

Hot Tub
WATER CARE & BASIC
MAINTENANCE GUIDE



At Master Spas, we want your hot tub maintenance to be as simple as possible so the majority of your time is spent enjoying your investment rather than maintaining it. This reference guide will walk you through the basic steps needed to maintain your hot tub, including how to test the water as well as adjusting chemicals and problem-solving issues to keep it clean and sparkling.

HOW TO TEST YOUR WATER.....PAGES 5-6

Reviews available testing options, as well as the recommended ranges for balanced water.

UNDERSTANDING WATER CHEMISTRY.....PAGES 7-10

An overview of the components that make up hot tub water chemistry and how these components work together as well as the additives that are frequently used to bring water back into balance.

ADDITIONAL WATER CHEMICAL SOLUTION.....PAGES 11-12

Covers a few other terms and products frequently used in water care and maintenance.

ROUTINE MAINTENANCE TIMETABLES.....PAGES 13-18

Outlines recommended frequency for routine maintenance elements such as filter and water changes.

PROBLEM SOLVER.....PAGES 19-20

Resource for determining the causes and potential solutions to fix problems.



HOW TO TEST YOUR WATER

How often you test and treat your water will vary depending on how frequently the hot tub is used, but it is generally suggested to do so twice a week. Keeping the chemical levels in check ensures your hot tub will be ready for use whenever you want to relax. Make it a goal to test the water before you get in to ensure properly sanitized and safe water.

It is also good to test after use so that you can make any small chemical adjustments necessary due to the contaminants bathers bring into the water.



There are two different methods you can use to test your water.



RECOMMENDED RANGES FOR BALANCED WATER

Total Alkalinity	80 - 150 ppm
pH	7.2 - 7.6
Chlorine	2 - 4 ppm
Bromine	3 - 5 ppm
Calcium Hardness	180 - 250 ppm

This table shows the ideal balanced measurements that you are looking for in your testing results. Parts per million (ppm), is a form of measurement used in most pool and spa chemical readings. This is equivalent to one milligram of concentration per liter of water.



Test Strips

The pads on these thin strips react by changing colors when you dip them in the hot tub water. To avoid faulty test results, use care when removing a testing strip from the packaging. Open the package and shake one strip out into your hand, avoiding contact if possible with the remaining strips. Seal the container immediately so the remaining strips are not exposed to moisture. Dip the test strip into the water and follow the instructions supplied with test strips as instructions may vary. Note the colors on your testing strip and compare these to the key found on the packaging to determine whether elements are neutral, too high or too low.



Testing Kit

When using a testing kit, you will be examining an actual water sample from your hot tub, rather than a strip. Be careful to follow the instructions on your kit, filling the container to the appropriate level and then dropping the instructed liquid into the container. Compare the new color of your water to the key provided with the kit to determine how to proceed. Depending on which kit you purchase, it can test for each one of these elements: total alkalinity, pH, chlorine, bromine and calcium hardness.

UNDERSTANDING WATER CHEMISTRY

Now that you've tested your water, let's go over the results. It is important to note that the order in which you adjust your chemicals does matter. Here, common chemicals will be covered with explanations of what they do for your water, acceptable ranges allowed and adjustment tips should they be at either extreme of the testing spectrum. Keep in mind that if you have to add chemicals to compensate for the results of your water test, you should allow the filter to circulate the water for an hour before you retest the water. Add any adjustment chemicals needed one at a time, letting the water rest and recirculate before retesting or adding any other chemicals. This way you can see how each chemical influences the chemistry of your water. Pay close attention to the directions on each chemical's packaging, as usage instructions can vary from product to product.

Total Alkalinity (TA)

Your water's alkalinity and potential hydrogen (pH) go hand in hand and are two of the most important elements to pay attention to in your pursuit of balanced water. Alkalinity measures substances in your water such as hydroxides, carbonates and bicarbonates. When at the proper levels, these elements keep your water from clouding and growing bacteria, as well as prevent the inner workings of your hot tub from deteriorating or forming scale. TA also helps to stabilize pH. The higher the TA level (as long as it is within the recommended range), the less likely the pH is to change. You are looking for a range between 80 - 120 ppm. With low alkalinity, the pH will fluctuate and be harder to control. With high alkalinity, it becomes extremely difficult to change the pH.

pH

A measurement of pH indicates the acidity or basicity of the water. The goal is to have a neutral, stable pH to prevent spa damage and unhealthy conditions. Low pH levels can corrode metals, etch or stain fiberglass or acrylic, cause unsanitary conditions that irritate the eyes or skin and destruct the total alkalinity of the water. High pH can cause cloudy water, eye or skin irritation, scale formation and poor chlorine or bromine efficiency. Note that the chemicals you are using to sanitize and clean your hot tub can also lower or raise the pH level in the water. You want this range to fall between 7.2 - 7.6 on the scale. Unfortunately, there are lots of variables to preventing high pH in your hot tub. You can use the chart to the right to help you balance it.



After testing your pH and TA levels and identifying a level that reads outside of the recommended range, locate the problem in the table below and adjust according to the solution indicated, following the directions on the bottle of the additive chemical.

BALANCING pH AND TA

PROBLEM	SOLUTION
High total alkalinity	Use pH decreaser
High total alkalinity, high pH	Use pH decreaser
High total alkalinity, low pH	Use a pH decreaser for TA and then a pH increaser
Low total alkalinity, high pH	Use pH decreaser and then a alkalinity increaser
Low total alkalinity, low pH	Use pH increaser
Low total alkalinity	Use alkalinity increaser
Low pH	Use pH increaser
High pH	Use pH decreaser



When adding any chemical, always spread them across the water while the pumps are running. Remember to let the water recirculate in your hot tub for an hour before taking a new test of your water chemistry.

UNDERSTANDING WATER CHEMISTRY

Calcium and Calcium Hardness

Calcium is a natural, necessary part of water's chemistry. The total hardness measurement tells you how much magnesium and calcium are in your water. However, calcium hardness can react with all of the chemicals, bacteria, dirt and other substances that your water dissolves and get thrown out of balance. Just like the other elements, calcium levels must remain balanced and need to be monitored or you run the risk of metal deterioration, water foaming or clouding and scale formation at the surface of your water. The calcium hardness of your water should fall between 150 - 250 ppm. If your calcium reading is high, use a sequestering agent, following the recommendations on the bottle. To prevent this in the future, filter your source water when filling the hot tub. If the reading is low, use a calcium hardness increaser to adjust it to an acceptable range.

Sanitizers

After the hot tub is used, natural body oils, matter from cosmetic products and contaminants are left behind and contribute to unbalanced water. Because hot water is a breeding ground for unwanted bacteria, it is essential to use a sanitizer to create a healthy, clean water environment in your spa.



Typically, hot tub users opt to use either chlorine or bromine for a sanitizer—but never both.

Chlorine

Just as chlorine is used to kill bacteria in a pool, it is used to sanitize hot tub water. Typically the less expensive option, chlorinating granules dissolve quicker in water than bromine, which results in the need to be re-added more often. The optimum range for chlorine is 2 - 4 ppm. If the chlorine level reads low, add more throughout the week and check the levels after you use the hot tub. If the chlorine measures above 5 ppm, bathers should not enter the water until the level dissipates. This will occur by waiting for it to drop or using a chlorine neutralizing product.

Bromine*

Bromine and chlorine essentially do the same things—sanitize hot tub water. However, this sanitizer choice takes longer to dissolve, even up to a few days in order to show up in your testing results. This can make it easy to inadvertently add too much bromine if you do not wait long enough between adding it and retesting the water. If you choose to use Bromine, the balanced measurement would fall between 3 - 5 ppm. If this measurement is low, add more as needed. If the level too high, remove the bromine tablets or floater from the water and let the levels dissipate.

*If bromine is chosen as the sanitizing option, it may be necessary to remove the EcoPur® filter to achieve proper bromine levels.





ADDITIONAL WATER CHEMICAL SOLUTIONS

Below is a list of some other common chemicals and how they resolve issues in spa water chemistry.

Defoamer: A chemical used to temporarily reduce foaming. Causes of foaming include body oils, cosmetics, lotions, surface cleaners, high pH or algae, as well as other organic materials. Low levels of calcium or sanitizer can also cause increased foaming. Note that you may need to physically remove the foam and/or drain all or part your water to remove or dilute the causes of the foam.

pH Increaser: A chemical that raises the pH in your hot tub.

pH Decreaser: An acid-based chemical that lowers the pH in your hot tub.

Alkalinity Increaser: Specifically boosts just the alkalinity in your water. Note that pH increasers will slowly do this as well.

Enzyme Product: This neutralizes oils, residue, foam and scum but should only be used if chlorine and oxidizer or non-chlorine shock have already been properly used.

Spa Clarifier: This product helps reduce cloudy water due to pH and free chlorine levels being unbalanced. It does this by binding to small particles to help them get caught in the filter.

Sequestering Agent: This chemical is used to help remove or inactivate metals and minerals in water. If the minerals and metals in water are not sequestered, they can cause a reaction, turning the water brown, red, orange or green depending on the minerals and metals present in your water. It is important to add a sequestering agent when adding water to your hot tub and even on a regular basis (if bottle instructions recommend doing so).

Sanitizer: Germs and bacteria enter the water from the environment and the human body; a sanitizer keeps the water balanced and safe to use. Either chlorine or bromine can be used as a sanitizer to create a healthy water environment.

ROUTINE MAINTENANCE TIMETABLES

This section includes recommended maintenance instructions to properly care for your hot tub. While these are intended to be used as guidelines, you should adjust your routine maintenance according to the bather load and the frequency in which you use your hot tub.

Cleaning & Replacing Water Filters

In addition to maintaining properly balanced water, be sure to check your filter(s) on a regular basis. Filters are necessary to remove particles of dust, dirt, algae and other contaminants that continuously enter the water. If the hot tub is not operated long enough each day for the filter to do its proper job, this puts a burden on the chemicals, causing extra expense. Most filter systems by default are set to run four hours a day, which may need adjusted if the hot tub is heavily used.

When cleaning the filters, be sure to never have the pumps (including the circulation pump) running without the filters in place. Failure to do so may result in debris being drawn into the pumps, causing unwarranted damage. Once a week, shut down your hot tub and remove the EcoPur® Charge orange cartridge (if you have one). Next, rinse the outer filter's fabric with a garden hose. Once a month, you should use a filter cartridge cleaner on the outer filter to thoroughly clean its fabric. **NOTE:** EcoPur® Charge cartridges should not be cleaned with a filter cartridge cleaner and just needs to be replaced every six months.

To make it easy to frequently clean the filter cartridge, keep spare filter cartridges on hand. This way you can swap them out as you clean them rather than having to do a prolonged shut down of your hot tub. It also allows the cartridges to dry out between usages, which can help increase the lifespan of them. Replace the cartridge when the pleats begin to deteriorate or if the filters are simply not coming clean, resulting in lack of flow through them and cloudy water conditions although the water is chemically balanced. Lastly, your filter should be replaced with a new filter once a year.

See the "Clean Your Filter Elements" in the maintenance section of your Master Spas product owner's manual for more detailed information.



ROUTINE MAINTENANCE TIMETABLES

Draining & Refilling Your Hot Tub

Whether you intend to use your hot tub on a seasonal basis or year-round, it is important to know the draining and refilling process, which should take place every six months that it is in use. Here are a few considerations to pay attention to when draining and refilling the spa:

Draining the Tub

First, be sure to turn the power off to your hot tub at the breaker. Drain your spa completely using the drain valve (if so equipped), which will either be mounted to the front right corner or back right corner at the base of the frame, or located in the equipment area behind the front skirt panel (consult your Master Spas product owner's manual if you have trouble locating the drain). The water will trickle from the drain but you can expedite the process by using an inexpensive submersible pump purchased from your Master Spas dealer or a local hardware store.

Filling the Tub

Your spa should be filled with filtered water by using a pre-filter, which can be attached to your garden hose and obtained from your local Master Spas dealer. This helps reduce the amount of minerals and contaminants from entering your hot tub through your source water, which will make adjusting the water balance

easier after a new fill. Never use more than 50% of softened water when filling your hot tub and fill it to the minimum water level line as indicated on near the sticker on the filter area. You'll also want to add a sequestering agent to combat suspended minerals in the water. Allow water to circulate and filter for at least 30 minutes, then test the water.

Stain and Scale Prevention

If you have noticed staining and scaling in your hot tub, it is recommended that you drain the water and clean the inner shell with a chemical product that helps remove scaling from spa surfaces. At that time, your water filter should also be cleaned before refilling the spa. Once the tub is filled again, you can use a stain and scale prevention product.

Shocking

By shocking the water in your hot tub, you can remove organic compounds from the water, kill bacteria, remove bromamines or chloramines and reactivate the bromides in the spa for cleaner water. You should shock your water once a week, after heavy bather use or any time free chlorine levels test lower than total chlorine levels. To do this, either add oxidizer/non-chlorine shock to burn off the chloramines or add extra chlorine to raise the chlorine level above 8 ppm.

Oxidizer/non-chlorine shock acts by releasing oxygen in the water, which serves a similar function as chlorine. An advantage to using this type of shock is that the water is safe to enter after 15 minutes of the application and excessive sanitizer (chlorine) levels do not occur. However, an oxidizer/non-chlorine shock doesn't disinfect the water for bacteria. If you use chlorine to shock, you must wait until the total chlorine reading is below 5 ppm. You'll want to vary which type of shock method you use, as chlorine-based shock can be hard on your hot tub's components if you use it every time. When adding chlorine or oxidizer/non-chlorine shock, always spread it across the water surface while the pumps are running.

System Flush

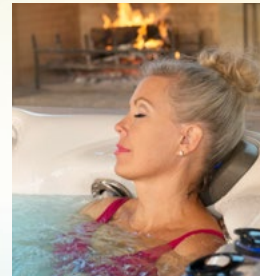
In order to keep your hot tub running smoothly, consider flushing it to clean the plumbing as often as you drain and refill the spa, so every six months. First, clean your water filter and balance your water chemistry as previously discussed, noting proper chlorine or bromine levels. Next, use a flush or purge product and allow the spa jets to run (see bottle for detailed instructions and recommended runtime). Drain, wipe down the hot tub interior with a soft cloth, rinse off any residue and suck out any remaining water with a shop vacuum. Then, refill your hot tub following the instructions in "Filling the Tub".



ROUTINE MAINTENANCE TIMETABLES

Care & Cleaning of Hot Tub Surface

With a soft cloth, wipe down the spa surface with a non-abrasive spa surface cleaner that may be purchased through your Master Spas dealer. Do not use paper towels. Be sure to rinse any residue from the spa surface. If your spa has developed an oily or chalky residue at the waterline, it may require special treatment (see chart on page 20). It is recommended you clean your hot tub surface every six months; consider doing this after your tub is drained and before you fill it with new water.



Spa Pillow Care

Your spa pillows should be rinsed biweekly to remove any chemical residue. This should help to prevent pillows from becoming stiff, discolored or rapidly deteriorating. If the hot tub will not be used for a period of time, you can remove the pillows to extend their life.

Cleaning of the Jets

The majority of the jets in your spa can be individually turned on or off. If any of these jets become hard to turn, it will be necessary to clean the jet as grit and mineral deposit may be present. The jets in your spa can be removed for cleaning by unscrewing counter-clockwise until they loosen and then pulling them out.

Place the jet(s) in a container and fully immerse them in white vinegar. Let the jet(s) soak overnight and then rinse with water before reinstalling them. It may be necessary to clean grit and deposits from the jet body (mounted in the hot tub shell) by using a small bristled brush. These should be cleaned every six months or if the spinner jets are not able to turn.

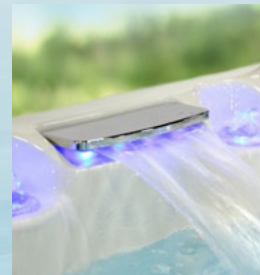


Care of the Spa Cover

Always cover your spa when not in use with an approved insulated spa cover by Master Spas. This will greatly reduce energy consumption, will help the spa water to heat more rapidly and protect the spa shell. Water loss and chemical usage will also be reduced. Periodically, hose off both sides of the spa cover to maximize its life. Once a month, use a vinyl cleaner and conditioner on the vinyl portion of your cover to keep it fresh and rinse off any residue. When adding chemicals, keep the cover open for at least 15 minutes to prevent any gas discharge damage. Always turn the water feature valve down (if equipped on your spa) so that the water features do not hit the cover when it is closed.

Stainless Steel Care

Clean the stainless steel areas on your hot tub frequently with fresh, clean, non-chlorinated water. You can buff them with stainless steel polish or car cleaning wax for extra protection. Should rust appear, clean immediately with stainless steel polish or chrome cleaner. Never clean them with an abrasive material like steel wool, acids or bleach.



PROBLEM SOLVER

Owning a hot tub can be a very relaxing and rewarding experience. Master Spas hopes you'll find this helpful in allowing you to enjoy your hot tub for many years to come. When troubleshooting problems, it is best to test your water chemistry first and have the results handy for reference.



For further assistance on maintaining your hot tub, consult your owner's manual or contact the Master Spas Customer Service Department at 800-860-7727 or customerservice@masterspas.com.

PROBLEM	POSSIBLE CAUSES	HOW TO FIX IT
CHLORINE ODOR	Excessive chlorine	Shock water with oxidizer/non-chlorine shock treatment
	Low pH	Adjust pH if necessary
WATER ODOR	Low levels of sanitizer	Adjust sanitizer level with chlorinating granules
	pH out of range	Adjust pH using chart on page 8
	Bacteria or algae growth	If sanitizer has already been adjusted, it may be necessary to perform a system flush
CLOUDY WATER	Dirty filters or inadequate filtration	Clean filters with filter cleaner and adjust filtration
	Unbalanced water chemistry	Test and adjust chemistry levels
	Old water	Drain, clean inner shell and refill with filtered water
CLOUDY AND GREEN WATER	Total alkalinity levels are low	Use a pH increaser
	Sanitizer levels are low	Apply oxidizer/non-chlorine shock treatment and adjust sanitizer
CLEAR GREEN WATER	High iron or copper content	Use a sequestering agent
	Sanitizer levels are low	Apply oxidizer/non-chlorine shock treatment
BROWN WATER	High iron or manganese level	Use a sequestering agent
FOAMING	High levels of body oils, lotions, soap, etc.	Add small amount of defoamer, an enzyme product and check water chemistry
	Low calcium hardness	Use a calcium hardness increaser
	Unbalanced water chemistry	Test and adjust chemistry levels

PROBLEM	POSSIBLE CAUSES	HOW TO FIX IT
EYE OR SKIN IRRITATION	Unsanitary water	Adjust water chemistry according to testing results
	Total chlorine level above 5 ppm	Apply oxidizer/non-chlorine shock treatment
	Poor sanitizer/pH levels	Adjust pH level as necessary using chart on page 8
SCUM DEPOSITS AT WATERLINE	Body oils and dirt	Use multi-purpose cleaner to clean spa surface and add enzyme product to spa water
CHALKY, WHITE SCALE DEPOSITS	Minerals present in the water and lack of sequestering agent use	When tub is drained, use a multi-purpose cleaner or white vinegar and scrub with a soft cloth
PITTING OF METAL FIXTURES	Low pH or total alkalinity	Check water chemistry and adjust using chart on page 8

