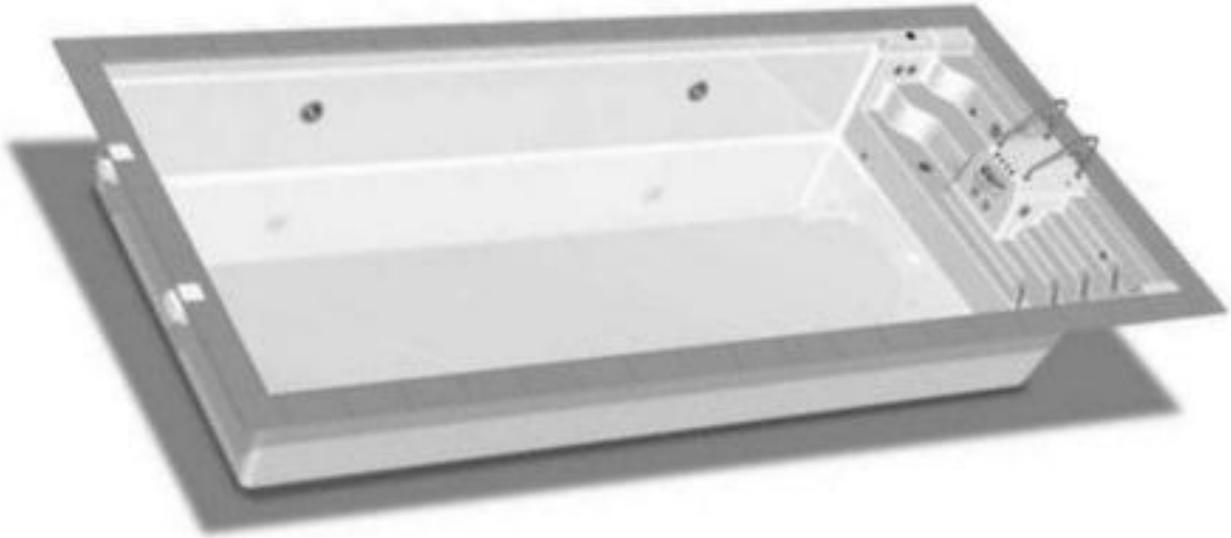




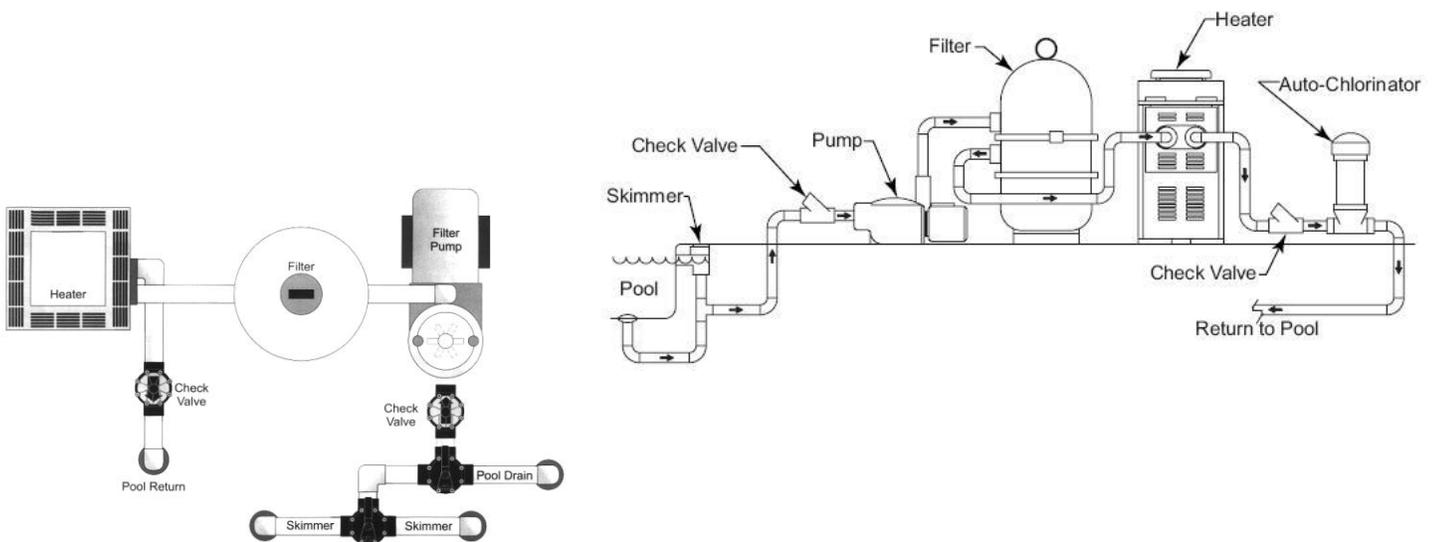
# Arkansas Department of Health



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## GUIDELINES FOR POOL AND SPA OPERATORS

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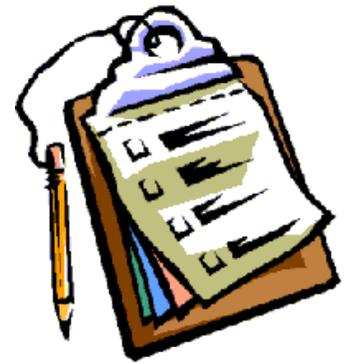


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## Pre-opening Checklist



Pool floors and walls watertight and free of cracks; repairs or resurfacing done
No visible dirt or algae; recommend power washing pool to remove stains and debris
Inlets in good working order and adjusted to prevent dead spots in water circulation
Main drain properly grated and secured (approved covers) *check hydrostatic valve for proper operation before refilling pool
Skimmers in good repair, weirs operational, baskets cleaned of any debris
Hair and lint strainers in place; checked and cleaned
Chlorinator in good working order: no leaks, inlet/outlet lines checked for brittleness and buildup inside lines
Gas chlorinators (if applicable) properly installed and ventilation method(s) working, supplied SCBA
Filter system in good working order: no major leaks, gauges work, filter media level and cleanliness checked
Diving boards, ladders, hand rails properly attached and non-slip steps provided—step edges marked
Lighting in good repair: light fixture(s) screws and framing secure and leak proof—GFI provided for underwater lights
Concrete walkways and decking in good repair & properly drained; loose debris removed & repairs made
Pool fence is minimum of 4 feet high and no opening between railing larger than 4 inches—gate is self-closing, self-latching and lockable
Flow meter working: can be easily read, no cracks or leaks, plunger able to ‘flutter’, not filled with debris
Warning signs posted in plain view with clearly visible lettering at least 4 inches high
Life saving equipment is provided and in good working order: poles, lifelines, life preservers, One ring buoy or similar flotation device such as an American Red Cross approved rescue tube and/or shepherd’s crook and pole (recommended by Department), & flutter boards--& <b>must be accessible at all times</b>
Depth markers: required height, contrasting color (pool wall and deck), unit of measurement
Water test kit has new reagents---test strips have not expired
Chemical rooms clean and free of water and/or leaks
Required records (and extra blank copies) ready and in place: Swimming Pool Operational Record, Report of Accident or Drowning
Recommended Forms: Record of Pool Contamination Incident, Employee MSDS Training
First Aid kit and basic life saving equipment provided and restocked
Lifeline installed and in good condition in pools greater than 5 ½ ft deep
Indoor pool has proper ventilation to prevent moisture accumulation; HVAC system working properly
Contact the local health unit for seasonal opening/permitting; 7-10 days before announcing pool opening
Annual permit fee paid

**\*In compliance with Federal Pool and Spa Safety Act (Virginia Graeme Baker)**

# Pool Water Chemistry

## Effects of pH

Bacterial rate of kill  
Eye irritation  
Corrosion of pipes  
High pH may also cause clouding & discoloration of water  
Low pH may cause corrosion damage to recirculation system  
Effects on coagulants used in rapid sand filters  
Algae growth

## Factors Affecting pH

Gas chlorine lowers pH  
Sodium & calcium hypochlorite raise pH moderately  
Makeup water may affect pH  
Windblown dust, debris, and bather contaminants may cause sudden changes in pH

## Total Alkalinity

Total alkalinity is the measure of the ability of the water to resist changes in pH  
Total of all alkaline chemicals in pool water mostly: carbonates, bicarbonates, and hydroxides  
Total alkalinity is the ability of carbonates and bicarbonates to neutralize or buffer acids  
Proper ranges: ▪ plaster pools 80-125 ppm ▪ vinyl, painted, fiberglass pools 125-150 ppm

## Effects of total alkalinity

If low alkalinity: pH bounce, staining, increased corrosion  
If high alkalinity: cloudy water may occur due to suspend calcium carbonate in water, high acid demand, pH usually high, bicarbonate scale

## Stabilization ---Cyanuric acid stabilizer/conditioner

### *Characteristics and helpful information:*

Granular product, which prevents loss of chlorine to ultra-violet sunrays  
Dissolves very slowly—totally soluble-- Floats on top layer of water  
Leaves no residue—does not dissipate or wear out—is lost with backwash, drag-out, and splash out leaks  
Operator must keep chlorine level at minimum 1.5 ppm to ensure proper chlorination level when using stabilizer  
Excessive levels of cyanuric may lead to an increased risk of algae growth

When stabilizer/cyanuric acid is present in sufficient amounts in the pool water, the free chlorine residuals remain 3-10 times longer than a pool with no stabilizer/cyanuric acid present in the water

## Half of the chlorine in the water can be destroyed by sunlight in less than one hour causing free chlorine levels to drop and increase the chance of disease transmission and illness

*Application:* Backwash filter and with pump in operation slowly add stabilizer through skimmer or broadcast stabilizer into deep end of pool ----also do not backwash filter for 24-36 hours

\*Note: if using trichlor- or dichlor- products, a stabilizer is already present in the formed tablet

## Calcium Hardness

Low causes: foaming in spas, corrosion (if pH & alkalinity are also low), etching may occur on cement and plaster finishes

*Solution:* add calcium chloride

High causes: rough pool/spa surfaces that can scratch and infect skin, clogged filters, scaling, cloudy water, reduce circulation, short filter runs

*Solution:* partially drain pool and refill

## Total Dissolved Solids (TDS)

Dissolved matter contaminants from bathers waste (sweat and other), algacides, metal/stain control chemicals, clarifiers, defoamers, enzymes, wind-borne debris and water balancing chemicals

High amounts of TDS can cause disinfection problems leading to algae and bacterial growth that may cause illness, make the water look dull/tired, scaling may occur, chemical balance hard to maintain and may exhibit a bad/salty taste

*Solution:* have a water replacement schedule especially on spas or salt generating pools - See Spa Water Change (Page 7)

## ARKANSAS POOL CHEMICAL OPERATIONAL PARAMETERS

Below are operation parameters for the proper chemical treatment and maintenance of pool/spa water. Chemical treatment alone will not produce sanitary pool water. A filtration system in proper operational condition is also required to attain sparkling clear, polished, sanitary water. **\*Mandatory tests for compliance \*\*Test when suspect**

Disinfectant Levels*	Min	Ideal	Max	Comments	Chemical Values	Min	Ideal	Max	Comments
Free chlorine, ppm									
Pool	1.0	1.0 – 3.0	5.0	Hot weather/heavy use may require operation at or near maximum level. Regular Superchlorination is recommended.	pH*	7.0	7.4 – 7.6	7.8	If pH is: <b>Too high:</b> Low chlorine efficiency, Scale formation, Cloudy water, Eye discomfort <b>Too low:</b> Rapid dissipation of disinfectant, Plaster and concrete etching, Eye discomfort, Corrosion of metals, Vinyl liner damage
Spa	2.0	3.0 – 5.0	5.0		Total Alkalinity* (buffering), ppm as CaCO <sub>3</sub> chlorite	60	80 – 100 calcium, lithium, sodium hypochlorites 100-120 sodium dichlor, trichlor, chlorine gas, bromine compounds	180	If total alkalinity is: <b>Too Low:</b> pH bounce, Corrosion tendency <b>Too High:</b> Cloudy water, Increased scaling potential, and pH tends to be too high
Where stabilizer is used	1.5				Cyanuric acid*, ppm	None	25-40	100	If stabilizer is: <b>Too Low:</b> Chlorine residual rapidly destroyed by sunlight <b>Too High:</b> May reduce chlorine efficacy <b>Note:</b> Stabilizer is not needed in indoor or brominated pools.
Disinfectant Levels*	Min	Ideal	Max	Comments	Chemical Values	Min	Ideal	Max	Comments
Combined chlorine, ppm**					Total dissolved solids	300	1000-2000	3000	These values are offered as ppm guidelines rather than absolute values to indicate concern for accumulation of impurities in the course of operation. Excessively high TDS may lead to hazy water, corrosion of fixtures, etc., and can be reduced by partial draining with addition of fresh water. High initial TDS may indicate poor water quality due to corrosive mineral salts, humus, or organic matter. <b>Consult local water authority.</b>
Pool	None	None	0.2	High combined results in reduced chemical efficacy. Take remedial action to establish break point chlorination.	Calcium hardness, ppm**	150	200-400	500-1000	Operation of pools at maximum hardness will depend on alkalinity (buffering) requirements of the sanitizer used. Minimum alkalinity and lower pH must be used with maximum hardness (Over 50ppm)
Spa	None	None	0.2	Other signs of combined chlorine: Sharp chlorine odor, Eye irritation, Algae growth	Heavy metals**	None	None		If heavy metals, such as copper, iron, manganese, are present: Staining may occur, Water may discolor, Chlorine dissipates rapidly, Filter may plug, May indicate pH too low, corrosion, etc.
Disinfectant Levels*	Min	Ideal	Max	Comments	Temperature	Max	Comments		
Bromine, ppm					Spa	104° F	For 15 minute intervals on a timer		
Pool	2.25	2.25 – 4.0	4.0						
Spa	2.25	3.0 – 5.0	5.0						
Disinfectant Levels*	Min	Ideal	Max	Comments	Oxidation Reduction Potential	Min	Ideal	Max	Comments
Iodine, ppm					ORP	650	---	---	When chlorine or bromine is used as the primary disinfectant, ORP can be used as a supplemental measurement of proper sanitizer activity. The use of ORP testing does not eliminate or supersede the need for testing the sanitizer level with standard test kits. An ORP reading may be affected by a number of factors including (1) pH, (2) probe film, (3) cyanuric acid, and (4) other. Follow manufacturer's recommendations.
	---	---	---	Levels not established <b>Note:</b> Local Health Department officials must be consulted before use.					



# Water Testing and Balancing Tips

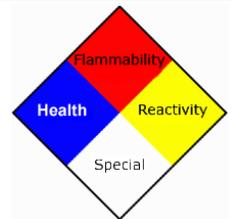


- Recommend complete water analysis with each seasonal opening of the pool
- Secure water samples 18 inches below pool surface away from return inlets
- When using the testing block, do not use your finger to cap the test kit tube when shaking to mix
- Replace reagents yearly
- Store test kit out of sunlight and away from extreme heat, cold, acids and chlorine
- Compare tests against white background
- Test pH and chlorine daily (minimum 2-3 times)
- Test total alkalinity, combined chlorine (CC), and stabilizer (cyanuric acid) weekly
- Test calcium hardness 1-2 or more times monthly
- Maintain records of all tests and when performed
- Use a DPD test kit or test strips. OTO test kits are not allowed. OTO only measures total chlorine amounts. Free chlorine is the active disinfectant.
- Calculate correct amount of chemical(s) needed to balance water—you need to know your pool volume in order to put the right amount of chemical(s) in water—otherwise you may offset other chemical balances and/or increase your use of certain chemicals---increasing the time, chemical(s) and **money** used on pool
- **Always add chemicals to the water, never add water to chemicals!!** (recommend mixing bucket and broadcast in pool) (Never mix dry stabilized and dry non-stabilized chlorines together—they can spontaneously combust)
- If you're using a pH probe please be aware that: temperature can affect readings due to the water's pH and electrode output and may lead to errors in measurement, control, or calibration
- If using ORP (oxidation reduction potential) meter/controller: It uses voltage to measure the efficiency of the sanitizer. This type of monitoring can be affected by numerous water chemistry parameters such as sanitizer, cyanuric acid, and pH. Other substances can also affect the efficiency of the ORP but keeping these factors maintained at a constant value rather than the preset values chosen on the ORP settings can produce a fairly accurate reading. If the pH is kept relatively constant then the ORP readout of free chlorine is fairly accurate. Unstabilized chlorine products are more easily automated & controlled by ORP controller. Higher levels of chlorine (>3ppm) may affect the ORP & give a false reading. The presence of cyanuric acid lowers the ORP. Water without combined chlorine will have a higher ORP than water with combined chlorine.



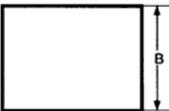
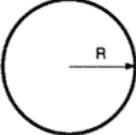
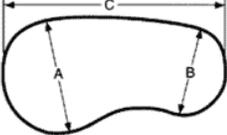
## Chemical Handling

Handling chemicals is a constant job requirement for pool operators and good habits are essential for accident prevention. The following is a list of precautions for anyone using or maintaining pool chemicals.



- ✓ **Follow all manufacturers instructions**
- ✓ **Never add water to chemicals.** Add chemicals to water slowly and protect eyes with glasses and avoid fumes with a mask.
- ✓ **Never miss any chemical with powdered chlorine or liquid chlorine.** A toxic gas is immediately released.
- ✓ Always use a clean dipper. It must be free of grease, oil, or other chemical deposits before dipping into a container of powdered chlorine.
- ✓ **Always keep chemicals in their original containers and away from any moisture.**
- ✓ **Always replace the chemical container covers tightly after use.**
- ✓ **Keep chemicals away from electrical equipment and excessive heat.**
- ✓ **Always have an approved gas mask or self-contained breathing apparatus,** rated for chlorine use. Do not store in chemical room or in chlorine gas room.
- ✓ **Always discard empty chemical bags/buckets properly.** They can mix with other substances in the trash and may ignite.
- ✓ **Never flush excessive chemicals into sewage that leads to a septic tank treatment system.**

# Frequently Used Conversions, Formulas and Constants

Shape	Surface Area	Volume (in gallons)
Rectangular or square pools	Length (A) X width (B) = square feet 	Surface area X avg. depth X 7.5 = pool volume
Round	3.14 X radius (R) X radius (R) = square feet 	Surface area X avg. depth X 5.9 = pool volume
Oval	3.14 X radius (r1) X radius (r2) = square feet 	Surface area X avg. depth X 6.7 = pool volume
Kidney shaped	Avg. width $\{(A+B) \div 2\}$ X length (C) = square feet 	Surface area X avg. depth X 7.0 = pool volume
Odd or Irregular shaped pools	divide the pool up into basic shapes to best determine surface area	divide the pool up into basic shapes to best determine volume or get copy of pool engineering specifications

**\*\*NOTE: (Depth at shallow end + depth at deep end) then  $\div 2$  = Average depth (Avg. depth) \*\***

## Conversions

ounces to pounds # oz $\div 16$ = # lbs	square inches to square feet # sq. inches $\div 144$ = # sq ft	Celsius (C) to Fahrenheit (F) degrees F = $(9/5 \times \text{degrees C}) + 32$
fluid ounces to gallons # fluid oz $\div 128$ = # gallons	meters to feet # meters x 3.28 = # feet	Fahrenheit (F) to Celsius (C) degrees C = $5/9 \times (\text{degrees F} - 32)$
liters to gallons # liters x 3.786 = # gallons	yards to feet # yards x 3 = # feet	BTU vs. temperature rise # BTU's = # gallons x 8.33 x # degrees F (temp. rise)
cups to fluid ounces # cups x 8 = # fl oz	gallons to pounds # gallons x 8.33 = # pounds	parts per million to milligrams per liter 1ppm = 1mg/l
cubic feet to gallons # cubic feet x 7.5 = # gallons	quarts to gallons # qrts x 4 = # gallons	1ppm = 8.3 pounds of chemical in one million gallons of water
pints to quarts # pints x 2 = # quarts	micron = 1 millionth of a meter 25.4 microns per 1/1000 inch	1 pound per square inch (psi) is the pressure created by a column of water 2.31 feet high

**Flow Rate:** Pool volume  $\div$  turnover rate  $\div 60$  = gallons per minute (gpm)

**Turnover Rate:** Pool volume  $\div$  Flow Rate  $\div 60$  = hours

**Spa Water Change:** Replacement Interval (days) =  $[(\text{Spa gallons} \div 3) \div \{\text{Users per day}\}]$

**Combined Chlorine (chloramines):** total chlorine – free chlorine = if .2 or more then shock

<b>Swimming pool maximum bathing load (SPMBL) for Arkansas swimming regulations</b>	The maximum number of bathers in the pool at any one time shall not exceed a number determined by the formulas
$\{(A - S S) \div 30\} + \{S \div 15\} = \text{SPMBL}$ (For outdoor pools)	Where: A = Total area of water surface in square feet S = Area of pool less than 5.5 feet deep in square feet.
$\{(A - S S) \div 30\} + \{S \div 25\} = \text{SPMBL}$ (For indoor pools)	
<b>Spa:</b> max. bather load = 1 per 10 sq. ft. of water surface	

# Dosage Chart - Chemically Treating 10,000 Gallons of Water\*

Chemical	Change		
<b>Increase free available chlorine</b>	<b>1ppm</b>	<b>5ppm</b>	<b>10ppm</b>
Chlorine gas	1.3 oz	6.7 oz	13 oz
Calcium hypochlorite (67%)	2 oz	10 oz	1.3 lb
Sodium hypochlorite (12%)	10.7 fl. oz	1.7 qts	3.3 qts
Lithium hypochlorite	3.8 oz	1.2 lbs	2.4 lbs
Dichlor- (62%)	2.1 oz	10.75 oz	1.3 lbs
Dichlor- (56%)	2.4 oz	12 oz	1.4 lbs
Trichlor-	1.5 oz	7.5 oz	14 oz
<b>Increase total alkalinity</b>	<b>10ppm</b>	<b>30ppm</b>	<b>50ppm</b>
Sodium Carbonate (Soda Ash)	14 oz	2.6 lbs	4.4 lbs
Sodium Bicarbonate **	1.4 lbs	4.2 lbs	7 lbs
Sodium Sesquicarbonate	1.25 lbs	3.75 lbs	6.25 lbs
<b>Decrease total alkalinity</b>	<b>10ppm</b>	<b>30ppm</b>	<b>50ppm</b>
Muriatic acid (31.4%)	26 fl oz	2.4 qts	1 gallon
Sodium Bisulfate	2.1 lbs	6.4 lbs	10.5 lbs
<b>Increase pH</b>	<b>7.2-7.4</b>	<b>7.0-7.4</b>	<b>6.6-7.4</b>
Sodium Carbonate (Soda Ash)	6 fl. oz	8 oz	12 oz
<b>Decrease pH</b>	<b>7.8-7.6</b>	<b>8.0-7.6</b>	
Muriatic acid	12 fl. oz	16 fl. oz	
<b>Increase calcium hardness</b>	<b>10ppm</b>	<b>30ppm</b>	<b>50ppm</b>
Calcium chloride (100%)	0.9 lbs	2.8 lbs	4.6 lbs
Calcium chloride (77%)	1.2 lbs	3.6 lbs	6 lbs
<b>Increase stabilizer</b>	<b>10ppm</b>	<b>30ppm</b>	<b>50ppm</b>
Cyanuric acid	13 oz	2.5 lbs	4.1 lbs
<b>Decrease stabilizer</b> if exceeds 100 ppm, add make-up water, close off the main drains & drain water using only the skimmers (stabilizer is found in the top 12-15 inches of water)			
<b>Neutralize free available chlorine</b>	<b>1ppm</b>	<b>3ppm</b>	<b>5ppm</b>
Sodium Thiosulfate	2.6 oz	7.8 oz	13 oz
Sodium Sulfite	2.4 oz	7.2 oz	12 oz

\*Always follow instructions on manufacturer's label

**Example:** You have a 60,000 gallon pool with no free chlorine residual and want to raise it, at most, to 5ppm and you are using a trichlor product.

5 ppm = 7.5oz of trichlor for every 10,000 gallons

60,000 gal ÷ 10,000gal = 6

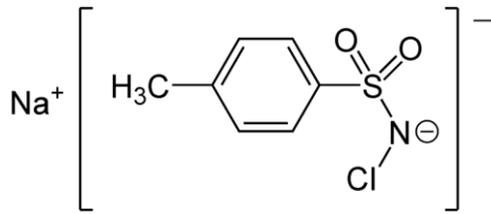
6 x 7.5 oz = 45 oz needed for your size pool

\*\*Recommended chemical of choice

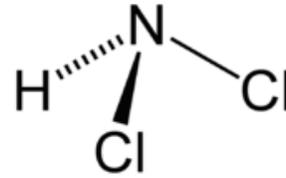
Note: Attempting to lower cyanuric acid from main drain will not significantly lower level of stabilizer.

Units	Teaspoon	Tablespoon	Fluid Ounces	Cup	pints	quarts	Milliliters	Liters
1 teaspoon	1	1/3	1/6	1/48	1/96	1/192	4.9	0.005
1 tablespoon	3	1	1/2	1/16	1/32	1/64	15	0.015
1 fluid ounce	6	2	1	1/8	1/16	1/32	30	0.030
1 cup	48	16	8	1	1/2	1/4	237	0.237
1 liquid pint	96	32	16	2	1	1/2	473	0.473
1 liquid quart	192	64	32	4	2	1	946	0.946
1 milliliter*	0.20	0.068	0.034	0.0042	0.0021	0.0011	1	1/1000
1 liter	203	67.6	33.8	4.23	2.11	1.06	1000	1
1 US gallon	768	256	128	16	8	4	3,784	3.79

# Shocking the Pool



*Chloramine*



*Dichloramine*

## *Some tips to remember when shocking:*

- Close the pool: over night or for 6-8 hrs (if using a non-chlorine shock product; swimmers can be admitted within 20 minutes. This product is primarily used in pools no larger than 40,000 gallon due to cost of product)
- **NEVER ADD CHEMICALS WHEN SWIMMERS ARE IN THE POOL**
- Shock when chloramines (Combined Chlorine - CC) exceed .2 ppm (**total chlorine – free chlorine= if .2 or more then shock**)
- A minimum 10-12 ppm of chlorine is needed to ‘burn-out’ the chloramines, 20 ppm for liquid fecal release, and for bad algae blooms/growth up to 30 ppm
- Hand feed mixture of chemical and water (when hand feeding granular chlorine is best to mix in bucket of water first to avoid burning the pool surface/liner and creating calcium deposits on pool surface and sand filters)  
\*Note: **DO NOT BROADCAST DRY PRODUCT** - This is the only time a method of hand feeding is allowed
- Always use proper eye and skin protection devices when adding chemicals
- Lower pH to around 6.9 before adding chlorine
- Measure the free chlorine levels the next morning before anyone gets into the pool
- If the free chlorine reading is above 3 ppm use less chlorine the next time you superchlorinate
- If the free chlorine reading is zero use more chlorine the next time you superchlorinate
- High chlorine levels may bleach out the color of the DPD and give a false reading of zero chlorine; it is advised that you keep paper test strips on hand to check for excessive chlorine

(Amount of chlorine compound to introduce 10ppm for every 5,000 gallons of water)

Chlorine Product	% chlorine	5,000 gal
Calcium hypochlorite**	65	.63 lbs
	78	.53 lbs

**\*\*Recommended chemical of choice because it does not add stabilizer to water**

Take your pool volume and divide by 5,000 then multiply that answer by amount of chlorine product to get needed amount to shock the pool. For 20 ppm, double amount calculated, or for 30 ppm, just triple the amount calculated  
*Example: 120,000 gallon pool using 65% cal hypo when combined chlorine level was above .2*  
 120,000 gal ÷ 5,000 gal = 24 → 24 x .63 lbs = 15.13 lbs of cal hypo need for shock

<b>Chlorine</b> <b>17</b> <b>Cl</b> <b>35.453</b>	<b>Characteristics of Frequently Used Chlorine Disinfectants In Pools and Spas</b>					
	Gas chlorine	Sodium hypo-	Lithium hypo-	Calcium hypo-	Dichlor-	Trichlor-
% Available chlorine	100%	10-12%	35%	65-78%	56% or 63%	90%
pH effect	Lowers (pH 0)	Raises (pH 13.0)	Raises (pH10.8)	Raises (pH 8.5-11)	Neutral (pH 6.7)	Lowers (pH 2.8-3.5)
Total alkalinity effect	Decreases	Increases	Increases	Increases	None	Decreases
Lost to sunlight	Yes	Yes	Yes	Yes	No	No
Physical appearance	Gas	Liquid	Granular	Granular/tablet	Granular	Granular/tablet
Miscellaneous	Unstabilized very toxic	Unstabilized loses strength in storage over time	Unstabilized totally soluble expensive	Unstabilized continuous use can cause high calcium level and scale	Totally soluble cannot mix with unstablized	Slow dissolving cannot mix with unstablized

Bromine: tablet/stick form, lowers pH (4.0), not stabilized-lost to sunlight, can burn skin/eyes, decreases total alkalinity



## Specialty Chemicals for Pool and Spas\*\*



Type	Product	Treatment uses	Miscellaneous info
<b>--Algaecide--</b> kills algae  <b>--Algaestat--</b> inhibits algae growth	Chelating copper compounds Colloidal silver Phosphate removers	Treats all algae types	Metal algaecides tend to precipitate out of water and cause pool stains
	Polyquats	Treats most algae, green the best	not as effective on black or yellow algae, non-foaming, can act as a flocculent can cause slight increase in chlorine demand
	Quaternary ammonium (quats)	Mainly used to treat green algae	can cause foaming if agitated can cause slight increase in chlorine demand
	Anhydrous ammonia	Treats yellow or green algae	
	Borate compounds	Treats most algae, pink slime	
<b>--Balancers--</b> help maintain chemical balance	Carbon dioxide Others include: calcium chloride, muriatic acid, sodium bisulfate, sodium bicarbonate, and sodium carbonate	pH too high	Lowers pH & raises tot. alkalinity
<b>Stain removers or Metal control</b> to remove stains or neutralizes metal's color effect on water	Chelating agents	Treats discolored water caused by metals	Binds with metal allowing them to be caught by filter or vacuum
	Sequestering agents	Treats discolored water caused by metals	Keeps metal in solution so they cannot stain
<b>Clarifiers and Flocculants</b>	Chitin Aluminum sulfate (Alum) Polyaluminum chloride	Treats hazy or dull water	Chelating /coagulant agent(s) bind small particles so they can be filtered or vacuumed out
<b>Vinyl / tile cleaners</b>	Removes scale and scum ring around water's edge		
<b>Defoamers</b>	Reduce levels of lotions, body oils, along with other organic matter that tend to create foam		
<b>Filter cleaners</b>	Can remove calcium buildup and which can help reduce filter pressure		
<b>Enzymes</b>	Catalysts that consume oily films on surfaces		

\*\*Note: Always follow manufacturers instructions when using any of the specialty chemicals



# First Aid Procedures for Persons Exposed to Chlorine and Other Pool Chemicals

Immediate first aid is necessary whenever anyone is exposed to chlorine or other chemicals used around a swimming pool. All pool attendants should be trained in cardiopulmonary resuscitation (CPR) and first aid. The phone numbers of the nearest fire department, emergency medical care service (EMT's, hospital) and poison control information center should be posted and readily available to anyone.

## Skin contamination

Skin contamination with any chlorine compound, acid, or alkaline chemical should be immediately flushed with large amounts of water. Contaminated clothing should be removed while under running water. It takes at least 15 minutes flushing to stop the burning action of acids and at least 30 minutes for alkaline chemicals such as the hypochlorites. Never attempt to neutralize the chemical or to apply any ointments. The local emergency medical care service should be called.

## Eye contamination

Even very small quantities of pool chemicals in the eyes can cause permanent damage if not treated promptly. The eyes must be flushed immediately with large amounts of running water, holding the eyelids apart so that the eye is thoroughly flushed. Flushing must continue for at least 30 minutes. While the eyes are being flushed the local emergency medical care service should be called. Continue flushing with water until rescue workers arrive. They will continue the flushing action until they feel it is safe to transport the patient. Never attempt to neutralize the chemical in the eye or to put anything in the eye.

## Inhalation

Chlorine gas and toxic gases from the combination of two or more pool chemicals, or from the combination of an organic compound with calcium hypochlorite, can cause severe damage to the respiratory tract and may result in respiratory arrest. **Evacuation from the contaminated area is the first priority.**

If breathing has not stopped the person exposed to toxic gases should be placed in a comfortable position and kept warm and quiet until medical help arrives. Never give anything by mouth to an unconscious person.

If breathing has stopped, mouth-to-mouth resuscitation must be given. If the person's heart has also stopped, cardiopulmonary resuscitation must be started immediately.

Always call the local emergency medical services when a person has been exposed to toxic gases. In addition, anyone exposed to gases, whether they become unconscious or not, needs to see a physician to prevent possible delayed health complications, such as pulmonary edema, from the exposure.

### **Recommended First Aid Kit for Pool Operators**

24	Plastic or non-waxed eye cups for eye washing	6	40" or larger triangular bandages
1	Pair of scissors	24	2" X 2" gauze pads
1	Pair of tweezers	24	3" X 3" gauze pads
4	Needles to remove wood or metal splinters	2	1" roller gauze bandages
1	Flashlight	4	2" roller gauze bandages
1	Mechanical resuscitator	12	2" bandage compresses
1	Bottle of antibacterial soap	1	Square yard absorbent gauze
1	Bottle of liquid sterilization agent	1	Antiseptic in plastic squeeze bottle or tube
4	Rolls of 1" adhesive tape	1	Tube of burn eraser
4	Rolls of 1/2" adhesive tape		
60	1" Band-Aids		

\*\*Note: Aspirin or other medications that are taken orally must not be dispensed. Water is the only liquid recommended.



# Disease and Accident Prevention



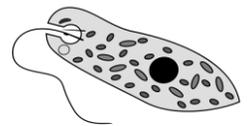
A routine and frequent disinfection program should be implemented for disease and accident prevention. The following should be used to protect the public and YOU as an operator:

- Maintain proper disinfection residual (refer to page 5). During heavy use, especially in hot weather when temperature is above 84 degrees F, or if you use a stabilizer, keep the chlorine residual at or above 1.5 ppm.
- Diving board rules should be posted in pool area and no diving allowed in water less than 5 ft.
- A visible warning sign should be affixed on the door or near the entrance of the chlorine/chemical room(s).
- Persons with open wounds, wearing adhesive bandages, infections or sickness should not enter the pool.
- Any suits or towels for public use must be properly laundered.
- Require all patrons to take a soap shower and enforce it.
- No food, gum, or glass containers allowed in pool area.
- Disease causing pathogens can also be present on surfaces in poolside areas such as: spas, benches, seats, decking and other areas people share. Locker rooms and toilet facilities need to be disinfected frequently during operation hours, especially decks and seats. You can use 5-6% household bleach ratio of 1 cup bleach for every gallon of water used.

Posters explaining such things as: food items, combs, bathing suits, towels, showers, wounds and sickness can help educate the public on such issues are encouraged. (see Appendix) Posters may also be downloaded from the Center for Disease Control website: [www.cdc.gov/healthyswimming/posters.htm](http://www.cdc.gov/healthyswimming/posters.htm)

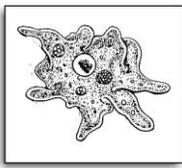


## Specific Disease Concerns



- 1) Intestinal diseases: typhoid fever, paratyphoid fever, amoebic dysentery, leptospirosis, bacillary dysentery, etc  
Fecal (enteric) related illnesses: *salmonellosis, shigella, adenoviruses, noroviruses, etc*
- 2) Respiratory diseases: rhinoviruses, sinusitis, and sore throat can spread easier in swimming areas due to low or no disinfection agents, close contact, and moisture. *HVAC needs to be checked regularly to ensure proper working order.*
- 3) Eye, ear, nose, throat, and skin infections: the exposure of delicate mucous membranes, the movement of harmful organisms into the ear and nasal passages, and even overuse of water treatment chemicals can contribute to different kinds of infection.
- 4) Disease causing pathogens which transmit staph, impetigo, athlete's foot, dermatitis, etc. can also be present in the locker room, on floors and benches, and on the pool decking.





# Common Illnesses Associated With Pools & Spas



Illness	Organism	Symptoms	Mode of Transmission
Ear infections (swimmers ear)	<i>Pseudomonas aeruginosa</i>	ear aches, inflamed ears, swollen mucous membranes	bacteria in water entering ear canal of swimmer
Skin rash (dermatitis)	Bacteria ( <i>Staphylococcus</i> or <i>Pseudomonas</i> ) Virus (molluscipoxvirus)	red pimple-like rashes of the skin, especially around hair follicles, itching, sore armpits	direct contact with bacteria from water entering skin pores (especially spas), sharing towels, suits, etc.
Granulomas (small lesions on skin)	<i>Mycobacteria</i>	lesions growing into larger, ulcerated sores	scraping the skin against rough sides or bottom of a pool
Athletes foot	<i>trichophyton rubrum</i> or <i>epidermophyton floccosum</i> or papliiomavirus	itching, scaling, cracking, blistering of feet, especially between the toes or even plantar warts	dirty floors, showers, bathhouses, etc. or direct contact with infected person
Gastroenteritis	bacteria ( <i>Escherichia coli</i> , <i>shigella</i> , <i>salmonella</i> ,) Protozoa ( <i>giardia</i> , <i>crypto</i> .) or other bacteria or viruses	diarrhea, vomiting, possible fever, cramps, fatigue	swallowing bacteria in water contaminated by infected bather, direct contact
Pink eye (conjunctivitis)	<i>streptococcus</i> or adenoviruses	irritation and redness in the eyes, sometimes a slight fever	direct contact with infected individual, or by viruses in poorly chlorinated water
respiratory illness	bacteria ( <i>pseudomonas</i> , <i>legionella</i> , <i>streptococcus</i> ) virus ( <i>rhinovirus</i> , adenovirus)	pneumonia, flu-like symptoms, sinus problems, sore throat, cough	direct contact or prolonged water contact, airborne inhalation of organism usually associated with spas, spray pools, or indoor pools, HVAC problems
Herpes	<i>Herpes simplex virus</i> (HSV)	lesions	non-venereal mode of passing the virus through open lesions in contact with water and poolside surfaces (seats, etc.)

## Interesting Tidbits on the Human Body That Can Impact a Pool Environment

- ❖ Up to 38,000 microorganisms expelled with clearing the nose
- ❖ From 100 million to 1 billion organisms from 1 gram of saliva from the mouth
- ❖ Active swimmers can perspire around 2 pints of sweat an hour
- ❖ Hands may have from 1/2 to 5 million organisms shed in a single washing
- ❖ The lower body covered by the swimming trunks has excessively high numbers of microorganisms and high organic matter (a tenth of a gram or more!) which can be shed by a person if not adequately bathed prior to entering the pool.
- ❖ Hot water (from spas/hot tubs) opens your skin pores so that germs can more easily enter your body
- ❖ The air you breathe from HVAC (heat ventilation/air conditioning) for indoor pools along with high humidity levels, can carry harmful airborne germs if the system is not properly maintained and/or routinely checked
- ❖ Chloramines are formed when chlorine binds with ammonia from body wastes and can give off strong chlorine/bleach smells. Chloramines can inhibit disinfection if level is too high (>0.2) & shocking is needed. Chloramines also can burn the eyes and skin.



## Common Injuries



- Reckless diving
  - Waterslides—poorly located in pool and/or not properly maintained or monitored
  - Projecting and ungrated pipes—installed improperly or poorly maintained (ex. Main drain, vacuum pipes)
  - Improperly vented chlorinators and storage rooms
  - Glass objects in pool
  - Improperly installed or maintained electrical equipment and fixtures
- Any of the above and other injuries or sickness can result in liability lawsuits, bad media exposure, pool closings, etc.

## Pool Staff Concerns & Restrictions

- The pool operator is responsible for all training and assigning duties to pool staff, & enforcing all *Rules & Regulations Pertaining to Swimming Pools and Other Related Facilities of the AR Department of Health*.
- The pool staff is responsible for following all rules and regulations by the Department and any other facility regulations set forth by the management.
- The pool operator is responsible for the overall health of pool staff.
- The pool staff is responsible for reporting any personal illnesses and/or accidents to pool operator.
- If someone on the staff has hepatitis, herpes, or any gastrointestinal illness, it should be reported to the pool operator.
- Any illness that is accompanied with the symptoms: diarrhea, fever, vomiting, jaundice, sore throat with fever, and any skin rash, boil or lesion, should be evaluated by a physician and reported to pool operator.
- Written consent from a physician, on what duties can and cannot be performed by pool employee, should be enforced.
- It is the pool operator's responsibility to restrict or exclude certain duties of ill pool staff.

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### LIST OF RECOMMENDED RULES FOR ALL POOL AND OTHER RELATED FACILITIES

These rules may be conveyed by any combination of words, pictures, or symbols. Those rules noted by \* are addressed within the Rules and Regulations.

1. All persons should take a shower before entering the water.
2. Running or boisterous play is not allowed on the deck.
3. \* Glass articles, sharp metal objects, and other hazardous objects are not allowed in the enclosure.
4. \* Pets or any animals are not allowed in the enclosure except for service animals for the physically impaired.
5. \* Persons with contagious or infectious health conditions are not permitted to patronize the pool.
6. Games, tubes, and other water play equipment can be allowed with permission of the management and if properly supervised.
7. \* An adult must accompany minors under the age of 12.
8. Children under the age of 7 shall require the presence of a parent or guardian. Non swimmers of any age must not enter the deep area.
- 9 \* Location of nearest telephone for emergency use or emergency notification procedure.
10. Pool hours are \_\_\_\_\_ to \_\_\_\_\_. (Set by owner and posted)
11. \* A first aid kit is located \_\_\_\_\_.
12. \* Street clothes and shoes are not allowed in the water. Children should not be allowed in the pool or wading pool with disposable diapers unless covered with plastic pants.
13. \* Food or drink is prohibited in the pool water.
14. Gum and tobacco are not allowed on the wet deck area.
15. Use of the pool by persons under the influence of alcohol or drugs is prohibited.
16. The management has the right to ask any patron to leave for non-compliance with the above rules.

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### Required Spa Warning Sign – Must Be Posted

1. Elderly persons and those suffering from heart disease, diabetes or high blood pressure should consult a physician before using the spa pool.
2. No person suffering from a communicable disease, transmissible via water, shall use the spa pool. Persons using prescription medications should consult a physician before using the spa pool.
3. Individuals under the influence of alcohol should not use the spa pool.
4. No person shall use the spa pool alone.
5. Pregnant women should not use the spa pool without consulting their physician.
6. Persons should spend no more than 15 minutes in the spa at any one session.
7. All children under 14 years of age shall be accompanied by a responsible adult observer.
8. No person shall run or engage in horseplay in or around the spa pool.



# Procedures for Fecal Accidents in Pools and Other Related Facilities \*



In the event of fecal contamination, the following procedures shall be followed:

## For both formed-stool and diarrheal fecal accidents:

- Direct everyone to leave all pools into which water containing the feces is circulated. Do not allow anyone to enter the contaminated pool(s)—if pools use same filter-- until all decontamination procedures are completed.
- Remove as much of the fecal matter as possible using a net or scoop and dispose of it in a sanitary manner. Clean and disinfect the net or scoop. Vacuuming stool from pool is not recommended.

## Formed stool (solid, non-liquid)

- Raise the free available chlorine concentration to a minimum of 2 ppm (if less than 2 ppm), and ensure the water's pH is between 7.2-7.5 and temperature is about 77°F. Pool closure time will be approximately 30 minutes.
- Maintain the chlorine concentration at 2 ppm, pH 7.2-7.5, for at least 25 minutes before reopening. Ensure that the filtration system is operating while the pool reaches and maintains the proper free available chlorine concentration during the disinfection process.
- Recommend establishing a fecal accident log by utilizing the **Record of Pool Contamination Incident** form found in the Appendix.

## Diarrhea (liquid stool)

- Raise the free available chlorine concentration to 20 ppm, water's pH is between 7.2-7.5 and temperature is about 77°F. The chlorine and pH levels should remain at these levels for at least 12.75 hours. Chlorine stabilizer (if present) must be below 50 ppm in order to achieve sufficient to inactivation of *Cryptosporidium*. Data suggests it would take approximately 30 hours to kill 99.9% of Crypto in the presence of 50 ppm or less cyanuric acid, 40 ppm free chlorine, pH 6.5 and a temperature of 77°F or higher.
- Backwash the filter thoroughly and discharge to waste.
- Swimmers may be allowed into the pool when the free available chlorine level has been returned to the normal operating range allowed by the state or local regulatory authority.
- Recommend establishing a fecal accident log by utilizing the **Record of Pool Contamination Incident** form found in the Appendix.

1 ppm (1mg/L) chlorine at pH 7.5 and 77°F (25 °C)		
GERM	TYPE	KILL TIME
E. coli 0157:H7	Bacterium	Less than 1 minute
Hep A	Virus	About 16 minutes
Giardia	Parasite	About 45 minutes
Cryptosporidium	Parasite	About 96,000 minutes (6.7 days)

High concentrations of organic matter from excessive bather load, ammonia compounds (sweat, urine, etc.) binding with chlorine producing chloramines, sunlight, pH too high or low, and turnover rate can affect the time for disinfection and the amount of free chlorine it will take to neutralize water pathogens.

Crypto inactivation time for diarrheal accident	
Chlorine Levels (ppm)	Disinfection Time
1.0	6.7 days
10	16 hours
20	12.75 hours

Giardia inactivation time for formed accident	
Chlorine Levels (ppm)	Disinfection Time
1.0	45 minutes
2.0	25 minutes
3.0	19 minutes

The information above was obtained from the Centers for Disease Control and Prevention.



# Cleaning Up Body Fluid Spills on Pool Surfaces



Body fluids, including blood, feces, and vomit are all considered potentially contaminated with blood borne germs. Therefore, spills of these fluids on the pool deck should be cleaned up and the contaminated surfaces disinfected immediately.

## Appropriate Disinfectants Bleach

One of the most commonly used chemicals for disinfection is a homemade solution of household bleach and water. Since a solution of bleach and water loses its strength quickly a fresh mixture should be made before each clean-up to make sure it is effective.

## Other Disinfectants

A listing of other approved commercial disinfectants can be found at [www.epa.gov/oppad001/chemregindex.htm](http://www.epa.gov/oppad001/chemregindex.htm) and <http://www.fda.gov/cdrh/ode/germlab.html>. These disinfectants are effective when used according to the manufacturer's instructions.

## Recipe for Bleach Disinfecting Solution

9 parts cool water

1 part household bleach

Add the household bleach to the water. Gently mix the solution.

## Clean-up Procedure Using Bleach Solution

1. Block off the 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 paper towels or 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 air-dried.
8. Remove gloves and place in plastic garbage bags with all soiled cleaning materials.
9. Double-bag and securely tie-up plastic garbage bags and discard.
10. Thoroughly wash hands with soap and water.

Note: This section provided by the CDC website





# When to Close a Pool



## Policy:

In compliance with Act 623 of 1987, as amended, and *Rules and Regulations Pertaining to Swimming Pools and Other Related Facilities*, the following critical items are grounds for immediate closure by the Department. The pool operator should voluntarily close the pool if any of these conditions exist.

- ➔ Failure to restrict employees with infection;
- ➔ Unapproved water supply without hot and cold running water under pressure;
- ➔ Improper sewage, liquid waste disposal;
- ➔ Cross-connection, backsiphonage;
- ➔ Lack of proper safety measures;
- ➔ Excessive turbidity (cloudiness where the drain cannot be seen);
- ➔ Failure to maintain proper chemical levels;
- ➔ Failure or lack of filtration, sanitizing and cleaning equipment and chemicals;
- ➔ Absence or lack of required supervisory personnel;
- ➔ Any condition, deficiency, or practice which, if not corrected, is likely to result in illness, injury, or loss of life.

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### Some examples of when to close pool:

- |   |   |
|---|---|
| ▶ Chlorine level falls below 1 ppm or rises above 5 ppm     | ▶ Water-borne outbreak                            |
| ▶ pH below 7.0 or above 7.8                                 | ▶ Pool operated without valid permit              |
| ▶ Main drain(s) not covered and/or grates broken or damaged | ▶ Any critical item noted on inspection form      |
| ▶ Fecal accident  | ▶ Missing safety equipment                        |
| ▶ Blood or vomit release into water                         | ▶ Pool cleaning and super-chlorinating            |
| ▶ When deficiencies are not corrected in given time limit   | ▶ Broken or damaged underwater lighting           |
| ▶ Foreign objects or debris that may cause a safety risk    | ▶ Drowning (complete <b>Accident Report</b> form) |



## Annual Permit for Operation



**A. Annual Permit for Operation is Required.** No municipality, person, firm, corporation, association, organization, or institution shall operate, maintain or permit the use of any public swimming pool or other water related facility without a written permit from the State Health Officer or authorized representative. Prior to approval of the application for permit, the Department shall inspect the proposed facility to determine compliance with these rules and regulations. The department shall issue a permit to the applicant if the inspection reveals that the facility is in compliance with the requirements of the rules and regulations. Each permit shall expire December 31 following the date of issue. Applications for renewal of permits for existing public swimming pools will be mailed to the operator prior to January 1 of each year. The annual permit fee to operate a public swimming pool is due and payable January 1. The permit fee shall be paid to the Department before the permit is issued. The permit shall be kept and displayed in a conspicuous manner, properly framed, at the pool for which it is issued. **NOTE: PLEASE REFER TO ACT 623 AS AMENDED FOR THE CURRENT PERMIT FEES REQUIRED.**

**B. Suspension and Revocation of Permit.** Failure to comply with these regulations or failure to maintain equipment and facilities in good condition will be cause to immediately suspend this permit until such time the condition, which caused the suspension, has been corrected. Continuing violations of these regulations will be cause for the permit to be revoked by the State Health Officer or his authorized representative after a legal hearing as provided for in the Administrative Procedures Act. Ark. Code annotated 25-15-201, et.seq.

# Pool and Spa Troubleshooting and Preventative Maintenance

Area	Problem	Preventive or Corrective Action
<b>Hydraulics</b>	Pool flotation or movement, cracking on sides or bottom	Do not drain pool when subsurface water table is high because of continuous rains, low terrain subject to runoff winterizing and discharging large sums of water on the ground in the immediate area of the pool, or an ineffective or missing hydrostatic valve in the main drain
	Constant low water level in balance tank and vacuum	Consider float control valves for adding fresh water
	Howling sound from pump (cavitation)	Increase head pressure by throttling back on valve following pump. Check for blockage on suction side.
<b>Electrical</b>	Continued power short circuiting	Disconnect or trip breaker switch to off. Call a qualified service technician.
	Can feel electrical current but no shock	Cords on deck lying in water can discharge low currents. String cord above deck.
	Sparks or smoke	Turn off immediately. Call a qualified service technician.
	Hot, growling or vibrating motor	Bearings need lubrication or replacing. Coupling connection out of balance; stop motor and balance.
	Lights dim	Determine what equipment causes the change. Check voltage demand to that supplied. Check for short circuiting of appliances.
<b>Mechanical</b>	Valves turn hard	Lubricate stem
	Excessive water leaking	Tighten packing nuts. Replace packing.
	Pump is not moving water	Prime pump. Clean skimmer or hair and lint screen. Check impeller. Pump rotation is in wrong direction. Check for obstruction at inlets. Seal and fittings worn, pipe fittings not tight allowing air in causing cavitation.
	Excessive leaking at pump	Tighten packing. Replace packing if tightened to maximum.
<b>Temperature</b>	Changes in pool temperature	Check heater thermostat. Check heater efficiency and operation. Filter and/or pump operation inadequate. Thermostat or pressure switch out of adjustment or defective.
	Indoor air during extreme weather	Reduce or eliminate air exhaust and intake with outside air. Check humidistat. Screen windows to reduce loss. Build a temporary plastic-sealed vestibule at entry.
	Cold showers	Check heater. Limit length of showers.
	Warm pool water	Drain and add water. Aerate.
	Scale formation on tubes in heater	Excessive hardness in pool water. Water flow through heater is too restricted (adjust valves and/or check for debris in skimmers, hair/lint strainer, and filters)
<b>Humidity</b>	Windows and walls water laden in pool area	Maintain air 2°-3° warmer than pool. Warm walls & structure to raise dew point. Introduce warm dry air. Increase air movement using fans.
	Shower & locker rooms	Check exhaust system. Open windows for cross ventilation.
<b>Water clarity</b>	Pool & heavy loads	Increase chlorine to 3 ppm prior to load. Check filter efficiency. Check turnover rate. Test water every hour.
	Dull or gray for a period of time	Superchlorinate to 8-10 ppm. Check filter efficiency. Check TDS. Partially drain and refill pool.
<b>Flowmeter</b>	Reading too low or not moving	1) Filter clogged, backwashing may be necessary 2) Skimmers, screens, strainers may need cleaning 3) Flowmeter, itself, may need to be cleaned or installed incorrectly 4) Pump malfunction

Area	Problem	Preventive or Corrective Action
<b>Pool shell</b>	Slippery sides &/or bottom	Super-chlorinate 8-10 ppm. Brush area to eliminate potential algae growth
	Stains around inlets	Adjust pH (too low or corrosive)
	Stains	Brown, blue or black on plaster shell (metals such as iron, copper and manganese); low pH causing erosion of metal components; add sequestering agent which may remove new staining, or drain and acid wash.
	Scaling	Clogging of filter and pipes, scale on pool walls Can be caused from unbalanced water (high pH, high total alk., high calcium hardness) Need to balance water
	Losing water more than 1” in 24 hrs. during non-use. (1” for every 1,000 sq ft= 620 gallons)	Use SCUBA and a squirt gun with bluing or food coloring; squirt around outlets and inlets; observe movement of color. Repeat above at joints in deep end. Observe area around pool for wet soil from broken pipes. Check main drain—hydrostatic valve
<b>Filters</b>	Sand filter	<ol style="list-style-type: none"> <li>1. Inadequate/poor filtering or sand in the pool: Check the backwash valve (if left on intermediate position, sand can flow back into pool). Channeling; rake and eliminate mud balls and crust; replace sand. Possible broken laterals in filter; replace them. Insufficient filter sizing.</li> <li>2. Pressure too extreme when backwashing: observe gauges to prevent upsetting levels.</li> <li>3. Adding soda ash or coagulants too fast: doesn't dissolve quickly and can clog the sand and increase pressure—add these products slowly</li> </ol>
	Diatomaceous earth (DE)	<ol style="list-style-type: none"> <li>1. Inadequate/poor filtering or DE in the pool: filter screen/cloth (septa) has a hole in it (milky pool water); replace or repair. Check the backwash valve (if left on intermediate position DE can flow back into pool)</li> <li>2. If hardening/caking of DE remove and recharge</li> <li>3. Septa is not coated correctly—feeding DE too quickly into skimmer during recharge or DE septa is not adequately coated (recommended amount is 2 oz. per sq. ft. of filter area)</li> <li>4. Rust, calcium buildup, or soda ash can increase pressure and affect filtration--treat septa with a light acid wash and strong stream of water through the septa. Never use Alum with DE filters, it solidifies the filter cake</li> </ol>
	Cartridge filters	Poor filtration without a rise in pressure may be from torn or worn out cartridges—need to be replaced
	Air pressure buildup	<ol style="list-style-type: none"> <li>1) Enough air pressure can force media into the pool and can cause channeling in sand filters or disrupt the DE filter cake.</li> <li>2) If air is in the filter tank: check for hairline cracks/leaks in plumbing pipes and fixtures on suction side of pump, low water level with air entering the skimmer</li> <li>3) Release any air buildup: some filters have automatic venting already, if not, open the pressure release valve until a steady stream of water comes out</li> </ol>

Area	Problem	Preventive or Corrective Action
<b>ORP control panel</b>	ORP reading is too low	<ol style="list-style-type: none"> <li>1. Disinfection low, pH too high, cyanuric acid too high</li> <li>2. The ORP sensor may be faulty, fouled, or out of calibration and may need cleaned or replaced</li> </ol>
	ORP reading is too high	<ol style="list-style-type: none"> <li>1. Disinfectant too high, pH is too low</li> </ol> The ORP sensor may be faulty, fouled, or out of calibration and may need cleaned or replaced
<b>Pool water</b>	Air bubbles in water	Check suction side of pump for air leaks at hair and lint strainer lid, valves, pipe fittings and chemical injection. Bleed air out of filter.
	Foam on water	Water hardness too low. Some added algaecides have a tendency to produce foam. Someone dropped detergent into pool. Add a defoamer
	Cloudy/milky water	Possible causes: <ol style="list-style-type: none"> <li>1. No disinfectant</li> <li>2. Reduced flow rate; check for blockage.</li> <li>3. Backwash filter.</li> <li>4. Extra heavy bather load; super-chlorinate.</li> <li>5. Check chemicals &amp; balance; too high in pH and/or total alkalinity or total dissolved solids (TDS).</li> </ol> If 1-4 ok then you may use a clarifier or flocculent.
	Colored water	Green: clear green—copper—use clarifier possible heavy algae growth, low free chlorine, shock needed Reddish-brown: iron or rust; add a sequestering agent or clarifier. Blue-green: low pH dissolving copper Blue or black: Manganese—use clarifier
	Algae	Can cloud water, can grow on walls of pool in areas with poor circulation (dead spots). Can be prevented with proper filtration, elimination of dead spots and sufficient disinfection levels, shocking when combined chlorine level exceeds 0.2, and frequent brushing of pool/spa walls on routine basis, and use of algaecide or algaestat. Green and black algae or pink slime; super-chlorinate and backwash Yellow/Mustard algae----turn off pump, brush and vacuum waste after settling, backwash filters, use special algaecide. <u>To treat algae:</u> <ol style="list-style-type: none"> <li>1) Turn off pool recirculation pump</li> <li>2) Brush all pool surfaces and skimmers -- brushing helps break up/loosen algae and can remove some algae's protective coatings that make them resistant to disinfection</li> <li>3) Turn pump on and vacuum debris to waste drain</li> <li>4) Shock pool up to 30 ppm—be aware of any pool finishes that may be affected—check chlorine residual next day</li> <li>5) Backwash or clean filter media</li> <li>6) Add algaecide when chlorine is below 5 ppm -- Quats and poly quats should be added 24 hrs after shocking</li> </ol> <u>To prevent algae or return of it:</u> <ol style="list-style-type: none"> <li>1) Keep disinfectant levels within required range</li> <li>2) Routinely brush walls, skimmers and pool floor—also gutters if you have them</li> <li>3) Clean and backwash filters regularly—according to manufacturers instructions or when 10-12 psi above starting pressure</li> <li>4) Respond quickly to the first sign of any algae signs</li> <li>5) Use algaecide regularly – according to manufacturer's instructions</li> </ol>

# Equipment Maintenance Cleaning

## When to Backwash

1. Follow the manufacturer's instructions
2. If instructions are not available, then backwash when the pressure gauge reaches 10-12 psi above initial startup pressure reading (i.e. when backwashing for the first time of the season, record what the pressure reading is for each filter unit, then the successive backwashing should be done after 10-12 psi is reached over the recorded starting pressure)
3. Frequent backwashing is not necessary. In fact it can waste chemicals (\$), time & water. The cleaning efficiency of the sand filter(s) actually keeps improving as the pressure increases to that recommended 10-12 psi threshold.
4. The flowmeter may have a low reading if the filter(s) are clogged.

**\*\*NOTE:** if it seems to be short periods between backwashes the filter may be undersized or the pump may be too powerful for the system. Another possibility is that there is a large number of pool contaminants (dirt, debris, body oil, lotions, algae, etc), high bather loads. Low sand level in filter—may need to add more sand

## How to Backwash Correctly

 <p>Sand Filters</p>	<p><i>Multiport valve assembly</i></p> <ol style="list-style-type: none"> <li>1) Turn pump off</li> <li>2) Open any backwash gate valve (if any)</li> <li>3) Rotate handle from FILTER to BACKWASH</li> <li>4) Open air bleeder assembly on filter(s)</li> <li>5) Turn pump on and run for 2-3 minutes or until water is clear</li> <li>6) Turn pump off and turn valve to RINSE position</li> <li>7) Turn pump on and run for 30 secs to 1 minute</li> <li>8) Close backwash gate valve (if any)</li> <li>9) Turn pump off &amp; turn valve to FILTER position</li> <li>10) Close air bleeder assembly</li> <li>11) Turn pump on and note starting pressure</li> </ol>	<p><i>Slide valve</i></p> <ol style="list-style-type: none"> <li>1) Turn pump off</li> <li>2) Twist to unlock plunger T-handle, and pull upwards 2-3"</li> <li>3) Open any backwash gate valve (if any)</li> <li>4) Open air bleeder assembly on filter(s)</li> <li>5) Turn pump on</li> <li>6) Turn pump on and run for 2-3 minutes or until water is clear</li> <li>7) Turn off pump and push T-handle back down into locked position</li> <li>8) Close backwash gate valve (if any)</li> <li>9) Close air bleeder assembly</li> <li>10) Turn pump on and note starting pressure</li> </ol>
 <p>Diatomaceous earth (DE) filters</p>	<p><i>Multiport valve assembly</i></p> <ol style="list-style-type: none"> <li>1) Empty the skimmers of any debris</li> <li>2) Turn pump off</li> <li>3) Rotate handle from FILTER to BACKWASH</li> <li>4) Open backwash gate valve (if any)</li> <li>5) Turn pump on and run for 2-3 minutes or until water is clear</li> <li>6) Turn pump off and turn valve to RINSE position</li> <li>7) Turn pump on and run for 30 secs to 1 minute</li> <li>8) Rotate handle from RINSE to BACKWASH</li> <li>9) Turn pump on and run for 30 secs to 1 minute</li> <li>10) Turn pump off and turn valve to FILTER position</li> <li>11) Close backwash gate valve (if any)</li> <li>12) Turn pump on</li> <li>13) Mix recommend amount of DE in a bucket of water making a slurry (2 oz. per sq. ft.)</li> <li>14) Add DE slurry SLOWLY to skimmer closest to pump</li> </ol>	<p><i>Bump handle</i></p> <ol style="list-style-type: none"> <li>1) Empty the skimmers of any debris</li> <li>2) Turn pump off</li> <li>3) Bump handle slowly 15-20 times</li> <li>4) Turn pump on and run for 2-3 minutes or until water is clear</li> <li>5) Turn pump off</li> <li>6) Bump handle slowly 15-20 times</li> <li>7) Turn pump on and run for 30 secs to 1 minute</li> <li>8) Turn pump off</li> <li>9) Close backwash gate valve (if any)</li> <li>10) Turn pump on</li> <li>11) Mix recommend amount of DE in a bucket of water making a slurry</li> <li>12) Add DE slurry SLOWLY to skimmer closest to pump</li> </ol>

## How to Clean ORP and/or pH Probes

1. Follow the manufacturer's instructions
2. If instructions are not available, then turn off the power to the controller
3. Remove the probes from the flow chamber
4. Scrub the probes with a soft brush and mild detergent (hand soap or even toothpaste)
5. Reinstall the probes and turn on the power to controller



# Winterizing the Pool



General Area	Office supplies, seasonal records, & office equipment	Store in covered boxes or filing cabinet
	Janitorial supplies	Liquids in nonfreeze storage
	First aid supplies and equipment	Store in covered boxes, or enclosed storage room
	Ventilation equipment	Lubricate, spray rubber and fabrics with silicone
	PA system, radio, phones, keys, other electrical appliances, etc	Remove and store in secure, dry area
	Electrical control panels	Shut off all electrical breakers, spray switches with silicone, lock panel door, tape switches for under water lights in off position
	Main water supply	Turn off at source and drain line
	Openings, rooms, etc.	Rodent control
Pool Area	Diving boards	Remove, store flat and cover
	Pool furniture and outside fixtures	Repair, cover or put in enclosed area away from weather
	Safety equipment	Store in enclosed room
Locker & shower rooms	Showers	Remove and store shower heads and soap dispensers
	Lockers	Clean out and cover
	Toilet and sink fixtures	Disconnect fixtures and/or shut-off valves
Chlorinator and chemical room(s)	Chlorinator	Disconnect, drain, lubricate any moving parts, store in dry non-freezing area
	Water lines	Drain
	Tools	Store and spray with silicone
	Chlorine and other pool chemicals	<i>All DRY chemicals</i> ---Seal bucket lids and/or bags tightly and secure them in an enclosed room away from moisture (if you have gas cylinders return them to supplier) <i>All liquid chemicals</i> ---discard hypochlorites based liquid chemicals, use up inventory
	Wall heaters, fans	Cover or dry storage spray with silicone
	Gas mask	Dry storage, spray rubber with silicone
	Test kit	Dry storage, indoors away from extreme heat or cold
Filter & pump	Pool water heater	Shut off energy supply at main source, spray switches with silicone and cover, also drain
	Sand filters	Backwash , drain, rake sand, leave open but protected
	D.E. filters	Backwash , drain, leave open, wash filter covers (septa)
	Gauges, flowmeter	Remove, drain, dry storage
	Valves	Close and back off two or three turns, drain
	Hair strainer	Remove and clean
	Pump	Drain & refill with antifreeze
	Motors	Lubricate, terminate power supply, spray with silicone, cover but allow air circulation

# Cleaning Procedures for Spas and Hot Tubs



The spa/hot tub should be drained and periodically cleaned and refilled with fresh water, due to the buildup of minerals and other substances in the water. Frequency recommendations are based on bather load and water quality. Water should be partially replaced as often as necessary to maintain water quality. Requirements for completely replacing the water may vary from once every few days to one month.

Replace water as necessary to dilute dissolved solids, to maintain water clarity, and to do necessary routine maintenance. Facility should be thoroughly cleaned and disinfected while empty. Although minimum requirements may vary, the National Swimming Pool Foundation recommends a weekly regimen. Measure and re-adjust the chlorine level and chemical balance before using the spa again.

Some spa/hot tub manufacturers recommend adding an emulsifier to your tub's water prior to draining it. This breaks up and dissolves oils for easier removal. To clean your tub, drain it and scrub it out with a 50 ppm chlorine solution (1/4 cup of regular 5.25% bleach per gallon of water used to clean). Use rubber gloves and long-handled brushes, and be careful to protect your skin and eyes. Avoid inhaling any chemical fumes.

The cartridge filter should be cleaned monthly or more often if needed (depending on bather load). One indication that the filter needs cleaning is that water in the tub will remain cloudy after proper disinfection and dirt or skin oils may remain on the surface of the water after using the tub.



## Cleaning the Cartridge Filter in Spa and Hot Tubs

Disassemble the filter and scrub out the filter housing with the 50 ppm chlorine solution. You can clean it in the following manner unless it is due for replacing anyway:

- 1) Thoroughly rinse down the cartridge with a high-pressure nozzle on a garden hose. Do not clean the cartridge with a brush, because brushing can imbed the dirt more deeply, or even harm the filter fabric.
- 2) Soak the cartridge for several hours in an oil cutting solution, such as trisodium phosphate, or whatever your pool/spa store recommends. Thoroughly rinse the cartridge after soaking (trisodium phosphate can burn; follow label instructions).
- 3) Test the cartridge for mineral buildup. Apply a few drops of muriatic acid to the cartridge fabric; if it foams, assume that the acid is dissolving minerals (these minerals can plug the filter). To remove mineral buildup, soak the cartridge in a solution of 1 part muriatic acid to 10 parts water for 2-4 hours. Several cleanings may be necessary for heavy mineral buildup. Rinse well after soaking.
- 4) Finally, soak the cartridge for several hours in a 50 ppm chlorine solution to thoroughly disinfect it. After soaking, rinse well.

**Caution:** these chemical solutions can burn, so use rubber gloves and goggles along with good ventilation to avoid toxic fumes. Rinse well if splashed on skin. If splashed in eyes, flush with large amounts of water for at least 15 minutes and contact medical personnel and continue flushing until they arrive.

- After cleaning cartridge, reassemble the filter and if drained, refill the hot tub. Apply a shock treatment of 10 ppm and maintain that residual for at least 10 hours. Then before re-using the hot tub, carefully measure and adjust the chlorine & pH levels.
- Spa operators find it helpful to have 2 filters cartridges, while one is being cleaned the other spare one can be used to cut down on lag time. Regularly clean your tub's skimmer of hair and debris. This is important, because the skimmer basket is an ideal breeding ground for bacteria.



## Principal Types of Pool Finishes

Rubber-based paint is the most popular, and the best swimming pool paint type. A high quality chlorinated rubber base paint provides a smooth surface that repels water and is easy to clean. It's one of the easiest finishes to apply. The new coat partially penetrates the old to provide a perfect bond.

Another type of rubber base paint is one which is based on synthetic rubber. Note: the synthetic rubber base covered here is not an emulsion paint, which is described in the next section.

Emulsion or latex paint signifies a paint which uses water rather than a volatile solvent. This is a specialty item which is recommended for unpainted masonry pools which are moist at the time of application or for painting a pool previously coated with an emulsion.

Vinyl paints offer a smooth and satisfactory surface when applied by experts. Vinyl's volatile nature and rapid set-up time demand a special application technique. They're thin, require more coats, and increase labor costs. However, they are easy to clean and repaint.

Epoxy paints can do an excellent job if they're two component epoxies (not ready mixed esters) and carefully applied. Inferior products or improper application can cause chalking and delamination (pulling away of one coat from another). On repainting, surface preparation requires extra care.

"Cement type" finishes. Water-mixed cement paints are generally not desirable due to fading and powdering that require repainting each year. Keep in mind, though, that the old water mixed cement paint underneath will probably continue to loosen and fall away in patches. So prepare for some touch-up work each season.



## Preparing to Paint Your Pool

Concrete pools. Your pool must be washed before painting. First remove loose and peeling paint with a wire brush. Then wash your pool with any popular detergent to remove paint particles, dirt, scum, oil and grease. After washing, flush off the walls and floor with clean water from a hose under pressure. Scrub continuously. Let the pool dry thoroughly before painting.

Etching repaired areas: if your pool requires patching before painting, such cement patches must be etched to enable the paint to bond. Etching bare concrete prevents peeling of paint. Etching with muriatic acid opens up the microscopic pores of the concrete. The pool can be etched while still wet from cleaning and rinsing. Etching enables the paint to lock into the surface for proper bonding.

All bare concrete pools require etching or sandblasting. If the surface of the pool has been steel-troweled, give special attention to good etching. A steel-troweled finish is not recommended: a wood-float finish should be used. If you have a gunite pool, or one which has a steel-trowel finish, or one whose surface is smooth and/or dense, a 20% or even 30% muriatic solution should be used.

*Refer to the next section (page 26) on how to acid etch a pool.*

Special (or problem surface preparation) Where paint is peeling, blistering and/or powdering badly, it should be sandblasted. Sandblasting is the only way to get a truly satisfactory surface.

When making arrangements with a sandblaster ask him to guarantee:

- to remove every last trace of the old paint so there is none left on the surface or in the pores of the concrete
- to furnish a fully watertight pool
- to render the concrete smooth and even-textured, filling all cracks, air holes and other cavities which sandblasting may have exposed.

After sandblasting and making the necessary structural repairs, you have essentially a new, unpainted pool.

Plaster pools. These are regular concrete pools to which a thick white or near-white “cement-type” surface has been applied.

If the plaster finish is in good shape and is not powdering, flaking or chalking, acid etching and painting will produce an outstanding job. Not only will the paint give the pool a beautiful tile-like surface that’s easy to clean, but the plaster will be protected from deterioration.

Fiberglass pools. Because of the inherent characteristics of fiberglass, bonding of paint to this type of pool is a problem. The answer is complete and careful cleaning, and the use of paint which has the best bonding characteristics.

Clean the surface of the bare fiberglass pool with a cleanser such as Ajax. Careful scrubbing will remove all dirt, oils, etc., on the surface and in any eroded pits. Rinse the surface thoroughly. Next, slightly roughen the fiberglass with sandpaper. This will provide the “tooth” for a better mechanical bond with the paint. Hose down the pool to remove dust and any other remaining foreign matter. When the surface is dry (paint will not adhere satisfactorily to a damp surface) the pool may be painted. Never use a solvent wipe on a fiberglass surface after it has been sanded in preparation for painting.

# Acid Etching

## Preparation

### *Drain the pool/spa.*

Note: A completely drained pool needs to have the hydrostatic valves opened as soon as they are accessible while the pool is being drained of water. If not, then the pool could be damaged by the hydrostatic pressure from ground water. The hydrostatic valves are located in each main drain.

### *Acid handling*

- Always wear full protective gear when working with acid. This includes: gas mask/respirator, rubber gloves and boots, goggles, etc.
- Never work alone
- Have adequate ventilation
- Follow manufacturer's directions when handling acid
- **REMEMBER, always add acid to water; NEVER add water to acid**
- If using a sump pump to remove water, be sure pump is plugged into a GFI protected outlet
- Refer back to First Aid Procedures (page 11) for accidents or injury

### *Mixing*

A mixture of 10-20% of muriatic solution is the usual strengths needed for etching.

Never use metal utensils for mixing. The acid solution must be kept away from all metal parts and fixtures of the pool. Immediately rinse with copious amounts of water to any exposed metals to prevent corrosion.

Examples of 10% Mixtures
1 gal. 20% MA + 1 gal. of water = 2 gal. 10% solution
1 gal. 30% MA + 2 gal. of water = 3 gal. 10% solution
1 gal. 20% MA = 1 gal. 20% solution use straight from bottle

## Applying Solution

Note: Have a water hose running throughout etching procedure

Have on proper gear (refer to acid handling)

Work in one section of pool at a time

- 1) In one section of pool, apply acid solution with a garden sprinkling can or plastic sprayer
- 2) Scrub with a non-metal brush
- 3) Wait for foaming to cease and hose rinse thoroughly with fresh water
- 4) Repeat fresh water rinse and scrub with a stiff non-metal brush to remove any acid residue
- 5) Don't let any acid dry on the pool surface. This will cause paint failure!
- 6) Strip masonry surfaces to a uniform granular texture similar to fine or medium sandpaper grit. This will ensure a good bond for paint.
- 7) Wash with a solution of soda ash in water to neutralize any other acid residue.
- 8) Repeat for each section until the entire pool surface is done.
- 9) Wastewater from etching needs to be diluted with soda ash to ensure a pH range (5.5-8.0) for proper disposal.
- 10) Be sure to flush all materials and equipment used with fresh water.
- 11) Allow the pool surface to dry.
- 12) Follow manufacturer instructions for applying paint and other surface preparation.



# Legal Liability Related to Swimming Pool Operators



<b>Definitions</b>	
<b>Liability</b>	Responsibility, especially when negligence is a factor in injury occurrence
<b>Plaintiff</b>	The person who has been injured and who brings a suit
<b>Defendant</b>	The person or organization whom the plaintiff charges was responsible for the occurrence of the injury
<b>Action for Tort</b>	A legal action brought by a plaintiff to obtain compensation
<b>Negligence</b>	The defendant acted improperly or failed to act properly. To establish negligence a casual relationship between the defendant's action and the plaintiff's injury must be established.
<b>Contributory Negligence</b>	The actions of the plaintiff were a partial cause of the injury. Proof of it may minimize or eliminate the defendant's responsibility
<b>Trespass</b>	Unauthorized entry upon premises when such entry is prohibited
<b>Attractive Nuisance</b>	A thing or condition to which others may be attracted (i.e. pool without fencing around it)
<b>Assumption of Risk</b>	The element of risk if obvious to and accepted by the injured person (i.e. the use of a diving board)
<b>Respondent Superior Doctrine</b>	The employer is responsible for the negligent acts of employees

## **Bases for Liability Suits**

Failure to provide safe facilities: (i.e. the facility has slippery decks, inadequate lighting, steps and handrails which do not comply with state regulations)

Failure to provide safe equipment: (i.e. the facility has a diving board with flaw, ladder handrails with sharp edges)

Failure to provide safety equipment: (i.e. the area lacks sufficient ring buoys, poles, shepherds hooks, etc.)

Failure to supervise: (i.e. no lifeguard on duty, an insufficient number of guards is provided; lifeguard leaves the area unattended (Public Pools))

Failure to comply with regulations: (i.e. the management has permitted conditions of impure water and unsanitary facilities to exist)

Failure to post: (i.e. the management has permitted a lack of depth markers or warning signs as required)

Failure to provide security: (i.e. gates have been left unlocked; no fence provided around outdoor swimming facility)

Failure of an employee to properly perform: (i.e. talking to persons while lifeguard is on duty, leaving his/her post)

Lack of action: (i.e. failure to provide first aid treatment; failure to advise an injured person to obtain follow-up treatment; failure to act promptly in effecting rescue; failure to enforce regulations; failure to inspect facility and equipment)

Failure to administer properly: (i.e. employing or assigning unqualified personnel; knowingly permitting dangerous conditions to exist)

The above information was extracted form Aquatic Instruction, Coaching and Management by John A. Torney, Jr. and Robert D. Clayton. Burgess Publishing Company, Minneapolis, MN 1970

*This is for informational purposes only and does not constitute liability for the authors and editors of this publication. Any additional information which may be needed with regard to the subject of legal liability should be obtained from qualified legal counsel.*

# Appendix

ARKANSAS DEPARTMENT OF HEALTH  
GUIDELINES FOR SUBMISSION OF PLANS FOR POOLS, SPAS AND  
OTHER WATER RELATED FACILITIES

Complete and detailed plans shall be submitted to the Arkansas Department of Health. No part of the work shall be undertaken until written approval of the plans has been granted by the Department of Health.

The following items shall be included in the submittal:

1. Plans and specifications shall be submitted in triplicate.
2. A cost estimate for the project must be provided. A REVIEW FEE of 1% of the estimated cost is charged for all plans submitted. The minimum fee charged is \$50.00, and the maximum fee is \$500.00.
3. The name, address and location of the pool/spa along with the name, address and phone number of the person to be contacted for any necessary additional information.
4. Complete technical specifications for all equipment relating to recirculation, filtration, disinfection, maintenance, ventilation, lighting and fencing. **Indoor** pools and other related facilities shall submit HVAC drawings and specifications for the pool room.
5. Complete detailed drawings to include, but not limited to, the pool/spa, deck, make-up water supply, equipment rooms, piping arrangements, profile, bathhouse.
6. Information pertaining to necessary signs and other required safety equipment.
7. A signed statement from the owner, general contractor or other responsible party specifying any item or items to be provided by the owner, i.e., test kits, fencing.
8. Addresses of all parties to receive copies of swimming pool correspondence.
9. Plans for all Class A pools or other pools as determined by the Department shall be prepared by a professional engineer. All work shall be performed in compliance with the Arkansas State Licensing Law for Contractors and laws of the Arkansas Board of Registration for Professional Engineers.
10. Mailing Address:

For Class A Pools:

Arkansas Department of Health  
Engineering  
4815 West Markham, Slot H-37  
Little Rock, Arkansas 72205-3867

For All Other Class Pools:

Arkansas Department of Health  
Environmental Health Protection  
4815 West Markham, Slot H-46  
Little Rock, Arkansas 72205-3867

11. Questions contact:

Class A Pools – Engineering, 501-661-2623  
All Other Class Pools – Environmental Health Protection, 501-661-2171

# Employee MSDS Training

Date\_\_\_\_\_

Trainer/Instructor\_\_\_\_\_

Topics:

- Special handling procedures for swimming pool chemicals
- Storage practices for swimming pool chemicals
- Potential health related hazards
- Swimming pool chemical interactions

Common swimming pool chemicals:

- Sodium Hypochlorite
- Calcium Hypochlorite
- Bromine
- Muriatic Acid
- Sodium Bisulfate
- Sodium Bicarbonate
- Test Kit reagents

- General Protection Practices
- Emergency Care

Employees present for training session:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Training verified by: \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_  
Title



Was matter reported to local health department? \_\_\_\_\_ Yes \_\_\_\_\_ No

**Retain with permanent facility records**

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**ARKANSAS DEPARTMENT OF HEALTH  
ENVIRONMENTAL HEALTH PROTECTION  
ENVIRONMENTAL HEALTH SERVICES**  
*REPORT OF ACCIDENT OR DROWNING AT POOLS, SPAS  
OR OTHER RELATED FACILITIES*

**GENERAL INFORMATION**

Name of Facility: \_\_\_\_\_ Address: \_\_\_\_\_ City: \_\_\_\_\_

Name of Victim: \_\_\_\_\_ Address: \_\_\_\_\_ City: \_\_\_\_\_

Date of Incident: \_\_\_\_\_ Time: \_\_\_\_\_ am/pm Accident  Drowning  Fatality

Description of water and weather conditions at time of the incident: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name of employees involved in rescue attempt or treatment of injury:  
\_\_\_\_\_  
\_\_\_\_\_

Facility open at time of incident Yes  No  Lifeguard on duty Yes  No  Bather load: \_\_\_\_\_

VICTIM: Male  Female  Age: \_\_\_\_\_ Non-Swimmer Yes  No

FACILITY: Indoor  Outdoor  Spa  Pool  Water Slide  Other  (Specify): \_\_\_\_\_

Emergency telephone provided: Yes No

Type of lifesaving/firstaid training of employees involved: \_\_\_\_\_  
\_\_\_\_\_

TYPE OF INJURY: Abrasion or contusion  Concussion  Fracture  Laceration  Strain or Sprain

Other  (Specify): \_\_\_\_\_

AREA OF BODY INJURED: Head  Trunk  Arm, hand or finger  Leg, foot or toe

Other  (Specify): \_\_\_\_\_

DESCRIPTION OF INJURY: \_\_\_\_\_  
\_\_\_\_\_

**FACTORS WHICH MAY HAVE CONTRIBUTED TO ACCIDENT**

Slippery Surface: Surrounding pool  Bottom of pool  Steps

Other  (Specify): \_\_\_\_\_

Deck Equipment: Ladders or handrails  Lifeguard equipment

Other  (Specify): \_\_\_\_\_

Pool Enclosure: Inadequate  Gate unlatched  Horseplay involved

Other  (Specify): \_\_\_\_\_

Recirculation/Filtration Equip.: Mechanical  Electrical  Missing/broken equipment

Other  (Specify): \_\_\_\_\_

Diving, Jumping or Sliding: From board  From poolside  From slide

Other  (Specify): \_\_\_\_\_

Other: Swimming miscalculation  Natural causes  Use of alcohol

Chemical or chemical related accident: Yes  No

If Yes, chemicals involved: \_\_\_\_\_

Brief description of accident: \_\_\_\_\_

Were police, rescue unit or other emergency personnel called: Yes  No

If Yes, list: \_\_\_\_\_

Brief description of emergency action taken on site: \_\_\_\_\_

Degree of treatment required: None  CPR  First aid  Emergency room  Hospital admission

If necessary, make a sketch of the pool/spa area involved in the injury or accident

Additional remarks relevant to this accident: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

**G**

1

**O T**

2

**D I A**

3

**R R H E A**

4

**D O N ' T**

5

**S W I M**

6

**Can  
you  
read  
this?**

Swimming when ill  
with diarrhea can  
spread germs in the  
water and make  
other people sick.

**Got diarrhea?  
Don't swim.**

[www.cdc.gov/healthyswimming](http://www.cdc.gov/healthyswimming)



# Healthy Swimming

## Six "PLEAs" for Protection Against Recreational Water Illnesses (RWIs)

**PLEASE** do not swim when you have diarrhea. You can spread germs in the water and make other people sick.

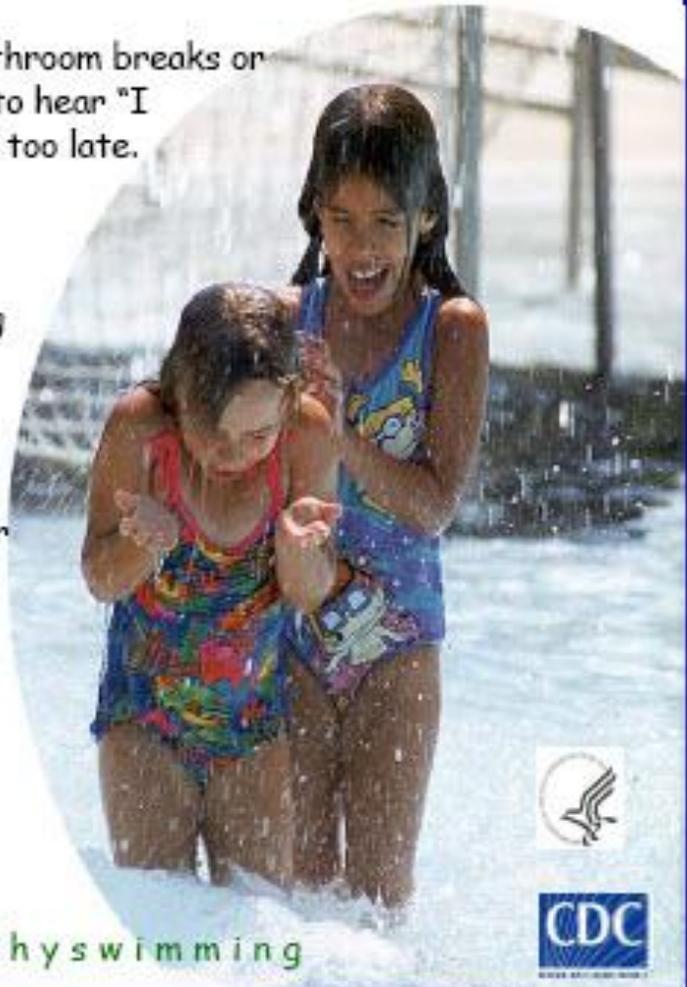
**PLEASE** do not swallow pool water. Avoid getting water in your mouth.

**PLEASE** practice good hygiene. Take a shower before swimming and wash your hands after using the toilet or changing diapers.

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

**PLEASE** change diapers in a bathroom or a diaper-changing area and not at poolside.

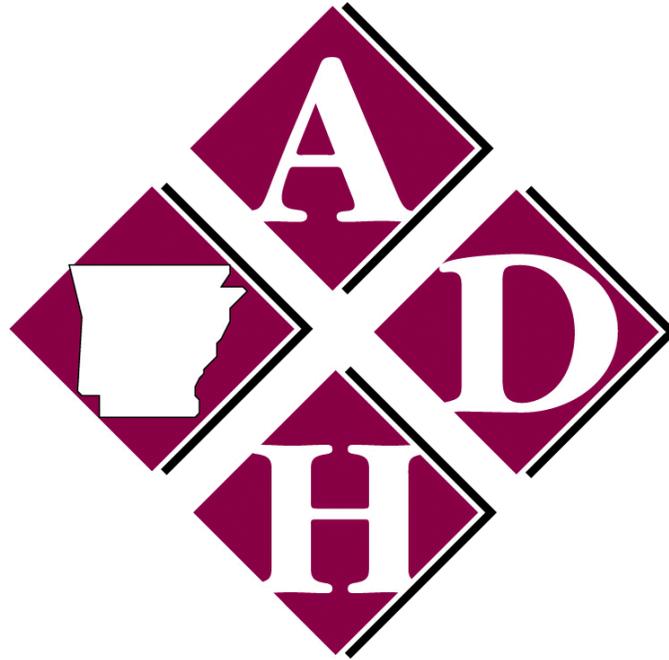
**PLEASE** wash your child thoroughly (especially the rear end) with soap and water before swimming.



For more information visit:

[www.cdc.gov/healthyswimming](http://www.cdc.gov/healthyswimming)





## Arkansas Department of Health

*Environmental Health Protection  
4815 West Markham Street, Slot 46  
Little Rock, Arkansas 72205-3867  
Telephone (501) 661-2171*

**This manual has been compiled using information from:**

**Swimming Pools: Safety and Disease Control Through Proper Design and Operation (CDC)**

**Suggested Health and Safety Guidelines for Public Spas and Hot Tubs (CDC)**

**and other industry related publications**

**This publication provides useful information for pool and spa management and operation. The operator should also utilize the assistance of the ADH Environmental Health Specialist and the current *Arkansas Rules & Regulations Pertaining to Swimming Pools & Other Related Facilities*. Any questions or comments please contact your local county health unit.**

**Only properly trained individuals with required licenses and qualifications should perform repairs and equipment replacement.**

**Updated and Revised by Forrest Montgomery, R.S., Environmental Health Specialist  
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