be in an uncombined or “free chlorine” state.

“Total Chlorine” is the sum of the free chlorine and combined chlorine residuals.

I - RECORDS:

- 1.1 **Daily Operation Records:** A daily operation record shall be kept on site for all pools/spas.
- Records shall include the free chlorine, total chlorine, pH, amount of chlorine added, and any other chemicals that have been added.
 - **Temperatures, pH and chlorine levels shall be recorded at least four times daily for public pools and two times daily for semi-public pools.**
 - Any maintenance done to the pool or equipment shall be recorded.
 - Records shall be kept at least three years to facilitate the newer pool operators in the following years.
 - Copies of the bacterial tests shall be kept with the daily records and readily available at the time of inspections.

II - POOL BASIN:

- 2.1 **Pool Materials:** Materials for the pool basin must be non-toxic, durable, water proof, and easily cleanable. The basin must be of a light color to facilitate observation of swimmers by lifeguards.
- 2.2 **Condition of Pool Basin:** The pool basin and sides must be smooth, free of cracks, leaks, and protrusions. Paint must be in good condition to protect the basin material from cracking or chipping.
- 2.3 **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 water level) and on the top edge of the deck. The markers shall be at least four inches in height, of a contrasting color, and located on each side of the pool.
- 2.4 **Skimmers, Gutters, Baskets, and Inlets:** 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.
- 2.5 **Lifeline/Deep End Separation:** The facility shall provide a floating lifeline at or within one foot of the break in grade between the shallow and deep portions of the pool, if the deep part of the pool exceeds five feet. It must be at least three-fourths inch in diameter, supported by colored floats, and shall be securely fastened to both sides of the pool walls with non-corrosive recessed connectors. The lifeline shall be in place at all times that the pool is open, except for those times designated for lap swimming only.
- 2.6 **Water Depth:** Approximately three-fourths of the pool area should be from three to five feet in depth, not including the diving area. The diving area must have adequate depth and clearance for safe diving. No diving shall be allowed in water less than 5 feet deep.
- 2.7 **Diving Boards:** Public pools shall not have diving boards over 10 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 10 feet from obstructions, pool walls, and at least 16 feet from overhead obstructions.
- 2.8 **Fence/Other Barrier:** A high fence or other barrier at least 6 feet high shall completely encircle the pool and deck area and shall be locked when unattended.

III - POOL WATER QUALITY:

- 3.1 Color/Clarity:** The color of the pool water should be sparkling and clear. Any tint to the water indicates a chemical or algae problem. The water shall be of sufficient clarity that the main drain in the deepest area of the pool is readily visible from the deck.
- 3.2 Algae:** Algae must be taken care of immediately before staining occurs. Algae may be taken care of by super-chlorination of the pool and by brushing the dead algae off of the pool basin. If left untreated, algae will blossom rapidly and the pool will become cloudy and unusable.
- 3.3 Grease Line:** If a grease line is visible, the film should be cleaned at the end of the day to prevent permanent staining.
- 3.4 Main Drain Visibility/Clarity:** The water shall be clear enough to easily see the main drain in the deep end of the pool. *If the main drain in the deep end of the pool is not visible due to swimming shall NOT be allowed, and the pool shall close until such time as proper water clarity can be achieved and maintained.* For indoor pools, the lighting must be bright enough to be able to **easily** see the main drain.
- 3.5 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 once a week until an approved sample is tested. A water sample shall be taken and sent in monthly from each water source (If there is a main pool and a wading pool or spa, both shall be tested monthly).
- 3.6 Water Testing Equipment:** Every pool shall provide testing equipment/a test kit for the determination of disinfection residuals chlorine (Cl) and hydrogen ion (pH) levels. The chemicals must be stored in accordance with the manufacturer's recommendations. Test strips or sticks are not suitable for use in place of a test kit.
- **pH and Chlorine Ranges:** The disinfectant residual testing equipment shall have a range of at least 0.0 to 5.0 ppm (mg/l) free chlorine. Hydrogen ion testers shall be able to indicate a pH range between 6.8 and 8.5.
 - **Age of Reagents:** Test kits should have the reagents replaced every six months or at the beginning of each swimming season. The date of purchase should be documented.
- 3.7 pH, Free, and Total Chlorine:**
- A pH between 7.2 and 7.8 shall be maintained to prevent irritation to the mucous membranes of the eyes and other body parts.
 - Free chlorine residuals shall be maintained at 1–5 ppm for all pools; and a free chlorine residual of 3–5 ppm shall be maintained for all spas/whirlpools. This will assure proper sanitizing of the pool water.
 - Total chlorine is the combined free chlorine and chloramines. If the total chlorine level is more than 0.5 ppm above the free chlorine level, the pool should be super-chlorinated.
- 3.8 Temperature:** The ideal water temperature in a pool is 78 F to 84 F degrees. Swimming should not be permitted when the water temperature is below 65 F. A manual thermometer shall be located in the pool or at a minimum shall be readily available for immediate reading of the pool's temperature. **The temperature shall be recorded a minimum of two times daily.** Spa water should not exceed 104° F. Therapy pool temperatures may exceed 104° F. with the approval of the local public health authority. A thermostatic control device must be installed to prevent the temperature from exceeding the maximum.

IV - MECHANICAL EQUIPMENT

- 4.1 Filters:** All pools must have a filter system installed in the main re-circulating system. It can be any one of three types: sand, diatomaceous earth, or cartridge. These must be maintained in accordance with the manufacturer's specifications and design limits.
- 4.2 Gauges:** Pressure/vacuum 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 circulating inlets and outlets.
- 4.3 Feeders:** All recirculation systems shall include a feeder and monitor for the introduction of soda ash or other chemicals to control the pH of the water. Smaller pools can effectively control pH manually.
- 4.4 Recirculation Pump:** The facility shall provide adequate pumping equipment. The pumps shall have sufficient capacity to:
- Provide for the maximum turnover of the pool;
 - Provide adequate pressure for back-washing of filters; and
 - Develop necessary suction required for cleaning when suction type bottom vacuum is used.
- 4.5 Valving:** All piping and plumbing shall be installed in compliance with the North Dakota State Plumbing Code. The valving shall be adequate to perform all of the functions necessary for proper pool functions and maintenance.
- 4.6 Recirculation System:** The recirculation system shall consist of pumps, filters, and hair and lint catchers, together with all necessary pipe connections to the inlets and outlets of the pool and for back-washing of the filters.
- This system shall be operated continually 24 hours per day during months of operation.
 - This system must have adequate filtration and pumping capacity to provide **ONE COMPLETE TURNOVER OF THE POOL WATER EVERY 6 HOURS FOR SWIMMING POOLS, ONE HOUR FOR WADING POOLS, AND 30 MINUTES FOR SPAS.**
 - The main drain and skimmers must function in accordance with the pools design standards. (Refer to Section 8.4 for exceptions to wading pool recirculation systems).
- 4.7 Cross Connections:** All plumbing must be installed in accordance with the North Dakota State Plumbing Code. Hose bibs must have a proper backflow prevention device installed.
- 4.8 Maintenance:** All mechanical equipment, plumbing, filtration equipment, etc., must be maintained in proper working order.
- The mechanical equipment room/premises shall be cleaned and disinfected on a regular basis to prevent injury from physical objects as well as contaminated surfaces.

V - DISINFECTION EQUIPMENT

- 5.1 Continuous Chlorination:** Equipment at the facility shall provide adequate disinfect to 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.
- 5.2 Chemical Feeding Equipment:** All public pools must be equipped with automatic chemical feeding equipment for controlling disinfectant and pH.
- 5.3 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.
- **Access:**
The room shall be at ground level to provide easy access. The door shall open to the outside and 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.
 - **Exhaust Fan:**
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.
 - **Platform Scale:**
A platform scale shall be provided at the facility for the daily weighing of the chlorine cylinder.
 - **Safety Chains:**
Safety chains shall be provided at the facility for securing chlorine cylinders to prevent tipping. Cylinders shall be chained on the upper half of chlorine cylinders.
 - **Chlorine Room Equipment:**
A cylinder wrench for turning off the cylinder should be attached to the top of each cylinder being used.
 - **Ammonia:**
An ammonia bottle should be used to detect any small leaks of chlorine gas; ammonia should be replaced yearly. A Chlorine Institute safety kit is recommended for all pools using gas chlorine.
- 5.4 Chemical Storage:** Chemicals shall not be stored in the gas chlorine room. 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.
- 5.5 Super-Chlorination** should be conducted when needed to remove organic materials or algae.

VI - BATHHOUSE/DRESSING ROOM/LOCKER ROOM

- 6.1 Bathhouse Location:** The bathhouse must be located to provide entrance to the pool area near the shallow end of the pool only. The bathhouse facilities should protect the pool area from prevailing winds.
- 6.2 Floors and Walls:** The floors and walls shall be of smooth, non-slip, non-absorbent material.
- **Floor drains:** Adequate floor drains shall be installed in all areas subject to standing water.
 - **Matting:** Rubber, non-slip matting may be used on floor if it is disinfected daily. Carpet is not allowed.
- 6.3 Space:** The bathhouse/dressing room area shall provide sufficient space for dressing and a clothing storage area.
- 6.4 Ventilation and Lighting:** Adequate ventilation shall be provided to eliminate excessive humidity that may cause damage or encourage mold and bacteria growth. Lighting must be in working order, UL approved, and be at least 10 foot candles at the floor surface.
- 6.5 Water Supply:** The facility shall provide an approved potable/drinking water supply such as angle jet or other approved type drinking fountains.
- 6.6 Showers:** Showers shall be located adjacent to the dressing rooms. Warm water shall be provided at all shower heads. At least one shower head per forty patrons is required. The shower area must be provided with sufficient floor drains to handle the waste water.
- Patrons shall be encouraged to take a warm cleansing shower prior to entering the pool.
 - Any patron showing symptoms of infection shall be excluded from entering the swimming pool.
- 6.7 Toilet Facilities:** The facility shall provide at least one sink with hot (<120 degrees F) and cold running water for each sixty patrons and one toilet and one urinal per 60 men and one toilet per 30 women.
- Hand soap, along with single-use hand towels or mechanical dryers shall be provided and readily available at all times near the hand washing sinks.
- 6.8 Maintenance:** The bathhouse, including the locker rooms and showers shall be cleaned and disinfected (hot soapy water followed by a 1% chlorine solution or other approved disinfectant) a minimum of two times a day, and more often when necessary to prevent injury from physical objects as well as contaminated surfaces.
- On days the pool is in service, but not in use by the public, the premises shall be cleaned and disinfected at least once before the pool reopens.

VII - DECKING/POOL AREA:

- 7.1 Decking Design:** Decks and sidewalks around the pool shall be at least eight feet wide, not 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.
- 7.2 Decking and Walkway Slope:** Decks and walks 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.
- 7.3 Walkway and Deck Material/Texture:** The finish texture of decks must be smooth, non-slip, non-porous material that is comfortable to bare feet. Carpet, floor matting, walkways, or other porous materials which interfere with floor cleaning or provide a place for bacteria and fungi to multiply, are prohibited.
- 7.4 Cleaning and Disinfecting:** The pool deck area shall be cleaned and disinfected a minimum of two times a day for pools that are open for more than 6 hours per day; a minimum of once per day for pools open 6 hours or less per day. Standing water must be removed to prevent algae and fungal growth.
- 7.5 Steps and Exit Ladders:** All steps or stairs entering a public pool shall have a non-slip surface and be of a contrasting color for patrons to easily see. They shall have sturdy and easily visible handrails on either side and at the top leading out over the water. Ladders or stairs must be located at the shallow end and at both sides of the deep end of the pool. Exit ladders shall be adequately secured in place.
- 7.6 Diving Standards:** Diving areas shall meet current standards of the National Swimming Pool Foundation. All diving boards must have a non-slip surface and be in good physical shape with no visible cracking. Board standards must be secured to the deck. If diving boards are present, a sign shall be displayed with diving board rules.
- 7.7 Pool Rules Posted:** Swimming pool rules must be posted in an easily viewed location where swimmers can see them. The print shall be easy to read and large enough to view from all areas of the pool.
- 7.8.1 Lifesaving Equipment:** The facility shall provide at least one set of lifesaving equipment that is readily accessible and consisting of:
- One or more poles 15 feet to 16 feet in length, having a shepherd's crook with an aperture of 18 inches or more between the tip of the hook and the pole.
 - Two or more flutter boards; and
 - Two or more throwing rings having a minimum diameter of 18 inches equipped with 65 feet of one-fourth inch line.
- 7.9 Telephone:** A working telephone shall be provided adjacent to the pool area for emergency use.

VIII - WADING POOLS

- 8.1 Location:** Wading pools shall be in a separate enclosed area, physically set apart from the swimming pool.
- 8.2 Accessibility:** The wading pool shall have a fence or partition that is sufficiently high which shall separate and prevent waders from entering the main pool area. Wading pools shall be in an area that can be locked when not in use.
- 8.3 Bathhouse:** The bathhouse shall be easily accessible to the wading pool patrons. A sign shall be posted that states that all individuals shall take a warm cleansing shower prior to entering the wading pool.
- 8.4 Recirculation System:** The recirculation system and filtration must function to the same codes as the larger pool. Disinfectant levels must also comply and must be recorded as is the large pool on a daily record. If the wading pool is NOT hooked up to the recirculation system, the pool water quality must be inspected and tested on a more frequent basis. The frequency that the pool water quality inspections and tests need to be done should be based on the bather load and the number of hours that the wading pool is open per day.
- 8.5 Pool Rules:** Pool rules must be posted in the wading pool area in an easily viewed location and in large enough print to view from all areas of the wading pool.
- 8.6 Depth and Quality:** Maximum water depth for the wading pool is 24 inches. Water quality must meet the same standards as the larger pool.

IX – Spas

- 9.1 Types:** Known as therapeutic, hydrotherapy, spa, or hot tub pools; the regulations for these small heated pools are listed below.
- 9.2 Temperature:**
- Spa water should not exceed 104 Fahrenheit. A thermostatic control device shall be installed to prevent the temperature from exceeding maximum.
- 9.3 Accessibility:** A bathhouse shall be easily accessible to the spa patrons.
- 9.4 Regulations:** The following items and all applicable areas of the “pool section” of these rules and regulations must function to the same codes as listed for swimming pools, unless specified:
- Recordkeeping
 - Pool Rules
 - Basin/Decking
 - Water Quality-Calcium hardness levels 100 to 800 ppm; Maximum temperature 104 °F.
 - Disinfectant Levels
 - Free chlorine levels 2 to 10 ppm;
 - Maximum combined chlorine - 0.5 ppm
 - Recirculation System
 - Turnover rate for spas – 30 minutes
 - Filtration

CHEMICAL SAFETY

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.

Caution should be used in storage of swimming pool chemicals. 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.

BASIC RULES FOR MIXING AND ADDING CHEMICALS: 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; do not 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.

- ✓ **NEVER ADD WATER TO ACID; ALWAYS ADD THE 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.

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.

When mixing calcium chloride, soda ash and 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.

When adding chemicals to the 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.

Again, NEVER ADD WATER TO ACID; ALWAYS ADD ACID TO WATER.

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

Material Safety Data Sheets (MSDS) for all chemicals used at the facility should be kept in a clearly labeled binder and readily accessible on site.

APPENDIX A

WATER BALANCE RANGES

TOTAL ALKALINITY: a measure of resistance to change in pH

- Acceptable Range: 60-180 ppm
- Ideal Range: 80-120 ppm*

(*If using calcium hypochlorite, sodium hypochlorite, or lithium hypochlorite as a chlorine source, keep alkalinity from 80-100 ppm. If using chlorine gas, dichlor or trichlor, keep alkalinity from 100-120 ppm).

pH: a measure of acidity

- Acceptable Range: 7.2-7.8
- Ideal Range: 7.4-7.6

CALCIUM HARDNESS: a measure of calcium ions in water

- Acceptable Range: 150 – 1,000 ppm
- Ideal Range: 200-400 ppm

TEMPERATURE: in degrees Fahrenheit

- Pools: Competition: 78-80
Recreation: 82-84
Special Populations: 86-88
- Spas: Not to exceed 104

FREE CHLORINE: the chlorine available to kill bacteria or algae

- Pools: Acceptable Range: 1.0 – 5.0/Ideal Range: 2.0 – 4.0 ppm
- Spas: Acceptable Range: 2.0 – 10.0/Ideal Range: 3.0 – 5.0 ppm

TOTAL DISSOLVED SOLIDS: a measure of minerals dissolved in the water

- Not adjustable, other than by draining off water and adding fresh water.

APPENDIX B

PROBLEMS ASSOCIATED WITH IMPROPER WATER BALANCE

Improper pH...

- Too low: Corrosion of pool fixtures, plumbing, and staining of walls; chlorine dissipates more quickly, skin/eye irritation
- Too high: Scaling water--plugged filters, reduced circulation, cloudy water; slows chlorine activity, skin/eye irritation

Improper Alkalinity...

- Too low: Corrosive water—pool fixtures, plumbing, and staining of walls; may cause pH bounce
- Too high: Scaling water--plugged filters, reduced circulation, cloudy pool; may pull pH level up and be difficult to change

Improper Calcium Hardness.....

- Too low: Difficulty in maintaining proper water balance; corrosive water--etching of plaster, pitting of concrete, dissolving of grout, pitting of pool decks
- Too high: Scaling water--plugged filters, reduced circulation/cloudy pool, heater inefficiency, crystals forming on the inside walls of pool.

Improper Chlorine.....

- Too low: Bacterial and algae growth, cloudy water
- Too high: Eye irritation, pH hard to manage, possible corrosion to plumbing

Improper Temperature

- Too low: Greater tendency to corrode
- Too high: Greater tendency to scale

APPENDIX C**AMOUNT OF CHEMICAL NEEDED TO TREAT 10,000 GALLONS OF WATER****TO INCREASE FREE AVAILABLE CHLORINE 1 PPM:**

- Chlorine gas (100% -green gas).....1.3 oz.
- Calcium hypochlorite (65-70% -granular/tablet).....2.0 oz.
- Sodium hypochlorite (12-15%-liquid commercial bleach).....13 fl. oz.
- Lithium hypochlorite (35%-white powder)...4.0 oz.
- Dichlor (56% or 62%).....2.5 oz.
- Trichlor (90%).....1.5 oz.

TO INCREASE TOTAL ALKALINITY 10 PPM:

- Sodium bicarbonate (baking soda).....1.5 lbs.

TO DECREASE TOTAL ALKALINITY 10 PPM:

- Muriatic acid (HCL).....21.12 fl. oz. (2/3 qt)
- Dry acid (sodium bisulfate).....1.5 lbs.

TO INCREASE pH from 7.2 – 7.4:

- Soda Ash.....6.0 oz.

TO DECREASE pH from 7.8 – 7.6:

- Muriatic Acid (HCL).....12.0 fl. oz.

TO INCREASE CALCIUM HARDNESS 10 PPM:

- Calcium Chloride (100%).....1.0 lb.
- Calcium Chloride (77%).....1.25 lbs.

TO NEUTRALIZE 1 PPM OF FREE AVAILABLE CHLORINE:

- Sodium Thiosulfate.....1.0 oz.
- Sodium Sulfate.....3.25 oz.

APPENDIX D

CHEMICAL CALCULATIONS

1. Determine what you are trying to do. Find the appropriate chemical for the task in Appendix C (e.g. sodium bicarbonate). This is the Amount of Chemical needed to treat 10,000 gallons of water (e.g. 1.5#).
2. Divide the volume (e.g. 125,000) in gallons of your pool by 10,000 (e.g. $125,000/10,000 = 12.5$).
3. Determine the desired change you need to make by subtracting the value from your pool from the ideal value in Appendix A (e.g. Total alkalinity in your pool is 60 and you want to raise it to 100; the amount of change you need is 40). Take this number (e.g. 40) and divide it by the amount of change (in ppm) given in Appendix C (e.g. for free chlorine changes-this number is 1 ppm; for alkalinity and calcium hardness-this number is 10 ppm). (e.g. $\text{Desired Change} = 40/10 = 4$)
4. Take the number in "Amount of Chemical" (e.g. 1.5#), multiplied by the number in "Pool Volume" (e.g. 12.5) multiplied by the number in "Desired Change" (e.g. 4). The Total is the amount of chemical that you need to add to your pool (e.g. 75#).

(Amount of Chemical x Pool Volume x Desired Change = Total Amount Needed)

SUPER-CHLORINATION/ BREAKPOINT CHLORINATION

TOTAL CHLORINE – FREE CHLORINE = COMBINED CHLORINE
COMBINED CHLORINE X 10 = AMOUNT NEEDED TO REACH BREAKPOINT

FOLLOW THESE STEPS:

1. Go to Appendix C and find the type of chemical that you are using (e.g. Calcium Hypochlorite). From Appendix C, find the number used to treat 10,000 gallons of water (e.g. 2.0 oz. for Calcium Hypochlorite). This is the "Amount of Chemical".
2. Divide the total number of gallons of your pool by 10,000. This is your pool volume. ($\text{Gallons of Pool}/10,000 = \text{Pool Volume}$).
3. Multiply the Combined Chlorine number (you received from test results) by 10. This is your "Desired Change" ($\text{CC} (1) \times 10 = \text{Desired Change}$).
4. Multiply the numbers you got for "Amount of Chemical" (Step 1) by the "Pool Volume" (Step 2) by the "Desired Change" (Step 3) to get the Amount of Chemical needed to add to your pool to achieve Breakpoint Chlorination.

(Amount of Chemical x Pool Volume x Desired Changed = Total Amount Needed)

APPENDIX E

FECAL, VOMIT, AND BLOOD CONTAMINATION PROCEDURES

FORMED STOOL IN POOL WATER (Solid, Non-Liquid):

1. Evacuate all bathers from pool or spa. Do not allow anyone to enter contaminated pools until decontamination procedures are complete.
2. Remove as much fecal material as possible using a net or scoop. Vacuuming fecal material is not recommended.
3. Raise free available chlorine level to >10 parts per million (ppm); adjust the pH to between 7.2- 7.5
4. Check the filter system. Check the chlorine level to ensure it is maintained at a level of > 10 ppm for at least 30 minutes (If necessary, thio-sulfate may be used to reduce the free chlorine residual). Re-open the pool.
5. Document the incident in the daily records.

DIARRHEA IN POOL WATER (Liquid Stool):

1. Same as Step 1 for solid stool.
2. Same as Step 2 for solid stool.
3. Raise free available chlorine to 20 ppm or greater; adjust the pH to between 7.2 and 7.5, and maintain these levels for at least 8 hours.
4. Backwash pool filters thoroughly. Discharge the effluent directly to waste. Do not return the backwash through the filter. Where appropriate, replace filter media.
5. Document the incident in the daily records.
6. Do not allow bathers into pool until free chlorine residual is between 2-4 ppm.

SPECIAL CONSIDERATIONS:

Low volume pools, such as wading pools and spa pools should be drained, sanitized, refilled, and filters should be back-washed.

If the person has a communicable disease, which results in shedding of cysts, such as *Giardia* or *Cryptosporidium*, sampling should be done after the above steps to assure removal or inactivation. If the agent persists, additional sanitizing may be necessary.

VOMIT IN POOL WATER:

If vomiting results from swallowing too much water, the vomit is probably not infectious. However, if the full content of the stomach is vomited, follow this guidance step:

Respond to the vomit accident as you would to a formed fecal accident. This protocol should be adequate for disinfecting a potentially infectious vomit accident.

BLOOD IN POOL WATER:

There is no public health reason to recommend closing a pool after a blood spill. Germs from blood do not survive long when diluted into properly chlorinated pool water. If the pool staff chooses to temporarily close a pool to satisfy patrons, that is the pool manager's decision.

CLEANING UP BODY FLUID SPILLS ON POOL SURFACES:

Body fluid spills, including blood, feces, and vomit, should be cleaned up, and the contaminated surfaces should be disinfected immediately. A fresh solution of regular household bleach and water should be made up right before each clean-up to make sure it is effective in cleaning and disinfecting the surface properly.

BLEACH DISINFECTING SOLUTION:

Add 1 part household bleach to 9 parts cool water

CLEAN-UP PROCEDURE FOR SURFACES-USING BLEACH SOLUTION:

1. Block off area of the spill from patrons until clean-up and disinfection is complete.
2. Put on disposable latex gloves to prevent contamination of hands.
3. Wipe up the spill using absorbent material and place in plastic garbage bag.
4. Gently pour bleach solution onto all contaminated areas of the surface.
5. Let the bleach solution remain on the contaminated area for 20 minutes.
6. Wipe up the remaining bleach solution.
7. All non-disposable cleaning materials used such as mops and scrub brushes should be disinfected by saturating with bleach solution and then air dried.
8. Remove gloves and place in plastic garbage bags with all soiled cleaning materials.
9. Double-bag and tie-up plastic garbage bags, discard the bags.
10. Wash your hands thoroughly.

APPENDIX F

MODEL DIVING BOARD RULES:

1. USE DIVING BOARD ONLY UNDER DIRECT SUPERVISION OF A COACH OR LIFEGUARD.
2. ONLY ONE PERSON ON THE DIVING BOARD AT A TIME.
3. LOOK BEFORE DIVING TO ENSURE THAT THE AREA IS CLEAR.
4. DIVE OR JUMP ONLY IN A STRAIGHT LINE FROM THE END OF THE EQUIPMENT.
5. NO MULTIPLE BOUNCES ALLOWED.
6. THE LADDER IS THE ONLY MEANS ALLOWED FOR MOUNTING THE EQUIPMENT.
7. SWIM TO THE CLOSEST POOL EXIT OR WALL IMMEDIATELY AFTER COMPLETION OF THE DIVE.
8. DIVING BOARD USE IS PROHIBITED WHEN SWIMMING IS ALLOWED IN DIVE AREA.

MODEL SPA WARNING SIGN:

1. SPA CAPACITY AND HOURS OF USE:
SPA USE DURING ANY OTHER TIMES IS PROHIBITED.
2. ELDERLY PERSONS, AND THOSE SUFFERING FROM HEART DISEASE, DIABETES, HIGH OR LOW BLOOD PRESSURE ARE PROHIBITED FROM USING THIS SPA.
3. UNSUPERVISED USE BY CHILDREN IS PROHIBITED
4. DO NOT USE SPA WHILE UNER THE INFLUENCE OF ALCOHOL, ANITCOAGULANTS, ANTIHISTAMINES, VASOCONSTRICTORS, VASODILATORS, STIMULANTS, HYPNOTICS, NARCOTICS, OR TRANQUILIZERS.
5. DO NOT USE ALONE OR FOR LONGER THAN 15 MINUTES AT A TIME.

MODEL POOL RULES:

1. POOL CAPACITY AND HOURS OF USE:
POOL USE DURING ANY OTHER TIMES IS PROHIBITED.
2. NO FOOD, DRUGS, OR ALCOHOLIC BEVERAGES ALLOWED.
3. NO GLASS CONTAINERS.
4. NO DIVING OR JUMPING FROM DECK INTO DIVE AREA (IF DIVING BOARDS PRESENT).
5. DIVING ALLOWED ONLY IN DESIGNATED AREAS.
6. NO HORSEPLAY, RUNNING, SHOIVING, OR DUNKING.
7. NO ELECTRICAL APPLIANCES ALLOWED.
8. NO SWIMMING IF YOU HAVE ANY COMMUNICABLE ILLNESS, DIARRHEA, VOMITING, NASAL, OR ORAL DISCHARGES OR SKIN RASHES.
9. ALL BATHERS MUST SHOWER WITH WARM WATER BEFORE ENTERING POOL.
10. SWIM DIAPERS REQUIRED FOR ALL CHILDREN THAT ARE NOT POTTY TRAINED AND FOR ANY OTHER INDIVIDUALS THAT MAY BE INCONTINENT.
11. ENCOURAGE CHILDREN TO TAKE REGULAR BATHROOM BREAKS.
12. NO CHANGING DIAPERS IN POOL AREA.

MODEL SLIDE RULES:

1. SLIDE TO BE USED BY THOSE OF APPROPRIATE AGE AND SWIM ABILITY.
2. LOOK BEFORE SLIDING TO ENSURE THAT THE AREA IS CLEAR IN WATER BELOW.
3. USERS SHALL SLIDE IN A FEET FORWARD POSITION ONLY.
4. NO HORSEPLAY, SHOIVING, OR PUSHING ON/FROM SLIDE AREA ON DECK AND NO SWIMMING IN POOL AREA BELOW SLIDE.
5. EXIT SLIDE AREA IMMEDIATELY AFTER USE.

SIX “P-L-E-As” FOR HEALTHY SWIMMING

Protection Against *Recreational Water Illnesses* (RWIs)

YOU CAN CHOOSE TO SWIM HEALTHY!

Healthy swimming behaviors are needed to protect you and your kids from RWIs and will help stop germs from getting into the pool in the first place. **EVEN A WELL MAINTAINED POOL IS ONLY AS SAFE AS THE HEALTH OF THE SWIMMERS WHO USE IT!** Here are six “P-L-E-As” that promote Healthy Swimming:

Three “P-L-E-As” for All Swimmers

*PLEASE do NOT swim when you have diarrhea...this is especially important for kids in diapers. You can spread the germs into the water and make other people sick.

*PLEASE do NOT enter the pool unless you have taken a shower first.

PLEASE Do NOT swallow the pool water. In fact, try your best to avoid even having water get in your mouth.

*PLEASE wash your hands with soap and warm water after using the toilet or after changing diapers. You can protect others by being aware that germs on your body end up in the water.

Three “P-L-E-As” for Parents with Young Kids

Follow these “P-L-E-As” to protect your child and others from getting sick and to keep RWIs out of your community:

*PLEASE take your kids on bathroom breaks or check diapers often. Waiting to hear “I have to go” may mean that it is too late.

*PLEASE change diapers in a bathroom and not at poolside. Germs can spread to surfaces and objects in and around the pool and spread illness.

*PLEASE wash your child thoroughly (especially the rear end) with soap and water before swimming. We all have invisible amounts of fecal matter on our bottoms that end up in the pool. **In addition, children ill with infectious diarrhea should refrain from swimming for two weeks after cessation of diarrhea.**

(Note: *Cryptosporidium* or *Giardia* may be excreted for several weeks after symptoms stop).

Reference: www.healthyswimming.org (CDC/Division of Parasitic Diseases)

For further questions, contact:

Cavalier County Health District (CCHD): (701) 256-2402
Lake Region District Health Unit (LRDHU): (701) 662-7035