

Table of Contents

WATER BALANCE PARAMETERS	1
1. The Story of pH	1
2. Total Alkalinity	3
3. Calcium Hardness	4
4. Total Dissolved Solids	6
SANITIZING AND OXIDATION	7
Sanitizer levels to be maintained in a hot tub	7
Bromine/Chlorine Demand	8
Bromine and Chlorine odor	8
Methods used to disinfect hot tub water	9
Types of Chlorine Residuals	9
Breakpoint Chlorination	9
Recommending a program for your customer	10
Beachcomber's water care programs	10
Ensure that the water is properly disinfected	11
Bromine Disc Floating Dispenser	11
Algae	12
METALS AND MINERALS	13
FILTRATION	14
BEACHCOMBER HEATSHIELD COVER CARE	16
BEACHCOMBER WATER CARE PRODUCTS FOR HOT TUBS	17
1. Treatment Products	18
2. Balancing Products	19
3. Care Products	20
4. Conditioning Products	22
5. Chemical Trade Names	23
6. Tote Kit Contents	24
7. Hot Water Fragrances	25
WATER TESTING	26
TROUBLESHOOTING	27
White Algae	27
Cloudy Water	27
Colored Water	28
Skin and Eye Irritation	28
Foam	28
Odor	29
Scaling	29
No Chlorine/Bromine Reading	29
Too much sanitizer	29
Scum Line	29
Measurement Conversions	29
Increasing Total Alkalinity	30
Increasing Calcium Hardness	30
Decreasing Alkalinity	30
GLOSSARY	31

Beachcomber Water Care products feature 4 main categories, with color coded labels. These colors make our products customer friendly, making it easy to distinguish between their functions in their backyard environment. This family of matching products are all properly branded, and are designed to sit on your shelf as different products, in a cohesive product line look.

Blue Conditioning Products

These products safeguard the hot tub from corrosion and mineral deposits to ensure enjoyable water quality, as well as protection for the pumping and heating equipment.

Orange Treatment Products

These products find, oxidize, kill and eliminate pathogens, viruses and live bacteria that can cause disease and irritations.

Terra Cotta Balancing Products

These products keep mineral levels in balance, as well as balancing parameters such as pH and Total Alkalinity. Natural water balance makes water safe and enjoyable.

Mustard Care Products

These products help you keep you hot tub investment looking great and in excellent shape. They enhance appearance as well as assist in cleaning and maintenance.

Water Balance Parameters

The Significant Water Balance Parameters for hot tub water:

The table below indicates the Government approved recommended ranges for keeping hot tub water clean and balanced.

Parameter	Range
Free Available Chlorine Level	3-5 ppm
Bromine Level	3-5 ppm
pH	7.2-7.8
Total Alkalinity	100-120 ppm
Calcium Hardness	150-200 ppm
Total Dissolved Solids	1500 ppm over Start Up TDS

Water that is not balanced can corrode concrete, grouting and metals (copper, steel, etc.) or deposit crusty, coarse substances called scale.

Corrosive water is "aggressive" (occurs when pH, TA or Calcium Hardness level is low) and attempts to dissolve concrete and metals, pitting concrete and destroying steel filters, copper heater elements, gas heaters, or heat exchangers. A telltale sign of corrosive water is staining. You can tell staining has occurred when a customer complains of colored deposits on the hot tub's surface or jet fittings. The deposits are actually colored metal salts of iron (brown), copper (blue/green/grey/black), or manganese (red).

Scaling water causes the opposite to occur. Scaling water attempts to deposit or precipitate calcium carbonate out of solution, causing unsightly deposits on surfaces, possibly plugging the filter and circulation piping.

Balanced water exhibits none of these damaging properties. The goal is to keep the customer's water balanced in order to avoid unnecessary and often costly repairs.

Water balance is maintained by controlling the parameters of pH, calcium hardness, total alkalinity, and TDS.

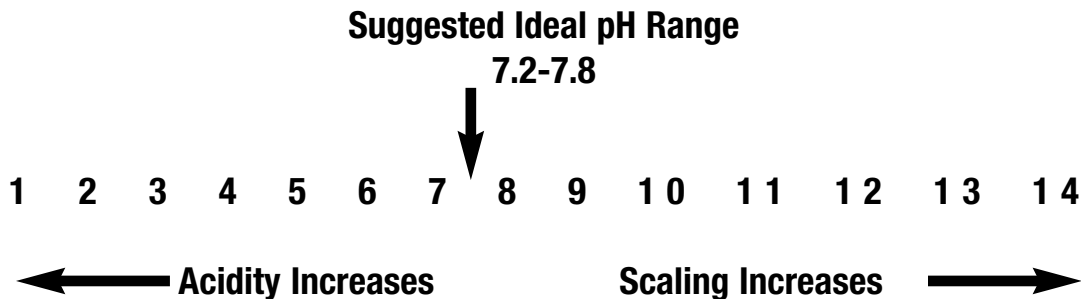
1. The story of pH (suggested: 7.2-7.8)

pH was invented as a scale of measurement to measure the acidity of water in the brewing of beer in the early 1900's. "pH" stands for "potens hydrogen", Latin for "hydrogen power".

pH is measured on a scale from 0-14, with a pH of 7 being neutral. Below 7, the water is acidic and above the water is basic (or alkaline). Acidity in water is caused by a predominance of H⁺ (hydrogen ions). The pH scale is logarithmic, meaning that every unit means 10 times the value of previous number. Therefore, a pH of 6 is 10 times more acidic than a pH of 7 and a pH of 2 is 10,000 times more acidic than a pH of 7. Note that the recommended pH range for pool and hot tub waters is slightly alkaline. The reason for this is bather comfort as the pH of the liquid in the human eye is about 7.5. Maintaining a tub with a lower alkalinity would result in irritation to bathers.

Problems encountered when pH level is out of range

The particular problem experienced will depend in part on whether your customer's tub or pool water has a low or a high pH level. Below we've summarized typical problems to expect when the pH drifts outside the ideal range.



Low pH	High pH
Corrosive Water	Scaling Water
Pitting of concrete & heater system	Cloudy water
Metals dissolve	Sanitizer inefficiency
Skin/eye irritation	Skin/eye irritation
Staining of walls	Reduced circulation
Vinyl wrinkles in pools	Plugged filters
	Odor

Several factors can contribute to a pH change in a hot tub:

1. addition of fresh water
2. rain
3. bather use
4. chemicals
5. dust
6. algae
7. neglect
8. improper testing
9. drop in alkalinity
10. Carry-out or splash-out
11. Evaporation

Balancing the pH

- pH is a measure of how acidic or basic the water is. If the water is below 7.0, the water is acidic. If the pH is above 7.0, the water is basic.
- Acidic water can cause pitting of the heater element and damage the equipment.
- Basic water forces the calcium dissolved in the water out of solution, causing cloudy water and scaling.
- The pH also has a dramatic effect on the sanitizer effectiveness in the water. A high pH level results in greatly reduced sanitizer effectiveness.

Increase the pH using
pH PLUS



Decrease the pH and Total Alkalinity using
pH MINUS



pH Level	Chlorine Effectiveness	pH Level	Bromine Effectiveness
5.0	100%	4.0	100%
7.0	75%	7.0	98%
7.5	48%	7.5	94%
8.0	22%	8.0	83%
11.0	0.03%	11.0	0.48%

2. Total Alkalinity (suggested range: 100-120 ppm)

Total Alkalinity is the measure of the ability of water to resist or "buffer" changes in pH. The Total Alkalinity reading is based on the total alkaline salt content of the water. A buffer is a chemical system that resists change upon the addition of acids or bases. The pH level can wander dramatically in hot tub or pool water with no buffering ability. This is known as pH bounce – a rapid fluctuation of pH levels with the addition of small amounts of acid, base, or other pH altering agents. The result is a highly unbalanced water condition, which can cause damage to copper heater elements, light rings, stainless steel fittings, dials, ladders, and concrete pool surfaces.

Balancing Total Alkalinity

Total Alkalinity is a measure of alkaline salts in the water. It acts as a buffer to the pH, helping to hold the pH at 7.2-7.8. If the Total Alkalinity is low, the pH will tend to stay lower as well. If the Total Alkalinity is high, the pH will tend to drift higher.

Increase Total Alkalinity with
RESIST



Decrease Total Alkalinity with
pH MINUS



Problems encountered when Total Alkalinity level is out of range

Low Total Alkalinity	High Total Alkalinity
Corrosive water	Scaling water
pH bounce	pH drifts upward
Cloudy water	Cloudy water

The effect of temperature on water chemistry

Temperature (suggested range: 102 - 104 degrees F, or 38 - 40 degrees C) plays only a minor role in maintaining water balance.

However, the temperature will affect how quickly the sanitizer present in the hot tub will be consumed or dissolved. Bather load has a much greater effect on sanitizer consumption.

The greatest impact of high temperatures in hot tubs is with a low sanitizer level. Low levels allow bacteria to flourish, causing skin rashes, eye and skin irritations and even flu symptoms in more serious cases. It is your responsibility to help educate your new customer on the importance and necessity of adequate sanitizer levels in their hot tub.

DID YOU KNOW? *Temperature also affects solubility, or how quickly water care products are absorbed into the water. The higher the temperature, the quicker the solubility. This is one of the big differences between pool water and hot tub water. Water care products are absorbed in a hot tub much faster, resulting in faster chemical reactions. One must also remember that balanced water at 104° F is not the same balanced water at 70° F as in a swimming pool.*

3. Calcium Hardness (suggested 150-200 ppm)

Calcium hardness is a measure of the amount of calcium present in the water. It is important that you check a customer's water sample to ensure that their Calcium Hardness level is in range because an abundance of calcium, or a lack of calcium can cause a variety of unwanted water conditions.

Water that contains high levels of calcium and magnesium salts is called hard water. These minerals combine with soap to form a grey insoluble curd-like substance, making the water "hard" to form suds in. Water that contains little or no calcium/magnesium is called "soft" water.

Hot tubs that contain too much calcium may produce "Calcium Carbonate" scale. Calcium deficient water may also cause foaming in hot tub water.

Balancing the Calcium Hardness level

Soft water (water with a low calcium hardness level) is corrosive and damaging to the equipment in a hot tub. Hard water (water with high calcium hardness level) tends to form scale on the surface of the hot tub and on the copper heater element. Also the water feels "gritty". Hard water is often the cause of two problems. The first, and less costly is that scaling can occur which causes the hot tub's surface to feel rough. The second and more costly problem is that hard water can significantly impair the heating ability of the hot tub heater element.

DID YOU KNOW? Calcium is such an excellent insulator, the scaling of calcium onto a copper heater element can, over a short period, reduce the efficiency by up to 50%.

Increase Calcium Hardness
with **PROTECT**



Decrease Calcium Hardness
with dilution

Just add water!

Problems encountered when the Calcium Hardness level is out of range

Low Calcium Hardness	High Calcium Hardness
Corrosive water	Scaling water
Foam	Cloudy water
Etching of plaster or concrete	Plugged filters
Cloudy water	Lowered heater efficiency
Odor	Reduced circulation

4. Total Dissolved Solids (TDS) (suggested range 1500 ppm over Start Up TDS)

Total Dissolved Solids is a measure of how "tired" or well used the water has become in a hot tub. The TDS reading tells you when a customer can dilute existing water by adding more water, and when a customer should drain, and re-fill their hot tub. As more water care products are added, especially granulars, the TDS level will climb. Instruct a customer to drain their hot tub when their TDS level reaches 1500 ppm over their Start Up TDS level. High TDS causes clouding, odor, and chemical inefficiency.

Draining and refilling your customer's hot tubs

The rule of thumb is every three months. A more accurate method is to check the TDS level. As soon as the TDS level has reached 1500 ppm over their Start Up TDS, customers should be advised to drain their hot tubs.

For proper sanitation, the hot tub must be drained periodically. The number of days between COMPLETE HOT TUB DRAINAGE is as follows:

Metric	# days between drainage equals	$\frac{\text{hot tub volume in liters}}{(10 \times \text{max \# daily bathers})}$
Imperial	# days between drainage equals	$\frac{1/3 \text{ (vol. US gallons)}}{(\text{max. \# of daily bathers})}$

Postponing draining over the winter months

The best way to postpone an entire drain and refill is to do a partial drain, especially during cold winter months. A partial drain is when you bring down the water level, not completely draining the hot tub. A partial drain will bring down the TDS level and allow more time before reaching 1500 ppm over your Start Up TDS. *Remember: the addition of new water may require the adjustment of pH, TA and CH level afterwards. Refer to your owner's manual for proper draining procedures. Never drain or partially drain a hot tub that is running. Always turn off the source power before attempting any draining procedures.

Customers often ask for advice on leaving their hot tubs while they take several weeks vacation. It is highly unlikely that a hot tub, full of 104 ° F water, would freeze in two weeks. Most people have a friend that can stop by and check the hot tub, or you, as their dealer provider, could offer to perform that check while they are away. This is an important function of positioning yourself as their "hero" for their Beachcomber Hot Tub.

In cases of extreme cold, the equipment pak can be removed and brought into the house – but this is rare. A Beachcomber Hot Tub is designed to operate outside all year long, in any weather.

Over-saturation of water with treatment products

The potential for over saturation is prevented by maintaining and keeping an eye on the TDS level. An increase in the TDS level is an indication that the amount of dissolved product in the water is increasing too. Once the TDS level reaches 1500 ppm over its Start Up TDS, it is close to its maximum saturation point.

Contributors to TDS Levels

- *hair*
- *lint*
- *pollen*
- *dust*
- *sweat and skin particles*
- *lotions*
- *oils*
- *soap*
- *environmental debris (leaves, pine needles, dirt etc.)*
- *water care products*
- *evaporation*
- *fecal matter*
- *urine*
- *nasal discharge*
- *expectorant (spit)*
- *cyanuric acid (from stabilized chlorines such as Chlor Blast)*
- *inert solids from granular products*

Sanitizing and Oxidation

Sanitation refers to the process of the reduction of the level of microorganisms (bacteria) present in the water to safe levels. A sanitizer is the product that kills and oxidizes any microorganism that may be present in your customer's pool or hot tub water.

Defined as sanitizers, bromine and chlorine destroy microorganisms, bacteria, algae, fungi and viruses and oxidize the dead microorganisms from the water. Oxidization refers to the process of "burning up" or removing dead organic compounds from the water.

The oxidization process reduces organic waste into simpler forms such as carbon dioxide and oxygen, rendering them safe for bathers. Some compounds are reduced by the oxidization process into a gaseous state, such a nitrogen.

Sanitizer levels to be maintained in a hot tub

Sanitizer	Recommended Level
Chlorine / Bromine	3 - 5 ppm

DID YOU KNOW? *Only 10-25% of the bromine/chlorine present in the water acts as a sanitizer! The remaining 75-90% of the bromine/chlorine present acts as an oxidizer, removing organics from water.*

Bromine/Chlorine Demand

Organics and microorganisms consume bromine/chlorine. This consumption is called the bromine/chlorine demand and is defined as the amount of bromine/chlorine that will react with contaminants before any bromine/chlorine is left behind to create a residual. The residual is the number that is read when using a bromine or chlorine test kit.

Microorganisms are living creatures too small to be seen by the naked eye, and are constantly being introduced into your customers' hot tubs by the wind, rain and bathers.

Bacteria, algae, fungi, and viruses are the organisms of concern. While most organisms are harmless to the human body, some microorganisms can cause disease and infection.

Organics generally contaminate hot tub water via the bather. The human body constantly sheds skin particles by the friction of the water contacting the bathers' skin, as well as nasal discharge, fecal matter, sweat and urine. The combination of all these factors creates what we call "bather load".

Organics, whether introduced to the water by the bather, or through the environment cause hot tub water to become odorous, dull, listless, a poor and inefficient sanitizer environment, and cloudy. The addition of high levels of bromine or chlorine will oxidize the organics, leaving the water clean and clear.

It is important to instruct your hot tub customer that the oxidization and sanitization process can, over time, degrade the underside of the hot tub cover. Leaving the cover partially open after shocking allows gases to dissipate easily, lengthening the life of the cover.

Bromine and Chlorine odor

Bromine and chlorine odor is caused by the combination of chlorine with ammonia (sweat, urine, etc.) to form a compound called combined chlorine/bromine or chloramines/bromamines. This occurs when a hot tub is not shocked weekly with either chlorine or a non-chlorine shock. Chloramines have a very strong chlorine odor and are known skin, eye, and mucous membrane irritants.

DID YOU KNOW? *With a very low odor, unlike chloramines, bromamines are very effective at killing bacteria and can be "regenerated" with the addition of fresh oxidizer - Beachcomber's "Bromate" granular product (in a Bromine environment).*

Chloramines however have virtually no ability to kill bacteria and therefore need to be removed from the water. Chloramines can be removed from pool or hot tub water with the addition of chlorine or non-chlorine shock.

Please note that shocking weekly may not be enough. Depending on your customer's use of the hot tub, they may need more chlorine or bromine. Always tell your customer to maintain a sanitizer reading of 3-5 ppm for chlorine and bromine.

Methods used to disinfect hot tub water

There are two primary products used to disinfect or sanitize hot tub water: chlorine and bromine. Chlorine was the preferred disinfectant for many years because of its availability and low cost. In the past years, bromine has challenged chlorine's market dominance because of the rising costs of chlorine and bromine's superior effectiveness over a wider pH range than chlorine.

pH Level	Chlorine Effectiveness	pH Level	Bromine Effectiveness
5.0	100%	4.0	100%
7.0	75%	7.0	98%
7.5	48%	7.5	94%
8.0	22%	8.0	83%
11.0	0.03%	11.0	0.48%

Types of Chlorine Residuals

There are 3 types of chlorine residuals that need to be measured for proper sanitizing efficiency: free, total and combined chlorine.

Free Chlorine (FC) is the chlorine residual present in water that is killing germs and oxidizing organics. Acceptable levels of FC are 3-5 ppm.

Combined Chlorine (CC) is the chloramines formed by the reaction of FC with ammonia waste from bathers. CC has little sanitizing capability. Level should not exceed 0.2 ppm.

Total Chlorine (TC) is the sum of FC and CC.

Breakpoint Chlorination

Breakpoint Chlorination is the removal process of combined chlorines when CC levels exceed level of 0.2 ppm. This is accomplished by an addition of chlorine to increase combined chlorine levels.

$$\text{Breakpoint Dosage} = 10 \times \text{combined chlorine level}$$

Recommending a program for your customer

Two-Part Bromine System

Advantages	Disadvantages
Easy to use	Bromate must be added daily
More forgiving over a wider pH range	Low pH of oxidizer (2.3)
Non chlorine	Contributes to TDS
Low Odor	

Bromine Disc System

Advantages	Disadvantages
Weekly addition of Bromate	Low pH of both Bromate and the discs
Long lasting tablets	Handling of product by the customer
More forgiving over a wider pH range	Slow dissolving tablets do not create a residual
Low Odor	

Bromo Blast System (“One Part Bromine”) *(n/a in the USA)*

Advantages	Disadvantages
Eliminates Bromide for the customer	Add every day or couple of days
Does not produce odor causing “chloramines”	Contributes to TDS

Chlor Blast System

Advantages	Disadvantages
Close to pH neutral (6.7) anhydrous form	Add every day or couple of days.
Least expensive granular chlorine	Contributes to TDS
Easily handled	Adds stabilizer to the water

Care Free System

Advantages	Disadvantages
Lower chlorine use due to oxidizer	The system must be followed closely or cloudy/musty water may occur
Best for lower bather loads	
A simple water treatment system	More filter maintenance
No chloramine odor	Not effective when the pH is above 7.6
	Contributes to TDS

Ensure that the water is properly disinfected

Test the chlorine/bromine level and ensure that the levels are in range. The chlorine and bromine level should be between 3-5 ppm.

Test the pH and ensure that it falls in range between 7.2 and 7.8.

If the chlorine/bromine level is low, add the proper disinfectant to the water for the maintenance system you are using. Wait 15 minutes, and test the water again. Once you have the chlorine/bromine level and the pH level in range, you can be assured that your hot tub is adequately disinfected.

To ensure that there is a proper amount of sanitizer in the water, always test the water before entering the hot tub.

The human body is a carrier of microorganisms, which is why we need to ensure that the chlorine/bromine level is in range before anyone enters the hot tub.

DID YOU KNOW? A hot tub's chlorine/bromine level depletes as a result of usage. One adult uses approximately 1 ppm of chlorine or bromine every 15 minutes at a water temperature of 102-104° F (38-40° C). This depletion creates the "chlorine demand".

Beachcomber Floating Dispensers

Bromine Discs and Mini Discs are an easy way to have a constant supply of chlorine/bromine in your hot tub water but they are not fail-safe. Even when a floating dispenser is filled with tablets, the chlorine/bromine level in the hot tub could be zero. The tablets are slow dissolving and if the level of chlorine/bromine in the hot tub falls to zero, it may take several days for the levels to return to normal (if you do not shock with **Bromate, Bromo Blast, Lithchlor, Chlor Blast, or Care Free Boost**). Always test the water before using the hot tub to ensure the levels are in the appropriate range. If the level of chlorine or bromine has fallen to zero, instruct your customer to raise sanitizer levels back to the desired range by adding the shock treatment which corresponds to the sanitization system they are using. Your customer could be using a floater, but still have a low level of sanitizer available to kill bacteria.

A very easy system for shocking is with the **Chlor Blast** 35 gram pouch. This pouch is designed as a one-time use, and can be used as a shock treatment for either a bromine or a chlorine system. Instruct your customer to use it all at the same time, and not to store any unused portion. Also, ask your customer to rinse the empty pouch in their hot tub water to make it safe for disposal. This rinsing procedure ensures that there is no sanitizer powder left in the package. Rinsing is extremely important for safe disposal at the customer's home.

Beachcomber has developed a software program called **Tethys**, which interprets the water test results for you in an easy to print format. The program will provide customers with a printout of their daily, weekly, and monthly product requirements. Once you have run a water test on the customer's water sample, input the values into the program, click the print option and the program will do the rest of the work for you. **Tethys** also offers you an easy way to create mailing lists, allowing you to better manage your customer relationships.

Algae

Algae is a plant growth which has adapted over the years to changing environments. The algae species that is found in hot tubs is Anabaena or Anacyatis algae or known as "White Algae". White Algae appears in the form of small flakes that resemble tissue paper or a clear slime that coats the filter and pipes. Both algae can show up in a hot tub if there is no sanitizer residual. To prevent these two algae, maintain a sanitizer level between 3-5 ppm.

DID YOU KNOW? *There is much discussion in the industry relating to white algae. This residue is a type of biofilm and is generally not a living organism. The term "white algae" has taken hold for lack of a better term. In fact, white algae can be simply "sludge" that can build up in pipes, due to low sanitizer levels, or usually, neglect. Algae is generally not found often in a hot tub, due to lack of exposure to the sun to create photosynthesis, the necessary building blocks that algae need to live. However, that is not to say that algae could not present itself in a hot tub. Regardless of the discussion, adequate levels of sanitizer will prevent a host of problems in a hot tub, including the infamous "white algae".*

The steps to remove White Algae

If you suspect that your customer has white algae, refer to the "White Algae Elimination Sheet" from Tethys.

When removing algae, it is important to remember these two steps:

1. Stop the algae accumulation
2. Remove free floating algae from the hot tub

White algae may require a hot tub to be drained more than once. Prior to initial draining, two products currently available on the market may need to be used – a filter sock which covers the filter opening to catch debris, and a "pipe cleaner" like **Deep Clean 5** to free algae that clings to internal pipes. White algae is almost always a sign of either neglect or low sanitizer levels or both. If your customer has it, be prepared to spend some time with them to educate them on sanitation in a hot water environment. When using shock, filter socks or **Deep Clean 5**, always follow the directions on the labels.

DID YOU KNOW? *White Algae can present itself when there is no sanitizer level present or if the hot tub has been neglected for a period of time!*

Metals and Minerals

Dissolved metals have the ability to stain surfaces and discolor water if not properly controlled. The preferred level for metals in hot tub water is zero. Metals that are commonly found in water are copper and iron. Manganese is sometimes found but is not as common. The problems with metals is that they may stain the surfaces they come in contact with and can also discolor the water. This staining can ruin an investment, as a metal stain can't always be removed. Metal stains can be identified as follows:

Metal	Stain Color	Water Color
Copper	blue-green to black stain	blue-green or black
Iron	yellowish, red-brown	yellow-brown
Manganese	grey to black stain, violet	coffee-brown

Metals are traditionally introduced into water in a number of ways:

1. addition of fresh water
2. metallic algicides
3. corrosion of metal heater elements from improper water balance.
4. well water or other source water containing high levels of metals and/or minerals

Metals stain surfaces and discolor water because they fall out of solution by influences in the water or acting on the water. The influences can be:

1. oxidizers (sunlight and chlorine)
2. products that cause a dramatic change in pH and TA

Beachcomber products to add to prevent the effects of potential metals

The addition of **ELIMINATE # 1** upon start-up will prevent any metals present in the water from falling out of solution and **ELIMINATE PLUS # 2** weekly will protect from any metals that may be present in fresh additions of water.

Eliminate # 1

for metals at start up



Eliminate Plus # 2

for weekly protection



Filtration

Filtration is the most overlooked parameter to clear water. If the filter is old or dirty, water will never be crystal clear, even if it is properly balanced and sanitized. As the filter ages it isn't capable of removing debris to maintain water clarity. Debris can be categorized into two groups:

1. Oil/Grease (i.e. suntan lotions, sweat, hair & scum etc.). These will eventually coat the filter fibers and render the filter incapable of filtering effectively.
2. Scale/Scum (i.e. calcium scale, rust etc.) Scale and scum deposits deteriorate filter fibers, reducing the overall filter area, leading to poor filter performance.

When debris accumulates to a degree where filtration efficiency is affected, the hot tub owner will face increased operating costs, less effective water care products and poor water clarity.

Products used to remove deposits and clean hot tub filters

Beachcomber has two different filter cleaners:

- To remove organic debris and scum, use **Filter Pure**.
- To remove scale and mineral buildup, use **Filter Cure**.

Filter Cure and **Filter Pure** are designed to use alternately on a monthly basis. One month use **Filter Pure** and the next month use **Filter Cure**, alternating these products will prevent over cleaning, improve filtration, and extend the life of the filter. DO NOT MIX THESE TWO PRODUCTS TOGETHER. The reason not to mix them is that one is an acid (Cure) and one is basic (Pure), they would render each other ineffective, or neutral.

Filter Pure is a highly concentrated, alkaline detergent based cleaner. **Filter Cure** is an acidic cleaner that breaks down minerals such as Calcium. Instruct your customer to dilute these after used for cleaning filters before disposal. Diluting with water will reduce greatly the impact on our environment.

Filter Cure

Acidic based for scale and minerals



Filter Pure

Alkaline based for grease and oil



The life expectancy of a Beachcomber filter

Filters have a life expectancy of 2 - 3 years if taken care of properly. Over-cleaning will cause the fibers to deteriorate faster and not cleaning them enough can make the filter almost impossible to clean thoroughly. If filter fibers are discolored, stiff, coarse, frayed, separated, have a mucky feel, a grey look, or delamination, then it is time to replace the filter.

Beachcomber Plus offers different filters for many different makes of hot tubs. These filters (often called cartridges or elements) come in a 25 or a 50 square foot form. The square footage is the measure of all the fiber fins flattened out. These fins are more than capable of filtering a small body of water like a Beachcomber Hot Tub. These private branded "Microfilters" are available as a regular stocking item from Beachcomber Plus.

Beachcomber Plus also offers a filter cleaning canister, made especially for Beachcomber Hot Tub filters from heavy duty ABS plastic. It is easy to use and gives your customer a quick and easy solution to cleaning filters, instead of using a pail that may not fit the filter. Most "car wash" style pails do not fit hot tub filters. It's very important to have the entire filter submerged for proper cleaning and this is best accomplished with a Beachcomber Filter Cleaning Canister.

Agitation, as with any detergent cleaning process, is also very important. That's why Beachcomber's filter cleaning canister comes with a lid/bristle brush combination to allow the home owner to periodically agitate the solution while soaking the filter.

Warning: *Leaving the filter to soak for more than two days can erode the stainless steel wire that is attached to the bristle brush.*



Beachcomber's Filter Cleaning Canister, made to fit Beachcomber Microfilters.



Beachcomber's Microfilter, available in either 25 or 50 square foot versions.

Beachcomber Heatshield Care

A Beachcomber Heatshield should last 3-5 years if taken care of properly. The product meant for that purpose, is Beachcomber's **Cover All**. **Cover All** is specially formulated for hot tub covers as it contains a special UV protectant and conditioner to protect your customer's cover from the sun's damaging rays and chemically treated water. Use **Cover All** every time you drain and refill as part of your regular hot tub maintenance routine. Cover All comes with a convenient spray nozzle for easy application and should be placed on your shelves with the spray nozzles screwed on tightly.

DID YOU KNOW? *Purezyme works to eliminate organic odors and scum that can occur on the under side of hot tub covers. Spray the underside of cover with Purezyme and wipe down, let it stand for at least two hours, then rinse off.*

Never allow children or pets to sit, play or stand on top of a hot tub cover. Beachcomber has allowed for an adequate "snow load" to sit on a hot tub cover for short periods of time, however, added weight from children or pets will quickly deteriorate any hot tub cover. Instruct your customers to properly care for and maintain their hot tub cover for maximum life expectancy.

Superior Energy Efficiency

Beachcomber Power Guard and Power Guard Plus Heatshields are POWER SMART® endorsed products. They not only meet minimum R12 insulating value, they exceed it.

With over 57% more insulating power than standard hot tub covers, Beachcomber POWER SMART® endorsed Heatshields could save you up to \$500 per year in heating costs, versus old inefficient covers that provide little to no insulating value. Beachcomber Heatshields exceed CSA and ASTM Safety requirements, including static load and child resistance.*



Beachcomber Water Care Products for Hot Tubs

Product	Granular	Liquid	Shipping Class
1. Treatment			
Bromide		X	n/a
Bromate	X		n/a
Bromine Disc	X		5.1
Bromo Blast	X		5.1
Care Free Boost	X		5.1
Chlor Blast	X		5.1
Lithchlor	X		5.1
Mini Disc	X		5.1
2. Balancing			
pH Minus	X		8
pH Plus	X		n/a
Protect	X		n/a
Resist	X		n/a
Soft	X		n/a
3. Care			
Cover All		X	n/a
Filter Cure		X	8
Filter Pure		X	8
Foam Free		X	n/a
Kleenzyme		X	n/a
Tub Clean		X	8
Neutr-All		X	n/a
Deep Clean 5		X	8
4. Conditioning			
Care Free	X		n/a
Eliminate		X	8
Eliminate Plus		X	8
Purezyme		X	n/a
Pure Blue		X	n/a

5. Tote Kits: A conveniently packaged assortment of products to assist with start up or refilling of your customer's hot tub.

1. Bromine Disc Tote
2. Bromo Blast Tote
3. Care Free Tote
4. Chlor Blast Tote
5. Two-Part Bromine Tote
6. Care & Balancing Tote - this tote contains all the products necessary for balancing. It does not include any treatment (chlorine or bromine) products for your customer.

6. Hot Water Fragrances – available in both liquid and granular, various scents add to the hot tub experience.

1. Treatment Products - Orange Labels

Bromate and Bromide (Two Part Bromine)

Bromate: pH 2.8

A dual purpose buffered, non-chlorine oxidizer for the effective release of Bromine sanitizer from the Bromide bank already contained in the water. Added upon start-up, weekly and daily as needed for the Two Part System; follow directions as per the label. Added upon start-up, weekly and daily if needed for the Bromine Disc Program; follow directions as per the label.

Bromide:

A clear solution of bromide salts which remains as a stable bank in the hot tub water until **Bromate** is added. **Bromide** by itself has no disinfectant properties. It is only when Bromate is added that an effective sanitizer is created.

Bromine Disc: pH 4.8

A slow dissolving Bromine tablet to kill bacteria and algae in hot tub water. Used with the Bromine Disc Program; ensure the dispenser is always full and open to the appropriate setting to maintain the bromine level. Bromine disc contains both Bromide salts and Bromate oxidizer.

Bromo Blast: pH 4.8

A One Step Bromine based disinfectant and shock treatment that kills and controls the growth of bacteria and algae in hot tubs. Added upon start up, as well as daily and weekly as needed. Follow the directions on the label.

Please note that Bromo Blast is not available in the USA.

Care Free Boost: pH 6.7

A chlorine based disinfectant and that kills and controls the growth of bacteria and algae in hot tub water. Balance the hot tub water then follow start-up instructions as per the label. To be used exclusively with the conditioning product, Care Free.

Chlor Blast: pH 6.7

A chlorine based disinfectant that kills and controls the growth of bacteria and algae in hot tub water.

Chlor Blast Pouch:

A one-step, powdered oxidizer/sanitizer for hot tubs. Simply tear open a package and add the complete contents to the hot tub water. This product will boost the chlorine level while it is oxidizing and sanitizing the water.

**Warning: Chlor Blast pouch is designed as a single use application. The user is not to store an open pouch with product remaining inside. Available while stocks last!*

Lithchlor: pH 10

A chlorine based disinfectant that kills and controls the growth of bacteria and algae in hot tubs. Maintain daily levels; determine the level by testing with a chlorine test kit. Lithchlor is a highly soluble, fast acting product, and this is one of its main strengths.

2. Balancing Products - Terra Cotta Labels

Did You Know? *Beachcomber water care product names are designed to give the hot tub owner a good indication of what the product actually does. This is important, in an industry filled with an array of confusing names. Building on that philosophy when you train your customer will promote trust and confidence in you as their water care professional.*

pH Minus

Decreases the pH of hot tub water to prevent corrosion, cloudy water and eye irritation. For levels that are above 7.6 broadcast recommended dosage over water at half hour intervals. Check the pH after every dose. Maintain a level of 7.2 - 7.8 ppm. Note: pH Minus will also decrease total alkalinity levels.

pH Plus

Increases the pH of hot tub water to prevent corrosion and eye irritation, helping to increase the efficiency of the sanitizer. For levels that are below 7.2 broadcast recommended dosage over water at half hour intervals. Check the pH after every dose. Maintain a level of 7.2 - 7.8 ppm.

Protect

Helps **protect** hot tub equipment and parts. Increases the hardness of hot tub water to prevent corrosion of metal equipment and parts. For levels that are below 150 ppm, use Protect as directed on the label. Maintain a calcium hardness level of 150 - 200 ppm.

Resist

Helps water to resist changes in pH. Increases the alkalinity of hot tub water to prevent pH bounce and corrosion. Increase the effectiveness of the sanitizer with properly balanced total alkalinity. For levels that are below 100 ppm, use Resist as directed on the label. Maintain a level of 100 -120 ppm.

Soft

Prevents calcium build-up, enhances water quality and comfort and helps buffer pH to prevent pH bounce. Added upon start-up and weekly; use as directed on the label.

Soft comes with a pleasing fragrance. Similar to “green apples”, this fragrance will be a hit with your Soft user. Once added to the hot tub, the fragrance will last about 5 - 10 minutes after application.

Did You Know? When demonstrating the new fragrance to your Soft customer, never put your nose directly into the container! Always “waft” the scent towards your nose with your hand. The Soft scent is concentrated in the bottle and could irritate if directly inhaled. This is a good practice to follow with any water care product.

3. Care Products - Mustard Labels

Cover All

A heavy-duty liquid vinyl cleaner and UV protectant for all types of hot tub covers and vinyl products around the home. Spray Cover All directly on the vinyl surface, and wipe off.

Filter Cure

Filter Cure is an acidic cleaner formulated to remove damaging calcium and mineral deposits and buildup from your filter. Alternate monthly cleaning with Filter Pure for best results. Do not mix these chemicals. Follow directions and dosage as directed on the label. For best results, offer your customer Beachcomber's Filter Cleaning canister for easy and efficient filter cleaning.

Filter Pure

Filter Pure is a heavy-duty alkaline detergent cleaner, which removes organic contaminants and improves the performance of your filter. Appropriate for cleaning of cartridge or sand filters. Follow directions and dosage as directed on the label. For best results, offer your customer Beachcomber's Filter Cleaning canister for easy and efficient filter cleaning.

Foam Free

A concentrated rapid defoamer designed to dissipate and suppress suds and foam in hot tubs. If foaming persists, your customer's water will need to be tested. Follow directions and dosage as directed on the label. Excessive foam is an indication of a combination of things: high TDS, low calcium hardness or dirty filters.

Kleenzyme

A natural enzyme cleaner specially formulated to clean virtually any surface. Kleenzyme is ideal for patio furniture, automotive and household vinyl surface cleaning applications. Follow directions and dosage as directed on the label. This is a 100% environmentally friendly cleaner.

Did You Know? *Kleenzyme comes with a convenient spray nozzle for easy application. Kleenzyme is non toxic and will not harm pets or children! Try Kleenzyme on tough pet odors! Kleenzyme's enzyme formula neutralizes odors on contact and will not affect colored fabrics. For best results, always test on an inconspicuous area to test for colorfast ability.*

Nu Wood

An exterior, water based wood stain to restore hot tub cedar skirting. Seals in color and natural beauty from the elements. Nu Wood also protects the wooden cedar cabinet from treated hot tub water. Follow application instructions on the label.

- Did You Know?**
- *Older hot tub cedar cabinets were originally stained with an oil base stain that is not compatible with this water based stain. To use this stain on an older hot tub, a thorough sanding will have to be done before application.*
 - *Beachcomber Hot Tubs equipped with EnviroSkirt™, a synthetic wood look-a-like, cannot be treated with Nu Wood. EnviroSkirt™ has been properly treated from the factory to give a lifetime of beauty and lustre and does not require any further treatment.*

Tub Clean

A fast acting surface cleaner for the removal of water lines and grease build-up on hot tub surfaces. Tub Clean is highly concentrated and should not come in contact with hot tub water. Tub Clean is also effective on vinyl siding, whitewall tires, and many other home and auto applications. Follow directions and dosage as directed on the label.

Deep Clean 5

Regular easy maintenance prevents bacteria growth

Microorganisms can be somewhat protected from oxidizers and sanitizers as they hide beneath a slippery film. It is very important to remove these deposits before they continue to accumulate, or grow in bacterial numbers. Regular use of Deep Clean 5 will help prevent this biofilm from accumulating.

Maximize Heater Coil Efficiency

Deep Clean 5 is formulated to remove calcium scale that can reduce the efficiency of the hot tubs' heater coil. Each time you use Deep Clean 5, the heater is cleaned to prevent the harming effects of calcium buildup on the heater.

Routine use prevents buildup in pipes

Making Deep Clean 5 a part of the regular draining routine, with its tough, acidic formula will ensure that internal piping remains clear and clean. A clean hot tub will ensure better all around performance, from filtration to water flow.

Neutr-All

Neutr-All completely removes chlorine or bromine from hot tub water, making it safe to drain. Neutr-All is powerful - to instantly neutralize, or reduce your sanitizer. Use right before you drain your hot tub to ensure that your hot tub water is free of sanitizer, making it safe to drain. Don't forget that Neutr-All is very powerful. It's perfect for draining – but adding too much in an effort to reduce the sanitizer level can make it difficult, or even impossible to bring back a chlorine / bromine level.

Both are available in 500 mL / 16 oz bottle size. For Deep Clean 5, one bottle treats the average full size hot tub for two drainings. Neutr-All lasts much longer. Always consult your hot tub owner's manual for proper draining procedures.

4. Conditioning Products - Blue Labels

Care Free

A water conditioning system, exclusive to the Beachcomber Water Care line of products. This product replaces the traditional water sequestrants, oxidizers, enzymes and clarifiers. Designed to use in conjunction with Care Free Boost sanitizer. Balance the hot tub water then follow start-up instructions as per the label.

Eliminate #1

A liquid concentrate formulated to prevent the staining of iron, copper and magnesium on hot tub surfaces and equipment. Add one entire (500 ml) bottle upon start-up.

Eliminate Plus #2

A liquid concentrate formulated to prevent calcium scale in hot tubs. Added upon start-up and weekly. Follow the dosage amounts as per the label.

Pure Blue

A highly concentrated liquid clarifier formulated to clear cloudy hot tub water and restore its sparkle. It is designed to coagulate suspended micro-particles to form masses large enough to be removed by the filter. Added upon start-up and weekly. Follow the dosage amount as per the label. Relatives coming tonight for a hot tub? Cloudy water? Pure Blue will help.

Purezyme # 3

Natural microbial enzymes formulated to eliminate scum, reduce odors, and improve clarity. Added upon start-up and weekly. Follow the dosage amount as per the label.

Did You Know? *Purezyme is 100% biodegradable and completely environmentally friendly! This is because it is a natural enzyme, made with molasses, seaweed and other natural ingredients. Purezyme competes with algae for food, which is why it is such an amazing clarifier. It will prevent scum line and helps keep water clear and sparkling.*

5. Chemical Names

Stk No.	Name	Chemical Name	Size
Balancing Products			
70110	Ph Plus	Sodium Carbonate (Soda Ash)	600 g / 1.25 lbs
70120	Ph Minus	Sodium Bisulfate	800 g / 1.75 lbs
70130	Resist	Sodium Bicarbonate	500 g / 1 lb
70140	Protect	Calcium Chloride	500 g / 1 lb
70170	Soft	Boric Acide Blend	500 g / 1.25 lbs
70171	Soft	Boric Acide Blend	900 g / 2 lbs
Care Products			
70021	Foam Free	Hydrophobic Silica	500 ml / 16 oz
70022	Foam Free	Hydrophobic Silica	1 L / 32 oz
70051	Filter Cure	Phosphoric Acid / Hydrochloric Acid	500 ml / 16 oz
70052	Filter Cure	Phosphoric Acid / Hydrochloric Acid	1 L / 32 oz
70061	Filter Pure	Potassium Hydroxide / Phosphoric Acid	500 ml / 16 oz
70062	Filter Pure	Potassium Hydroxide / Phosphoric Acid	1 L / 32 oz
70071	Cover All	Dimethyliminio Ethylene Dichloride	500 ml / 16 oz
70081	Tub Clean	Citric Acid Blend	500 ml / 16 oz
73021	Kleenzyme	Natural Microbial Blended Enzymes	500 ml / 16 oz
Treatment Products			
70180	Chlor Blast	Sodium Dichloro-S-Triazinetrione (stabilized)	35 g pouch / 1.25 oz
70151	Chlor Blast	Sodium Dichloro-S-Triazinetrione (stabilized)	500 g / 1 lb
70152	Chlor Blast	Sodium Dichloro-S-Triazinetrione (stabilized)	900 g / 2 lbs
70161	Lithchlor	Lithium Hypochlorite (unstabilized)	500 g / 1 lb
70162	Lithchlor	Lithium Hypochlorite (unstabilized)	900 g / 2 lbs
70181	Care Free Boost	Sodium Dichloro-S-Triazinetrione (stabilized)	500 g / 1 lb
70182	Care Free Boost	Sodium Dichloro-S-Triazinetrione (stabilized)	900 g / 2 lbs
70191	Bromide	Liquid Sodium Bromide Salts	500 ml / 16 oz
70192	Bromide	Liquid Sodium Bromide Salts	1 L / 32 oz
70201	Bromate	Potassium Monopersulfate	600 g / 1.25 lbs
70202	Bromate	Potassium Monopersulfate	900 g / 2 lbs
70203	Bromate	Potassium Monopersulfate	2 kg / 4.5 lbs
70250	Bromine Disc	1-Bromo-3Chloro-5,5-Dimethyl Hydantoin	400 g / 0.75 lbs
70251	Bromine Disc	1-Bromo-3Chloro-5,5-Dimethyl Hydantoin	2 kg / 4.5 lbs
70252	Bromine Disc	1-Bromo-3Chloro-5,5-Dimethyl Hydantoin	3.75 kg / n/a
70207	Mini Disc	Trichloroisocyanuric Acid	2 kg / 4.5 lbs
70208	Mini Disc	Trichloroisocyanuric Acid	7 kg / 15.5 lbs
70260	Bromo Blast	Sodium Dichloro-S-Triazinetrione / Sodium Bromide	600g / n/a
70261	Bromo Blast	Sodium Dichloro-S-Triazinetrione / Sodium Bromide	900g / n/a
70262	Bromo Blast	Sodium Dichloro-S-Triazinetrione / Sodium Bromide	2 kg / n/a
Conditioning Products			
70011	Pure Blue	Polymeric Compounds	500 ml / 16 oz
70012	Pure Blue	Polymeric Compounds	1 L / 32 oz
70031	Eliminate	Phosponobutane – Tricarboxylic Acid	500 ml / 16 oz
70041	Eliminate Plus	Phosponobutane – Tricarboxylic Acid / Polymaleic Acid	500 ml / 16 oz
70042	Eliminate Plus	Phosponobutane – Tricarboxylic Acid / Polymaleic Acid	1 L / 32 oz
73011	Purezyme	Natural Microbial Blended Enzymes	500 ml / 16 oz
73012	Purezyme	Natural Microbial Blended Enzymes	1 L / 32 oz
71109	Care Free	Peroxysulfate – Oxidizer and Conditioner Blend	600 g / 1.25 lbs
71110	Care Free	Peroxysulfate – Oxidizer and Conditioner Blend	900 g / 2 lbs

6. Tote Kits

- **Care & Balancing Tote**

pH Plus, pH Minus, Protect, Resist, Soft, Filter Cure, Filter Pure, Measuring Cup, Beachcomber Tote Card and a two ounce Aroma Fragrance.

Did You Know? *The Care & Balance Tote is designed to work with the other 5 treatment totes. The C&B tote contains all the balancers needed to balance hot tub water, but not the treatment products (bromine or chlorine). These are sold separately and are listed below. The actual treatment products are underlined for each identification.*

Beachcomber offers 5 Treatment Programs, in order to give your customers the range of choice that they need and deserve.

- **Bromine Disc Treatment Tote**

Bromate, Bromide, Bromine Disc, Pure Blue, Foam Free, Eliminate # 1, Eliminate Plus # 2, Purezyme # 3, Test Kit, Measuring Cup and a 2 oz Aroma Fragrance.

- **Bromo Blast Treatment Tote**

Bromo Blast, Pure Blue, Foam Free, Eliminate # 1, Eliminate Plus # 2, Purezyme # 3, Test Kit, Measuring Cup and a 2 oz Aroma Fragrance.

- **Care Free Treatment Tote**

Care Free, Care Free Boost, pH Minus, pH Plus, Protect, Resist, Care Free Test Kit, Measuring Cup and a 2 oz Aroma Fragrance.

- **Chlor Blast Treatment Tote**

Chlor Blast, Pure Blue, Foam Free, Eliminate # 1, Eliminate Plus # 2, Purezyme # 3, Test Kit, Measuring Cup and a 2 oz Aroma Fragrance.

- **Two Part Bromine Treatment Tote**

Bromate, Bromide, Pure Blue, Foam Free, Eliminate # 1, Eliminate Plus # 2, Purezyme # 3, Test Kit, Measuring Cup & a 2 oz Aroma Fragrance.

7. Judy Essence Scentsations

Judy Essence Scentsations - Liquids

Judy Essence Scentsations are available in 4 scents:

1. Afternoon Showers
2. Evening Shade
3. Midnight Passion
4. Moonlit Romance

Judy Essences are pH balanced and will not affect hot tub water chemistry. They are made with natural oils which help moisturize and condition skin, as well as providing a pleasing scent to hot tub water. The shelf life of Judy Essence Liquids is about 2 years.

This product is ideal for bundling during holiday and special occasions such as Valentine's Day, Mother's Day, Customer Appreciation Nights, and Christmas at special prices, and is ideal for cash counter impulse buys.

Judy Essence Scentsations - Crystals

Judy Essence Crystals are available in 4 scents:

1. Hawaiian Lily
2. French Café
3. Tropical Rain
4. Lavender Delight

Judy Essence Crystals will not affect hot water chemistry, however, as with any granular product, they will add to TDS. The shelf life of Judy Essence Crystals is 2 years and color will not fade unless displayed in direct sunlight.

For more information on Beachcomber's crystal and liquid scents, refer to the Beachcomber Plus Catalog, or call your Plus Partner.

Water Testing

When testing a customer's water sample, we test for water balance, and the sanitizer level. The sanitizer level measures the amount of residual Bromine or Chlorine present in the water that is available to kill bacteria.

The term water balance refers to pH, Total Alkalinity, and Calcium Hardness. All of these levels are tested for independently, and the significance of each is fully explained in this manual.

The instructions detailing proper water testing procedures are conveniently located on the inside of the lid of the portable Taylor K-2005 Professional Water Testing Kit. If you have the larger RX-1 desktop model Lab, an instruction card is also included. Beachcomber Plus offers both of these Taylor Test kits, as well as Taylor Reagents.

False or inaccurate water tests

There are three things to watch for when conducting a water test.

1. The first thing to look for is a Bromine or Chlorine level higher than 6.0 ppm. Above this level, the sanitizer present in the water will skew the results when testing for pH, Total Alkalinity, and Calcium Hardness, causing a false test reading.

- To correct for a high Bromine or Chlorine level, add 3 drops of Reagent #7 (Sodium Thiosulphate) to the water in the test vial before running either a pH, Total Alkalinity, or Calcium Hardness test. The addition of 3 drops of Reagent #7 will neutralize the sanitizer in the test sample, allowing you to get accurate results from your tests. As Reagent #7 has a high pH on its own, do not add more than 3 drops.

False readings that can happen with high sanitizer levels:

- high pH reading
- Total Alkalinity endpoint is yellow instead of red

2. The presence of Copper in hot tub water will skew the results of a Calcium Hardness test, causing it to appear as if you have a very high level of calcium present in the water. Copper can also cause the endpoint to be purple instead of blue. (Please note that Copper in hot tub water is rare.)
3. Proper titration (the act of applying droplets) is an important part of water testing. Hold the bottle vertically upside down to apply the drops, not on an angle. The drop size can be altered if the bottle is not held in a vertical position. Titration is the process of applying drops to a water test sample. Titration is still one of the most reliable forms of testing available on the market today.

If the color of the water sample used for the test does not change from pink to blue after more than 50 drops of Reagent #12, you may have copper present in the water. Copper is usually found in hot tub water that has both a low pH and Total Alkalinity and can often be present in well water. This condition causes water to become aggressive, stripping copper from the heater element.

If a customer is using well water in their tub, instruct them to add twice the recommended dosage of Eliminate # 2 at the initial fill.

Total Alkalinity test vial turns the water red instead of green.

If you have tested pH before this, it is probably quite low. The total alkalinity is 0 ppm. Whenever a titration test is performed and the water sample changes to the second color instantly, this indicates that the ppm is zero. To correct this situation, add RESIST to raise the total alkalinity of the water.

Troubleshooting

Did You Know? *One of the best solutions for a troubled hot tub is FRESH WATER. Often problems can be easily solved by draining and refilling a hot tub. After all, you do not know how that hot tub has been, or not been maintained. Trying to fix an existing problem can be time consuming for you and expensive for your customer. If you run into a situation that can't seem to get solved, advise your customer to drain and refill and start again.*

White Algae

Algae takes the form of small white flakes that appear to be like bits of tissue paper. Algae can consume large amounts of sanitizer and will appear without sufficient sanitizer or if the hot tub is left unattended for a long period of time.

Solution: If algae is present print out a White Algae Eliminate Sheet from your Tethys Water Analysis program. See page 12 of this manual for more information on white algae.

Cloudy Water

Water can become cloudy for several reasons:

TDS Level: Solids accumulate as a result of bather use and addition of water treatment products over a period of time. Solids dissolve and become part of the general water chemistry and when the dissolved solids become too concentrated, water clarity will deteriorate.

Solution: Drain and start-up fresh or do partial drain and fill with fresh water.

High/Low pH: When pH level drifts out of range, water will cloud.

Solution: Check TA and adjust if necessary and then adjust pH to 7.2 - 7.8.

Poor Filtration: Improper filtration will restrict water flow and result in cloudy water.

Solution: Clean filters with Filter Cure or Filter Pure, alternating these two cleaners monthly. NOTE: NEVER MIX FILTER PURE AND FILTER CURE as one is an acid base, and one is an alkali based cleaner.

Products added to water too close together: Products can have reactions to each other that can result in temporarily cloudy water.

Solution: Wait specified times between additions of products, especially the Eliminates.

Holiday Tender: At times, the Holiday Tender can become plugged. The small screw fitting at the bottom of the pipe can become clogged with calcium, and could require maintenance.

Solution: Remove the rubber gasket from the fitting and soak the fitting in Filter Cure overnight, then brush and rinse.

Floating Dispensers: Always make sure that the dispenser, if it is being used, is opened enough to allow the pucks to dissolve. When first putting a loaded dispenser into the water, turn it upside down to allow the shaft to fill with water, soaking all the tablets. This will ensure that all pucks come in contact with the water, and a "trickle" of Bromine/Chlorine will be present in the water.

Colored Water

Copper from equipment and pipes can dissolve into water due to improper balance. Water from wells and lakes can also have trace amounts of metals already present, and improper balance can cause water to change color.

Copper – Greenish Blue

Iron – Yellowish Brown

Solution: Use Eliminate # 1 upon start-up and Eliminate Plus # 2 weekly and ensure TA and pH are in range.

In areas with well water, metals and minerals can be more of a problem than city water. City water is generally pre-softened and pH balanced in most communities, but well water often comes with a higher level of minerals. Doubling the dose of Eliminate Plus # 2 upon startup will help reduce scale and staining. There are cases where water needs to be trucked in as source water is not treatable.

Skin and Eye Irritation

Improper TA & pH balance: Most causes for skin and eye irritation is improper Total Alkalinity and pH balance. Our skin and eyes are pH neutral so if water becomes acidic or alkaline our skin and eyes will react. Common reactions are red and itchy eyes and skin.

Solution: Ensure TA and pH are in range.

Chloramines: Chlorine combines with nitrogen and ammonia from bather waste to form chloramines, causing strong chlorine odor and irritations.

Solution: Eliminate chloramines by superchlorinating.

No Sanitizer Level: Water that doesn't have a sanitizer level is open to becoming contaminated by bacteria. The most common bacteria for hot tub water is Pseudomonas Aerginosa.

Solution: If you believe that Pseudomonas is present, print out a White Algae Elimination Sheet from your Tethys Water Analysis program and follow the steps as if you were treating white algae.

Foam

There are a few things that will cause foam to occur in a hot tub. Foam Free will disperse foam temporarily but if foaming persists, recommend a complete water analysis for a corrective procedure.

Low Calcium Hardness: Calcium levels should be maintained between 150-200 ppm. Water that has a low calcium hardness level will foam more than harder water.

Solution: Increase Calcium Hardness level to 150-200 ppm by adding Protect.

Bather Waste (body lotions, shampoos, etc.): Any detergent based product that enters the tub will cause foam. People and swim suits always have trace amounts of soap, lotion and detergents that are constantly introduced into the hot tub water environment.

Solution: Eliminate foam by rinsing or cleaning the filter, superchlorinating, or performing a partial or full drain.

TDS: A TDS level reaching 1500 ppm over your Start Up TDS can produce foam.

Solution: Drain and start-up fresh or do partial drain and fill with fresh water.

Odor

Odor is generally a pH or sanitizer (chloramine/bromamine) problem.

Solution: Adjust pH and superchlorinate to rid water of combined chlorine/bromine. This can also be a sign of high TDS.

Scaling

When pH levels become too high, calcium can precipitate and become calcium carbonate causing rough, hard deposits to form on hot tub equipment and acrylic. When calcium is precipitating from the water, the water will have a gritty feel to it.

Solution: To prevent, maintain pH, Calcium Hardness and TA. Use Eliminate Plus # 2 upon start-up and weekly.

No Chlorine/Bromine Reading

Maintained sanitizer level cannot keep up with bather load demand, especially during heavy use.

Solution: Check sanitizer level daily and adjust if needed. Check the customer's floating dispenser or Holiday Tender to ensure pucks are present and that the unit is intact, clean and functioning properly. Advise your customer to add chlorine/bromine after they leave the hot tub.

Too much sanitizer

Maintain sanitizer within recommended levels for either chlorine or bromine. The test kit may show a dark red or dark purple color if too much sanitizer is present.

Solution: Use Beachcomber's Neutr-All as directed on the label to lower sanitizer levels.

Asking the customer to leave the hot tub cover off to allow excess sanitizer to dissipate can sometimes be too much to ask, especially during winter. Using a suitable container, the cover can be propped open on one end 6 - 8" to allow sanitizer to deplete. And don't forget – too much sanitizer will change your testing procedure.

Scum Line

A scum line can easily form in a hot tub, often found around the skimmer opening or around the water line. Scum is an indication of a combination of things, such as; • high TDS, • low sanitizer levels, • neglect, • excessive use by bathers, • dirty filters and • plugged or non-functional floating dispensers or Holiday Tenders.

Solution: Ensure a clean filter. Ensure water is flowing through the Holiday Tender or Floater. Ensure sanitizer levels are maintained. Check the TDS level.

Measurement Conversions

1 oz = 28 g

1 cup = 16 tbsp

5 ml = 1 tsp

15 ml = 1 tbsp

15 g = 1 tbsp

1 fluid oz = 30 ml

240 ml = 1 cup

(Conversions are approximate)

Increasing Total Alkalinity using Resist

Increase in ppm	1000 L	2000 L	20000 L	40000 L	80000 L	200000 L
10 ppm	18 g	36 g	360 g	720 g	1.44 kg	3.6 kg
20 ppm	36 g	72 g	720 g	1.44 kg	2.88 kg	7.2 kg
30 ppm	54 g	108 g	1.08 kg	2.16 kg	4.32 kg	10.8 kg
40 ppm	72 g	144 g	1.44 kg	2.88 kg	5.76 kg	14.4 kg
50 ppm	90 g	180 g	1.8 kg	3.59 kg	7.18 kg	18 kg
60 ppm	108 g	216 g	2.16 kg	4.31 kg	8.62 kg	21.6 kg
70 ppm	126 g	252 g	2.52 kg	5.03 kg	10.1 kg	25.2 kg
80 ppm	144 g	288 g	2.88 kg	5.75 kg	11.5 kg	28.8 kg
90 ppm	162 g	324 g	3.24 kg	6.47 kg	12.9 kg	32.4 kg
100 ppm	180 g	360 g	3.6 kg	7.19 kg	14.4 kg	36 kg
110 ppm	200 g	400 g	4 kg	7.91 kg	15.8 kg	40 kg
120 ppm	216 g	432 g	4.32 kg	8.63 kg	17.3 kg	43.2 kg

Increasing Calcium Hardness using Protect

Increase in ppm	1000 L	2000 L	20000 L	40000 L	80000 L	200000 L
10 ppm	15 g	30 g	300 g	600 g	1.2 kg	3 kg
20 ppm	30 g	60 g	600 g	1.2 kg	2.4 kg	6 kg
30 ppm	45 g	90 g	900 g	1.8 kg	3.6 kg	9 kg
40 ppm	60 g	120 g	1.2 kg	2.4 kg	3.8 kg	12 kg
50 ppm	75 g	150 g	1.5 kg	3 kg	6 kg	15 kg
60 ppm	90 g	180 g	1.8 kg	3.6 kg	7.2 kg	18 kg
70 ppm	105 g	210 g	2.1 kg	4.2 kg	8.4 kg	21 kg
80 ppm	120 g	240 g	2.4 kg	4.8 kg	9.6 kg	4 kg
90 ppm	135 g	270 g	2.7 kg	5.4 kg	10.8 kg	27 kg
100 ppm	150 g	300 g	3 kg	6 kg	12 kg	30 kg

Decreasing Alkalinity using pH Minus

Decrease in ppm	1000 L	2000 L	4000 L	20000 L	40000 L	80000 L
10 ppm	25.75 g	51.5 g	103 g	515 g	1.03 kg	2.06 kg
20 ppm	51.5 g	103 g	206 g	1.03 kg	2.06 kg	4.12 kg
30 ppm	77 g	154 g	309 g	1.54 kg	3.09 kg	6.18 kg
40 ppm	103 g	206 g	412 g	2.06 kg	4.12 kg	8.24 kg
50 ppm	128.5 g	257 g	515 g	2.57 kg	5.15 kg	10.3 kg
60 ppm	154.4 g	309 g	618 g	3.09 kg	6.18 kg	12.4 kg
70 ppm	180 g	360 g	721 g	3.6 kg	7.21 kg	14.4 kg
80 ppm	206 g	412 g	824 g	4.12 kg	8.24 kg	16.5 kg
90 ppm	231.5 g	463 g	927 g	4.63 kg	9.27 kg	18.5 kg
100 ppm	257.5 g	515 g	1.03 kg	5.15 kg	10.3 kg	20.6 kg

Glossary

Acid

Products such as muriatic acid or sodium bisulphate (pH Minus) used to lower pH or alkalinity.

Acid Demand

A measure of the amount of acid required to reduce the pH (sodium bisulphate, or pH Minus) to a predetermined level. This can be accomplished by use of an acid titration procedure (Acid Demand Test).

Algae

Plant-like organisms that grow in water due to a lack of sanitizer. Algae can grow on surfaces or be free floating.

Bacteria

Potential disease carrying organisms requiring control and elimination by sanitizing products.

Balanced Water

Water that is neither corrosive nor scaling (in relation to pH, total alkalinity, calcium hardness and temperature factors).

Base Demand

A measure of the amount of alkali material required to raise pH (soda ash, or pH Plus) to a predetermined level. This can be accomplished by use of a base titration procedure (Base Demand Test).

Bather Load

The number of individuals using a hot tub and the principal source of bacterial and organic contamination.

Bromine

Non chlorine sanitizer that destroys bacteria and algae. Bromine produces hypobromous acid as does chlorine.

Buffer

Product that helps resist pH change and promotes a more stable water balance, such as Soft.

Calcium Hardness

A measure of the calcium and magnesium salts dissolved in the water.

Chlorine

Chemical sanitizer that destroys harmful bacteria and algae.

Clarifier

Products used to agglomerate organic wastes, improving water clarity and sparkle.

Combined Chlorine

The by-products formed when Free Chlorine reacts with waste materials, forming Chloramines. Total Chlorine is the sum of Combined Chlorine and Free Chlorine.

Free Chlorine

Available chlorine which is active (not combined with ammonia or a nitrogen molecule), that is ready to destroy bacteria and oxidize organic material.

Langelier Index (LSI)

A mathematically derived factor obtained from the values of calcium hardness, total alkalinity, and pH at a given temperature. Zero indicates perfect water balance.

Muriatic Acid

An acid used to reduce pH and alkalinity. This is highly corrosive hydrochloric acid with a pH of zero.

Organic Waste

Nitrogen and ammonia bearing compounds resulting from urine, saliva, perspiration, body oils and lotions that are continuously introduced into hot tub and pool water by bathers and swimmers.

pH

A logarithmic measure of the acidity of water. The pH scale is from 0-14 with 7 in the mid-point (neutral). A pH of less than 7 is on the acidic side of the scale, a pH of more than 7 is on the basic alkaline side.

ppm

Abbreviation for parts per million. One part of substance dissolved in one million parts of water. This is the unit of concentration commonly used in the pool and hot tub industry.

Residual

The amount of a compound existing in water, usually expressed as parts per million (ppm).

Sanitizer

A chemical compound, such as chlorine or bromine, which sanitizes (kills bacteria), kills algae and oxidizes organic matter.

Scale

Crust of calcium carbonate, the result of unbalanced water.

Sequesterant

A liquid formula such as Eliminate Plus # 2, that prevents the formation of calcium or the process of staining by modifying the structure of minerals, to make them non-adhering to heater elements and hot tub equipment.

Stabilizer

A compound (cyanuric acid) used to protect the chlorine molecule from being destroyed by UV rays from the sun.

Superchlorination

Application of large doses of chlorine or bromine to destroy the build-up of bacteria, algae and unwanted organics.

Surfactant

A material that can greatly reduce the surface tension of water, such as Foam Free.

Titration

The act of using drops to test water with a test vial.

Total Alkalinity

A measure of the acid-neutralizing capacity of water that indicates its buffering ability, or the measure of its resistance to changes in pH.

Total Chlorine

The sum of combined and free chlorine.

Total Dissolved Solids (TDS)

The accumulation total of all solids dissolved in water.