



POOL & SPA SAFETY

A Training Course
for Pool and Spa
Operators



THE CITY OF
COLUMBUS
ANDREW J. GINTHER, MAYOR

COLUMBUS
PUBLIC HEALTH

www.publichealth.columbus.gov

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Revised 5/2016



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SECTION I: INTRODUCTION TO POOL & SPA SAFETY

Purpose of Pool and Spa Safety

- Protect the public from possible safety and health hazards
- Provide a basic knowledge of regulations from the health code
- Build a good relationship between pool operators and the health department

Rules and Regulations

There are many sets of rules which pool operators must know. These rules are important to the health and safety of the patrons and all people who are in charge at the pool should be aware of the regulations.

- **Columbus Public Health (CPH)**, a local public health agency that enforces and regulates aspects such as: water chemistry, physical hazards, safety, and required signage. CPH licenses and inspects all public pools and spas within Columbus city limits and enforces local and state regulations.
- **Ohio Department of Health (ODH)**, the state public health agency, creates regulations for pools and spas that set minimum standards for all public aquatic facilities within the state of Ohio.
- **The Occupational Safety and Health Administration (OSHA)** protects the safety of workers. A key measure used in this protection includes Safety Data Sheets (SDS) which should be available for all substances at your pool. These sheets detail the risk involved with the substance and what should be done to protect yourself from the hazards.
- **The Center for Disease Control and Prevention (CDC)** does not regulate, but instead advises and investigates outbreaks of communicable diseases such as Cryptosporidium, Giardia, Shigella and E. Coli.
- **Consumer Product Safety Commission (CPSC)**, is charged with protecting the public from unreasonable risks of injury or death from many types of products. This includes swimming pools and ensuring compliance with such things as the Virginia Graham Baker (VGB) Pool & Spa Safety Act. *(As of April 1, 2011, VGB compliance was written into the Ohio Administrative Code as well.)*
- **U.S. Department of Justice** oversees and enforces the Americans with Disabilities Act (ADA), which ensures equal opportunities to people with disabilities.

Public Health Concerns

It is possible to spread disease from person to person via pool or spa water. Common forms of these diseases include: E. Coli 0157:H7, Hepatitis A, Giardia, and Cryptosporidium (Crypto). Disinfecting and keeping proper water balance in your pool will reduce the risk of these pathogens.

GERM INACTIVATION TIME FOR CHLORINATED WATER

GERM	E. Coli 0157:H7	Hepatitis A	Giardia	Cryptosporidium
TIME	Less than 1 minute	About 16 minutes	About 45 minutes	About 15,300 minutes or 10.6 days

**Water chemistry maintained at ideal conditions & disinfection times longer when using Cl Stabilizer (CYA)*

SECTION II: PUMP ROOM OPERATIONS

Pool Capacity and Draining Requirements

It is important to know the water capacity of your pool or spa. Pool (or spa) capacity is measured in gallons and can be determined when you know the measurements of your pool (or spa). See the appendix in the back of this workbook for a Calculation and Conversion worksheet to assist you in determining your pool's capacity.

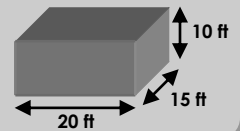
Draining spas and pools entirely is necessary when water balance concentrations are off and no other solution is successful. Cyanuric acid levels can only be reduced by draining.

For public spas, you *must* drain completely at least once every 30 days.

Pool Capacity = Pool Volume x 7.5

For a rectangular pool with no slope...
Volume = Length x Width x Depth
Volume = 20 ft x 15 ft x 10 ft = 3,000 ft³

Pool Capacity =
Volume x 7.5 =
3,000 ft³ x 7.5 =
22,500 Gallons

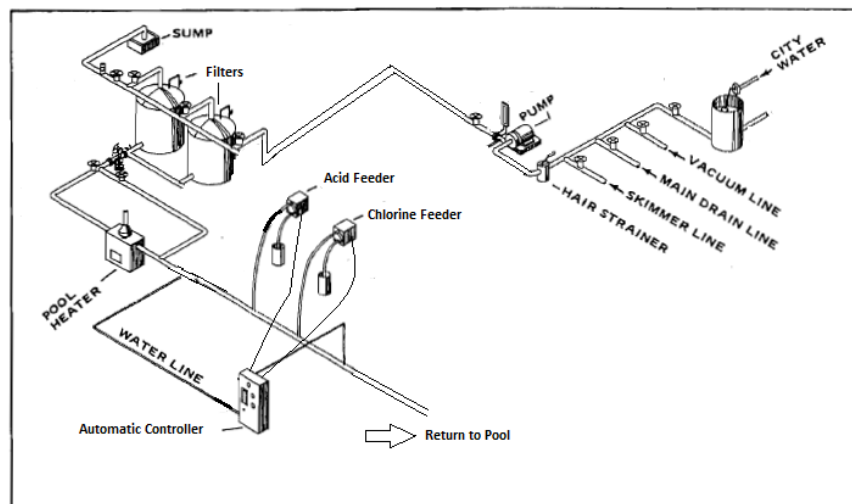


Hair and Lint Traps

You must have a **hair and lint trap connected to your pool or spa's circulation system**. This trap comes before the main filter and cleans out large debris such as hair and lint. If you are using a vacuum diatomaceous earth (DE) filter, you may not need a hair and lint trap, as the DE filter itself acts as the trap.



Pump Room Flow Diagram



Adapted from a diagram developed by the CDC

Filters - Follow manufacturer's instructions

Sand filters, commonly used in public pools and spas, are large drums containing a fine sand media. Water is pushed through the sand and particles are filtered out. Filtered water reenters the circulation system.



Diatomaceous earth (DE) filters are able to remove the smallest particles of all pool filters. These filters can be pressure or vacuum systems. They use diatomaceous earth (DE) powder that attaches to filter grids or fingers.



Cartridge filters are often pleated which maximizes the surface area. These filters are usually replaced every six months.



Type of Disinfectant: Sodium Hypochlorite (Liquid Chlorine)

Sodium hypochlorite, often called "*liquid chlorine*" because of its liquid form, is one of the most commonly used disinfectants at pools and spas.

The acceptable "available chlorine content" strength for liquid chlorine used in pools and spas is 10-12% and has a pH level of 13 (high pH, alkaline). In order to balance for this high pH, you can add an acid such as muriatic acid or inject CO₂, which can lower the pH to an approved level between 7.2-7.8.



Type of Disinfectant: Calcium Hypochlorite (Cal-Hypo)

This type of disinfectant is the dry form of chlorine. Calcium hypochlorite, sometimes known as "cal-hypo," comes in tablet, briquette, or granular form.

Cal-hypo tends to raise the pH of water from an ideal pH of 7.5 to a high pH of between 8.5 and 11. Adding muriatic acid to pools through the circulation system will lower the pH if necessary.

Using cal-hypo may result in high calcium levels. This can be good if you have very soft water, but an excess of calcium can cause scaling on the surfaces of a pool or spa.



Tablet Cal-Hypo



Briquette Cal-Hypo



Granular Cal-Hypo

Type of Disinfectant: Tri-Chlor and Di-Chlor

TRI-CHLOR: Tri-chlor typically comes in dry tablet or stick form and is put into the water by an erosion feeder. Tri-chlor must be carefully handled, as it is a Class I oxidizer, and it may speed combustion or, if it becomes contaminated, could ignite. The pH of a pool or spa will lower due to tri-chlor's low pH of 2.8-3.5 (acidic). You can use sodium carbonate or sodium sesquicarbonate to increase the pH. Tri-chlor also produces cyanuric acid, which stabilizes chlorine but can cause reduced effectiveness at excess levels and can lead to cloudiness in your pool. You must be sure to test your pool regularly to maintain proper water balance.

DI-CHLOR: This chemical, a dry tablet which is very soluble in water, has a nearly neutral pH of 6.7. Di-chlor, like tri-chlor, is a hazardous oxidizing chemical, and should be handled with great care. Di-chlor also has the same cyanuric acid build-up concerns that tri-chlor has. This disinfectant can be used in spas when pH control is of concern and is often used to superchlorinate vinyl-lined pools.

Type of Disinfectant: Bromine

BROMINE: Bromine, a temperature stable product, works like chlorine in disinfecting pools. Typically, a solid form of hypobromous acid (contains bromine, hydrogen, and oxygen) is dissolved to sanitize the water. When bromine reacts with nitrogen, the products (bromamines) have less odor and do not irritate patrons as much as chloramines tend to do. Bromine becomes ineffective when exposed to sunlight and works best in indoor pools and spas. Half of the bromine in an outdoor pool can be destroyed in 60-90 minutes.

Type of Disinfectant: Salt

This disinfectant method utilizes salt that is added to the swimming pool. The salt solution passes through an electrolytic cell which produces chlorine from the chloride ion in salt. The salt level appropriate to maintain a proper chlorine level is about 3000 to 3500ppm. This amount of salt is typically undetectable by bathers. If the salt concentration exceeds 6000ppm corrosion damage to metallic equipment can occur. The cells also need to be routinely cleaned to ensure they are working properly.

Disinfection Systems

PRIMARY SYSTEMS:

Erosion Feeders: Erosion feeders work with chemicals in solid forms such as chlorine or bromine tablets. The tablet (or stick, briquette, etc.) is placed in the feeder, and as water is forced past the chemical, it dissolves and is distributed into the circulation system and body of water.



Liquid Solution Feeders: Liquid disinfectants, such as liquid chlorine, are fed into the water downstream of the filters and heating systems in a circulation system. You must ensure that there is enough pressure in the system to get enough disinfectant into the circulation system.

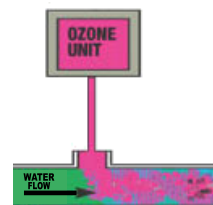


Salt Chlorine Generators: This disinfectant method utilizes salt that is added to the swimming pool. The salt solution passes through an electrolytic cell which produces chlorine from the chloride ion in salt.



SECONDARY SYSTEMS (USED IN ADDITION TO PRIMARY SYSTEM):

Ozone Generators: Ozone gas is an effective water disinfectant. However, because it can be hazardous to humans, there is a limit to people's exposure to ozone. The placement, installation and care of this equipment is important. Ozone is injected into the water, and all ozone should be used before the ozonated water enters the pool or spa. You must use chlorine or bromine in addition to ozone when disinfecting in this manner.



Ultraviolet (UV) Systems: Water can be disinfected using Ultraviolet lamps to generate UV radiation. Water in the circulation system flows through a UV cell to inactivate bacteria and viruses. The UV light will also oxidize chloramines. You must use chlorine or bromine in addition to this when using this uncommon method of disinfecting.



Disinfection Control and Automatic Controllers

As discussed before, the disinfection system is a very important part of any pool or spa operation. In order to ensure proper dosage, your pool or spa must have a chemical feeding device connected directly (interlocked) to the circulation system. **Hand dosing to continuously disinfect the pool or spa is not acceptable.**

An **automatic disinfection controller** must be in use to monitor and adjust the level of disinfectant (free chlorine or bromine) in order to maintain the minimum required level of disinfectant in the spa. This must be the primary means of disinfectant level control.

The automatic controller in the aquatic facility must also measure the pH and be able to regulate the pH level by adding the appropriate chemicals if adjustments are needed.



Turnover Rates, Flow Rates, & Flow Rate Indicators

The turnover rate of a pool or spa is the amount of time it takes for the total water volume to go through the filtration system. This is dependent on the circulation system you are using.

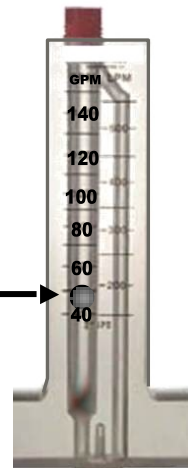
For public swimming pools, the minimum turnover rate is once every 8 hours.

For wading pools, the minimum turnover rate is once every 2 hours.

For public spas and spray grounds, the minimum turnover rate is once every 30 minutes.

To determine the pool or spa's minimum flow rate...

1. Calculate pool capacity (*shown above*): **Pool capacity = 22,500 gallons**
2. Determine the minimum turnover rate: **Public swimming pool = 480 min**
(8 hrs x 60 min/hr = 480 min)
3. Calculate flow rate in gallons per minute: **Flow Rate = Pool capacity/Turnover rate**
Solution: Flow Rate = 22,500 gallons / 480 minutes = 46.875 gallons per minute (GPM)



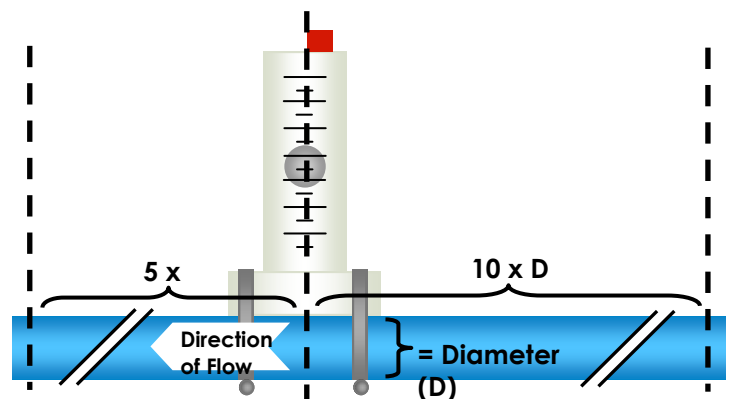
The flow rate is the rate of water flow through the circulation system, and is measured in gallons per minute (GPM).

Your **flow meter** (example shown below) should read at or above your calculated minimum required flow rate.

Flow meters must be strategically set up in your equipment room so that it can accurately read the flow rate. You must have a straight length of piping before and after your flow rate indicator. Check your indicator's instructions on exact lengths. See the picture below for a visual representation of this set-up.

Ensure that your flow meter is working properly. The float tends to get stuck and give inaccurate results. This can be remedied by cleaning the flow meter. When draining the pool or when the circulation pump is off we recommend that you check the indicator to make sure that the float drops to zero.

A **pump curve** is also an acceptable method of determining the rate of flow and uses the vacuum reading and pressure reading to determine the total dynamic head. The total dynamic head is used to determine the rate of flow on the pump curve chart. Pump curves are specific to each type of pump.



Flow Meter Installation

Equipment Maintenance

The equipment in your aquatic facility helps to keep your pool or spa safe for patrons. You must make sure that all aspects of your pool are in proper working condition so that your facility is operating at its best.

It can be easy to neglect the equipment room, because it is hidden from the view of the public. But it is very important to ensure that this room is:

- Clean and well-drained,
- Adequately lit and ventilated, and
- Not accessible to bathers and patrons.



Hazardous Materials Care

Pool chemicals can be hazardous if used improperly. All employees with access to the chemical storage area must have a knowledge of the chemicals as well as the dangers of improper use. See the manufacturer's instructions for safety precautions.

Moisture: Chemicals must be stored in a dry area. Containers should always be closed properly and not stored near leaks. Storing chemicals off of the floor will help in keeping them dry.

Improper Mixing: Many pool chemicals are incompatible with each other and could be hazardous if mixed. Do not mix chemicals, even if they are the same type. Muriatic acid and liquid chlorine are examples of incompatible chemicals that should be stored separately. All chemicals should be properly labeled.

Protection: To protect employees, a facility should provide personal protective equipment when necessary. You must provide safety data sheets (SDS) on-site to help employees become aware of the hazards and preventative measures related to pool chemicals.



SECTION III: POOL OPERATIONS

Chlorine Chemistry

Disinfectants such as chlorine undergo complicated chemical processes in water to help make it suitable for recreation. In order to understand how it works, we will need to look at a couple of chlorine's states in water and what effect that has on the water.

Free Chlorine = Available disinfectant

Combined Chlorine (aka Chloramines) = Result of free chlorine reacting with organic compounds containing nitrogen (N). *Sources of organic compounds containing nitrogen are urine, sweat and the environment.*

Total Chlorine - Free Chlorine = Combined Chlorine *(Use a test kit to determine total and free chlorine)*

Free chlorine is required to be at a level of at least 1 ppm for pools and 2 ppm for spas. Too much can cause irritation and too little will not eliminate harmful pathogens. **Combined chlorine** is ideally ZERO. Too much can create the "chlorine" smell in indoor facilities.

Superchlorination - Shocking

Superchlorination, often called "shocking," is a method of adding a larger dose of chlorine. This dose should be 10 times the amount of combined chlorine, subtracting the existing free chlorine, to achieve breakpoint chlorination. This results in the elimination of combined chlorine and increases the free chlorine level. Free chlorine is 25 times more effective than combined chlorine. Therefore, superchlorination causes a decrease in bacteria and algae growth.

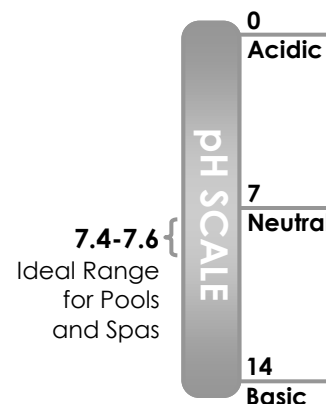
Combined Chlorine x 10 - Existing Free Chlorine = Break Point

During swimming season, superchlorinate as needed when the combined chlorine level exceeds 0.4 ppm. At all times, combined chlorine levels should remain below 1.0 ppm. Because free chlorine levels above 5 ppm can cause irritation to swimmers, swimming should be limited until the free chlorine level drops below 5 ppm. It is best to superchlorinate after hours to allow the disinfectant to properly circulate. If there is a fecal-related accident at your pool, close and shock the pool.

Other Water Balance Factors

In order to have effective disinfection, you must make sure that your water is “balanced.” This means that all chemical parameters need to be kept within the required limits. Some aspects of water chemistry will directly affect others. For example, a disinfectant such as tri-chlor can lower the pH below the required range due to it’s acidic pH.

Below are three chemical parameters that are key in balancing your water. This chart provides examples of what can go wrong in a pool or spa if the levels are too low or too high. Two other factors, temperature and total dissolved solids, are discussed following the chart below.



	pH	Total Alkalinity	Calcium Hardness
What is it?	Measurement of hydrogen ions in the water. Human tears have a pH of about 7.5, and the ideal range in your water is 7.4-7.6	Ability of the water to resist changes in pH. A “buffer” for pH changes in the water.	Calcium present naturally in water due to leaching in nature
Too high?	Scaling water (clogged filters and heating elements, reduced circulation, cloudy water), chlorine inefficiency, eye/skin irritation	pH lock, cloudy water, rough pool/spa surfaces, clogged filters and heater elements, reduced circulation	Scaling water, rough pool/spa surfaces, clogged filters and heater elements, cloudy water, reduced circulation, eye/skin irritation
Too low?	Corrosive water (etching of pool/spa surface, metal corrosion), chlorine loss, wrinkles in vinyl liners, eye/skin irritation	pH bounce, etching of pool/spa surfaces, staining of surface walls, heater failure	Corrosive water, etching of pool/spa surface, staining of surface walls, heater failure

Temperature

Unlike pH level and disinfectant concentration, temperature is a physical factor that contributes to water quality. In pools, the water temperature should not be more than 90°F unless otherwise approved, and in spas it should not be above 104°F.

At high temperatures, the disinfectant can quickly evaporate. If temperatures are extremely high scalding can occur in a spa.



Cyanuric Acid (AKA Stabilizer or Conditioner)

What is cyanuric acid? Cyanuric acid is a chemical that can lessen the effect of free chlorine breakdown in a pool by sunlight. Some solid forms of chlorine contain cyanuric acid or it can be added as a supplement. Tri-chlor and di-chlor are two solid forms (tablet, briquette, powder, etc.) of chlorine that are commonly used. Cyanuric Acid should only be used on outdoor pools that are using chlorine as the primary disinfectant. Check your disinfectant labels to know if you are using one of these forms of chlorine. Di-chlor by weight contains 57% cyanuric acid; tri-chlor contains 54% cyanuric acid.

Factors to consider when using cyanuric acid: Cyanuric acid is most effective between 30-50ppm. State law requires that cyanuric acid not exceed 70ppm. When the cyanuric acid level is above 70ppm, chlorine is less effective as both a disinfectant and algaecide. Because cyanuric acid does not break down or evaporate, as more is added the amount in the pool increases. As the cyanuric acid level in a pool increases, the ability of chlorine to affectively kill germs decreases. The best way to reduce cyanuric acid is to partially drain the pool and add fresh water.

Water Chemistry Parameters

Regulations are in place to ensure that all aspects of the water chemistry are at levels that will protect the health and safety of the swimmers. Below is a listing of regulated aspects, along with the “required” levels, and “ideal” levels, which are most desired.

	Required Levels	Ideal Levels
Free Chlorine	Pools: At least 1 ppm Spas: At least 2 ppm Pools w/ CYA: At least 2 ppm Spas w/ CYA: At least 3 ppm	Pools: 2-4 ppm Spas: 3-5 ppm
Combined Chlorine	Less than 1 ppm	0 ppm
Bromine	Pools: At least 3 ppm Spas: At least 4 ppm	Pools: 3-5 ppm Spas: 4-6 ppm
pH Values	7.2-7.8	7.4-7.6
Total Alkalinity	At least 60 ppm	80-100 ppm
Cyanuric Acid	Less than 70 ppm	30-50 ppm
Calcium Hardness	Pools: N/A Spas: N/A	Pools: 200-400 ppm Spas: 150-250 ppm
Temperature	Pools: Not above 90°F Spas: Not above 104°F	Pools: Not above 90°F Spas: Not above 104°F

If any of these levels are too low or high in your pool or spa, changes should be made. See the Water Balance Adjustment chart in the back of this workbook for help on attaining the proper levels.

Testing The Water

It is mandatory that each licensed pool or spa have a *diethyl-p-phenylenediamine* (DPD) test kit.

- **Read directions.** Not all test kits are the same. Before using your test kit, read all directions.
- **Store in cool, dark place.** The testing chemicals in some kits have an adverse reaction to high or low temperatures and light. Keeping the kit closed and in a cool area will help the chemicals remain accurate.
- **Keep equipment clean.** Debris, dust, or foreign chemicals may cause the testing equipment to give a false reading. Keep the kit closed when not in use.
- **Do not mix test kits.** Some kits use different reagents or different strengths of reagents. You should only use the reagents made for your kit, and follow the testing directions for that kit.
- **Replace reagents yearly.** The reagents used in testing can go bad, so replacing them yearly will ensure that they will work accurately, with proper care. Read the directions for your kit to see if you need to replace the reagents more often.



You must be able to measure these factors:

- Chlorine (or bromine)
- pH
- Total alkalinity
- Cyanuric acid
- Water temperature
- Clarity

When testing your pool or spa, **remember these helpful tips:**

- Test pools upon opening and at least once every four hours
- Spas & pools with automatic chemical controllers must be manually tested every 12 hours and prior to opening
- Take water sample away from inlets and outlets
- Make sure all chemical treatments have completely dissolved and mixed
- Test logs must be kept on file for at least 2 years
- Calibrate your thermometer regularly to ensure accurate readings (*see the appendix for instructions on how to calibrate a thermometer*)

If water is not tested and properly balanced, the chance for growth of a waterborne illness in the water is increased. See the appendix of this workbook for more information on waterborne illnesses that are common in pools and spas.



Registered Sanitarian testing the pH of the pool water

SECTION IV: RECORD KEEPING

Record Keeping

Keeping accurate records is an important responsibility at any pool or spa. Documentation requires time and effort, but will be a benefit to your facility.

Document the following on a daily basis:

- All injuries and fecal incidents as they happen
- Total Alkalinity • Temperature

Document the following upon opening and every 4 hours:

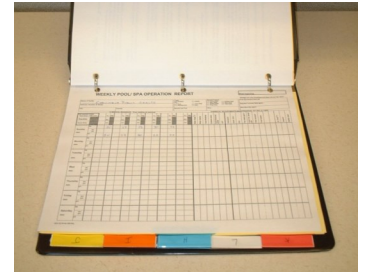
- Free Chlorine • Total Chlorine/Bromine
- Combined Chlorine • pH • Water Clarity
- All Chemicals Added

Document the following every week:

- Stabilizer (Cyanuric Acid, CYA), if used

If you have a SVRS it must be tested and documented at least once per month or according to the manufacturers specifications.

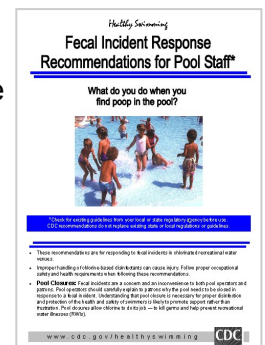
For a pool or spa using an automatic chemical control system, disinfectant and pH data must be manually tested and recorded every 12 hours. You must keep these records at the facility for two years. *Logs that may be used can be found at ODH's website at www.odh.ohio.gov/odhprograms/eh/swim/poolform/constopermaintform.aspx or at CPH's website at www.columbus.gov/publichealth/programs/Water-Protection/*



Fecal Incidents

Immediate action must be taken and the pool or spa closed until it has been properly treated in accordance with the procedures indicated in the CDC “Fecal Incident Response Recommendations for Pool Staff” guideline. An example action that may be taken is as follows:

- Close pool.
- Collect as much as possible in a bucket or net and dispose in a sanitary manner.
- It is NOT RECOMMENDED TO VACUUM.
- The pool must be closed until the following conditions are met to ensure proper contact time of disinfectant is made to kill any germs:
 - Formed Stool – If the pool or spa is at ideal water chemistry conditions and the free chlorine is at least 2.0ppm. The pool needs to be closed for at least 30 mins.
 - Diarrhea – The pool or spa needs to be Superchlorinated/Shocked to raise the free chlorine to at least 20.0ppm and kept closed at least 12.75 hrs.
- **Disinfection times will be longer when using chlorine stabilizer (CYA)*
- Document and record incident.



SECTION V: FACILITY SAFETY

Main Drains & Safety Vacuum Release System (SVRS)

Main drains are important to your pool's operations. Things to remember about main drains:

- Main drains must be in the **deepest area** of pool or spa.
- Must be **covered by outlet covers** which are VGB compliant, require the use of tools for removal, and are maintained in good repair.
- Pools or spas **on direct suction without an SVRS must have two drains** a minimum of 3 feet apart.
 - Unless the drain is considered unblockable ($\geq 18" \times 23"$)
- Main drains must be visible.
- Ensure that the suction outlet covers have not exceeded their manufactured lifespan.

Main drains can become blocked by something covering its opening, which creates a tight suction, or vacuum, between the drain and the blockage. This can cause dangerous entrapment of pool or spa patrons unless there is more than one main drain or a vacuum limit switch is in place.

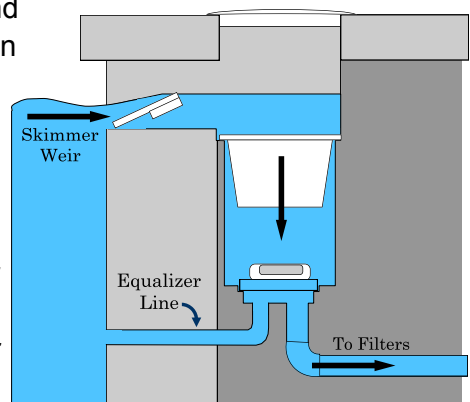
Safety Vacuum Release Systems (SVRS) are required on pools or spas with one main drain on direct suction. This device senses a blockage on the drain and reduces or eliminates suction at the drain. It should be mounted ahead of the hair and lint strainer in your equipment room or integrated with your pump.

Skimmers

Skimmers are located in the pool wall near the surface of the water and contain a basket which filters out objects from getting into the circulation system.

Skimmer weirs are buoyant levers located before the basket and act as a one-way gate, allowing water from the pool in, but not allowing water and debris already in the circulation system out.

Equalizer Lines are usually located below the skimmer box and allow suction to protect equipment if there is a blockage in the skimmer box or low water level. *These lines also must have a VGB compliant cover or be plugged in the pool wall by non-hazardous means.*



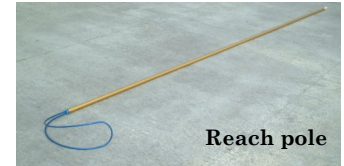
Safety Equipment

Spine Board: All pools must have at least one spine board. If the pool has lifeguards on duty, the boards need to have straps and head immobilizers. If there are pools that share a common fence surrounding them both, these pools may share one spine board.



Spine board

Reach Pole with Shepherds Crook: This pole, as shown, must be at least 12 feet long and nontelescopic.



Reach pole

Personal Flotation Device: For pools without lifeguards, you must have a "U.S. Coast Guard approved type IV personal flotation device" that has a line or rope attached that is at least 1/4 of an inch in diameter and between 30-60 feet in length. This device could be an approved ring buoy, throw bag, or equivalent throwing device.



Personal flotation device

First Aid Kit: There must be a first aid kit in a location that is easy to access at each pool. If the kit is not readily visible at the pool, a sign must be placed giving the location of the kit. The kit cannot be located in a locked room. This kit must contain new disposable gloves and materials such as bandages to stop bleeding and clean minor cuts and scrapes. This is an important part of your pool's safety system. Check the first aid kit regularly, and if materials are expired or out of stock, replace materials with new products.



Emergency Phone

Because emergencies may occur, patrons need quick and easy access to a phone in order to contact appropriate responders for the situation. You must make sure that whenever the pool or spa is open, patrons and lifeguards have access to the emergency phone and that it is in proper working condition.

The phone needs to be within 500 feet of each public pool or spa and under the control of the operator. Posted next to the phone should be a list of emergency numbers, such as police, fire, and rescue units in your area.



Lifeguards

Lifeguards can be a very important part of your aquatic facility. In emergency events, a person's life could be saved if there is a trained and certified lifeguard to respond on-site. Lifeguards also can prevent hazardous situations from occurring by maintaining a safe aquatic area at all times.



Who must have lifeguards?

Ohio Administrative Code says...

- All pools with diving boards
- All pools with recreational slides
- All pools with surface areas of 2,000 square feet or greater
- All pools with a surface area of less than 2,000 square feet and more than 50 people occupying the pool
- All pools with zero depth entry with depths more than 18 inches
- Uniquely designed pools as required by 3701-31-04(E)(4)(d)(ii)

How many lifeguards are needed?

NUMBER OF LIFEGUARDS REQUIRED

NUMBER OF BATHERS	POOL OR SPA SURFACE AREA (IN SQUARE FEET, FT ²)					
	1-1,999	2,000-3,999	4,000-5,999	6,000-7,999	8,000-9,999	10,000 or more
1-50	0	1	1	2	2	2
51-150	1	2	2	2-3	3-4	3-4
151 or more	1	2	3	4	4-5	4-5*

**If the pool or spa has a surface area of 10,000 or more square feet, add one guard for each additional 100 bathers or fraction thereof above 250 bathers*

- See the Ohio Administrative Code § 3701-31-04(E)(4) for more information on lifeguards
 - 6000sq.ft. or larger shall have a written plan

Lifeguards must...

- Be capable swimmers
- Have a valid and current lifeguard certification
- Be certified in CPR
- Be certified in first aid
 - Pool operator must have copies of lifeguard certifications on file
- Be prepared to enter the water at any time
- Have a rescue tube and a CPR pocket mask on their person
- Similarly attired and readily identifiable

SECTION VI: DESIGN REQUIREMENTS

Fencing

Fencing (or barriers) around any body of water is important to keep both pool patrons and the general public outside of the aquatic facility safe from unnecessary dangers. Below are mandatory regulations concerning physical barriers that all public swimming pools must follow.

- All fences to be at least **48 inches high** measured from the ground (*wading pools must have a fence at least 36 inches high*)
- All perimeter fences or barriers shall not have any opening that will allow a sphere with a diameter of 4 inches to pass through
- All doors or gates shall be **self-closing, self-latching and lockable**, and the latch must be at least 38 inches from the ground
- All barriers should require a key for entry, and must be locked whenever the pool is closed

Handrails, Ladders, and Steps

- One of the following must be in place at all public swimming pools for safe entry: **safe ladders, recessed steps, stairs with handrails, or zero depth entry.**
- All new or renovated pools/spas (built or renovated after January of 1999) shall have safe ladders, recessed steps, or stairs with handrails **at the shallow end and the deep end of the pool.**
- All spas must have at least one handrail to indicate the place of entrance for the spa.



Safety Line

Safety lines, or float lines, are floating buoys strung along a rope and stretched across the width of a pool at depth changes or depths of more than 5 feet. These lines keep patrons aware of the increasing depth of a pool. Below are regulations that public pools and spas must follow concerning safety lines.



- Lines must be anchored to interior pool wall
- Safety lines must be installed in pools:
 - When the depth is greater than **5 feet**
 - Where bottom **slope changes**
 - Line needs to be 1 foot towards the shallow side of the slope change
- NOT required if there is no break in slope between shallow and deep portions and water is five foot or less in depth



Decks

The deck surrounding a pool is an important aspect of any aquatic facility and should always be maintained and in compliance with regulations. Pool and spa decks should comply with the following mandates.

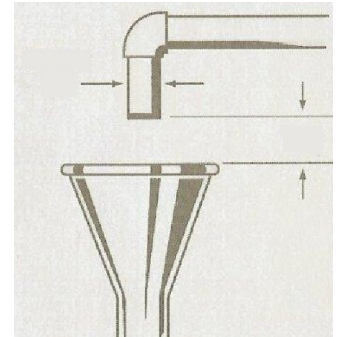
- Decks need to extend **around at least half of the pool perimeter**
 - This means that if your pool is 10 ft x 20 ft (10 ft + 10 ft + 20 ft + 20 ft = 60 ft perimeter), you need the deck to be surrounding at least 30 ft of the edge of the pool
- Outdoor decks should be at least 5 feet wide
- Indoor decks should be at least 3 feet wide
- There should be **no standing water** on decks
 - Standing water can cause patrons to slip and fall, so keeping the deck as dry as possible is always safest.
- Water collected on **decks must drain to separate drainage system**
 - Must NOT drain to pool or recirculation system



Backflow Prevention

Pool water must come from an approved source. Because pool water typically comes from the same lines that deliver drinking water, an approved method of backflow prevention must be in place. Your pool or spa must have one of the following:

- An air gap between the water surface and the end of the supply line
- ASSE 1013 in use for direct connections (mechanical device)
- ASSE 1011 for a fill line connected to a hose bib
- ASSE 1019 spigot for a fill line



Air Gap



ASSE 1013



ASSE 1011



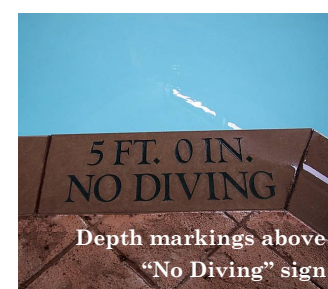
ASSE 1019

SECTION VII: SIGNAGE

Deck Signage

Depth Markings and “No Diving” Signs

- Letters for both must be at least 4 inches high and in contrast to the background
- An equivalent “No Diving” graphic can be used in place of the words “No Diving”
- Both must be within 2 feet of waters edge or six inches of the gutter
- Depth markings and “No Diving” signs should be next to one another
- There is to be at least two depth markings per spa or wading pool
- Depth markings and “No Diving” signage cannot be more than 25 feet apart at all pools
- Deck signage must be slip resistant



Safety Signage

In addition to the “No Diving” signage and the depth markings on the deck of the pool, other signs must be in the area to help ensure the safety of the patrons.

If your pool is not required by law to have a lifeguard (see page 16), you must post sign(s) stating:

- Warning, No Lifeguard
- Swimming alone is not recommended
- Children must be supervised



Close to each pool or spa, you must post a **sign stating the location of the nearest telephone** if the phone cannot be seen from the pool or spa area.

At the emergency phone you must **post the name and phone numbers of the nearest available police station, fire station and rescue unit.**

Any time the pool or spa is closed, you must post at least one sign stating “Danger - Pool (or Spa) Closed” or “Warning - Pool (or Spa) Closed.”

Some signs may be found at CPH’s website at www.columbus.gov/publichealth/programs/Water-Protection/

Spa Signage

Spas need to have special signage that pools do not need to have. This is because of the special risks that are involved with spas mainly due to the high temperature of the water. Below is the information that must be contained on a spa safety sign:

CAUTION SPA USERS

- 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 (one hundred four degrees Fahrenheit).
- Do not use alone.
- Unsupervised use by children is prohibited.
- 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.



Sign may be found at CPH's website at www.columbus.gov/publichealth/programs/Water-Protection/

SECTION VIII: SPRAY GROUNDS

What is a spray ground?

“A special use public swimming pool for bathing and/or interactions with fountains, sprays, jets, and other special features designed without standing water when the fountains are turned off so that users have full body exposure with circulated water”

Special Concerns for Spray Grounds:

- Circulation system must operate continuously, 24 hours a day, during all parts of year the spray ground is in use.
- An automatic controller is required for all spray grounds.
- Turnover rate, within the mixing holding tank, must meet a full system turnover at least once every 30 minutes.
- Surface must be slip & trip hazard resistant.
- All water should properly drain to ensure no standing water is present above the level of the outlet.



Spray Ground Signage

- Do not use pool when you have diarrhea
- Water is not meant for drinking
- Wash hands after using the restroom or changing diapers
- Take regular restroom breaks, change diapers only in a restroom

Any safety recommendations provided by manufacturer/designer should be posted, as well.

SECTION IX: RENOVATIONS

Plan Review and Equipment Replacement

If you are making any major changes or renovations to your aquatic facility, you must get it approved through the Ohio Department of Health. Any new or renovated pool must go through plan approval before it opens. Detailed drawings of the pool area need to be included during plan approval.

Substantial Alteration—Changes that exceed simple equipment changes. Plans must be submitted to ODH. This includes, but is not limited to:

- Change in the basic design (depth, shape, circulation system design, add special feature, deck, diving board basic design, perimeter barrier)
- Replacement of the circulation system
- New/relocated dive stand
- Pipe replacement (All to or from pool)
- Overflow system replacement (50%)

*Questionable situations call ODH Engineering (614)644-7527

When replacing old equipment or changing disinfectant types, an “Equipment Replacement Notification Report” must be completed and submitted to the Ohio Department of Health. If you are replacing an older device for a newer version, no report needs to be submitted as long as all specifications are identical.

You can find both the Application for Plan Review and the Equipment Replacement Notification Report on the ODH’s website at www.odh.ohio.gov/odhprograms/eh/swim/poolform/constopermaintform.aspx

SECTION X: CITY OF COLUMBUS CLOSURE PROCEDURES

Immediate Closure

According to Columbus Public Health a public swimming pool shall be immediately closed if any of the following conditions exist:

- The water clarity is not sufficient to see the main drain.
- The main drain is not secure or is missing.
- The disinfectant level cannot be measured.
- If none of the following are available: 1) Reach pole, 2) Personal flotation device, or 3) Spine board.
- The disinfection system is not in compliance with OAC §3701-31-04(D)(2) and §3701-31-04(D)(7).
- No lifeguard is on duty when required.
- The emergency phone is not accessible or operating properly and is not in compliance with OAC §3701-31-04(E)(2)(e).
- The presence of a hazardous object or substance in the swimming pool.
- Cyanuric acid above 100ppm.
- SVRS not functioning

If one of these items exists then the operator needs to close the pool until the imminent health hazard is corrected. If one of the above items are found during an inspection by Columbus Public Health, and the operator has not taken action, then the pool will be closed and a red sign issued.

Winter Closure Procedures

A public pool must be closed for the winter utilizing one of four methods (listed below). You must lock the entrances, post a “Danger/Warning - Pool (or Spa) Closed” sign, and meet one of the following requirements:

- Completely drain the pool and provide a perimeter barrier*. You must also ensure that the facility is inspected twice a month when it is closed, correcting violations as necessary and recording inspections.
- Leave the pool filled or partially drained and cover the pool with something that will support 225 pounds of weight. Also provide a perimeter barrier*, and have the facility inspected twice a month, in the manner stated above.
- Partially drain pool. Provide a perimeter barrier 6 feet high and a person to inspect the pool weekly in the manner stated above.
- Partially drain pool. Provide a perimeter barrier*, and provide a person on-site that will have frequent observance over the pool and will perform weekly inspections.

**Perimeter barrier needs to be 48 inches high, or 42 inches high if built before January 1, 1999*

If you do not wish to open your pool for the season, you must:

- Keep pool closed in accordance with one of the closure methods
- Pay for license - *If kept unlicensed, pool will have to be demolished or go through plan review with the Ohio Department of Health (ODH).*

