

Swimming Pool Maintenance

Steps to remove algae in swimming pools

1. Brush the walls and floor of the swimming pool to remove as much of the algae as possible. This will greatly reduce the amount of time it takes to kill and clear the algae bloom.
2. Ensure that the pH level is within the range of 7.2 - 7.6. This will ensure that any chlorine added will work more efficiently - high pH levels in particular will impair the efficiency of the chlorine doing its job. With the pool filter system running, add a chlorine based swimming pool shock at the rate of 1.6 kg. per 1,00,000 litres of pool water dosage for killing algae. The pool filter system should continue to run 24 hours a day.
3. If the condition of the swimming pool does not significantly improve after 12-24 hours of filtering, add a second dose of chlorine pool shock at the increased rate. Repeat this process until the algae has been eliminated.
4. Once the algae is dead it will turn a white or grayish color, and it will be suspended in the pool water or settle to the floor. When there is no longer any sign of the color green in your pool, thoroughly vacuum the swimming pool. It is recommended that you vacuum dead algae to waste and not through filter.
5. The pool filter should be backwashed or cleaned to be sure that dead algae is not trapped inside the filter. If the filter is not thoroughly cleaned the algae may quickly return.
6. Test and balance all of the pool chemical levels using the following guidelines. Free Chlorine: 1-3 ppm, pH: 7.2 – 7.6, Alkalinity: 80 – 120 ppm and Calcium Hardness: 200 – 350 ppm.
7. Begin adding an algaecide pool chemical on a weekly basis to prevent algae from returning.

Tips

- Pay closer attention to the chlorine level of your swimming pool water in the future. Algae and harmful bacteria are almost immediately destroyed by a free chlorine level of 1 ppm or higher. You have experienced an algae problem because you have not properly maintained the chlorine level, and it was allowed to drop below 1 ppm. Test pool water frequently and make any necessary adjustments for a clean, safe and easy to maintain swimming pool.
- Chlorine pool shock needs to be dissolved in a large bucket of water before it is added to the swimming pool. Always add chemicals to water when dissolving. NEVER add water to chemicals.
- Monitor your pool filter system closely during this entire process and thoroughly backwash or clean the filter each time the pressure rises 10 psi. above the normal operating pressure. The dead algae that your pool filter collects may quickly dirty the filter, and need to be cleaned out frequently.
- Phosphate Levels - high levels of phosphates in pool water will result in your pool using much more chlorine than usual. They are also one of the main food sources for algae, therefore it is important to have these levels checked fairly regularly especially if the pool seems to be using more chlorine than usual. A pool with a particularly bad case uses approximately 2.5 times the amount of chlorine that it should have, making it very difficult to maintain.

Warnings

- The swimming pool cannot be used until the algae is dead, and the chlorine level of the pool water has returned to a safe level of 3 ppm or less.

Chlorine and swimming pool algae

Why does chlorine kill swimming pool algae?

Chlorine kills bacteria and other single-celled algae by a chemical action called oxidation, which is sort of like burning by acid. Most drinking water also has chlorine, for the same reason.

Our skin is tough enough that weak chlorine in water won't hurt us, but you've probably noticed that in some swimming pools your eyes start to sting if you stay in too long. That's the chlorine starting to "burn" them.

Water, including swimming pool water, contains disease germs. Chlorine is the most common sterilizer. Slight amounts of chlorine are used to kill germs, but are harmless to people. Where water is sediment-free, only one or two parts of elemental chlorine may be added to 10 million parts of water.

Remember that shock, or super chlorination can never do much harm, but the bathing experience will be unpleasant until the chlorine drops to its normal level. Under normal conditions, there should be NO apparent odour of chlorine; if your pool smells of chlorine, this is due to the chlorine that is combined with other stuff and cannot escape - it actually means that there is not enough free chlorine in the pool.

Algae can grow in swimming pools if nutrients are present and a sufficient level of free chlorine is not maintained. In addition to properly dosing your water, it is recommended that the **algaecide be added in the morning on a bright sunny day for best results**. Algae are plants and grow in the presence of sunlight. Adding algaecide during algae's best growth time will increase intake of the algaecide and make it more effective.

Algaecides

Green Algae - is very susceptible to chemical treatment. Superchlorinate with 10 to 20 ppm **chlorine in the evening**. Keep the filter running and brush the pool walls and bottom. Periodically check chlorine and maintain above 3 ppm until water clears. Using an algaecide containing quaternary ammonia the next morning will help prevent the return of green algae.

Mustard Algae - is much more resistant to chemical treatment and clings more tightly to pool walls than green algae. Adjust pH and superchlorinate as for green algae then brush carefully. Later vacuum the pool, check chlorine and superchlorinate again if necessary. Mustard algae will generally return unless treated with a special mustard algicide or a copper based (CuSo₄) algicide. **Algicide should be added in the morning to treat algae in daylight - its most active period.**

Black Algae - can be controlled to some extent by frequent superchlorination and careful brushing with a stiff brush. (You should have a wire-brush attachment for your telescopic pole). Spot treatments can be made by turning off the recirculation pumps and pouring granular chlorine directly on recently brushed spots. You need to use strong algicides and maintenance of relatively high free-chlorine residual, but complete removal of black algae may require draining and cleaning the pool.

A very good "shock" for an algae bloom is liquid chlorine - it is cheap, works quickly, will not harm the pool surface. It also breaks down into plain water in 1-2 days, leaving no residuals. Be sure to also algae brush your pool daily to eliminate spores on the pool wall (which chlorine cannot invade).

Good pool hygiene is the best remedy against algae, but you can always try first by using plain **Copper Sulphate (CuSO₄)** crystals dissolved in water. You can obtain this from a chemicals supplier quite cheaply. Copper concentration at 1ppm or above in the pool water is a problem. Staining can be an issue. A pool concentration of 0.3 ppm – 0.6 ppm is usually considered "algae control" typical level. Any level above this will likely turn the hair green.

Taking weight ratio, 1 kg. of CuSO₄ releases (63.546 g/mole Cu) / (159.61 g/mole CuSO₄) = 0.405 kg. of elemental copper in the pool water. To achieve a target of 0.5 ppm of elemental Cu in 1,00,000 litres of pool water 0.05 kg. elemental Cu is required. Therefore, the required dose of CuSO₄ is (0.05/0.405) = 0.125 kg. for 1,00,000 litres of pool water.

Potassium Tetraborate:

This chemical, when added to the pool water in proper dosage, prevents algae from converting carbon dioxide into the fuel it needs for growth. It is quite effective.

Another item to look at is the method of sanitation and the type of filtering you have. Far too many pools out there were sold with marginal filter systems, meant to run 24 hrs per day. Well, these systems get old and tired, or the new owners only run it 12 hrs per day (or less). For good algae prevention, you need a combination of good filtration, sanitation and circulation.

Sodium Bromide Algaecide

When you add the sodium bromide and follow with a shock treatment, the bromide is converted into hypobromous acid the active sanitizing form of bromine. Certain types of algae such as yellow-mustard algae and bacterial conditions such as water mold or "pink" algae appear to more vulnerable to bromine than to chlorine. These problematic conditions, that seemed resistant to shock treatment, are controlled and eliminated by the action of bromine. It doesn't necessarily work as well against all types of algae and bacterial conditions, but against certain chlorine-resistant problems it is very effective. While it will help solve the problem and make the water smell and be less irritating, it will increase the chlorine usage.

Mustard algae can be treated in two effective ways and, both are good. Chelated Copper Algaecides are effective in controlling this type of algae. The chelated types of copper algaecide will require additions every week or two and this will certainly help, in your case. The sanitizer level, chlorine, is probably not being maintained adequately at all times. Make sure that you maintain a 1-3 PPM level of Free Chlorine, at all times. Do this and it is unlikely that you will see the mustard algae problem returning, with any regularity. If you don't have an automatic pool cleaner, consider adding a suction-side cleaner to your skimmer intake. These cleaners are quite affordable and are very effective at cleaning and improving the water circulation on the bottom. In the case of your above ground pool, it can act as a main drain, while operating. Another effective treatment for mustard algae is the use of one of those "Yellow" Products, containing sodium bromide. With a shock treatment, it will generate bromine, which seems to be especially effective against mustard algae. When shocking a pool make sure that you add enough product and it is added frequently enough to boost the Free Chlorine level to 5-10 ppm. Make sure that the pH is 7.2-7.6. Try to maintain at least 1-3 ppm, through the overnight period. Keep the filter operating continuously, until the problem is controlled. Once the problem is controlled resume normal chlorination and filtration. Poor circulation creates dead zones that promote algae growth. Better circulation assures better distribution of the sanitizing chemicals and makes algae problems less likely.

Introduction To Chlorine Sanitizing

Mastering the knack of pool science is not difficult with the right information and a little diligence. As for those readers who are experienced poolside chemists, put this article in the hands of anyone learning the ropes.

Think of the perfect swimming pool and visions of sparkling water and happy swimmers likely dance in your head. Keeping this scene intact involves taking the proper steps to sanitize the pool and prevent any health or aesthetic problems. The water will then remain clear of algae, free of disease causing pathogens and users won't complain about red eyes or chlorine smell.

Because you use chlorine, whether you're responsible for running a public facility or a water park, you have the necessary tools to make your job easier. For general pool treatment, chlorine has three essential characteristics: it acts as a rapid and persistent sanitizer, an effective algacide and a strong oxidizer of undesired contaminants.

Understanding the role of chlorine in maintaining safe water is not difficult once you learn the basics of pool chemistry.

INTRODUCTION TO CHLORINE

Chlorine is regularly fed into the pool water and should be tested daily -- at a minimum -- for proper disinfection. Routine chlorination kills harmful microorganisms that can cause health-related problems, such as gastroenteritis, Legionnaires disease, ear infections and athlete's foot. Learning how to properly test your water will allow you to identify the chlorine residual and demand in pool water. More frequent testing is needed if there is heavy bather use.

Listed below are some helpful definitions that will assist you in understanding the terms and tasks of applying chlorine-based sanitizers.

- *Free available chlorine (FAC)*. The portion of the total chlorine remaining in chlorinated water that has not reacted with contaminants -- and is "free" to go to work to kill bacteria and other contaminants. Make sure your test kit can measure FAC; many only test for total chlorine.
- *Combined available chlorine (CAC) or chloramines*. The portion of chlorine in the water that has reacted and combined with ammonia, nitrogen-containing contaminants and other organics such as perspiration, urine and other swimmer waste. Some chloramines can cause eye irritation and chlorine odors.
- *Total chlorine*. The sum of both the free available and combined chlorines.
- *Forms of chlorine commonly used in commercial pools*. Pools are treated with chlorine gas, sodium hypochlorite (liquid bleach), calcium hypochlorite (granular or tablet), lithium hypochlorite or chlorinated isocyanurates. When any of these compounds contact water, they release hypochlorous acid (HOCl), the active sanitizing agent. Chlorinated isocyanurates, a family of chemical compounds such as sodium dichloroisocyanurate and trichloroisocyanurate, also add cyanuric acid or stabilizer. A stabilizer, which can also be added separately, helps reduce excess loss of chlorine in water due to the ultraviolet rays of the sun.
- *Parts per million (ppm)*. Measurement that indicates the parts of a substance, such as chlorine, by weight in relation to one million parts by volume of pool water. A rule of thumb to follow to maintain good water quality in pools is to keep FAC levels between 2.0 and 4.0 ppm.
- *Shock treatment*. The practice of adding significant amounts of an oxidizing chemical to water to destroy ammonia, nitrogen-containing and organic contaminants. Adding chlorine as a shock treatment can also control algae and bacteria, but read the label to make sure that your product can do this.

BASIC STEPS FOR POOL TREATMENT

Carefully read and follow the manufacturer's instructions printed on the chlorine treatment package. Test the water regularly - it's a simple process to use a test kit. You want to maintain water balance by measuring:

- *Free available chlorine (FAC)*, which should be in the range of 2 - 4 ppm, but never fall below 1.0 ppm
- *Total chlorine*, to assure that *combined available chlorine (CAC)* levels are less than 0.2 ppm
- The pH level to keep it between 7.2 and 7.8, indicating that the chlorine is working effectively
- Total alkalinity to make sure that pH levels stay steady
- Calcium hardness to protect pool surfaces from corrosion.
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HOW MUCH OF WHAT?

The guidelines set by The Association of Pool & Spa Professionals are widely used, but to be certain, you should also check the health codes of the jurisdiction where you live. The chemicals a pool needs to maintain the required standards differ from pool to pool - and day to day. Keeping records to "get to know" a pool can help you interpret its characteristics and perform the correct task.

THE ASSOCIATION OF POOL & SPA PROFESSIONALS Suggested Chemical Standards for Swimming Pools	
Free chlorine, ppm	2.0 - 4.0
Combined chlorine, ppm	None
pH	7.2 - 7.8 (ideal range of 7.4 - 7.6)
Total alkalinity, ppm	
For liquid chlorine, cal hypo, lithium hypo	80 - 100
For gas chlorine, dichlor, trichlor and bromine compounds	100 - 120
Total dissolved solids, ppm	Not to exceed 1500 greater than at pool start-up
Calcium hardness, ppm	200 - 400
Cyanuric acid, ppm	30 - 50

SHOCK TREATMENT

Contrary to what most people think, a strong chlorine smell is not an indication of too much chlorine in the pool but actually a red flag that a "super dose" may be required to correct the problem.

Shock treatment adds a larger than normal amount of oxidizing chemicals to pool water. This additional dose destroys organic contaminants and oxidizes ammonia and nitrogen compounds to rid the area of irritating chloramine odor and, if chlorine is used for the purpose, to sanitize the water. Many chlorine shock products also provide usage instructions for destroying algae and bacteria, which can be an added benefit. Shocking should be done with the pump and filter operating, but after sundown to avoid the loss of chlorine to the sun's ultraviolet (UV) rays.

Superchlorination is another term that is sometimes used for shock treatment with chlorine products when 5 or more ppm of FAC is added. This mode of shock treatment -- in addition to oxidizing undesired wastes - is used to rid the pool of algae and bacteria that might be hiding in filters and hard-to-sanitize areas. Superchlorination also gets rid of chloramine odor. Adding 10 times the level of combined chlorine or chloramines in the water achieves so-called breakpoint chlorination when there is enough extra chlorine to consume the irritating chloramines.

According to standards for public pools, the ideal frequency for a super dose is every week, depending on use and water temperature. For high use pools, superchlorination may be required three times a week or more as a preventive measure. A good indicator of the need for a super dose is when combined chlorine climbs near or above 0.2 ppm.

MORE ON CHLORINE

As you learn your way around the pump room, you'll appreciate chlorine's importance in contributing to safe, clean water - making those visions of swimming in a sparkling, clear pool a reality.

Basic Rules of Thumb

- Always read and follow the manufacturer's instructions.
- Store chemicals in a cool, dry and shaded place.
- Never mix different types of chlorine - add each to the pool separately.
- Never mix chemicals together - add each to the pool separately.
- Avoid breathing fumes or vapors.
- Don't buy more pool chemicals than you'll use in a season - they lose effectiveness over time.
- Make sure pool chemicals are inaccessible to children.

Cost-Savers Tip

Save on chemical costs by adding chlorine for shock treatment after dark - during the day some will be lost to sunlight.

How to Diagnose and Clear Cloudy Swimming Pool Water

1. Test the swimming pool water for Combined Chlorine, pH, Alkalinity and Calcium Hardness. The two areas that are most likely to cause cloudy pool water are the pH and the Calcium Hardness.

2. If the pool chemical levels are not within the following suggested ranges, adjust the chemicals and run the pool filter system for 12-24 hours before re-testing. **Free Chlorine: 1-3 ppm, pH: 7.2 – 7.6, Alkalinity: 90 – 120 ppm and Calcium Hardness: 200 – 350 ppm.**
3. If all the pool chemical levels test in range, the cloudy pool water is caused by fine debris suspended in the pool water. **You should backwash or clean your pool filter following the manufacturer's instructions, and run the pool filter system continuously for 24 to 48 hours.**
4. If the water conditions have not significantly improved you should add a clarifier pool chemical to the pool water to help your pool filter remove the fine debris from the water. Continue filtering for 12 to 24 hours.
5. If the water conditions have not significantly improved you should add a second dose of clarifier, or a stronger clarifier chemical and continue to run your filtration system.
6. Sometimes a pool can be too cloudy for a clarifier. If this is the case you will have to move up to a flocculent. This will drop any suspended particles to the floor so you can vacuum it to waste.

Tips

- **It is important that you continuously filter the pool water until the water is clear, and closely monitor your pool filter pressure. Backwash or clean the pool filter as needed, following the pool filter manufacturer's instructions.**