Joplin Health Department

2024 Pool School

Housekeeping at the Joplin Public Library

- Please silence your cell phones.
- Vending machines are on the West side of library.
- This is a NON-SMOKING campus.
- Please go off campus to smoke.
- Restrooms are just outside this room.

- Women's to the West.
- Men’s to the East.

Purpose of this Class

- This class will pertain to pool operators that handle the daily functions of operating recreational water facilities.
- Over the course of this presentation, we will highlight best practices and go over the significant requirements of our ordinance.
- To meet the regulators and answer questions regarding your recreational water facility.

Handouts

- You have…
  - Calculations sheet
  - Daily checklist
  - Daily chemical log
  - Seasonal closing checklist
  - Seasonal opening checklist
  - Pen
  - Notepad
  - Complimentary handout bag
- Additional free items on the table in the back

Contents

1. Water Quality Standards
2. Routine Operations
3. Equipment Maintenance
4. Patrons, Spectators, and Staff
5. Swimming Pool Closures
6. Safety
7. Trouble Shooting
8. JHD Information

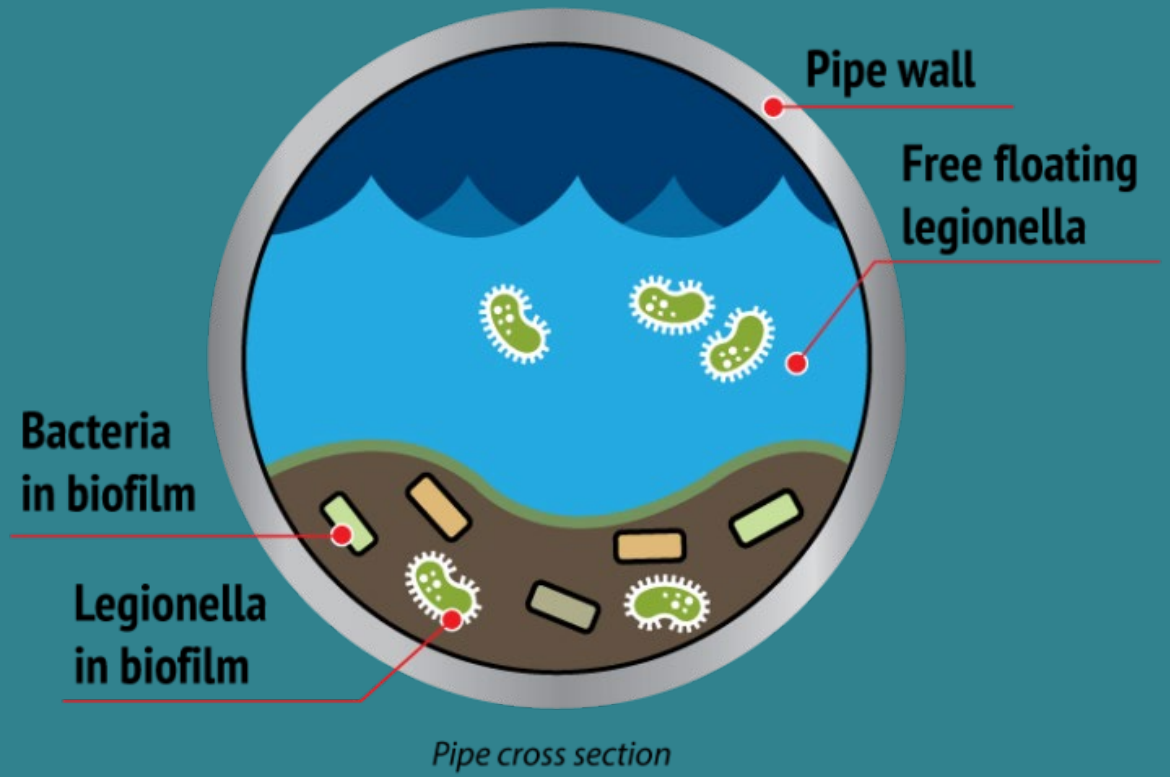
Importance of Pool Safety

Recreational Water Illnesses (RWI)

- Diseases that people can get from contaminated water they swim in.
- Disinfection is the first line of defense against RWI.
- Over 10% of pools fail their routine inspection due to improper disinfection levels.



Importance of Pool Safety



Pipe cross section

Between 2015 – 2019 (4 years) 208 outbreaks of RWI were reported.

- 71 outbreaks associated with hotel/motels.
- Resulted in 13 deaths.
- Cryptosporidium and Legionella are the most common causes of outbreaks.

Importance of Pool Safety

Drowning and Entrapment

- Drowning is the leading cause of death in children ages 1-4 and is the second leading cause of death in children ages 5-14.
- From 2014 to 2018, 11 reports of entrapment
  - 6 reports from public pools (2) and spas (4).
  - All victims were younger than 15 years of age.
  - More female victims than male because of hair entrapment.



Importance of Pool Safety

Chemical Accidents - Improper use or storing of pool chemicals can lead to high concentration levels or reactions causing burns, rashes, asphyxiation, and cancers.







Water Quality Standards

- Swimming pool water shall be **automatically** and **continuously** disinfected 24 hours a day.
- For slide pools, spas, or other special-purpose pools, we may require a higher disinfection residual than stated in the code.



Water Quality Standards



Free Chlorine

- Minimum 1.0 mg/l for a pH of 7.2
- Maximum 5.0 mg/l
- Ideal level should be between **2.0 mg/l** and **4.0 mg/l**
- Greater than 10 mg/l the pool must close immediately
- For higher pH values, 0.2 mg/l free chlorine for each 0.2 pH unit increase

Water Quality Standards

Chlorinated Isocyanurate (Chlorine with Cyanuric Acid)

- Minimum 1.0 mg/l for a pH of 7.2
- Maximum 5.0 mg/l
- Greater than 10 mg/l the pool must close immediately
- For higher pH values, 0.4 mg/l free chlorine for each 0.2 pH unit increase
- Cyanuric Acid protects chlorine from UV degradation
- Cyanuric Acid concentration shall not exceed 100 mg/l



Water Quality Standards

Bromine

- Minimum 2.0 mg/l for a pH below 7.8
- Maximum 10.0 mg/l
- Ideal level should be between **4.0 mg/l** and **6.0 mg/l**
- Greater than 10 mg/l the pool must close immediately



Water Quality Standards

Water Testing

- Daily testing for disinfectant and pH should be done before opening and every 2 hours while open.
- Types: Block comparator, Dip and read test strips, Photometer.
- Sampling procedures:
  - A sample should be taken from 18 inches below the water surface.
  - When comparing colors, hold at eye level towards northern horizon in daylight.
  - When adding drops, hold the bottle straight up and down for proper drop size.

Water Quality Standards



Dip-and-read test strips





Block comparator

Water Quality Standards



Photometer



Water Quality Standards

Superchlorination – Process of adding free chlorine or persulfate to reduce the concentration of combined chlorine.

- This is required when combined chlorine is greater than 0.5 mg/l.
- Raise free chlorine level at least 10 times the combined chlorine level.
- The pool must be closed, and only reopened when free chlorine levels drop below 5 mg/l.
- Only superchlorinate with chemicals designed to do so.

Water Quality Standards

Fecal Incident Response

- Close pool
- Remove as much fecal matter as possible
- Raise the free chlorine levels using these charts
- Backwash filters as needed
- Reopen pool when disinfection levels reach operating range
- Record the incident and keep records

Formed Fecal Incident	
Free Chlorine Concentration (ppm)	**Disinfection Time**
1.0	45 Minutes
2.0	25 to 30 Minutes
3.0	19 Minutes

Diarrheal Incident			
Concentration X Time Inactivation Value	**÷**	**Free Chlorine Concentration (ppm)**	**Time (Minutes)**
15,3000	÷	20	= 765 (12.75 hours)
15,3000	÷	10	= 1,530 (25.5 hours)

Water Quality Standards

Vomit in Pool Water

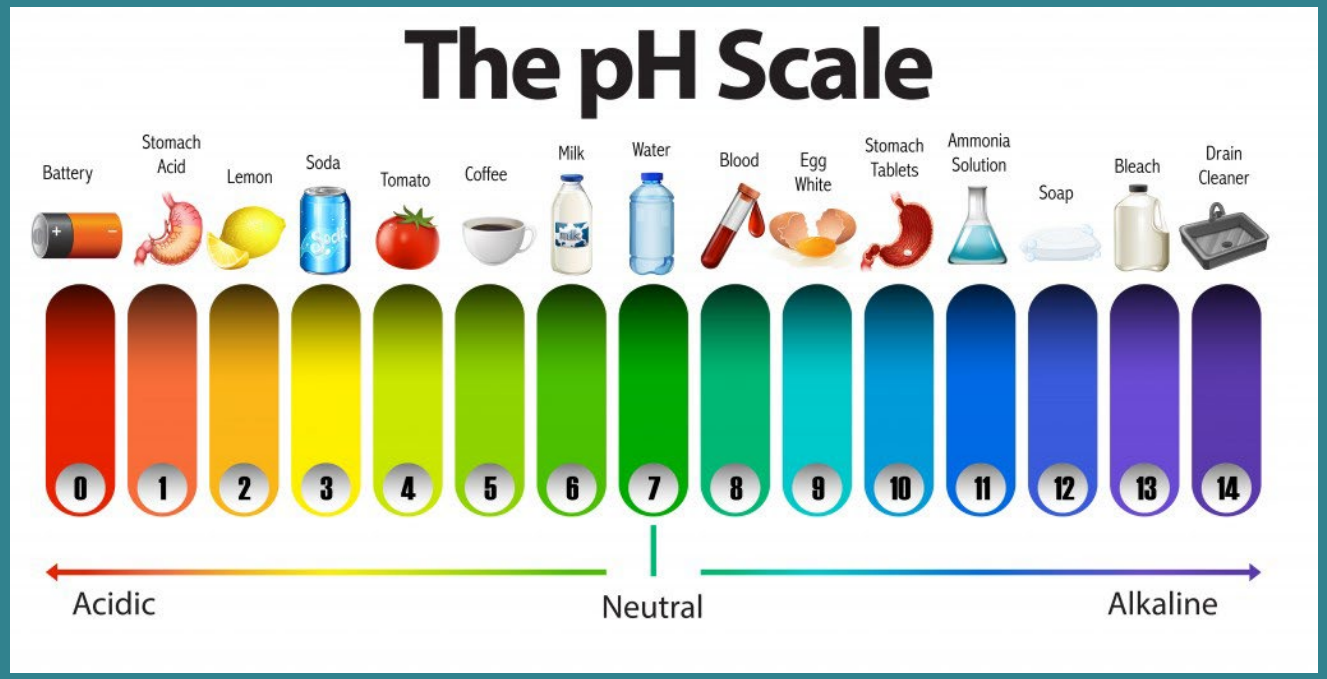
- If stomach contents are vomited up, take immediate action and respond the same as a formed fecal incident.

Blood in Pool Water

- Chlorine is good at killing germs found in blood. There has not been a case of someone becoming infected after exposure to blood in a pool.
- Ensure that the pool has proper disinfection levels.

Water Quality Standards

- pH – Maintained between 7.2 and 7.8.
- Alkalinity – Maintained between 60 mg/l and 180 mg/l.
- Clarity – Sufficient clarity that the main drain is readily visible from the side of the pool.



Water Quality Standards

Temperatures

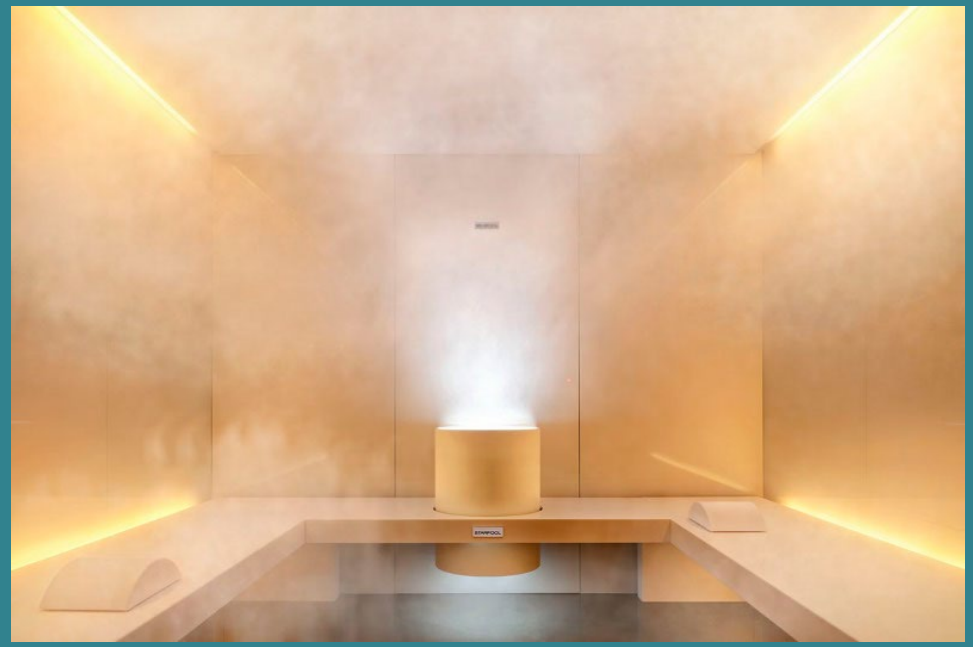
- Pool water temperatures should be maintained between 72°F and 85°F.
- Spa water temperatures must be maintained below 104°F.
- Special purpose therapy pools or spas may have different temperatures.
- Air temperature for an indoor swimming pool should be maintained from 2°F to 5°F above the pool water temperature.



Water Quality Standards

Indoor Air Handling

- Indoor relative humidity - 40% to 60%
- High humidity levels corrode building components
- Low humidity levels increase evaporation
- 6 to 8 air changes should occur every hour, 4 to 6 with mechanical cooling
- Maintain CO_2 levels below 0.1%



Routine Operations

Daily non-operating pool tasks

- Clean the deck
- Brush the pool walls
- Vacuum the pool floor
- Skim the water
- Clean and disinfect showers, restroom floors, and toilets
- Clean and inspect lockers



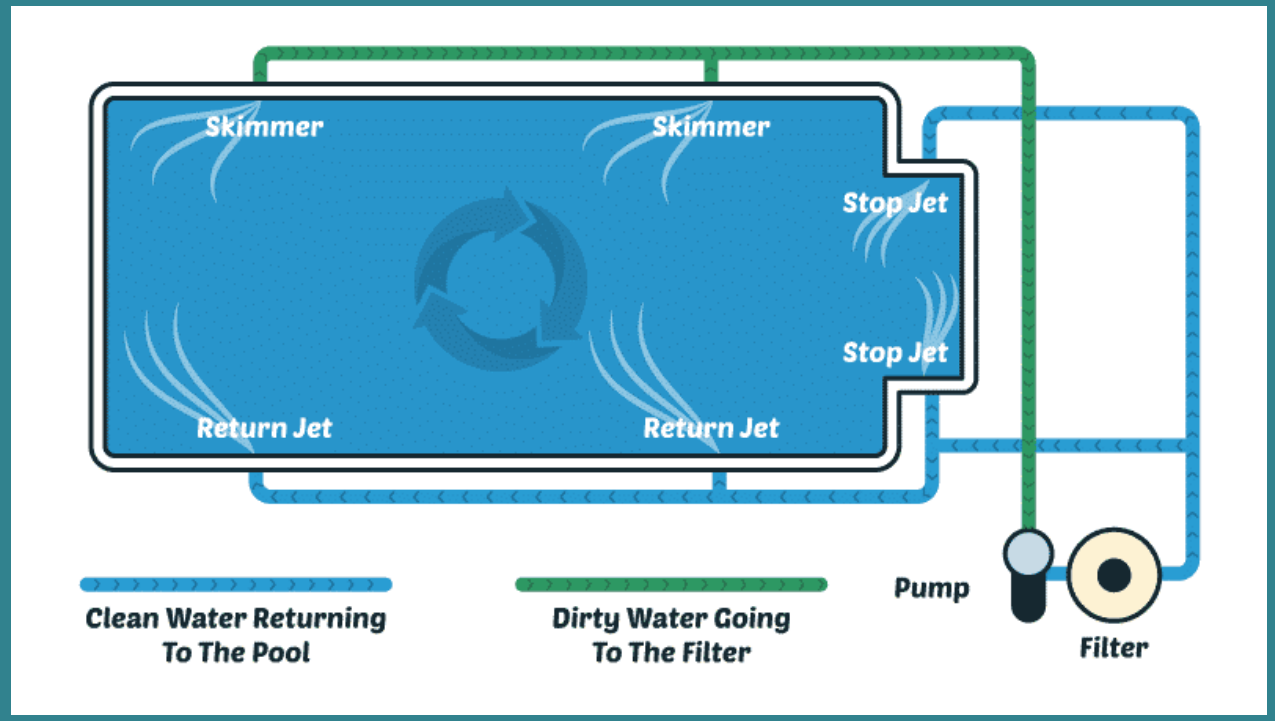
Routine Operations

- Mechanical Systems should be inspected daily, and any necessary repairs made.
  - Skimmers shall be cleaned daily and adjusted to assure effective skimming. Keep water levels in the middle of the skimmer opening.
  - Broken main drain grates shall be repaired or replaced as soon as possible. **The pool must remain closed until an approved grate is properly installed.**





Routine Operations



Inlet flow rates and direction shall be adjusted to assure circulation in all areas of the pool. Keep the water level 12 inches above inlets and all going in one direction, clockwise, or counterclockwise.

Routine Operations

- Water Level – Water shall be added to the pool to assure effective skimming.
- Other Equipment – All safety equipment, deck equipment, and signs shall be checked daily to assure compliance with these standards.



Routine Operations

- Records – Daily operating records shall be maintained and kept for at least 6 months.
  - Records should contain disinfectant residual, pH, any other chemistry or bacterial imbalances, water temperature, amount of chemicals used, backwashing, and special occurrences (such as equipment breakdown, fecal accidents, unusual problems).
- Water Analysis
  - Water quality analyses shall be performed daily
  - Test kits shall be properly maintained
  - Reagents and test strips renewed at least annually

Routine Operations

Chemicals

- Safety data sheets shall be kept on site for all chemicals.
- Store chemicals out of reach and in a cool, dry place and off the ground.
- Keep potentially corrosive, liquid chlorine or muriatic acid, away from metal items.
- Never mix chemicals together.
- **Never add water to chemicals!**
- Dilute small spills with water and clean up right away.
- Use different scoops for all chemicals.
- Do not reuse chemical containers.
- Use proper PPE and stay in a well-ventilated area.




Break Time

Equipment Maintenance

All equipment shall be operated and maintained properly.

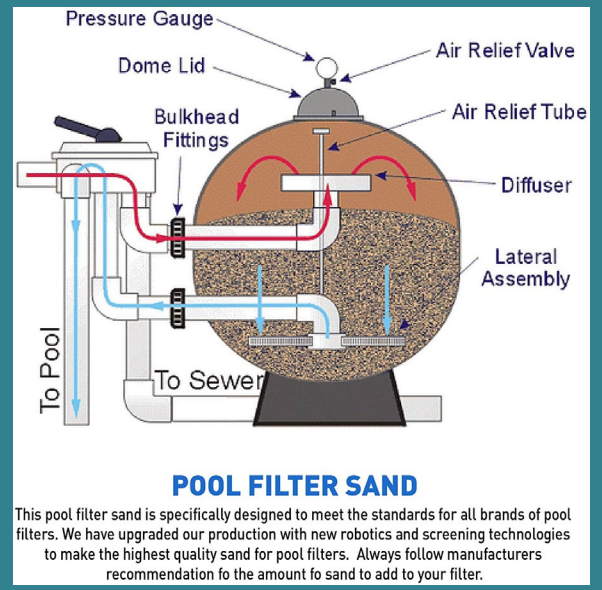
- Keep all equipment manuals for reference.
- Pumps, filters, disinfectant feeders, flow indicators, gauges, and all related components of the pool water recirculation system shall be kept in continuous operation **24 hours a day.**



Equipment Maintenance

Sand Filter

- Open the air release valve daily.
- Backwash at the flow rate indicated by the manufacturer or before.
  - Pressure differential exceeds 8 pounds per square inch
  - Or the flow rate drops below the required minimum
- Inspect internal components annually or when the filters fail to produce clear effluent.



Equipment Maintenance



Diatomaceous Earth (DE) Filter

- Backwash at the flow rate indicated by the manufacturer or before
  - Pressure differential exceeds required maximum or,
  - The flow rate drops below the required minimum
- Inspect internal components annually or when the filters fail to produce clear effluent.
- Replace strainer basket after backwashing the filter.
- Keep a two-week supply of DE ready.

Equipment Maintenance

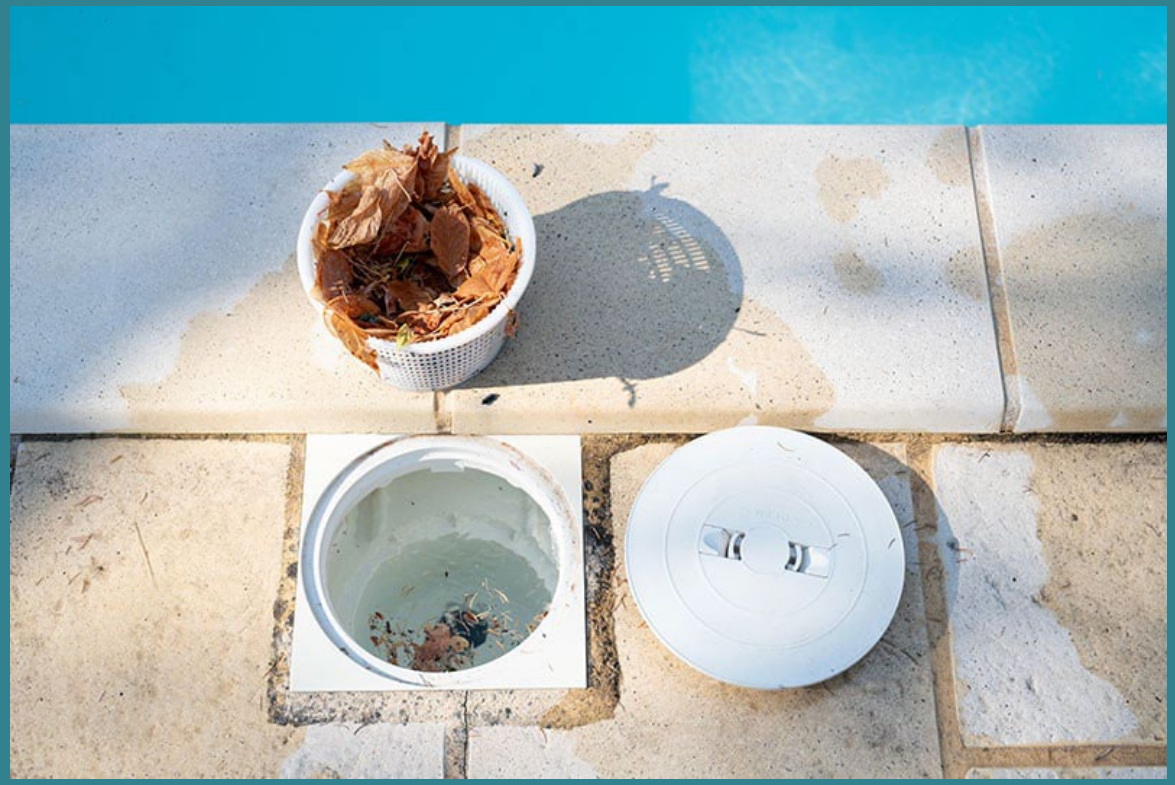
Cartridge Filter

- Clean, disinfect, and replace as the manufacturer recommends.
- Do not backwash filters. Remove the filter from the housing, spray down and clean.
  - To remove mineral, build up, soak in a light acid wash.
- Keep at least one extra set of filters on site and available.

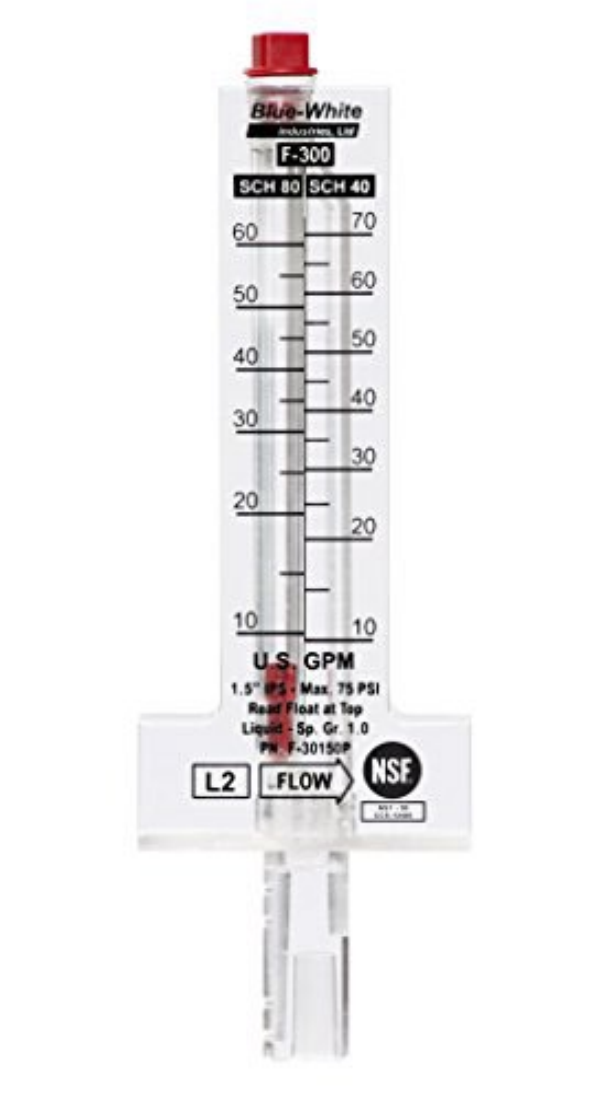


Equipment Maintenance

- Strainer baskets shall be removed and replaced by clean baskets frequently.
- Operate valves through their entire range occasionally to prevent corrosion and dirt from sealing them. Tighten or repack valve stem glands as necessary to prevent leakage.

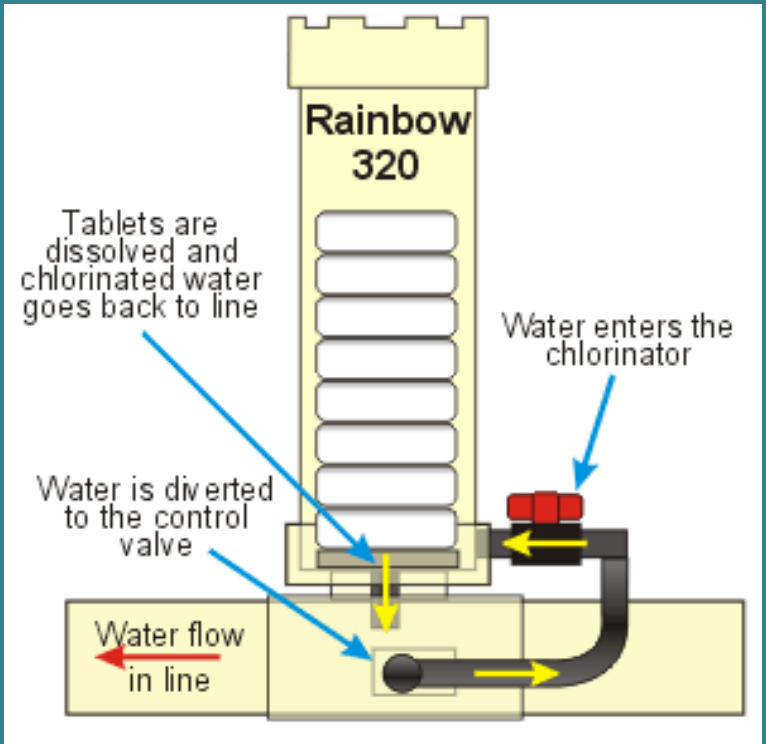


Equipment Maintenance



- Maintain flow meters in operating condition. Keep connecting tubes clean.
- Gauges – Bled lines occasionally to prevent blockage. Inspect periodically to assure proper operation, repair, as necessary.

Equipment Maintenance



Erosion Feeders

- Inspect and service periodically
- Only use chemicals designed to be used in erosion feeders
- Clean connecting tubes and replace as necessary to permit continuous free circulation

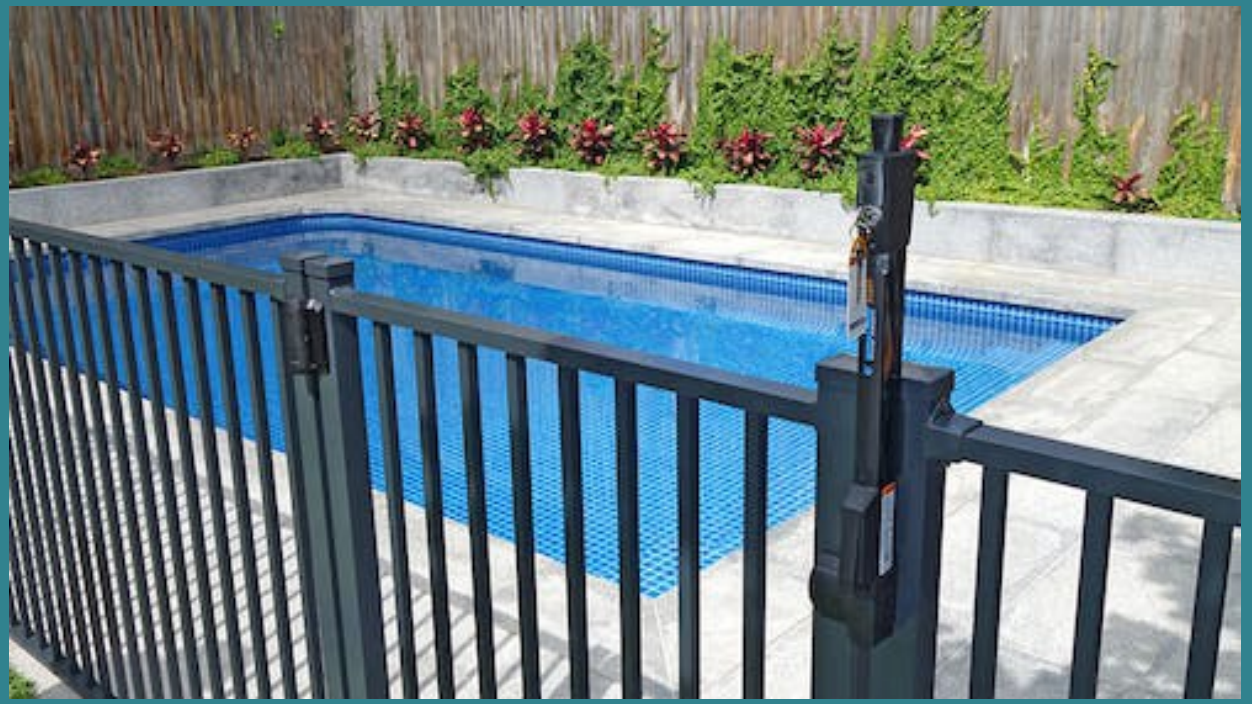


Equipment Maintenance

- Pool Structure and Decks
  - Cracks in the pools walls, floor, perimeter overflow systems and decks shall be repaired as soon as possible.
  - Seasonal pools shall have the repairs completed before annual reopening.
  - Pool walls, floors, deck, and equipment shall be painted as often as needed to keep them in good condition and free of corrosion.
  - Pool structure paint color shall be white or light in color.
  - The front edge of the steps in the pool should be painted a contrasting color.

Equipment Maintenance

- Fencing – At least 4 feet high, 2-4 inches off the ground, and less than 4-inch opening.
- Gates – Open away from the pool, be self closing and self latching.



Equipment Maintenance

- Electrical Systems
  - Periodic inspections and repairs shall be made by a licensed or certified electrician.
  - Defective underwater and overhead lights, including their lenses, shall be immediately repaired or replaced.
- Emergency shut off switch must be provided 5 ft to 10 ft from the spa.
- All water supply lines for pools and spas shall be protected against back flow. (Hose Bibb).

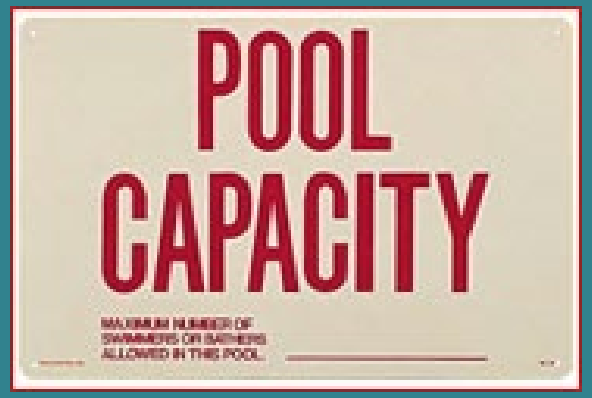


Patrons, Spectators, and Staff

Patrons

- Swimmers with an infectious disease communicable via water, shall not be permitted in the swimming pool (diarrhea or and open infected wound).
- Swimmers should shower before entering the pool and after using the toilet, before returning to the pool.
- Only clean swimwear shall be worn in the swimming pool.

Patron Load Limit – Do not exceed your patron load limit. Post a sign with the maximum number of bathers at one time.



Patrons, Spectators, and Staff

Signs shall be posted for effective visual observation.

- Clock shall be provided for spa users.
- Spa Rules Sign.
- Pool Rules Sign.
- No Lifeguard Sign.
- No Diving sign required when pool depth is 5ft or less.
- Prevent drowning sign.



Patrons, Spectators, and Staff

Spectators – Entry of persons in street clothes or shoes should be minimizes to prevent contamination of the swimming pool deck or the pool

Staff

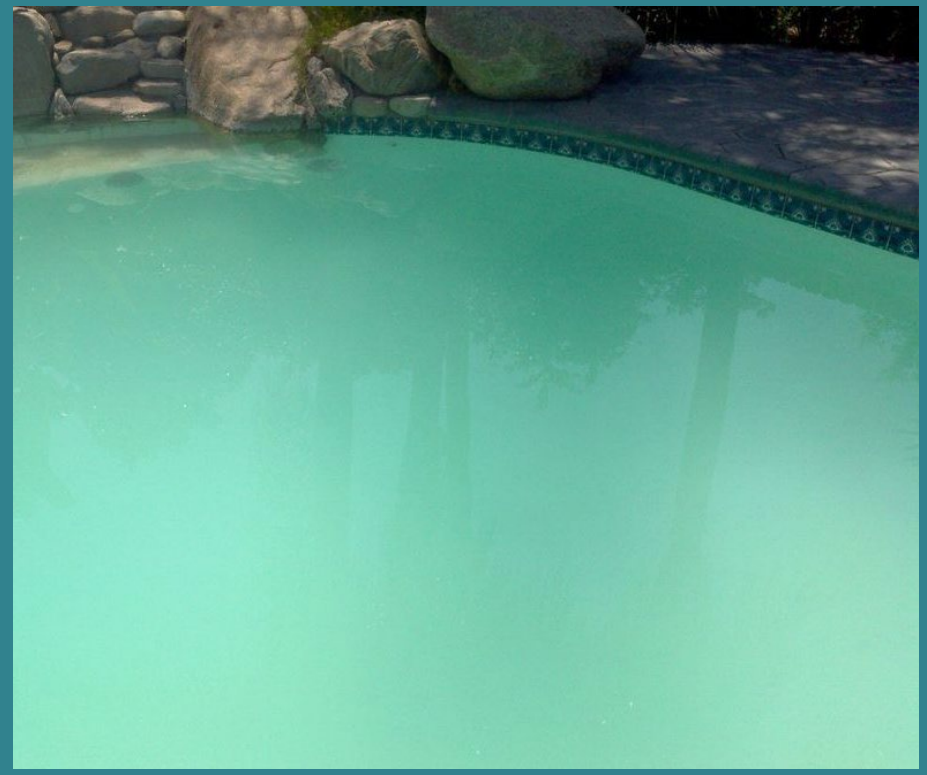
- Operator – A person knowledgeable in poolside testing and in operating the water treatment equipment shall be on the premise or immediately accessible whenever the pool is open for use.
- Additional staff shall be onsite at the facility as needed

Lifeguards

- One lifeguard and chair per 2,000 square feet of water surface for public pools.
- Semi-public pools may choose to provide lifeguards and use these same standards.
- Each lifeguard shall have valid and current lifesaving or lifeguarding certificate.
- Lifeguards shall be appropriately dressed and identifiable.
- Lifeguards of duty shall not engage in activities that would distract their attention for their duties.
- Slide Attendants – Slides must be supervised unless they meet all the exemption criteria in the code.

Swimming Pool Closure

- Disinfectant Residual
  - Chlorine or Bromine level exceed 10mg/l
  - Chlorine level is below 1 mg/l
  - Bromine level is below 2 mg/l
- Main drain is not visible from the side of the pool.
- Water treatment equipment is not functioning, no continuous disinfection.



Swimming Pool Closure

- Presence of bare electrical wire or other obvious electrical deficiency.
- Operator is not on premise or immediately accessible, or the absence of a required lifeguard.
- Enclosures do not comply with prevailing building code.
- Any other condition creating an immediate danger (damaged or missing main drain, thunderstorms, etc.).

Swimming Pool Closure

- Closure Signage – When the pool is closed for any reason, all entry and exits points shall be properly maintained and secures against unauthorized entry and a sign saying, "Danger – Pool Closed" shall be provided.



Swimming Pool Covers

- Must be maintained in a clean and sanitary condition.
- If the deck area is accessible when the pool is covered, a fully secured safety cover should be used.
- For seasonal, outdoor pools that wish to retain water it is recommended that they have a safety-type cover that can support the weight of a person.



Safety

Accident Prevention

- Decks shall be kept slip resistant and in good repair, without litter, obstructions, tripping hazards, or sharp edges.
- All deck equipment shall be kept secured and in good repair.
- Depth markings shall be maintained and plainly visible.
- Boundary line marked on the pool walls and floors at 5 ft clearly visible.
- Doors and gates to pool area shall be kept closed when not in use and locked when pool is not open for use.
- No glass objects in the pool enclosure.
- No running in the pool enclosure.

Safety Equipment



- Required lifesaving equipment:
  - Reaching device (Shepherd's crook)
  - Throwing device with a rope 1.5 X the width of the pool
- Lifesaving equipment shall be kept in good repair, at an established location, in ready condition, and only used for the intended purpose.
- Lifelines separating the shallow and deep (5ft) areas shall be kept in place and good repair.
- Any self-contained breathing apparatus, where required or provided, shall be kept in good repair and ready condition.

Safety

- Starting Blocks shall be removed or made inaccessible, except when competitive swimming or training is taking place.
- A place of action shall be prepared in writing and practiced with staff.



Trouble Shooting

Scale - Crusty white deposits on pool surfaces and circulation systems.

- Cause: High pH, alkalinity and calcium hardness levels.
- Treatment: Balance water chemistry, use cleaners with low pH.
- Prevention: Properly balance alkalinity, calcium hardness, pH and total dissolved solids.



Trouble Shooting



Scum Line - Microscopic deposits of chemicals at or slightly above water line.

- Causes: Water contaminants with low water solubility (calcium scale, skin fragments, skin oils, debris in water, cosmetics, detergents).
- Treatment: Use a cleaner in the water.
- Prevention: Regularly brush water line, use scale inhibitor, proper water balance.

Joplin Building Department

Contact for any building code questions and renovations

Rick Woods
Plan Reviewer
417-624-0820 ext. 1509

Bryan Wicklund
Chief Building Official
417-624-0820 ext. 1519

JOPLIN

PLANNING, DEVELOPMENT, & NEIGHBORHOOD SERVICES

Joplin Health Department

- Routine Monthly Inspections
- Complaint inspections
  - Inspect the nature of the complaint
- Annual pump room inspection
  - Conducted during one routine monthly inspection



Joplin Health Department

Thank you
Joplin Health Department
417-623-6122
321 E 4th St Joplin, MO 64801

Annie Duff
Jared Laster
Ryan Starchman

JOPLIN
HEALTH DEPARTMENT

Certified Pool Operator

CPO certification provides individuals with the knowledge, techniques, and skills required for proper pool operations. This course is available as both a blended training program or completely virtual.



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