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# Zen Bathworks Water Sanitation

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# Water Sanitation and Treatment

## Sanitation Procedure Quick Reference

NOTE: Be sure you have read and understood the full length "Recommended Sanitation Procedure" we have provided. This is for quick reference only.

### Dichlor Only

1. Test pH and adjust as necessary
2. Add \_\_\_\_\_ tablespoons of Spa 56 or equiv for my tub (1x dose indicated in Table 1)
3. Test chlorine levels after 5 minutes: range is 2-3 ppm
4. Add at least 30 minutes and not more than 24 hours BEFORE soaking
5. Maintenance shock every 2 - 4 weeks with \_\_\_\_\_ tablespoons for my tub (2x dose indicated in Table 1)
6. Shock after filling, after heavy use, after period of no use, or if contamination from algae or bacteria is suspected
7. Rotate your filter cartridge for a clean one about every 10th to 15th tub use.
8. Drain and refill your tub about every 2 - 4 months. Before refilling, scrub all interior surfaces with a medium brush, rinse and fully drain the tub, then refill with fresh water.

### Ozonator with Dichlor

1. Test pH and adjust as necessary
2. Add \_\_\_\_\_ tablespoons of Spa 56 or equiv for my tub (1/2 of dose indicated in Table 1)
3. Test chlorine levels after 5 minutes: range is 1-2 ppm
4. Add between 24 hours and 30 minutes BEFORE soaking
5. Maintenance shock should not be necessary, and is an indicator that the ozonator is not set correctly or is not working
6. Shock after filling, after heavy use, after period of no use, or if contamination from algae or bacteria is suspected
7. Rotate your filter cartridge for a clean one about every 10th to 15th tub use.
8. Drain and refill your tub about every 2 - 4 months. Before refilling, scrub all interior surfaces with a medium brush, rinse and fully drain the tub, then refill with fresh water

### Ionizer (ClearBlue) with Dichlor

1. Test pH and adjust as necessary
2. Check that copper levels are between 0.2 and 0.8 ppm
  - a. IMPORTANT: if copper levels are below range, use Dichlor-Only sanitation instructions until ion levels have risen to at least 0.2 ppm
3. Add \_\_\_\_\_ tablespoons of Spa 56 or equiv for my tub (1/4 of dose indicated in Table 1)
4. Test chlorine levels after 5 minutes: range is .5-1 ppm
5. Add dichlor between 24 hours and 30 minutes BEFORE soaking
6. Maintenance shock every 2 - 4 weeks with \_\_\_\_\_ tablespoons for my tub (2x dose indicated in Table 1)
7. Shock after filling, after heavy use, after period of no use, or if contamination from algae or bacteria is suspected
8. Rotate your filter cartridge for a clean one about every 10th to 15th tub use.
9. Drain and refill your tub about every 2 - 4 months. Before refilling, scrub all interior surfaces with a medium brush, rinse and fully drain the tub, then refill with fresh water

# Key Sanitation Concepts

## Introduction

In any hot tub, clean, balanced water is vital for your health and safety. Too little sanitation and you could come down with some nasty rashes or illnesses caused by bacteria or other waterborne pathogens; too much sanitation, and you could end up with different sorts of rashes, damaged hair, and bleached swimwear.

When you have a cedar tub, clean, balanced water is **also vital to the health and safety of the cedar wood!** Many of the water treatment products used in the spa industry are harsh on cedar, and some of them can cause severe damage. Let's take a deeper look at the most common sanitizing agent, which is also the one we recommend, and how it interacts with your cedar tub.

## Chlorine

Chlorine was the first water treatment method discovered by humanity that could cheaply and efficiently sanitize large amounts of water. In less than 150 years, chlorine sanitation has prevented incalculable hundreds of thousands of deaths and illnesses caused by waterborne pathogens. While the harsh smell and feel associated with chlorine has prompted the development of other supplemental sanitization products that can greatly reduce the amount of chlorine needed, the fact remains that some small amount of either chlorine or bromine plays an important role in every certified sanitation system.

When chlorine attacks contaminants, it binds to them and forms chemical compounds called chloramines. It's actually the chloramines building up over time that are responsible for most of the nasty smell and itchy feel we associate with 'chlorine'. Since we want to avoid that, we need a way to break up the chloramines. We do this by oxidation - adding powerful oxygen atoms that tear apart the chloramine molecules. **This process is called 'shock' treatment.** There are lots of different oxidizing products out there, and believe it or not one of the simplest ones is a big dose of...more chlorine. Yes, chlorine is both a sanitizer and an oxidizer! Using chlorine products for every step of the sanitizing process is quite common in the pool and spa industry.

That's not great for our cedar tubs though. Chlorine can't tell the difference between wood and other organic particles. Any chlorine that is left over once the water is clean will start to degrade the wood. The chlorine product we supply is Spa 56 by Leisure Time, and it is a **sodium dichlor chlorinating granules** product. Chlorine comes in many forms: sodium dichlor is much gentler than some of the alternatives and is what you want to use in your cedar tub. Using the wrong type of chlorine, or using far too much sodium dichlor, can attack the wood very quickly. It bleaches and loosens the wood fibers, giving the wood a whitish, hairy appearance that has to be sanded down once the tub is drained and dried.

Even correct doses of sodium dichlor are somewhat harsh on the wood and will reduce the service life of the tub. We don't want that, so what can we do? Enter the supplemental sanitation systems.

*But first, a quick note about Bromine. Bromine is a chemical similar to chlorine that is a little less unpleasant to humans than chlorine, and therefore is a popular substitute for some spas. We do **not** recommend it's use for cedar tubs though! Excess chlorine evaporates, which helps us keep it in the sweet spot of being enough to clean the water, but not too much to damage the tub. Excess bromine does **not** evaporate and instead builds up in the wood itself, which makes it very hard to prevent premature wood deterioration.*

*Others may disagree, but we say **no to bromine!***

## Oxidizing Supplemental Sanitation Systems

### Ozone

The oxygen we breathe is a molecule made of two oxygen atoms, or O<sub>2</sub>. Ozone is a molecule made of three oxygen atoms, or O<sub>3</sub>, but that extra oxygen atom is not strongly bound to the other two. If another molecule passes by, the third oxygen atom breaks away from the Ozone and attaches itself to the other molecule, which severely damages or entirely destroys it. Ozone is extremely powerful. It can easily break down bacteria and other pathogens, algae, lotion, makeup, chloramines, sweat, and more in a matter of minutes.

Ozone can be generated from atmospheric oxygen in one of two ways: exposure to certain wavelengths of UV light, or exposure to an electrical arc called 'Corona Discharge' or 'CD' for short. CD is cheaper, produces more ozone, and lasts longer than UV-generated ozone, and is becoming the industry standard.

Ozone is a gas, so we have to bubble it into the water. The most common way to do this uses a 'venturi' similar to a carburetor - calibrated water flow through the venturi creates a suction that draws in the ozone-rich air. This produces very fine bubbles (described as champagne bubbles) any time the pump is running.

*Note: the presence of bubbles does NOT mean that the ozonator is producing ozone. The ozonator is only activated during the control system's "filtration" cycle, which is set from the topside touchpad. The rest of the time, the champagne bubbles are just air.*

What about drawbacks? If excessive amounts of ozone wind up in the tub itself, the ozone can bleach the inside of the cover, and sometimes the wood itself especially above the waterline. Some cheap spas have this problem due to poor design, but in our tubs bleaching indicates a calibration error and can be avoided by calibrating the venturi correctly and by adjusting the length of the filtration cycle. Truly excessive amounts of ozone can be harmful to your lungs and eyes, but this is extremely unlikely with spa sanitation products.

The biggest drawback of ozone is that it can be difficult to tell if it's on or not. Some people notice a fresh, slightly metallic smell when lifting the cover, but it is hard to detect at all. Keeping a careful eye on total chlorine levels can also help identify an ozonator failure, since chloramines will start building up without the ozonator. There are test strips available to detect ozone in water, but the water samples have to be taken near the ozone injection manifold while the ozonator is active.

Whether an ozonator uses UV bulbs or CD chips, both will eventually wear out and need to be replaced. CD chips tend to last longer - typically around 2-3 years depending on usage - and are easier to replace.

*Another quick note, about Hydrogen Peroxide: You may come across references to hydrogen peroxide water treatment. Like ozone, hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) is an unstable molecule with an extra oxygen atom that wants to break off and attack something. Where ozone breaks down into oxygen, hydrogen peroxide breaks down into water. Although hydrogen peroxide does a great job at cleaning water, it's less commonly used because it's highly volatile stuff. This isn't your drugstore 3% solution for cleaning cuts - pool sanitation hydrogen peroxide is more like 35% and is capable of giving careless users significant chemical burns. Since it is in concentrated liquid form, it is much more likely to splash onto your skin or soak into your clothing than dichlor granules, which bounce off. While hydrogen peroxide itself is not flammable, it stores a tremendous amount of oxygen and can make existing fire hazards much more hazardous if improperly stored. We don't recommend it for these safety reasons. Finally, while it is highly effective at the moment it is added, it breaks down within minutes and does not provide any level of residual protection at all. If you insist on using hydrogen peroxide, it can only be used as a shock and not a residual sanitizer.*

## **AOP**

Ozone is great, but it can be made even better. When ozonated water is passed under certain wavelengths of ultraviolet light, the extra oxygen molecule in the ozone combines with some of the hydrogen atoms in the water to form Hydroxyl Radicals - 'OH, one oxygen and one hydrogen. And boy are they fierce! Anything ozone can kill in minutes, these little molecules can kill in milliseconds. Because they work so fast, they break down in the pipes and never come in contact with the cover or the wood. These high-tech systems go by the abbreviation AOP, short for "Advanced Oxidation Process", and they are capable of producing the most beautiful, clear, clean water you've ever seen, with just the tiniest amount of chlorine to keep it that way between AOP cycles.

What's the catch? Well, cutting edge technology tends to be expensive, and AOP is no exception. Good ozone systems can be found for \$100-\$200, but AOP costs around \$1000-\$3000. If you want the best and price is no issue, go for it!

## **Other Supplemental Sanitation Systems**

### **UV-C**

We've all seen the sunscreen ads about how we need to protect ourselves from harmful UV rays: UV-C sanitation uses similar, but even more powerful UV rays to work zapping bacteria, algae, and other biological contaminants! The radiation doesn't kill them immediately, but it does scramble their DNA, which makes it impossible for them to reproduce. Since bacteria reproduce every 4 to 20 minutes, that makes a huge impact!

UV-C systems are somewhat effective at breaking down chloramines, but are less effective than the oxidizing systems. The exact effectiveness can vary; it is possible to completely remove all chlorine and chloramines with UV light, but such systems use different wavelengths and much more intensity than typical pool or spa biological sanitizers. It may still be necessary to use chemical shocks more often than with oxidizing systems.

The special UV lightbulbs have to be replaced at fairly regular intervals, even if they are producing light, to make sure that the correct wavelengths are being produced. This task must be done carefully, because the UV light is dangerous if you are exposed to an illuminated bulb, and there are dangerous chemicals inside the bulb if it is accidentally broken. That said, in between bulb changes the UV system is maintenance-free.

### **Ionization**

First off, what's an ion? An ion is a particle with an electrical charge, either positive or negative. If a negatively charged ion meets a positively charged ion, they will stick together just like the north and south poles of a magnet. We'll come back to that in a moment.

Silver has antibacterial properties. This was discovered at least thousands of years ago - the ancient Greeks already knew about it and used silver jars to help stave off bacteria. Zinc is likewise effective against some forms of bacteria. Meanwhile, copper is effective against algae growth.

Rather than make a hot tub out of silver, modern technology lets us make tiny, charged ions out of these three metals by applying low voltage electricity to special bars made of a mix of the three metals. Now, it turns out that bacteria have a net negative electrical charge - each bacteria is essentially a living, negative ion! So if we produce metal ions with a positive charge, they will stick to the bacteria or algae like magnets and kill them! The ions are completely harmless to humans and cedar tubs, and unlike chlorine or ozone, they don't

evaporate. They will just circulate around the tub waiting to protect it from bacteria or algae. There is no by-product, no smell, no residue...just super-clear, inviting water.

NOTE: not all ionizers come with all three metals! There are cheaper ionizers out there that only come with copper-zinc, or even copper-only. They are still partly effective against a narrower range of algae, but they are NOT the same as the silver-copper-zinc ionizers such as ClearBlue, the brand we supply.

Ionizers are quite affordable, and low-maintenance. There are test strips to measure the amount of ions, and occasionally adjustments need to be made on the controller to keep the ions in the recommended range. The mineral cell (metal bars) need to be replaced every so often.

Ionizers work slowly. They must be used in conjunction with a small amount of chlorine (and optionally, with an oxidizing system) that will keep the bacteria or algae population from growing out of control faster than the ionizer can remove them. Ionizers also have no effect on non-biological contaminants (sweat, sunscreen, lotion, etc), which the chlorine will take care of.

Ionizers have no effect on chloramines either. If using an ionizer, you will need to either use a chlorine or non-chlorine shock treatment, or install an oxidizing sanitation system in addition to the ionizer. Ozone and ions together can produce excellent water quality at a reasonable price point.

## ***Break-In Water Treatment Procedure***

### **PH and Alkalinity**

The first thing you need to do after filling the tub is use a test strip to check the pH and alkalinity. These two measurements both have to do with whether the water is acidic, basic, or balanced. Both are adjusted with the same Spa Up and Spa Down products provided (or equivalent). Most domestic water sources are already close to balanced, and only need minor adjustments. If larger adjustments are necessary, focus on Alkalinity first, then fine-tune the pH balance once Alkalinity levels are within range.

### **Sanitation**

The second thing you will do after filling the tub is 'shock' the water with a large dose of chlorine, then continue adding small doses of chlorine either daily or every few days, depending on how much the tub is used. The dichlor sanitation instructions are important even if you have supplemental sanitation systems installed. **During the break-in period, the same Dichlor-Only instructions apply no matter what system you have.** If you have a supplemental sanitation system, after break-in you can follow the appropriate reduced-chlorine sanitation procedure.

During the first several months of using a new tub, dark-colored pigments called tannins will steep out of the wood and discolor the water. These are very similar to the tannins in coffee or tea, and will make your tub water look like...well...coffee or tea. The tannins themselves are not harmful, but some of your chlorine will be used up breaking down tannins and won't be available for breaking down bacteria. You will need to follow a slightly more robust sanitation routine until they are all gone.

- Part of that break-in routine is increasing the frequency of water changes and filter cleanings.
- The other part is adding a dose of dichlor daily, to replace what is used up by the tannins.



If you have an **ozonator**, you may optionally increase the length of the filtration cycle in addition to adding a standard dose of dichlor. Ozone will help break down the tannins. *NOTE: HydroQuip systems come with an ozonator. Our ACC controllers are wired and programmed to run an aftermarket ozonator, if desired.*

If you have an **ionizer**, you may be changing the water too frequently for the ion levels to build up to the needed levels. You will need to use the standard dose of dichlor, and you may wish to simply leave the ionizer off until the break-in period is over. *NOTE: We provide an ionizer with our ACC systems.*

During the break-in period, add a small dose of dichlor every day, if possible. The jets should be running to help mix in the chlorine; if you don't have jets, stirring with a paddle is recommended. Add the chlorine at least 30 minutes before using the tub, to allow the chlorine to fully dissolve and have time to sanitize. Since any excess chlorine eats at the cedar, your chlorine levels will drop to zero much more quickly than they would in a plastic spa. You will not be able to get a reading of stable free chlorine levels in between soaks no matter how much you add; it will just damage the wood. *Note: For this reason, we do not recommend systems that generate a constant flow of chlorine (e.g. salt chlorine generators) or products that dispense a constant supply of chlorine (e.g. chlorine floating tabs). Stick with dichlor granules.*

If you are using the provided Spa 56 dichlor, add enough to reach 2-3 ppm (parts per million). Since parts per million is not a convenient measurement system, we've converted to tablespoons for each of our tub sizes:

NOTE: Dry chemicals are dosed in ounces by WEIGHT; however, dichlor is close to 1 oz of weight per 1 oz of volume											
Tub	Gal.	oz	tbsp	Tub	Gal.	oz	tbsp	Tub	Gal.	oz	tbsp
Reference	500	0.5	1.0	5' Round 42"	400	0.4	0.8	7' Ellipse 48"	720	0.7	1.4
				5' Round 48"	460	0.5	0.9	7' Round 29"	530	0.5	1.1
4' Ellipse 29"	125	0.1	0.3	6' Ellipse 29"	300	0.3	0.6	7' Round 36"	680	0.7	1.4
4' Ellipse 36"	160	0.2	0.3	6' Ellipse 36"	375	0.4	0.8	7' Round 42"	810	0.8	1.6
4' Ellipse 42"	190	0.2	0.4	6' Ellipse 42"	450	0.5	0.9	7' Round 48"	940	0.9	1.9
4' Round 29"	165	0.2	0.3	6' Ellipse 48"	525	0.5	1.1	8' Ellipse 29"	535	0.5	1.1
4' Round 36"	210	0.2	0.4	6' Round 29"	390	0.4	0.8	8' Ellipse 36"	690	0.7	1.4
4' Round 42"	250	0.3	0.5	6' Round 36"	495	0.5	1.0	8' Ellipse 42"	820	0.8	1.6
5' Ellipse 29"	200	0.2	0.4	6' Round 42"	590	0.6	1.2	8' Ellipse 48"	950	1.0	1.9
5' Ellipse 36"	255	0.3	0.5	6' Round 48"	685	0.7	1.4	8' Round 29"	700	0.7	1.4
5' Ellipse 42"	305	0.3	0.6	7' Ellipse 29"	410	0.4	0.8	8' Round 36"	900	0.9	1.8
5' Round 29"	260	0.3	0.5	7' Ellipse 36"	520	0.5	1.0	8' Round 42"	1075	1.1	2.2
5' Round 36"	330	0.3	0.7	7' Ellipse 42"	620	0.6	1.2	8' Round 48"	1250	1.3	2.5

**Table 1: Spa 56 DiChlor Granules**

Tbsp doses are ONLY for Spa 56 or direct 5oz-per-500 gal equivalents!  
Refer to product labeling for other dichlor or non-chlorine shock products.

After 5 minutes, the chlorine will have dissolved enough to check your chlorine levels with a test strip. If you added a little too much, up to 5 ppm is safe to enter, or waiting a bit longer with the jets on will help evaporate some of that excess chlorine. If you have less than 2 ppm, add another dose of chlorine and stop. Don't test again. You may not be able to read the first dose anymore, and will end up adding too much.

**IMPORTANT:** 5 minutes is the only time you will be able to get an accurate reading.

If the same few people are using the tub several times per week, this amount of chlorine will be plenty. If you have a few extra guests over, add another dose of chlorine AFTER everyone is out of the tub to help with the extra bather load.

### **Maintenance Shocking**

About every 2 - 4 weeks, you will need to shock the tub to break up the chloramines. You can use Spa 56 to shock, by doubling the dose. Or you can use non-chlorine shock products, as long as they are compatible with chlorine, by following the manufacturer's instructions. REMEMBER: Either use a sodium dichlor product like Spa 56 or a non-chlorine shock that's compatible with chlorine. DO NOT use other chlorine shock products on cedar tubs!

### **Conditional 'Shocking'**

Any time your water equilibrium is disrupted, it can be a good idea to super-sanitize your tub. Technically speaking, we're not shocking chloramines, but since the process is the same as a dichlor shock, it's common for people to refer to this super-sanitation as 'shocking' as well. Times you will want to super-sanitize include:

- After refilling the tub
- After heavy bather loads (more people, longer soaking, )
- Before using if the tub has not been used for a while
- Anytime there is indication that bacteria or algae may be present (water cloudiness, slime or film on the walls)

### **Programming your Filtration Cycle**

In general, your filtration program should be set to run for a total of four hours per day. If possible, it is best to filter in two, 2-hour cycles every 12 hours. 2 hours is long enough to filter all the water in the tub, and two cycles per day offers better protection against quickly-multiplying bacteria. However, running one 4-hour cycle every 24 hours still gives good results.

Heavily used tubs may need a total of 6 or 8 hours of filtration per day. On the other hand, small and lightly used tubs may not need as much. Err to the side of caution based on your anticipated use, and then fine-tune as you gain experience maintaining your tub water.

### **Pre-Soak Showering**

A thorough shower is one of the most important steps of your sanitation routine! Every time we step in a tub, we bring various bacteria with us. Once they're there, hot tubs unfortunately are the perfect environment to incubate bacteria. This means that 4 people in a 100°F hot tub is the equivalent bather load of 300 people in an 80°F pool! The sanitation products and filtration system need to cope with any sweat, body oils, dead skin, lotion, makeup, etc. in addition to bacteria and algae, so the more you can scrub off before you hop in, the better your water quality will be for less effort.

Pre-soak cleanliness applies to your bathing attire as well. It is a very good idea to have dedicated hot-tub swimwear that never goes to the beach, public pools, or anywhere else where it could bring home unwanted bacteria or other contaminants.

### **Filter Cleaning and Changes**

Properly cleaning your filters is important for your water quality. No matter what sanitation system you use, your filter plays an important role in the cleanliness of your tub water. Made from pleated paper, the filter



captures particles of debris out of the water. While individual bacteria and algae are small enough to pass through, the filter captures a lot of the particles they're eating, therefore playing a key role in sanitation as well. Optional clarifier products such as Leisure Time Bright & Clear can help increase the filter's effectiveness.

Your filter needs to be rinsed with clean water regularly. To remove the filter, turn off the system, and then close the two ball valves. Lift the lock pin and rotate the ring to remove the top of the filter housing. Use a water stream, such as a hose nozzle set to 'jet' or a kitchen sink sprayer, to spray between each pleat at an angle, to flush the dirt out of the pleat from top to bottom. DO NOT use a pressure washer, or you will destroy your filter. During break-in, rinse your filter at least every two weeks. After you have cared for your tub for a while, you can rinse your filter as-needed, approximately every 3 or 4 weeks. But remember, it's much easier to clean a slightly soiled filter than a very soiled filter. You will likely spend less total time cleaning frequently rather than infrequently. When in doubt, give it a washout.

Filter cartridges perform more effectively if you allow them to dry in between cleanings. This is why we supply a spare filter cartridge as standard equipment. Rinse the filter immediately after removing it from service, then let it air dry, then rinse it again before putting it back into service.

At longer intervals the filter needs to be cleaned more thoroughly and degreased. This should be done about 3 months or 30-40 uses, though this varies depending on a variety of factors. Soak the dirty filter in a cleaning solution for at least 2 hours. Overnight is fine if you prefer. If your filter doesn't have too much greasy buildup, you can use a 50:50 mix of hot water and white vinegar. If you need more cleaning power, there are specially formulated spa filter degreaser products widely available that are just right for the job. Do not use household cleaning products - they may be too harsh and wear out your filter prematurely, and they may introduce foamy detergent residues into your tub water that you will then have to remove. Once cleaned and rinsed, set this filter aside to dry in a clean and dry location where it will be ready for the next filter swap.

If you take good care of your filters and your tub water, your filters should last 1-2 years each. If you are rotating your filters every 3 months as we recommend, that means you will have to buy 2 new filters every 2-4 years. Regular, gentle cleaning and good water sanitation practices will maximize their service life.

Replacement filters are widely available online and at hot tub / pool supply stores. Use a FC-2390 or equivalent 50 square foot replacement filter cartridge. If you are ever in doubt about whether or not to replace a filter cartridge, just replace it. In the grand scheme of things it is inexpensive insurance.

## **Water Changes**

While chlorine, ozonators, ionizers, and filters are integral parts to keeping your hot tubbing experience healthy and enjoyable, do not overlook the importance of water changes and physical scrubbing of your hot tub's interior. We recommend changing the water every 1 - 2 weeks, if possible, during the break-in period with a new tub. Most of the tannins will come out in the first few water changes, and in most cases they will be gone in about 4 to 6 months with these frequent water changes.

After that, your water change schedule depends on how you use and care for your tub. We recommend draining, scrubbing, and refilling every 30 - 40 hot tub uses, or every 4 months, whichever happens first. If you use only dichlor-only for sanitation, you will need to change the water regularly due to inevitable chemical buildups. If ever in doubt, change the water. Fresh water is the cheapest 'product' you can add to your tub!

Also whenever taking your tub out of service, remember stagnant water, even in small amounts such as in the pockets of your plumbing (bottom of pump, filter, heater, etc.), is breeding grounds for bacteria, algae etc. If your tub is not running, drain and ventilate all parts of your hot tub system, including the system components and plumbing. Always super-chlorinate your tub after refilling.

## **Tub Scrubbing**

Scrubbing should be done with a medium bristle brush. Scrubbing with warm water may be sufficient; if your tub needs more you can use a small amount of dish soap, or half a **teaspoon** (not tablespoon!) of Spa 56 per gallon of water in your scrubbing bucket.

## ***Maintenance Water Treatment Procedure (after Break-In)***

### **Dichlor**

After break-in, you may be able to reduce **how often** you add dichlor, depending on how often you use the tub. We recommend that you add chlorine 30 minutes to 24 hours BEFORE soaking. Allowing at least 30 minutes gives the chlorine enough time to kill any bacteria that may be present. After 24 hours, much of the chlorine will have evaporated, and enough time will have passed that bacteria could begin growing again soon. If you use the tub daily, you can add chlorine immediately after soaking, since your next soak is about 24 hours away.

We also recommend that you add chlorine at least twice per week, even if you are using the tub less than that.

If you are also using a supplemental sanitation system, you can also reduce **how much** dichlor you add each time. Refer to whichever of the following sections is applicable:

### **Ozonator**

If using an ozonator, you can reduce your chlorine dose by about half, to between 1 - 2 ppm.

Maintenance shocking for chloramines can be greatly reduced, and may not be necessary at all. It is still advisable to shock the tub in high-sanitation-load circumstances as listed above.

### **Ionizer**

The effectiveness of ionizers varies according to the makeup of the mineral cells. Our preferred brand, ClearBlue, recommends 0.5 - 1 ppm chlorine. The ClearBlue ionizer includes copper test strips that directly measure the copper ions, and indirectly measure the silver and zinc ions since all are produced proportionally. Use the ClearBlue instructions to bring your copper levels to between 0.2 and 0.4 ppm, and then check the copper levels every two weeks after that. **The reduced dichlor ONLY applies when the copper levels are at or above 0.2 ppm.** After every water change, you will need to use the full amount of dichlor while the ionizer mineralizes the new water.

As the ionizer has no effect on chloramines, and is slow to respond to changes in water chemistry, you will need to follow the shocking instructions as written above in the dichlor section.

## **Other Water Quality Notes**

Water sanitation has many variables, from the set temperature to the number of bathers to the local environment. These Sanitation Guidelines cannot account for everything, but they do provide you with what you need to know to fine tune your own sanitation routine to fit your usage and environment. For example, If you have low intensity usage (few people, clean people, usually the same people) and you have an ionizer and/or ozonator, you may be able to use even less chlorine or go further between water changes. On the other hand, if you love hosting hot tub parties, you will probably need to err to the conservative side of our recommendations. If this is your first hot tub and this all seems a little overwhelming, we hear you! It's a lot to grasp all at once. But rest assured, it isn't that bad once you get into the routine, and the relaxation that comes from worry free hot tubbing is totally worth it!