

WATER CHEMISTRY PROBLEMS

The proper maintenance of the water chemistry will go a long way to avoid problems. Once the chemistry has been optimized, the chemistry will vary depending upon the nature of the chemicals being added on a regular basis. Daily water testing is important as changes can occur quickly and should be corrected to avoid potentially undesirable water conditions.

WATER CHEMISTRY PROBLEMS: pH & Alkalinity

PROBLEM	POSSIBLE CAUSES	SOLUTIONS
Recurring high pH (above 7.8)	<ul style="list-style-type: none"> • Low total alkalinity (below 80 ppm) makes it difficult to control pH • Low calcium hardness (below 200 ppm) • Frequent additions of high pH chlorine products as: calcium, lithium or sodium hypochlorite • Failure to test pH frequently and adjust, as needed • Addition of too much pH Plus (sodium carbonate) 	<p>Test the water for total alkalinity and, if less than 80 ppm, adjust by adding SUN Alkalinity Plus as directed.</p> <p>Test the water for calcium hardness and adjust as necessary using SUN Hardness Treatment.</p> <p>Because the pH can be affected by several factors, test the pH frequently and add the appropriate pH control chemicals – SUN Plus or Minus – as required to keep the pH within the optimum range of 7.2-7.8.</p>
Recurring low pH (below 7.2)	<ul style="list-style-type: none"> • Low total alkalinity (below 80 ppm) makes it difficult to control pH • Use of low pH products as: trichlor chlorine or bromine tablets • Addition of too much pH Minus or muriatic acid • Failure to test pH frequently and adjust, as needed • Natural effects of bathers in water, acid rain and atmospheric carbon dioxide 	<p>Test the water for total alkalinity and, if less than 80 ppm, adjust by adding SUN Alkalinity Plus as directed. The use of trichlor or bromine tablets will require regular additions of SUN Plus to offset their acidic nature. Test the pH frequently and add the appropriate pH control chemicals – SUN Plus or Minus – as required to keep the pH within the optimum range of 7.2-7.8</p>
pH bounce (fluctuates frequently)	<ul style="list-style-type: none"> • Total alkalinity is too low (below 80 ppm) to buffer the pH • Addition of too much pH control chemical 	<p>Adjust the total alkalinity to 80-150 ppm by adding the appropriate amount of SUN Alkalinity Plus.</p>
High Total Alkalinity (TA) (above 150 ppm)	<ul style="list-style-type: none"> • Nature of the source water used to fill the pool • High pH conditions (above 7.8) • Long term use of high pH chlorine products such as: calcium, lithium or sodium hypochlorite • Failure to regularly test and adjust the pH and Total Alkalinity, as needed. 	<p>Add SUN Alkalinity Minus to lower the TA until either the TA drops to the desired level or the pH drops to 7.2. Dropping the TA is sometimes difficult. So long as the pH is optimum, the water is clear and scaling is not present, it may not be necessary to lower the TA. Test water regularly.</p>
Low Total Alkalinity (TA) (below 80 ppm)	<ul style="list-style-type: none"> • Nature of the source water used to fill the pool • Low pH conditions (below 7.2) • Long term use of acidic products such as: Trichlor or bromine tablets • Failure to regularly test and adjust the pH and Total Alkalinity, as needed. 	<p>Add SUN Alkalinity Plus according to label directions to raise the total alkalinity to the proper range of 80-150 ppm. Once the TA is optimized, maintaining a proper pH will help keep it within the ideal range. Test water regularly.</p>
Hints/Preventive Maintenance:	<p>Controlling the pH is important to help keep the chlorine efficient, reduce the possibility of corrosion and help keep the water comfortable for the bathers. Total alkalinity helps to stabilize the pH within the optimum range. Test the water for pH on a daily basis, if possible. If the pH is found to be out of range, add the appropriate chemical, as directed. See your SUN dealer for additional balance tips.</p>	

WATER CHEMISTRY PROBLEMS: Calcium Hardness

PROBLEM	POSSIBLE CAUSES	SOLUTIONS
High calcium hardness (above 400 ppm)	<ul style="list-style-type: none"> • Naturally hard water • Corrosion of masonry surfaces • Use of products containing calcium hypochlorite • Addition of too much calcium hardness increaser 	High levels of calcium hardness can lead to cloudy water and scale formation, especially in the presence of high pH and total alkalinity. Levels up to 400 ppm are usually not a problem, if normal chemistry is maintained. Levels over 400 ppm can be controlled by the addition of SUN Stain & Scale Inhibitor or the replacement of some of the water with softer water. To prevent further increases in the calcium hardness levels, do not use products containing calcium hypochlorite for sanitizing or shocking purposes.
Low calcium hardness (below 200 ppm)	<ul style="list-style-type: none"> • Naturally soft water • Failure to add calcium hardness increaser 	Low levels of calcium hardness can lead to the corrosion of masonry surfaces, especially in the presence of low pH and total alkalinity. Masonry pools should be increased to 200 ppm and vinyl and fiberglass pools raised to 80-200 ppm. SUN Hardness Treatment can be used to boost the calcium hardness to the proper level.
Hints/Preventive Maintenance:	Test the water for calcium hardness at the start of the season or at the first signs of cloudy water, scaling or deposits on underwater surfaces. Calcium hardness levels can be controlled by keeping the pH and alkalinity in their proper ranges.	

WATER CHEMISTRY PROBLEMS: TDS

High total dissolved solids (TDS) (above 3000 ppm)	<ul style="list-style-type: none"> • Use of water that is naturally high in dissolved salts • Long term use of pool without replacing any water • Long term buildup due to chemical additions – every chemical added to pool water contributes to TDS 	Replace some of the water with fresh water that is low in TDS. If there are no signs of a clarity problem, TDS is usually not a problem. Replacement of water lost due to pump out, backwashing and splash out will help keep the TDS in check. If there is a persistent water quality problem that defies explanation, TDS should be looked into as a possible contributing factor by bringing a water sample to your professional SUN dealer.
Hints/Preventive Maintenance:	Very high levels of TDS can lead to loss of chlorine efficiency and cloudy water. Yearly testing of TDS can pinpoint the possible need to replace some or all of the water.	

WATER CHEMISTRY PROBLEMS: Sanitizers

High rate of chlorine usage	<ul style="list-style-type: none"> • High pH (above 7.8) • Lack of adequate level of chlorine stabilizer • Extreme heat • Introduction of large amounts of debris & waste <ul style="list-style-type: none"> a) High bather usage b) Children urinating in the pool c) Heavy rains • High combined chlorine level • Presence of algae 	<p>Make sure to maintain proper levels of Free Chlorine, pH and stabilizer. If needed, adjust pH with SUN Plus or Minus and stabilizer with SUN Conditioner; filter continuously. Inspect for the presence of algae or bacterial slimes. If present, see Algae Problems. Make sure that children are not urinating in the pool, vacuum all debris from the bottom, and clean the skimmer.</p> <p>The addition of a SUN algaecide can be useful in lowering the amount of chlorine required to maintain proper water conditions, especially during hot weather and periods of high bather use.</p> <p>Combined chlorine (chloramines) is ineffective as a pool water sanitizer. Shock the pool with SUN-Brite non-chlorine shock, which converts the ineffective Combined Chlorine into Free Chlorine. Add enough shock until the difference between the Combined Chlorine and Free Chlorine is within 1 ppm. If needed, add SUN Booster or SUN-Burn to raise the Free Chlorine level to 1-3 ppm.</p>
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WATER CHEMISTRY PROBLEMS: Sanitizers (continued)

PROBLEM	POSSIBLE CAUSES	SOLUTIONS
High Free Chlorine levels	<ul style="list-style-type: none"> • Adding too much chlorine (incorrect feeder setting) • Shocking too frequently or using too much shock • Low bather demand 	<p>The Free Chlorine level will lower over time as the chlorine is used up. Thereafter, adjust the chlorine being added to the pool based on how the pool is being used and the water temperature. Add more during times of heat and peak usage, and less during cooler and less active periods of usage. If chlorine is added at too high a rate, the level of Free Chlorine can build up. Always follow label directions carefully.</p>
Low Free Chlorine levels	<ul style="list-style-type: none"> • Insufficient dosage of chlorine • High bather usage, heavy rains or extreme heat • Lack of adequate level of chlorine stabilizer • High pH (above 7.8) • Poor circulation or short filter cycle • Presence of algae and organic waste products 	<p>Shock the pool with a quick-dissolving product such as: SUN-Brite, SUN Booster or SUN-Burn. Repeat shock treatment until a Free Chlorine level of at least 3 ppm can be maintained overnight. Check pH and stabilizer level, and adjust accordingly with SUN Plus or Minus or SUN Conditioner respectively; filter continuously. Resume normal chlorination and filtration.</p>
High combined chlorine (chloramines – causes chlorine odors)	<ul style="list-style-type: none"> • Presence of organic waste products (children urinating in the pool) • Insufficient shock treatment • Failure to adequately maintain Free Chlorine • Poor circulation and filtration • Presence of algae and bacterial slimes 	<p>Combined chlorine (chloramines) can be odorous and irritating and is ineffective as a pool water sanitizer. Shock the pool with SUN-Brite non-chlorine shock, which converts the ineffective Combined Chlorine into Free Chlorine. Add enough shock until the difference between the Combined Chlorine and Free Chlorine is within 1 ppm. If needed, add SUN Booster or SUN-Burn to raise the Free Chlorine level to 1-3 ppm.</p>
Chlorine/Sanitizer Appears Ineffective	<ul style="list-style-type: none"> • Presence of organic waste products (children urinating in pool) or lawn fertilizer • High levels of combined chlorine (chloramines) • Insufficient shock treatment • Presence of algae and bacterial slimes • Failure to adequately maintain Free Chlorine • Poor circulation and filtration • High pH and/or stabilizer level and/or TDS 	<p>Shock the pool with a quantity of Free Chlorine 5-10 times that of the combined chlorine. A quick-dissolving product such as: SUN-Brite, SUN Booster or SUN-Burn should be used.</p>
Hints/Preventive Maintenance:	<p>Test your water daily to maintain proper sanitizer and pH levels. Make sure your filter is in good working order and the filter cycles are long enough. Test for Total Chlorine (Free Chlorine plus Combined Chlorine) occasionally or at the first signs of poor water quality. If you use a chlorine feeder with trichlor tablets, be sure to add tablets weekly to replace the quantity dissolved. Trichlor tablets are acidic and will require regular additions of SUN Plus in order to maintain a proper pH. Shock the pool to destroy contamination and help the regular chlorine additions work more effectively. Do not allow chlorine to come in direct contact with vinyl pool surfaces as it will cause bleaching.</p>	

WATER CHEMISTRY PROBLEMS: Sanitizers (continued)

PROBLEM	POSSIBLE CAUSES	SOLUTIONS
High rate of bromine usage	<ul style="list-style-type: none"> • Very high pH (above 8.0) • Introduction of large amounts of debris & waste <ol style="list-style-type: none"> a) High bather usage b) Children urinating in the pool c) Heavy rains • High water temperatures • Presence of algae and bacterial slimes 	Make sure the bromine level is being maintained at 3-5 ppm. Check the pH and adjust to 7.2-7.8 as necessary with SUN Plus or Minus . Inspect for the presence of algae or bacterial slimes. If present, shock with SUN-Burn or SUN-Brite to boost the bromine level to at least 5 ppm for an overnight period (see Algae Problems for more detailed remedy). Make sure that children are not urinating in the pool. Vacuum all debris from the bottom and clean the skimmer.
High bromine levels	<ul style="list-style-type: none"> • Adding too much bromine (incorrect feeder setting) • Shocking too frequently or using too much shock • Low bather demand 	The bromine level will lower over time as the bromine is used up. Thereafter, adjust the bromine being added to the pool based on how the pool is used, and the temperature of the water. Add more during times of heat and peak usage, and less during cooler and less active periods of usage. If bromine is added at too high a rate, the level can build up. Always test the bromine before shocking to help better judge the amount needed.
Low bromine levels	<ul style="list-style-type: none"> • Insufficient dosage of bromine (lack of proper brominating feeder) • Presence of algae and bacterial slimes • High bather usage, heavy rains or extreme heat • Very high pH (above 8.0) • Poor circulation or short filter cycle 	Shock the pool with a quick-dissolving product such as: SUN-Brite , SUN Booster or SUN-Burn . Repeat shock treatment until a bromine level of at least 5 ppm can be maintained overnight. Check pH and adjust as needed with SUN Plus or Minus ; filter continuously. Resume normal bromination and filtration. Keep brominator filled with tablets for best results.
Hints/Preventive Maintenance:	Test your water daily to maintain a bromine level of 3-5 ppm and a pH between 7.2-7.8. Make sure the filter is in good working order, and the filter cycles are long enough. Bromine tablets are acidic and will require regular additions of SUN Plus in order to maintain a proper pH. Shock the pool to destroy contamination and help the regular bromine additions work more effectively.	

WATER CHEMISTRY PROBLEMS: Shock

Not responding to shock treatment	<ul style="list-style-type: none"> • Failure to add enough shock to effectively deal with the problem 	The dosage on the product label may not always be enough to completely destroy all of the waste, debris and algae. It is intended as a starting point. Shock the water as directed and test for Free Chlorine after a few hours. Keep the filter running continuously until the water is clear. If the Free Chlorine is below 3 ppm, add a repeat dose of shock. Continue testing and add additional shock until a Free Chlorine level of at least 3 ppm is maintained for an overnight period. Resume normal chlorination and filtration.
Hints/Preventive Maintenance:	Shocking your pool on a weekly basis is important to destroy any buildup of contamination. For best results, shock weekly or after periods of high bather load, heavy rainfall or extreme heat; at first signs of algae; or whenever the Free Chlorine bottoms out. It is best to shock at night.	

WATER CHEMISTRY PROBLEMS: Chlorine Stabilizer

PROBLEM	POSSIBLE CAUSES	SOLUTIONS
High stabilizer levels (above 150)	<ul style="list-style-type: none"> • Long-term use of stabilized chlorine products (including shock products) • Excessive additions of cyanuric acid stabilizer 	High levels of cyanuric acid can reduce the efficiency of chlorine and make it necessary to maintain higher levels of Free Chlorine. Levels over 150 ppm should be lowered to optimum. The only way to lower cyanuric acid is to replace some of the pool water with fresh water. Always remove an amount of water that avoids possible vinyl liner shrinkage or structural damage (1-2 feet at a time is usually a safe amount).
Low stabilizer levels	<ul style="list-style-type: none"> • Insufficient dosage of cyanuric acid • Replacement of all or part of the water through draining or backwashing 	Low levels of cyanuric acid can easily be increased by the addition of SUN Conditioner . Add the product according to the package directions. Cyanuric acid will have a slight lowering effect on the pH; test and adjust if necessary.
Hints/Preventive Maintenance:	Cyanuric acid should always be added to outdoor, freshly filled or new pools that are to be maintained with chlorine. In northern areas, a level of 20-40 ppm is recommended. In sunbelt areas, a level of 40-60 is preferred. It is important to have the cyanuric acid level tested at least twice yearly and adjust as needed.	

PROPER RANGES FOR POOL/SPA WATER

pH:	7.2 - 7.8 (ideal 7.2 - 7.6)
Total Alkalinity:	80 - 150 ppm
Free Chlorine:	1.0 - 3.0 ppm
Combined Chlorine:	less than 1.0 ppm above Free Chlorine
Bromine:	3 - 5 ppm
Calcium Hardness:	200 - 400 ppm
Cyanuric Acid (Stabilizer):	20 - 40 ppm in northern areas; 40 - 60 in sunbelt areas
Total Dissolved Solids:	maximum level 3,000 ppm
Iron:	0 ppm
Copper:	0 ppm