

Make a Splash!

A Pool Owner's Guide

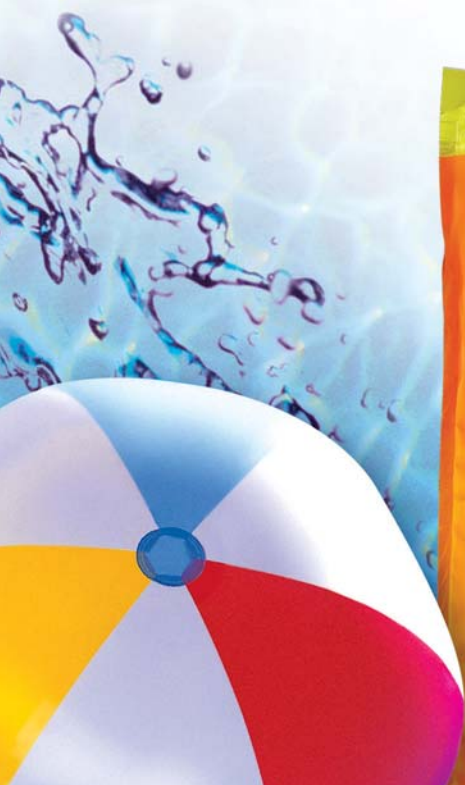
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Introduction

Okay – your pool has been cleaned, filled and is all ready for great swimming season. Or is it? Before it's time for "everyone into the pool," it should first be time for a few simple care and maintenance procedures.

The purpose of any pool maintenance program is to make sure the water is always safe and enjoyable. This is done by adding a suitable disinfectant and ARM & HAMMER® Baking Soda to control pH and alkalinity. But there may be a few occasions when other measures should be taken. This booklet will give you simple, safe and convenient ways to keep the quality of your swimming pool water always at its best.



The addition of the correct level of disinfectant to the pool water will kill bacteria and usually prevent algae growth... but only if the pH of the pool water is kept in the appropriate range. Maintaining this pH also minimizes eye irritation, reduces unpleasant odor, prevents corrosion, avoids scaling and keeps pool water clear. This booklet will show you simple ways to keep the water in the optimum pH range. And you will learn that pH fluctuations can be minimized by maintaining alkalinity using pure ARM & HAMMER® Baking Soda.

Church & Dwight Co., Inc. has produced ARM & HAMMER® Baking Soda – a multipurpose, natural household product – for over 150 years. Since 1973 we have run studies testing the use of ARM & HAMMER® Baking Soda to maintain pool pH with disinfecting agents. These studies have shown that ARM & HAMMER® Baking Soda can be used easily to raise alkalinity and control pH. It was found that with adequate alkalinity provided by ARM & HAMMER® Baking Soda, fluctuation of pool pH can be minimized.

And because ARM & HAMMER® Baking Soda is a safe, natural food-grade product, its use for alkalinity adjustment and pH maintenance is safer than the use of harsh pH adjusting chemicals.

Disinfecting Agents



To ensure the health and safety of pool users, it is essential to regularly add the appropriate level of disinfectant, such as chlorine, to pool water. Disinfectants kill bacteria and prevent the growth of algae. Disinfecting agents also aid in keeping the water clean via chemical reactions with other pool contaminants, such as human or animal body wastes and wind-blown debris.

Disinfecting products come in several forms and it is important to use them exactly as directed by the manufacturer, measuring all amounts carefully. The most frequently used disinfectants are the chlorinating agents. When using these materials, it is essential to keep free residual (available) chlorine at a minimum of one part per million (ppm). Free residual chlorine is chlorine existing in your pool in a chemically reactive state – ready for killing bacteria and algae.

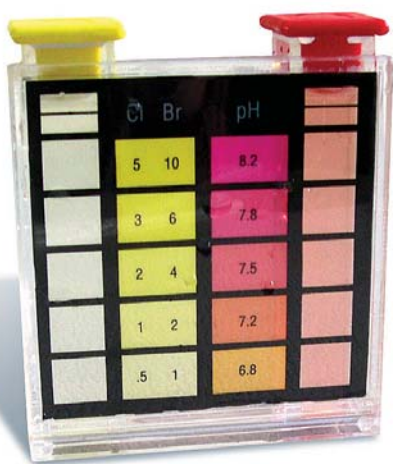
Strong sunlight deactivates and destroys the chlorine present in your pool. Therefore, chlorinate in the evening (after sundown) to allow maximum length of time for the disinfectant to operate. Loss of chlorine due to sunlight can be greatly reduced by using the stabilized chlorinated isocyanurates as the chlorine source. Slow dissolving trichloroisocyanurate (trichloro-s-triazinetriene) sticks or tablets are especially recommended for maintaining an effective chlorine level since they offer uniform chlorination over extended periods. In addition, these products offer the maximum chlorine content with effective, though not excessive, stabilizer level. To initially reach an effective chlorine level, also add a powdered or granular form of chlorinating agent. The sticks or tablets will then maintain an optimum level for an extended period.

To prevent the build-up of organic waste products, which inhibit the action of the disinfectant and increase eye irritation, the pool should periodically be superchlorinated. To superchlorinate the pool, the chlorine level should be increased above 5 ppm, using a quick-acting chlorine source, such as sodium hypochloride. A particularly economical way to super-chlorinate is to add liquid bleach. This usually contains about 5% active chlorine. With this concentration, add 1-2 gallons for every 10,000 gallons of pool water.

Optimally, superchlorination should be done about once every other week – after the heaviest swim period of the week (e.g. Sunday evening). Swimmers should not enter the pool during superchlorination or until chlorine level has dropped below 3 ppm. This will usually occur within 18 hours.

Please note that it is highly undesirable to superchlorinate using a stabilized chlorine source, such as chlorinated isocyanurate. These products are less effective superchlorinating agents and their use will result in excessive build-up of stabilizer. Excessive levels of stabilizer will reduce the effectiveness of your chlorinating agent in controlling bacteria and algae.

Maintenance of proper disinfectant level and regular superchlorination will usually prevent algae growth. Still, certain algae can become chlorine resistant. When this occurs, the addition of an algaecide is recommended.



Alkalinity & pH Explained

To maximize the effectiveness of the disinfectant, minimize eye irritation, reduce odor, prevent corrosion, avoid scaling and keep pool water clear, it is important to control pH and maintain alkalinity. Since these factors are influential in keeping the quality of the pool water at its best, an understanding of what these terms mean would be helpful.

What is pH?

pH is a measurement of the intensity of the acidity or basicity of water on a scale of 0-14. A pH of 7 is neutral. A pH below 7 indicates the water is acidic. A pH above 7 shows that the water is basic. Acidic water is corrosive to metallic pool fixtures and some wall materials, promotes odor formation and produces eye irritants. Optimally, pool water should be kept in the very mildly basic pH range of 7.2 – 7.8. When the pH is too high, the effectiveness of the disinfectant can be lessened, water clarity may be reduced and scaling can occur.

What is Alkalinity?

Alkalinity is a measure of the ability of the pool water to remain within a narrow pH range when various chemicals and contaminants enter the pool. Having adequate alkalinity of between 80-150 ppm in the water makes pH control simple. Alkalinity also plays a role in preventing corrosion. Excessive alkalinity, however, can promote scaling and cloudiness and can cause the pH to drift upwards out of the desired range.

Pool Maintenance Procedures

Sparkling clear water is usually a good sign of a well-balanced pool — but what can you do to keep it that way?

- A properly functioning filtration and circulation system is needed to remove various particles and insoluble matter
- Disinfection must be provided at proper pH to keep the water bacteriologically clean

When starting up a new pool or putting your pool into use for a new season, special treatment may be required to reach the proper initial pH, calcium and alkalinity balance. But these following procedures should be adequate to effectively maintain your pool under most conditions. When in doubt, don't hesitate to seek help from a pool professional.

A. Disinfectant

It is important to check the disinfectant level in the pool water daily. When chlorinating agents are used, free residual chlorine should be at least 1 ppm and not more than 3 ppm. When the level of disinfectant is low, add more, according to the package directions.

B. Simplified pH And Alkalinity Control

1. Check the pH of the pool water daily. Whenever it drops below the minimum acceptable pH of 7.2 add 9 lbs of ARM & HAMMER® Baking Soda per 10,000 gallons of water to raise the pH.
2. If after a day or so, the pH has not stabilized and drops below 7.2 again, add another 6 lbs. of ARM & HAMMER® Baking Soda per 10,000 gallons of water.

This procedure should bring your alkalinity into the desirable 80-150 ppm range and a stabilize your pH between 7.2 and 7.8 for several weeks.

To prevent clouding or scaling, especially in hard water areas (hardness above 250 ppm) and when using a calcium-containing chlorinating agent, keep the pH below 7.8 by adding a pH reducing agent, if necessary.

Alternative Professional Method For Controlling pH And Alkalinity

For greater accuracy, direct measurement of alkalinity may be preferred by some to control alkalinity and pH.

1. Every month or whenever the pH drops below the minimum acceptable level of 7.2, measure the alkalinity using a test kit or take a water sample to your pool dealer.

2. If the alkalinity is low, add sufficient ARM & HAMMER® Baking Soda to bring the alkalinity into the preferred range. When slow release tablets or stick disinfectants (trichloroisocyanurate) are used, the optimum alkalinity range is 110-150 ppm. With other disinfectants (e.g., sodium dichloroisocyanurate, sodium hypochlorite or calcium hypochlorite), the preferred alkalinity range is 80-110 ppm. ARM & HAMMER® Baking Soda should be added at a rate of 1½ lbs. per 10,000 gallons of pool water for every 10 ppm of alkalinity increase required. The pH will usually self-adjust into the proper area in a few days.
3. In the unlikely event that the pH is low and the alkalinity is adequate or high, Baking Soda (sodium bicarbonate) should not be used to adjust pH. Use a high pH chemical for this purpose, such as soda ash (sodium carbonate), which will raise pH rapidly without significantly increasing alkalinity.
4. When the pH is high, regardless of alkalinity, Baking Soda should not be used to adjust pH. Use an acid to reduce pH. After reduction of the pool pH, the alkalinity should be measured and, if low, ARM & HAMMER® Baking Soda should be added at the rate of 1½ lbs. per 10,000 gallons for each 10 ppm alkalinity needed to increase to 110-150 (trichloroisocyanurate) or 80-110 ppm (other chlorinating agents).

Usually, once you have added sufficient ARM & HAMMER® Baking Soda to bring the pool into the correct range for the chlorinating agent used, your pool's pH will stabilize in the 7.2 – 7.8 range.

An Additional Hint

Trichloroisocyanurate (trichloro-s-triazinetriene) is an especially desirable disinfectant to use in your swimming pool. Because it is sun-stabilized and the most concentrated chlorine source, it is highly economical. It offers uniform chlorination over an extended period because it is supplied as slow release tablets, sticks or canisters. It also avoids the addition of scale-producing calcium ions to the water, supplied by some other chlorinating agents.

But it should be noted that trichloroisocyanurate tends to use up the pool alkalinity more quickly than other chlorinating agents. As a rule of thumb, the alkalinity lost can be replaced by adding ARM & HAMMER® Baking Soda at the rate of 1½ pounds for each pound of trichloroisocyanurate used.

It is preferable to keep the alkalinity in the 110–150 ppm range when this chlorinating agent is used.

C. Other Procedures

Although disinfectant levels, pH and alkalinity are key to ensuring that the quality of pool water is adequately maintained, it is also advisable to occasionally check water hardness and chlorine stabilizer concentrations in the pool water.

Water hardness reflects the potential for scaling to occur. A moderate level of hardness is desirable to prevent corrosion. However, hardness should be kept below 250 ppm, where possible. If the hardness in the pool water is above 250 ppm and it cannot be replaced with water of lower hardness, keep the alkalinity below 110 ppm and be especially careful to keep the pH below 7.8.

Please note that hardness will increase with the use of calcium containing chlorinating agents such as calcium hypochlorite. Thus, when the pool contains very hard water, it is preferable to use another chlorinating agent.

The chlorine stabilizer concentration reflects the ability of the chlorinating agent to resist loss due to sunlight. Levels of stabilizer from 25 ppm to about 100 ppm are helpful in reducing chlorine loss. But excessive stabilizer will reduce the effectiveness of the chlorine to kill bacteria and algae. It is important to keep the level of stabilizer below 100 ppm by replacing some pool water, if necessary.

Chlorine stabilizer is introduced into the pool by using stabilized chlorine sources such as products containing sodium dichloro or trichloro – isocyanurate (trichloro-s-triazinetrione). Therefore, chlorine stabilizer levels should be monitored when these chlorinating agents are used.

Summary

The most important feature of the pool maintenance program should be to maintain chlorine levels between 1-3 ppm, pH between 7.2 – 7.8 and alkalinity between 80-150 ppm.

This can be done by adding disinfectant according to the package directions and by adding ARM & HAMMER® Baking Soda using the above simplified or alternative pH and alkalinity control procedures.

Periodic superchlorination of the pool using an unstabilized chlorine source is advisable to prevent organic waste build-up.

Hardness and stabilizer levels should occasionally be checked and adjustments made, if necessary.

Pump, Filter And Circulation Systems



The basic elements of the circulation system are the pump, piping, filter and chlorinator. Adjuncts are the skimmers, main drain, vacuum system, pump strainer and return outlets. You owe it to yourself, in the interests of economy and possible emergencies, to be familiar with the working of as much of this system as possible. If you aren't a plumber or an electrician, many procedures and repairs will require the help of a qualified pool service person. No attempt will be made by this booklet to explain the technical aspects of your pool's systems, but the following information should be kept in mind.

Balanced pool water chemistry is of little value if the filtration and circulation system is poor. A good filter removes undissolved particles and makes the water crystal clear. Good circulation ensures that all pool water is filtered and the disinfectant is well distributed throughout the pool.

Weather conditions and your pool's bather load will dictate how long the circulating system should run daily. If the water is cloudy or the bather load is heavy, around-the-clock operation may be required. Experience will be your best guide in this.

Above-Ground Pools

The low-cost, portability and variety of sizes and shapes of above-ground pools have brought the fun of backyard swimming to almost every family that wants it. There are some important things to keep in mind regarding above-ground pools.

Above-ground pools can meet health and safety standards only if properly equipped and located. If you plan to purchase one, insist on the following features:

- A pump/filter combination that can completely filter and recirculate an amount of water equal to the pool capacity every 8 hours.
- At least one skimmer and return (or returns) located so that deadspots and short circuiting (water flowing directly from a return to the skimmer) are eliminated.
- A pool location with a non-skid surface surrounding it.
- A pool location at least 10 feet from any electrical outlets and devices. The pump should be placed away from the pool to prevent exposure to the danger of electrocutions.

Common Pool Water Problems

The following lists some common pool water problems, with probable causes and suggested solutions. There is no substitute for the experience of your pool professional in dealing with unusual or major problems, but your knowledge of the following can save you a good deal of time, trouble and money.

1) ALGAE

These types can cause problems for the pool water:

- A. Green – Causes green appearance in pool
- B. Blue-green (black) – Forms dark spots on pool surfaces
- C. Yellow – Causes yellow, cloudy appearance in pool

Possible Causes

1. Insufficient free residual chlorine
2. Excessive levels of chlorine stabilizer
3. Very high pH
4. Poor pool circulation

Problem Elimination

Usually, superchlorination (explained on page 3 under “Disinfecting Agents”) and brushing the pool sides and bottom to remove dead algae will be found effective. Your pool filter should then remove the particulate residue. Occasionally, algae will resist this treatment. Here, the addition of a commercially available algaecide, according to the label directions, will usually be found effective.

Prevent Recurrence

If excessive levels of chlorine stabilizer are present in the pool after superchlorination (more than 100 ppm), partially drain the pool and replace with fresh water. Alternatively, maintain higher levels of the residual chlorine (2.5 – 3 ppm) in the water.

If the pool pH is high, readjust into the 7.2–7.8 range by carefully adding acid. Localized algae growth is frequently an indication of poor circulation. Check the pool circulation (filter, pump and hoses) to ensure optimum performance.

2) CORROSION OF WALLS, FIXTURES OR PLUMBING

This may show up as a peculiar color in water, as stains on pool surfaces or as pitting or discoloration of surfaces.

Possible Cause

Low pH, extremely low water hardness, and /or low alkalinity.

Problem Elimination

The use of ARM & HAMMER® Baking Soda helps in achieving the proper pH and alkalinity to minimize the potential for future corrosion. Keep the pH above 7.2 and the alkalinity above 80 ppm. If the water is very soft, especially with a plaster walled pool, calcium hardness should be added to at least 50 ppm. Unfortunately, nothing can repair the damage already done to fixtures and plumbing.

3) SCALING

Possible Cause

Usually a combination of high water hardness, pH and alkalinity.

Problem Elimination

Seek advice from a pool professional about the best method of scale removal.

Prevent Recurrence

Without draining and refilling your swimming pool, there is little you can do to reduce the water hardness. But when high hardness levels are present, scale formation can be prevented by reducing the pH and alkalinity levels. For water hardness above 250 ppm, a pH of 7.8 and an alkalinity level of 110 ppm are safe upper limits.

When pool water is very hard, it may be advisable to avoid using calcium-containing disinfectants such as calcium hypochlorite. These agents significantly increase water hardness.

To lower the pH or alkalinity of your pool, the careful addition of an acid is required. The proper dosage will depend on the type of acid used and the total alkalinity present in the pool.

4) TURBID (CLOUDY) POOL WATER

Possible Causes

1. Poor filtration
2. Insufficient chlorination
3. Excessive levels of chlorine stabilizer
4. High water hardness, pH and alkalinity

Suggested Solution

Check filtration system. If OK – operate filter continuously until water clears. Backwash filter as necessary. Cloudiness is sometimes an indication of algae growth. If insufficient chlorination has been present, superchlorinate. Check chlorine stabilizer levels and, if high, partially drain pool or maintain higher chlorine levels in water. With high hardness water, be sure the pH is below 7.8 and alkalinity is below 110 ppm.

5) CLEAN-BUT COLORED-WATER

Possible Causes

Usually due to dissolved metal impurities but occasionally due to algae.

Suggested Solution

Have water tested for iron and copper, If excessive levels are present, ask your pool professional how to remove them.

If excessive levels of metallic impurities are found in the water, it often means that the pool water has been allowed to become corrosive to metallic fixtures. Avoid future problems by maintaining pH above 7.2 and the alkalinity above 80 ppm.



Pool Talk In Plain English

Acid

A chemical, which when added to pool water, lowers the pH rapidly. Examples: muriatic acid, sodium bisulfate.

Algae

Microscopic plant life that forms on walls, floor and surfaces of pools. When carried in the air, in rain or dust storms, they can be deposited in pool water by the millions. They are frequently mixed with slime mold and feel oily or greasy. Most common strains due to algae are green, black, reddish brown and yellow.

Algaecide/Algaestat

Products used for algae control

Alkali (Base)

A chemical that, when added to pool water, raises the pH. Examples: sodium hydroxide (lye), sodium carbonate (soda ash), sodium bicarbonate (Baking Soda).

Alkalinity

A measure of the ability of the water to resist pH change.

Bacteria

Microorganisms transmitted to pool water by bathers, dust, wind and surface drainage. Many can grow and spread in recirculated water. Some are disease producing and are known as pathogenic organisms.

Baking Soda

Sodium Bicarbonate. A natural, safe buffer that can be used to adjust pH upwards, if low. It also provides alkalinity necessary to prevent the pH from frequently moving out of the desirable range.

Buffer

A chemical that helps water resist pH change. Sodium bicarbonate is a strong buffer.

Chlorine

In pool terminology – any chlorine sterilant or disinfectant added to water to kill bacteria, kill or inhibit algae growth and destroy other undesirable organic matter.

Chloramine

A chemical compound that forms from the reaction of a chlorinating product and body wastes. The formation of these products significantly reduces the effectiveness of the chlorinating agent in controlling bacteria and algae. Chloramines are severe eye irritants and cause the unpleasant chlorine odor around swimming pools. Chloramine formation can be prevented by keeping the pH above 7.2 and the free available chlorine above 1 ppm.

Hardness

Usually expressed as calcium carbonate. Although some level of hardness may be desirable to reduce chances of corrosion, higher levels indicate a greater chance for scaling.

Liquid Chlorine

In pool terminology, refers to solutions of sodium hypochlorite liquid bleach.

pH

Measurement of relative acidity and basicity of water on a scale of 0-14. A pH of 7 denotes neutrality. A pH below 7 indicates water is acidic, a pH above 7 shows water is alkaline (basic).

ppm

Parts per million. Relating to pool water, it is a rating of a quantity of any substance per million parts of water. Example: one pound of Baking Soda to 10,000 gallons of water provides about 7 ppm of alkalinity.

Scaling

Mineral deposits on pool floor and walls and in plumbing or filtering systems that can be unsightly or interfere with proper pool operations.

Shocking

Same as Superchlorination.

Soda Ash

Alkaline chemical (Sodium Carbonate) used to rapidly raise pH.

Stabilizer

A chemical that will help reduce the loss of free residual (available) chlorine due to sunlight and evaporation. Example: cyanuric acid. It is often added as part of the chlorine source.

Superchlorination

Heavy doses of chlorinating product to kill accumulated bacteria or algae or to remove other accumulating organic matter. Superchlorination doses may be in the 5 to 10 ppm range, compared to the normal levels of use of 1 to 1.5 ppm. Stabilized chlorinating agents should not be used for this.

Guidelines For Safe Use of Swimming Pools



One adult, with a back-up if necessary, should assume primary responsibility for supervising everyone using the swimming pool. Basic rules and prohibited activities should be established; communicated to, and understood by all persons, young and old, using the pool; and posted near the pool. Most importantly, consistently enforce these rules. Never leave the pool unsupervised. When supervision isn't available, even for a minute, close the pool.

Important – but often overlooked – rules are as follows:

1. Never swim alone or allow others to do so.
2. Special attention should be paid to diving and head first sliding into the pool. If the head of a person entering the pool at high speed hits the bottom or side, an object or another person, injuries to the spinal column may result-causing temporary or permanent paralysis or even death. Serious spinal injuries can occur even at very slow speeds, if the head strikes firmly against the pool bottom or side. Diving into in-ground pools designed for this activity should be confined to the deep part of the pool. Also, there should be no diving or headfirst sliding into above-ground pools because they aren't designed for it.
3. Guard against electric shock. Keep electrical appliances a significant distance away from the pool. Don't use extension cords. Use a ground fault circuit interrupter (GFI) on any appliance that must be at poolside. Where possible, use battery operated appliances around the pool. Electrocution from appliances and telephones in contact with the water is a real danger.
4. List the telephone numbers of your physician, police department and fire department on the door of your cabana or equipment shed.
5. For use in emergencies, keep on hand a shepherd's crook, a ring buoy, first aid kit and lifeline.
6. Never add disinfecting agents or harsh chemicals when bathers are in the pool. Bathers should stay out of the pool until these chemicals have dissolved and are distributed evenly throughout the pool.



CONSUMER RELATIONS DEPARTMENT
ARM & HAMMER DIVISION OF CHURCH & DWIGHT CO., INC.
P.O. BOX 7648 • PRINCETON, NJ 08543-7648