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Water Safety Month 2023

Week 1

Testing & Basic Chemicals

There are so many different types of pool chemicals- We are going to concentrate on the very basic ones that control- Chlorine, pH, Alkalinity, Calcium & Cyanuric Acid.

Recommended Chemical Guidelines & Dosing Chart

	MINIMUM	IDEAL	MAXIMUM
Free Chlorine Pool	3 ppm	3-4 ppm	5 ppm
Free Chlorine Spa	3 ppm	3-5 ppm	5 ppm
Combined Chlorine	0	0	0.2
pH	7.2 ppm	7.4-7.6 ppm	7.8 ppm
Total Alkalinity	60 ppm	80-100 ppm	120 ppm
Calcium Hardness Pool	150 ppm	200-400 ppm	850 ppm
Calcium Hardness Spa	100 ppm	150-200 ppm	750 ppm
Cyanuric Acid	0	15-20 ppm	30 ppm

Dosages to Treat	10,000 Gallons		
Chemical	Desired Change		
Increase Chlorine	1 ppm	5 ppm	10 ppm
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
Increase Total Alkalinity	10 ppm	30 ppm	50 ppm
Sodium Bicarbonate	1.4 lbs	4.2 lbs	7.0 lbs
Sodium Carbonate	14 oz	2.6 lbs	4.4 lbs
Sodium Sesquicarbonate	1.25 lbs	3.75 lbs	6.25 lbs
Decrease Total Alkalinity	10 ppm	30 ppm	50 ppm
Muriatic Acid (31.4%)	26 fl.oz.	2.4 qts	1 gal
Sodium Bisulfate	2.1 lbs	6.4 lbs	10.5 lbs
Increase Calcium Hardness**	10 ppm	30 ppm	50 ppm
Calcium Chloride (100%)	0.9 lbs	2.8 lbs	4.6 lbs
Calcium Chloride (77%)	1.2 lbs	3.6 lbs	6.0 lbs
Increase Stabilizer	10 ppm	30 ppm	50 ppm
Cyanuric Acid***	13 oz	2.5 lbs	4.1 lbs
Neutralize Chlorine	1 ppm	5 ppm	10 ppm
Sodium Thiosulfate	2.6 oz	13 oz	26 oz
Sodium Sulfite	2.4 oz	12 oz	1.5 lbs

Chemicals broken down *by order of importance

Alkalinity (TA) in pools is extremely important and helps prevent sudden pH changes. Alkalinity helps stabilize the pH in your body of water.

Low Alkalinity can cause your water to have "pH bounce". This is when your pH shifts drastically causing your pool water to be unbalanced.
Can Cause:

- Chlorine Inefficiency
- Metal Corrosion
- Pool Staining
- Scale

High Alkalinity your pH will be much higher than normal. "pH lockout" can occur where pH levels become difficult to adjust.
Can Cause:

- Reduce Pool Circulation
- Clogged Filters and heating elements
- Rough Surfaces
- Cloudy pool water

What Causes Alkalinity to Rise or Fall?

- Rain
- Body Fluids
- Shock
- Sunscreens
- Make-up water with high alkaline levels

How to Raise the Alkalinity levels in your pool:

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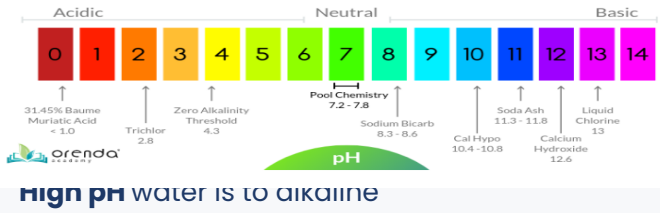
⇒ Sodium Bicarbonate (Bicarb or baking soda)
*Always remember to add chemicals to water, never water to chemicals.

How to Lower the Alkalinity levels in your pool

⇒ Partial water replacement
⇒ Muriatic acid- this will lower pH and alkalinity at the same time.

pH alone in pools is unstable. pH is a scale that measures the degree of acidity or alkalinity of the water. The scale of pH ranges from 0-17 with 7 being neutral.



Low pH water is acidic.
Can Cause:

- Chlorine Inefficiency
- Metal Corrosion- pumps, ladders, slides, etc..
- Eye and Skin irritation
- Etch plaster

High pH water is to alkaline
Can Cause:

- Scaling on surfaces
- Cloudy pool water
- Increases calcium hardness levels
- Chlorine Inefficiency

What causes high pH?

pH rises naturally by swimmers, splashing, adding air into the pool will cause the CO2 to break up and pH to rise.
pH also rises when other chemicals are added to the pool, Chlorine will raise the pH.
Temperature rise can also cause pH to increase.

How to raise pH?

⇒ Soda Ash chemical will increase pH

What causes low pH?

Stagnant pool water can lower pH due to carbon dioxide in the air will start to dissolve into the water.
Make-up water with low pH will also cause pH to decrease.

How to lower pH?

⇒ Muriatic Acid chemical will decrease pH
⇒ CO2 will decrease pH

Chlorine (CL) also known as sanitizer is the most effective way to kill bacteria, algae and keep the water safe for swimmers. There are many different types of chlorine and many different ways to administer Chlorine .

Low CL can cause your water to be unsafe for swimmers
Can Cause:

- Algae Growth
- Eye/Skin Irritation
- Clogged Filters
- Water unclean

High CL Can cause your water to be unsafe for swimmers
Can Cause:

- Eye/Skin Irritation
- Lung Irritation
- Rough Surfaces

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- Cloudy pool water
- Heater Failure

Most used Chlorine Types

Liquid VS Tabs

Chlorine type is really a personal choice depending on needs, location, cost and staff preferences. We will break down a few pros and cons to each.

	Liquid	Tablets (Dry Chlorine)
Cost	• Most Cost effective • Cost can increase or decrease depending on supplier and demand multiple times a year.	• More expensive initial cost • More stable on cost throughout the year. • More expensive per bucket vs same amount for liquid.
Availability	• More available • Easily to get from suppliers • Has about 10% available chlorine	• Can be very volatile depending on what is being produced when. • Depending on the type of feeder- use specific tab that might not be as available.
Transportation	• Needs a special permit • More hazardous	• Needs a special permit • Less hazardous
Storage	• Does not have a long shelf life • Needs larger storage area per square foot.	• Has a longer shelf life as long as stored correctly
Usage	• Easy to dispense • Will Raise Chlorine very quickly • Chemical Feeder easy to repair	• Easier to maintain chlorine level in pool • Does not overshoot as quickly • Chemical feeder has more parts that require repair

Chlorine Tab PROs:

- Stabilized - no need to add extra Cyanuric Acid
- Highest available chlorine level of any chlorine compound 90%
- Reliable, consistent
- Easy for storage, handling, and application
- Long shelf life

Chlorine Tab CONS:

- Cyanuric acid will build up over time causing chlorine issues
- Tablets can not quickly raise chlorine levels so another type of “Shock” is needed.
- Adds chlorine to water slowly

Liquid PROS:

- Fast-Acting immediately available chlorine
- Lower purchase cost
- Can be used for many different purposes around the pool
- Easy to apply
- Goes into a solution and disperses quickly

Liquid CONS:

- Lower available chlorine level
- Unstable
- Short shelf life