

WATER CHEMISTRY

Total Alkalinity

Total Alkalinity is the basic capacity of the spa water to resist change in the pH. When the alkalinity is low, the pH and alkalinity will change very easily with bather use or chemical adjustment.

The opposite will happen when the alkalinity is high. It will take more bathers or chemicals to change the pH and alkalinity levels.

The optimum total alkalinity level is between 80 to 120 parts per million (PPM).

Controlling Alkalinity

1. Always follow printed instructions on the bottle and/or packages.
2. Always adjust Total Alkalinity and Sanitizers first even if it throws the pH further off.
3. Chlorine users will generally use more "pH/Alkalinity Down".
4. Bromine users will generally use more "pH/Alkalinity Up".
5. Make sure test strips are not wet or outdated prior to testing.
6. Never test immediately after using oxidizer shock. Prior to testing, allow 30 minutes of circulation with the spa cover half off.
7. Always add chemicals when pump(s) are on high speed.
8. Always premix "pH Alkalinity Down" chemical in half a bucket of water prior to introducing them to the spa.
9. Never attempt to adjust pH or Total Alkalinity in large increments. Adjustments are made easier, and will stay set longer if you make them in small increments.

You will be using the same chemicals to lower the pH and Total Alkalinity ("pH/Alkalinity Down" and "pH/Alkalinity Up"). This creates concern with some people: throwing off one level to correct another.

Question & Answer

Q: My pH is low and the Total Alkalinity is high. What do I do?

A: Add small amounts of "pH/Alkalinity Down" to bring down the alkalinity level first. Be sure to allow plenty of circulation and standing time for the water's chemical levels to change. This may take anywhere from 1 to 3 hours depending on the size of the adjustment. (Smaller adjustment amounts are always better than larger adjustments.) Then you may start adjusting the pH back up, by using "pH/Alkalinity Up" in smaller amounts at a time.

Q: My pH is high and the Total Alkalinity is low. What do I do?

A: Add small amounts of "pH/Alkalinity Up" to bring up the alkalinity level first. Be sure to allow plenty of circulation and standing time for the water's chemical levels to change. This may take anywhere from 1 to 3 hours depending on the size of the adjustment. (Smaller adjustment amounts are always better than larger adjustments.) Then, you may start adjusting the pH back down, by using "pH/Alkalinity Down" in small amounts at a time.

pH- Potential Hydrogen

pH is the measurement of the acid in water.

The normal range of your spa's pH level is between 7.2 to 7.8 and can be easily tested with simple test strips.

Low pH

The lower your pH, the more acidic your water will become. That's right, Acid! Effects of low pH are dissolving or pitting heaters, manifolds, pump seals, and in some cases, the acrylic finish itself.

High pH

The effects of high pH are increased scaling, calcium deposits, cloudy water, clogged filter and effectiveness of your sanitizers (Chlorine and Bromine).

What affects pH

Everything that is introduced into the spa water has its own pH level, INCLUDING YOU. All of these different pH levels can cause conflict with the spa water's ability to maintain its correct pH levels.

Example

Spa owners that use their spa 3 or 4 times a week have a lower pH than spa owners that use their spa once or twice a week.

Even sanitizers (Bromine, Chlorine, Etc.) that you use can affect the spa water's pH levels.

Did you know that Bromine has pH levels of 3.0 while chlorine has a pH level of 7.1? Other types of sanitizers have pH levels so low, it is like adding pure acid to your spa.

Be very careful of what you are putting into your spa water.

Chlorine users

Chlorine is very sensitive to pH. Readings higher than 7.8 will cause chlorine users to use twice the amount of chlorine to maintain a proper level. If you are using excessive amounts of chlorine with little effect, check the pH and Total Alkalinity levels.

Calcium & Scale

Calcium is one of the few minerals that does not dissolve in hot water. In fact, hotter water makes calcium more of a solid, gritty, chalky substance that attaches itself to the acrylic finish, heater, and everywhere else in the spa. We refer to these conditions as "scaling." High pH can also increase the effects of this condition.

If left untreated "scaling" causes heater, pump, and jet failures. All of which are not covered by the spa's warranty.

Prevention and treatment

1. Never allow the spas water temperature to exceed 104° F.
2. Check the pH levels and adjust at least three times a week if necessary.
3. Never allow the pH level to exceed 7.8.
4. Use "Metal Protector" every time you fill your spa. (See printed instructions on bottle.)
5. Use "Stain and Scale Defense" weekly as described in the Clear Water Plan.
6. Applying "Fast Sheen" to the spas acrylic surface when you drain and clean your spa will greatly help your spas finish protect itself from scale build-up.(Shiny surface ONLY!)

Calcium clean up

Unfortunately, there is very little that you can help you remove calcium or scale completely in a spa. Prevention is the key.

Cleaning

When you drain the spa, clean the surface with "Multi- Purpose Cleaner" and rinse well.

Calcium Hardness

DO NOT USE SOFT WATER WHEN FILLING YOUR SPA. This is primarily for two reasons:

1. Soft water tends to be very unstable. This means that locking-in pH and total Alkalinity levels becomes difficult.
2. Soft water becomes quite foamy with very little turbulence. No amount of "Foam Gone" will stop it from foaming for very long.

What does this mean?

Your spa water needs to have some hardness to it. If you live in an area that the water source is soft, you will need to add 2 oz of "Calcium Increaser" to raise water hardness level 20 ppm at a time. This will make your water more manageable.

Please follow all printed instructions on the bottle and use in very small increments.

Well Water (Very hard water)

In some areas, the water that you have may be very hard. In these cases, it is acceptable to fill half of the spa with hard water and the other half with soft water from a water softener.

Vinyl and Leather Cover (pillow and cover protectant)

Due to the constant punishment your spa cover and pillows receive, you want to protect them by applying Vinyl and Leather Cleaner as a part of monthly maintenance.

The Vinyl and Leather Cleaner is specifically designed to protect spa covers and pillows from chemical and ultraviolet damage. It accomplishes this without leaving an oily residue behind that is normally associated with common automotive vinyl protectants.

Use Of Vinyl and Leather Cleaner:

Vinyl and Leather Cleaner should be used sparingly. Incorrect product usage may cause water clarity issues.

Spa Covers:

1. Remove spa cover from spa.
2. Allow spa cover to dry completely.
3. Spray Vinyl and Leather Cleaner on cover evenly and wipe dry.
4. Allow spa cover to dry completely.
5. Reinstall cover on spa.

Pillows:

1. Wipe pillows dry with a soft cloth.
2. Carefully spray Vinyl and Leather Cleaner directly onto pillow.
3. Wipe pillows dry.
4. Allow pillows to dry completely.

Important: Do not use automotive vinyl protectants on spa covers or pillows. These products are generally oil based and will cause severe water clarity issues that are difficult to correct.

Filters & Filtration Cycles

Filtration:

Filtration is one of the most important steps you can take ensuring clean, clear water. Regardless of what some people may think, it is far more inexpensive to fix water clarity problems by filtering your spa for the appropriate amount of time than it is to use excessive amounts of chemicals, filtration times, and/or water replacement.

Superior Spas filtration system, simply draws contaminated water through the filter by removing debris from the water. Next, it pumps the newly cleaned water back into the spa through various jets.

Spas equipped with the Ozonator will also receive ozone injections into the filtered water for further protection against contaminants during filtration cycles.

Filtration also ensures that chemicals are mixed thoroughly through the water, increasing chemicals performance.

Filtration Cycles:

All electronic controlled spas have programmable filtration. (See sales rep or Control Manual card). This varies based on number of users and chemicals being used.

Why do I need to clean the filter cartridge?

Because the filter can't protect itself from bacterial growth, it still needs to be cleaned on a regular basis. This maximizes your spas performance and ensures the heating and filtration systems are functioning correctly.

Most spa filter canisters are manufactured with a filter bypass. When a filter becomes full of debris, the bypass will open allowing water to flow around the filter, rather than through the filter. When this happens, your daily filtration cycles are no longer effective.

Another casualty of a dirty filter cartridge is the loss of water temperature. The spas heating system will only function with the proper amount of water flow through the system. When this happens, your daily filtration cycles are no longer effective.

How to clean filter

In addition to spraying the filter with a high pressure nozzle as listed in the spas owner's manual, deep cleaning the filter cartridge is also necessary.

Even if the filter cartridge looks perfectly clean, you will still need to deep clean it regularly.

Minerals and other contaminants are very difficult to see and can get lodged deep into the filter fibers causing water flow issues.

You will need to have an extra filter cartridge on hand for the deep cleaning process. It is necessary to always have one filter either cleaning or drying, and the other installed in the spa. This process will double the filter cartridge's overall life and performance.

Steps to clean the filter

1. Place the dirty filter into a bucket with the Filter Cartridge Cleaner.
2. Allow the filter to soak for a minimum of 24 hours.
3. Remove filter and spray clean with a water hose, and allow the filter to dry thoroughly.
4. Reinstall as described in the Water Plan.

Chemicals & Uses

Metal Protector

Your Water Plan recommends the draining and refilling of your spa every four (4) months. Upon initial and refilling your spa, you will want to add 16oz. of Metal Protector to the center of the spa. Make sure all the jets are on high speed.

Metal Protector will hold the active minerals in the newly added spa water in a state of "Solution." The term solution means that minerals in the water are being held a kind of suspension, keeping them from bonding to anything in the spa and causing damage. Mineral control is a critical part of maintaining spa performance and longevity.

In addition to fill-up protection from minerals, the Water Plan also recommends the weekly maintenance of mineral protection. This is accomplished by adding a weekly dosage of Scale Defense.

DO NOT USE SPA BRITE OR LIKE PRODUCTS, ON THE SAME DAY YOU ADD METAL PROTECTOR TO THE WATER. Adding these chemicals on the same day will result in cloudy water.

Do not ADD these products together within a 24 hour period

Oxidizer Shock ----- Oil Gone (will result in a brownish tint to the water)
Spa Brite ----- Stain & Scale (will result in a greenish tint to the water)

Water Symptoms

Cloudy Water

Everyone experiences cloudy water at one time or another.

The number one cause of cloudy water is the spa user and what they bring into the spa. As discussed before, the average spa holds only about 450 gallons of water. What you bring into the spa will stay in the water for quite some time. If you overload it with contaminants it will take a longer time to clear-up, if it can clear-up at all. Think of the spa as a thorough body wash. Everything in your clothes, skin and hair will be washed off and left in the spa water causing cloudy water.

How do I prevent it from happening?

1. Never wash the clothes that you wear into the spa in laundry detergent or fabric softener. Laundry detergent and fabric softener stays in your clothes no matter how well you rinse them. This causes cloudy and foamy water that is almost impossible to clean up. The only thing you can do is wait for it to eventually filter out. Adding SPA BRITE in this case will only further delay the spas ability to clear-up.
2. Never enter the spa with sunscreen or lotion on your skin. Oil is very difficult to remove from the water and can cause a reaction with other chemicals that you may add to your spa causing a cloudy water condition. It is best to rinse off prior to entering the spa.
3. Use caution when adding any chemicals to correct a problem. Most cloudy water problems are made worse by the spa owner adding chemical after chemical to correct a cloudy water problem that normally would have cleared up with a little OXIDIZER SHOCK and filtration time.
4. Remember, swimming pool chemicals are completely different than spa chemicals. Enter a spa with wet clothes from a swimming pool can cause a possible chemical reaction to either the spa user and/or the spa water. Always rinse thoroughly when transferring between a swimming pool and spa.
5. Clean the spas filter(s) regularly as described in the Water Plan.

Oily Water

Body oil, perspiration, lotions and tanning oil will quickly accumulate in your spa. Enzyme oil gone is the chemical that will help break-down excessive amounts of body and oils in the spa water.

Remember, the best solution is prevention. Always watch what goes onto your body because it will eventually end up in your spa.

How to use Enzyme Oil Gone:

1. Add ½ oz of Enzyme Oil Gone to a spa running on filter speed. Allow spa to filter until the spa water no longer feels or looks oily. We recommend increasing your spas filter mode during this time.
2. You may find the need to add this product to your weekly chemical maintenance plan. If so, simply repeat step once a week. (Weekly dosages do not generally require additional filtration time.)

Smelly Water

Burned-out chemicals, bacteria, and other organic waste in your spa can cause water to have an odor. Treating the water with Oxidizer Shock will remove smells in most cases, two to four tablespoons per application. You may use Chlorine Granules in worse cases.

Note: Spa must be running with all of the jets on high for 30 minutes with the cover half off. You may repeat Oxidizer Shock treatments in 30 minute intervals if necessary.

Big Water Clarity Issue?

1. Identify the water clarity issue first: is it soap, oil, Bacterial, or Chemical Imbalance?
2. Select the proper treatment.
3. Clean the filter cartridge and increase the amount of filtration until the water clears-up.
4. Add 2oz. of Oxidizer shock at a time, in 30 minute intervals, with the spa cover at least half off with all the jets on high speed.
5. Be patient! With few exceptions, spa water will not clean or clear-up overnight. Cloudy water requires proper identification, the correct treatment, and plenty of filtration.

Water Temperature & its effects

The actual water temperature will greatly effect how efficient your spa chemistry is. Here is an example of what hot water can do to your spa water and its chemicals.

Hot Spa Water:(100 F-104 F)

1. Increases water evaporation.
2. Increases chemicals dissipation.
3. Increases amount of spa user waste.
4. Accumulation of minerals and salts.
5. Increases Total Dissolved Solids (TDS)

As you can imagine, the inverse effect is true with cooler water temperatures.

Does this mean that you should not operate your spa at higher water temperatures?

No, we just want you to be aware that your chemical usage will increase or decrease with the actual water temperature.

Safety is our main Concern

1. Read and follow all printed instructions listed on bottles, packages and owner's manual.

2. Read and follow all printed instructions listed in chemical startup kit.

3. DO NOT EXCEED CHEMICAL DOSAGES PER GALLON as listed in the owner's manual, chemical bottles, packages, and kits. Most chemical instructions are figured for a 500 gallon spa however, most spas hold less than 500 gallons. In this case, ALWAYS USE SLIGHTLY LESS THAN THE RECOMMENDED AMOUNT OF ANY CHEMICAL. IT IS MUCH EASIER TO ADD ADDITIONAL CHEMICALS THAN IT IS TO REMOVE EXCESS CHEMICALS FROM THE SPA WATER.

Remember, less is more when dealing with spa chemicals!

4. Never mix chemicals together.

5. Never change chemical brands or types without completely draining, flushing, and thoroughly cleaning the spa, pillows, and cover first.

6. Be careful NOT to add certain chemicals on the same day.

7. Always protect the eyes while introducing chemicals into the spa.

8. In the event of overdosing a sanitizing chemical (bromine, chlorine, etc.), immediately turn off power to the spa and drain water into a safe, locally approved area. Rinse pillows, jets, and spa surface with regular tap water. Refill the spa to proper water level, turn back on, and set the filtration time to completely circulate and minimize the risk of chemical damage to your spa.

Important Chemical Safety Notices

Chemical Directions:

- * All directions in this program are calculated for Wholesale Hot Tub chemicals only. Other chemicals may have similar names and/or usage descriptions. However, all chemicals are manufactured differently, increasing the likelihood of under or over dosing spa chemicals.
- * Failure to follow chemical directions may result in serious injury, sickness and even death.

Chemical Usage:

- * Always introduce chemicals to spa water with all pumps operating on high speed.
- * Apply chemicals to the center of spa water.
- * Always wear protective clothing and eyewear when handling chemicals.
- * Spa users that notice skin irritation must immediately suspend spa usage and consult their physician.
- * Pregnant women should consult their physician prior to using a spa for both chemical and temperature recommendations.

Chemical Storage:

- * Chemicals must be stored completely out of the reach of children in an area that is well vented, cool, and dry.
- * Failure to provide a proper area for chemical storage may result in serious injury, sickness, fire, explosion and even death.

Physical Chemical Hazards:

- * Do not allow chemicals to come in contact with skin, eyes or clothing. As mentioned previously, always wear rubber gloves, protective eyewear and clothing to reduce the risk of chemical contact and irritation.
- * Remove and wash clothing that may have been exposed to chemical contact prior to wearing again.
- * Inhaling or digesting chemicals will cause serious injury, sickness, and even death.
- * Do not mix chemicals. Mixing chemicals together may cause chemical reactions that vary from poor water conditions to fire and explosion.

MINERAL SYSTEM

Start Up

- Clean surface of spa with Multi-Purpose Cleaner
- On shiny acrylic apply a coat of Fast Sheen to the surface
- Fill Spa To Proper Fill Level (Do Not Overfill)
- Test water for Alkalinity & PH (Adjust ALKALINITY always first then PH if necessary)(Water sample tested for Calcium/Hardness NOTE: Soft water is very problematic in a hot tub)
- Add 16oz. of Metal Protector
- Add 2oz. of Scale Defense
- Add 2 TBSP. of Non-Chlorine Shock
- Add 2 TSP. of Chlorinating Powder

With Every Use

- 2 TBSP. of Non-Chlorine Shock PER PERSON (based on 500 gallons)

Weekly

- Test water & adjust Alkalinity then pH if needed
- Add 2 TSP. of Chlorinating Powder
- Add 2oz. of Scale Defense
- Add 2oz. of Spa Brite (optional or as needed)
- Add 2oz. of Oil Gone (optional or as needed)
- Remove filter and hose off

Monthly

- Remove filter cartridge & soak with filter cleaner
- Clean & apply treatment to cover

Every 4-6 Months

- Drain & refill spa
- Follow Start Up instructions
- MINERAL stick lasts 4 months (**DO NOT REMOVE the stick from water once placed. If ever removed from water for any period of time stick will DEACTIVATE & MUST BE REPLACED.**)

Water Balance

pH Range should be 7.2-7.6

To lower pH, add pH Down

To raise pH, add pH Up

Alkalinity Range should be 80-120 ppm

To lower alkalinity, add pH Down

To raise alkalinity, add Alkalinity Up

Calcium Hardness should be 200-350 ppm

To raise Calcium Hardness add Calcium Increaser

Bromine System

Start Up

- Clean surface of spa with Multi-Purpose Cleaner
- On shiny acrylic apply a coat of Fast Sheen to the surface
- Fill Spa To Proper Fill Level (Do Not Overfill)
- Test water for Alkalinity & PH (Adjust ALKALINITY always first then PH if necessary)(Water sample tested for Calcium/Hardness NOTE: Soft water is very problematic in a hot tub)
- Add 16oz. of Metal Protector
- Add 2oz. of Scale Defense
- Add 2 TBSP. of Sodium Bromide
- Add 2 TSP. of Non-Chlorine Shock
- Add Bromine tablets to floater and adjust and test as necessary to 3.0-5.0 ppm
- Let water circulate at least 30 minutes without the blower on

Weekly

- Test water & adjust Alkalinity then pH if needed
- Add 2oz of Non-Chlorine Shock
- Add 2oz. of Scale Defense
- Add 2oz. of Spa Brite (optional or as needed)
- Add 2oz. of Oil Gone (optional or as needed)
- Remove filter and hose off
- Add more bromine tablets if needed

Monthly

- Remove filter cartridge & soak with filter cleaner
- Clean & apply treatment to cover

Every 4-6 Months

- Drain & Refill Spa
- Follow Start Up Instructions

Water Balance

Bromine levels should be between 3.0-5.0 ppm (unless spa is equipped with a Ozone system, if so 1.0-3.0 ppm is acceptable)

pH range should be between 7.2-7.6

Alkalinity range should be 80-120

Calcium Hardness should be between 150-350 ppm

Why Use a Chemical Plan?

A better understanding of spa chemicals and their usage will help protect you from ugly, unsafe water and the expense associated with clean up.

In some cases, it is less expensive to drain the spa and start over than it is to add additional chemicals and waste filtration time cleaning up bad spa water.

Avoiding problems

There are no quick fixes to spa water problems. It is much easier, less expensive, and less time consuming to use a Water Plan than it is to troubleshoot and correct water issues.

Ask yourself:

Which is easier, less expensive and more convenient? Changing the oil in your car 4 times a year, or replacing the car every 2 years. A chemical maintenance plan for your spa is not that much different. Either follow Superior Spas Water Plan or replace your spa every two years.

We know you don't want to become a chemist. You just want to enjoy your new spa. That is why Superior Spas Water plan is so effective.

Chemical Damage

The most common reason for a spa failure is chemical abuse or customer neglect. For example, the pump seal used on a typical spa is the same pump seal used to pump acid solutions for chemical companies and yet this same pump seal fails in numerous spas because the owner did not follow a chemical plan.

Chemical damage is not covered by Superior Spas limited warranty. In addition to wasted expenses on excess chemicals, you will find yourself spending even more money on replacement parts.

Even the brand(s) of spa chemicals that claim they are not as harsh as chlorine or bromine in fact are.

If you do not follow the chemical plans, the damage to your spa can be twice the cost of the chlorine or bromine damage.

Advantages of a Water Plan

1. Chemical use is minimal.
2. Chemical odor is almost non-existent.
3. Pillows, spa covers, and filter lids last for years.
4. Spa usage is more enjoyable.
5. Water is always clean, clear and safe.
6. Little time invested.
7. No smock required (it's a chemist joke).