

# Keeping Your Spa Clean and Safe

The chemicals on our bodies along with dirt, dust, pollen and other environmental buildup, along with the fact that hot water increases the rate of reactions with these chemicals, makes for a great necessity to keep our spas clean and sanitized. Just 15 minutes of sitting in your spa can throw off the chemical balance!

The Dictionary.com definition of sanitize is “to free from dirt, germs, etc., as by cleaning or sterilizing.” In the case of your hot tub, we are trying to destroy microorganisms and bacteria that buildup in the spa. Keeping your hot tub water balanced not only protects your surfaces and equipment from degradation, it also enables your spa’s sanitizers to work more efficiently and effectively. While there are many different things to measure within your hot tub, the three most important are: pH, total alkalinity, and calcium hardness. We will discuss these in detail along with the importance of maintaining a proper balance, as well as adequate testing procedures.

pH is a measure of how acidic or basic a solution is. If your water has low pH level, then your water will be acidic, which can cause corrosion of metal components, irritation to the skin and eyes, and loss of chlorine. If your water has high pH, it will be basic, which can lead to crusty deposits on piping and the walls of your spa, cloudy water, poor chlorine disinfection, and irritation to the skin and eyes.

Total alkalinity is a measure of the alkaline materials (carbonates, bicarbonates, hydroxides, etc.) dissolved in the water, which have a large effect on pH levels; it is a pH stabilizer which helps keep your pH from changing drastically. You should first adjust your alkalinity to the correct level, and then your pH levels if needed. Because a hot tub has such a small body of water, the pH and alkalinity tend to fluctuate a lot. It’s important to watch these levels closely and test regularly for imbalance.

Calcium Hardness is responsible for how “hard” the water is, or how much mineral content is in the water. Water with low calcium hardness will look to increase its levels by dissolving it from the material it encounters, in this case, your spa. Water with high calcium hardness will often leave rough, unsightly scaling on surfaces and equipment. High water temperature increases the chances for scale formation, most likely on heater elements. If allowed to build up, these deposits will cause increased water pressure, reduced circulation and poor heating. Chemicals to correct calcium hardness are generally not expensive and should be applied at each refill alongside general maintenance.

The following chemicals are your typical sanitizers. Again, these are designed to kill bacteria and microorganisms that aren’t safe for you or your spa. Adding these chemicals will typically alter the levels mentioned above, and you may need supplemental compounds, like pH down, to keep a proper water balance after sanitizing

Chlorine is a very popular chemical for spa water sanitation. Any chlorine compound added to water forms the powerful sanitizing and oxidizing combination of hypochlorous acid and hypochlorite ion, often simply referred to as “free chlorine”. Free chlorine immediately reacts with contaminants in the water, forming chloramines (combined chlorine), which cause objectionable odors as well as irritation to the skin and eyes if allowed to accumulate. Free chlorine is also susceptible to degradation by UV light coming from the sun; however, this loss

can be slowed by cyanuric acid (CYA). Chlorine is cheaper by weight than some alternative solutions like bromine, however, it requires more maintenance and use.

Bromine typically has a less pungent odor when used over chlorine alone. Another benefit of bromine is that its effectiveness isn't significantly affected by pH changes encountered in spa water. Unfortunately, there is no known stabilizer for bromine like the effects of CYA on chlorine, so it is best to have your spa covered or indoors while using bromine. As mentioned, initial costs of bromine are higher compared to chlorine, but will be cost-effective over time due to the lower number of necessary annual treatments.

Biguanide Compared with chlorine or bromine, biguanides are less susceptible to UV light, and are more stable, leading to longer life.

Ozone Some spas are also equipped with ozone generators, which create ozone gas, an extremely powerful but short-lived sanitizer and oxidizer. Ozone doesn't eliminate the need for a chlorine or bromine residual, but their use can be greatly reduced with oxidation. Oxidation is the process of eliminating organic contaminants from water so the primary sanitizer (usually chlorine or bromine) is free for its main purpose — killing germs. Aside from ozone generators, oxidation can also be accomplished by shocking the water:

UV Light Ultraviolet sterilizers/sanitizers can kill some of the most chlorine-resistant pathogens. However, it cannot be used as a standalone sanitizer. It must be used with an oxidizer, and persistent sanitizer, such as chlorine or bromine. In this manner, it kills microbes, that other sanitizers might not.

Shock agents are oxidizers that break down the oils, lotions and other tough compounds that end up in the water which sanitizers aren't designed to eliminate. It is recommended to shock your hot tub once a week to keep your water clean and clear. This can change depending on how often your hot tub is used, your geographical location, and humidity levels. When it comes to shocking your hot tub, there are two types of treatments to be aware of:

- Non-chlorine shock - A monopersulfate (MPS) compound, is an oxygen-based shock and is used more regularly for maintenance.
- Dichlor shock - A form of chlorine often called sodium dichlor, this is both a sanitizer and shock. This type of shock is used occasionally to clear up problems. In most cases, dichlor shock is recommended only when you refill your hot tub. After that the non-chlorine shock is the best option to go with

Though not a solution in and of themselves, mineral purifiers can be used to assist your sanitizers in keeping your water clear.

These are all the chemicals you NEED to care for your hot tub properly. Of course, there are other chemicals that you may need in case of any water issues. Having too much of these chemicals can be just as bad for you or your spa as too little, so be sure to maintain levels in the proper range. One of the great things about a hot tub is if you are having problems with chemical imbalance, it is very easy to start over and just drain/refill your spa. In fact, for proper care, your spa water should be regularly cleaned out at 3-4 month intervals and scrubbed down anyway.

Another desired chemical treatment may be the addition of clarifiers. These are responsible for making the water look crystal clear. Yet another important measurement of spa water quality is total dissolved solids (TDS). Hot, jetted water evaporates more quickly than still water, leaving behind any impurities that were dissolved in it. Repeated evaporation and topping off causes TDS to build up, which can contribute to corrosion of spa components and cloudy water. TDS cannot be lowered through chemical treatment. Instead, partially drain the vessel and refill it with lower-TDS water.

So how do you know when you need to add any of these chemicals? Well you test the water of course. You must be careful to use the right test strip for your sanitizer type, as there are differing test strips for different sanitizers. Test strips will typically measure 1) Free Available Sanitizer, 2) pH level and 3) Alkalinity. Some strips test more, but these are generally the basics. Below you can find a general table summing up the testing guidelines from the Association of Pool and Spa Professionals.

WHAT	MIN	IDEAL	MAX
Free Chlorine, ppm	2	2 to 4	4
Combined Chlorine, ppm	0	0	0.2
Total Bromine, ppm	2	2 to 4	8
PHMB, ppm	30	30-50	50
pH	7.2	7.4-7.6	7.8
Total Alkalinity, ppm	60	80-120	180
Total Dissolved Solids	N/A	N/A	1500
Calcium Hardness, ppm	100	150-250	800
Visible Algae	None	None	None
Bacteria	None	None	Local Code
Cyanuric Acid, ppm	10	30-50	100
Temperature (F)	60	102-104	104

While discussing spa cleanliness, we must include the filtration system. Your filter is trapping particulates that are floating in the water. Neglecting maintenance can affect your spa and your health. If the filter is never cleaned/replaced, then it is 1) clogged up and restricting flow (which can damage the heater among other things) and 2) not doing its job, which means you are bathing in oily, unclean water. Therefore, you need to clean the filter often to avoid complications. How often you need to clean is dependent on how much you use your spa. If 1-2 people use it only 1-2 times a week, it will require less cleaning than a family of four using it every other day. You should be doing a basic rinse and clean at a minimum of every other week with some soap and water (there are more deep cleaning chemicals that can be purchased), and possibly more often if it is toward the end of the filter's life cycle. You should be fully replacing the filter at least once every 6-8 months, and it is recommended to keep a spare on hand as a backup. The added benefit is that you can use the spare filter while cleaning the primary one. Never use bleach or laundry detergent or wash in a dishwasher or laundry machine, as this can damage your filter. A garden hose (not a pressure washer) is best for a

quick rinsing but this will typically get out only dirt and debris, whereas the oils from our skin/skin products cannot be removed without a weak acid wash or other spa filter cleaning agent. Be sure to never clean with household products, and rinse thoroughly with water after cleaning with chemicals.

Following these procedures and guidelines will ensure longevity of your spa and its components as well as the personal comfort and health of those bathing in the spa. Neglecting them can lead to decreased life and failure of internal spa components, especially the heater and pump. The levels specified here are general recommendations. If you have any questions or concerns about your spa or any chemical treatments, contact a professional to evaluate your personal situation.