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I Love My Pool

The Perfect Pool in Five Easy Steps

Featuring the EZ-Clear Pool Care System™

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For INYOPools.com

I Love My Pool

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I personally warrant this product to be of quality and integrity. If you are not satisfied, please return it to me with your comments for refund and postage. We wish to continue earning your confidence and respect. ~ Ken Christensen

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Ladies & Gentlemen... in the Center Ring...

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When I first moved to Florida and had my own pool at the house, I'll be honest; I had no idea how to service a pool. Going back thirty years when my family had an above ground pool brought no recollections on what to do. And so... I looked for books in the library, on the Internet, and then in bookstores. Believe it or not, I couldn't find anything I could relate too! Every book I looked at was overly technical, vague when it came to chemical treatments, or far too complex for something that my intuition told me shouldn't be so complicated.

Still confused, I went to a local pool store that had an electronic water testing system which was perfect for a complete novice to pool maintenance. The employees recommended certain amounts of chlorine, pool acid, and a variety of other products that, as time went on, seemed to be too expensive and potentially unnecessary.

I remembered taking care of our pool when I was younger and I just didn't recall that it was as complicated as the pool store made it seem. However, this way was easy and I bit the bullet on the extra products I was told I needed. Still, I didn't have any idea of why I was doing what I was doing.

When I first started my job servicing pools with a large pool company in Melbourne, Florida, I was concerned that learning how to take care of a pool and apply proper chemicals might be a problem. As time went on and I serviced over seventy pools on a weekly basis, the hardest obstacle was getting over the fact that taking care of a pool was REALLY EASY!!

I will not be teaching you trade secrets, mystical formulas, or complex chemical equations. Taking care of your pool is very simple, easy and uncomplicated; it just requires a little time - but not as much as you would think. Case in point: While servicing pools, I had a basic system I followed every week. Unless a pool had an abundance of debris or leaves on a weekly basis, the average pool took less than ten minutes, even less if it had an automated floor vacuum!

Obviously, this is not something the pool service industry wants you to know, but it is the truth. By following my ***EZ Clear Pool Care System***™, it is not unreasonable to think that you can become master of your pool by devoting eight to ten minutes of your time once a week. There will be some trial and error, but if something goes wrong, DON'T PANIC! Consider it part of the learning curve and move forward.

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Chapter 1

Introduction To Your Pool

How does your pool look?

The Good

The Bad

The Ugly

A Funny Thing Happened On The Way To My Pool

Who among us, in our infinite wisdom, has said; “Screw it, I’ll add chemicals to my pool next week”? Of course, when next week comes, the pool has turned an interesting shade of yellow or green, causing you to cringe in embarrassment. These are the times to reflect on the value of checking and balancing pool chemicals on a weekly basis.

Over the years, I have seen pools that have not been serviced for weeks, months, or years. Some can be turned around by adding chemicals, while others have to be drained in order to start fresh. In Southern Florida, if a pool hasn’t been serviced for two or three weeks, you would be surprised how quickly it goes bad, especially during the summer.
I have seen tadpoles, frogs, mosquitoes and an assortment of bugs enjoying the swamp like setting of a neglected pool in less than two weeks time. What is equally astounding is how quickly these critters disappear once chlorine is added and chemicals are properly balanced. Tadpoles literally dissolve when exposed to chlorine (don’t let your kids see this, it’s disgusting!)

After the Florida hurricanes of 2004, some pools along the Intercoastal Waterway in Brevard County were flooded when water rose over the safety embankments into the pool. This also caused water damage to the filter system as well. Within weeks, these pools had developed their own eco systems which included fish, crabs, reeds, shells and a variety of water life and plants. Pelicans and seagulls floated happily on the waters’ surface and established nests in the trees because they now had a private wildlife sanctuary. Pools along the ocean were filled with sand, some up to four feet deep, which played havoc on the filtration system!

So, if you have neglected your pool for a few weeks, take light in the fact that you will probably be able to turn it around with proper chemical treatments recommended by your pool store. If your pool has been subjected to extreme weather conditions or storms and you do have to drain your pool, heed this warning: Some areas of the country have a low water table and if you drain the water from your pool, it could literally pop the pool out of the ground... not a pretty sight!

To me, a swimming pool is the ultimate relaxation escape to be savored in the privacy of your own home. But let's be honest, life gets busy, you get stressed, and it is easy to blow off spending 10 - 15 minutes on your pool once a week. That is why it is so important to develop a positive outlook that taking care of your pool is "Relaxing Time" instead of a "Chore". With this attitude, you may be surprised at how therapeutic brushing, netting and maintaining proper chemical balance can be. Look ahead to the weekend when you can enjoy the fruits of your labor and float happily in your pool, hopefully with little, or no cares in the world.

The EZ Clear Pool Care System™

The information in the upcoming chapters are intended to give you basic guidance and a simplistic understanding of how to balance chemicals and service your swimming pool. It is based solely on what I have learned the past five years while servicing over 150 pools.

As a result of my success with keeping pools in tip-top shape, I have developed basic strategies that will help you understand how easy it is to keep your pool sparkling clean and clear.

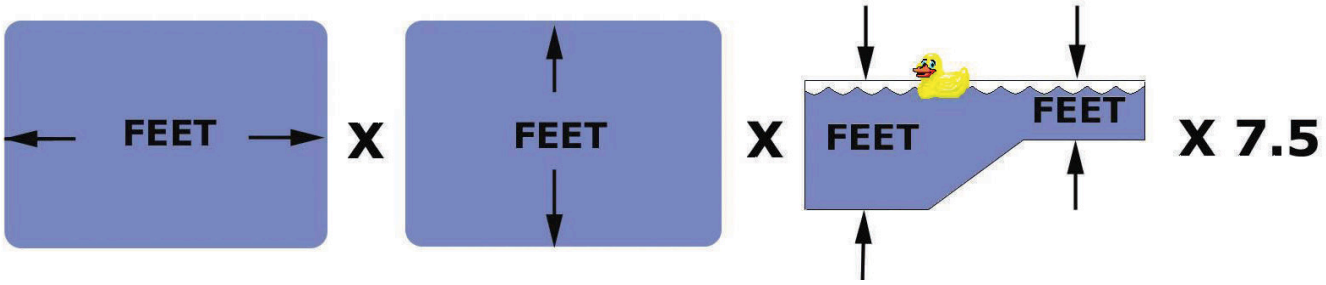
Some industry professionals may have a different opinion, so I encourage you to read other manuals or books if you don't understand what I have written. If you prefer the technical aspect of chemistry, there are numerous publications that give you much more in-depth information.

As you learn about balancing the chemicals in your pool, visit your local pool store with samples of water in hand and have them tell you how well your chemicals are balanced. With the information gained from your pool store employees and from what you learn in this book, you can plan a simple maintenance schedule that should only take 10 - 15 minutes of your time every week (some pools may only require your attention every two weeks, although once a week is ideal).

Keep track of the days and weeks you service your pool by using the maintenance schedule on page 127. You will then see patterns that help you understand the simplicity of chemical balance. Don't hesitate to work closely with your pool store until you find that you have a clear understanding of chemistry balance.

Determining the Size of Your Pool and Volume of Water

An average pool size is 15 x 30 feet in diameter, 3 - 4 feet deep in the shallow end, and 9 - 15 feet deep in the deep end. The average volume of water in a pool this size is around 10,000 - 15,000 gallons.



The following formula will determine the size of your pool and volume of water. This is crucial information when you go to your pool store as it gives the store employees insight on how much chlorine and pool acid you may have to add every week. Whether your pool is rectangle shaped, kidney shaped, or another design, simply put, the larger the pool, the more chemicals you will have to use.

Once you determine the size of your pool and volume of water, write it in the chart on the next page.

Calculating water volume for a rectangle or square shaped pool

This process is simple and is a combination of length x width x depth x 7.5 to equal the total pool water volume. We'll do it in the spaces below.

1) With a tape measure, or, using approximate footage, measure the length and width of your pool.

Total length _____ Total width _____

2) Approximate the depth of the shallow end and deep end of your pool.

Depth (shallow end) _____ (deep end) _____

Add together _____ and divide by 2, = _____ total depth

Now, write it all down here:

3) Total length _____ x total width _____ x total depth = _____

Add together:

4) Total _____ x 7.5 = _____ U.S. Gallons.

Write total gallons on chart on next page.

Example:

Depth (shallow end) 4' (deep end) 10'

Add together 14' and divide by 2 = 7' total depth

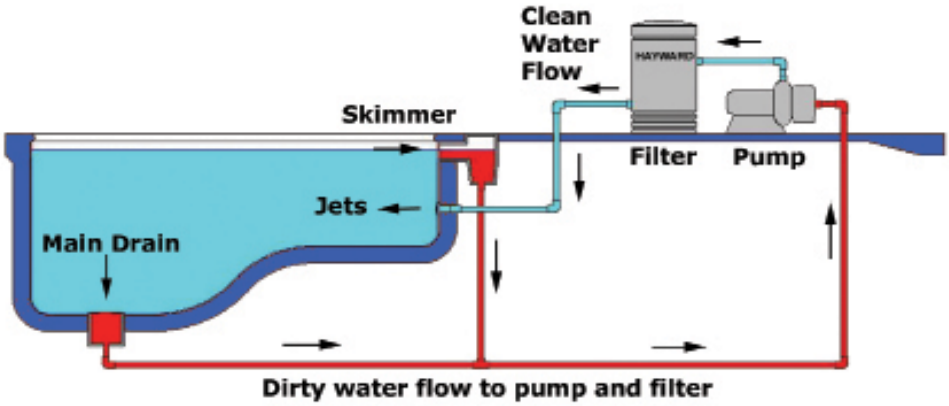
Total depth: 7' x total length: 30' x total width: 15' x 7.5 =1,350'

How Your Pool Works

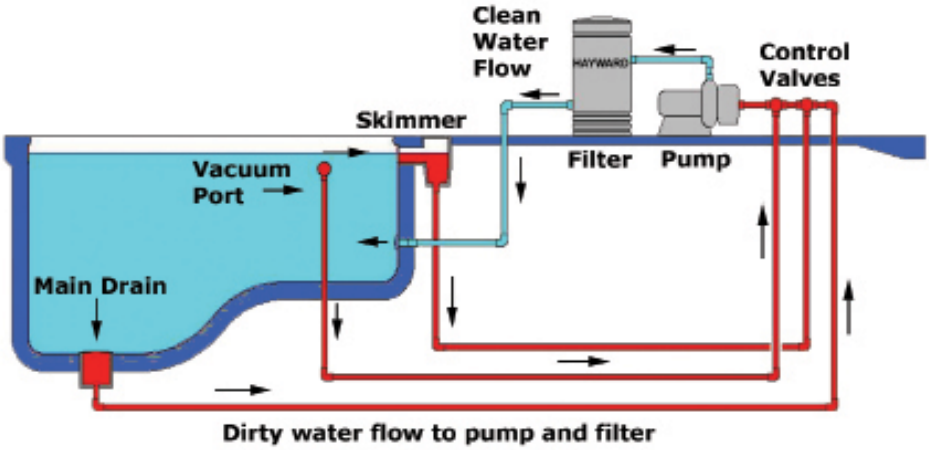
A standard pool filtration system is very simple: Suction is created from the pump motor when turned on. This draws dirty water from the main drain at the bottom of the pool and the skimmer port, which is the square hole near the top of your pool.

The dirty water is pulled through underground pipes to the pump, into the filter, and the clean water is then redistributed into the pool, typically through water ports (jets) in the walls of the pool. A timer turns the pump on for a specified amount of time every day (an hour for every ten degree of water temperature) and continually circulates the water during this period. In order for the filtration system to work at maximum efficiency, it is important that the filter is clean, free of dirt and debris, and cleaned at least once a month.

Two of the most common filtration systems are:



Single Line Suction System has a pipe that runs from the skimmer, connects with the main drain pipe, goes directly into the pump and filter, and then back into the pool.



Multi-port Suction System has individual pipes running from the main drain and skimmer. These interconnect just before they reach the pump and typically have a valve that can be adjusted. This valve allows you to manipulate the force of suction from the skimmer or main drain. Some pools have a side port with an individual valve adjustment, which an automated floor vacuum can be attached. The side port pipe that leads to the pump is separate from the main drain and skimmer pipes.

Checking Your Equipment

Before we delve into steps 2 - 5 of ***The EZ Clear Pool Care System***™, let's check your pool equipment. By performing these simple steps, you are ensured that EVERYTHING is in proper working order. Rather than fill this chapter with excessive photos, I have referred you to the proper pages in the descriptions below. (don't worry, they are all in the next two chapters). Mark the chart on the next page and bring it to your pool store. Be sure to bring the parts that need to be replaced also.

Cartridge Filters (page 16) In order to ensure that your filter system is working efficiently, we are going to do a simple test. Although this may seem tedious, if your filter is bad, your pool filter will not perform at maximum efficiency. Remove filter and clean. How bad does it look? Are the bands around it broken? Do the grids remain dirty and discolored even after cleaning? Does the filter fill heavy even after you clean it? When was the last time you replaced the filter? If it is more than 12 - 18 months old you need a new one.

Filter Housing O-Ring Set filter aside and examine gasket on housing top. Does the gasket fit snugly in the indentation around the filter? If so, this is good. Is the gasket loose or stretched? Can you fit your finger in between the gasket and the housing? Is the gasket cracked or does it have flat spots? If yes, replace it right away as it will give you problems when you put the housing back together.

Pump Basket O-Ring (page 27) Remove pump basket lid and check o-ring for cracks or flat spots. This is a critical part of the pressure so make sure it is in good condition. Lubricate before putting it back on. If you can't remove lid, purchase a pump lid wrench from your pool store.

Pump Basket Remove pump basket. Most baskets require a quarter turn to remove it. Others lift right out but have to be put back the same way. Pay attention as to how you remove it. Is it cracked or broken? Do you have trouble taking it out? If so, replace.

Pressure Gauge (page 23) When you turned off your motor, did your pressure gauge needle go down? If so, this is good. If it did not move, you will need a new pressure gauge. A standard pressure gauge requires a 1/2" open-end wrench (or larger). When you purchase a new pressure gauge, try to buy one that has three needles in it, black, green and red. The black needle shows you the PSI (pounds per square inch) when the pump is on. The red and green needles can be set to let you know when the filter is clean and dirty.

Skimmer Basket & Lid Turn off motor, lift the skimmer lid from the hole on deck adjacent to your pool (page 28). This hole can range from 4" - 8" and you will see a skimmer basket. Remove basket and check for cracks or breaks. Replace if broken. Check skimmer lid. Is it brittle, or cracked? No? Are you sure? Keep this in mind: If someone steps on top of an old skimmer lid, their foot could break it, get caught in the hole and any number of accidents could occur. Be sure that this is a sturdy cover. If you have any doubts, replace it. Some covers were made before certain safety standards were established.

Today, stronger, and sturdier covers can replace an older design.

Now, let's get to the fun stuff...

Pool Equipment Checklist

Record your pool water volume here: _____

Filter type: Cartridge_____ D.E. Filter_____ Sand Filter:_____ (descriptions on page_____)

Motor Brand:_____ (check label on motor) Motor Size_____(in horsepower)

Equipment condition chart

a) Filter Cartridge	_____ Good	_____ Bad	Model # _____
b) Filter Housing O-Ring	_____ Good	_____ Bad	Model # _____
c) Pump Basket O-Ring	_____ Good	_____ Bad	Model # _____
d) Pump Basket	_____ Good	_____ Bad	Model # _____
e) Pressure Gauge	_____ Good	_____ Bad	Model # _____
f) Skimmer Basket	_____ Good	_____ Bad	Model # _____
g) Skimmer Lid	_____ Good	_____ Bad	Model # _____

NOTES: _____

_____

_____

_____

_____

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Chapter 2

Swimming Pool Filters

A Brief History of Water Filtration

As we float in our pools, soak in baths and drink cool fresh water, it is easy to take water filtration for granted. Believe it or not, the technology for water filtration is not a new concept!

The earliest records of water filtration and purification date back to 2000 B.C. where Sanskrit (India) and Greek writings outlined the desire for better tasting water. Although nothing was known about micro organisms that caused disease, it was assumed that good tasting water was clean. Filtration consisted of boiling water, placing hot metal instruments in the water, or straining it through sand, gravel and charcoal filters. Around 1500 BC, the Egyptians discovered the principle of coagulation and applied the chemical alum for suspended particle settlement. Pictures of this technique were found in the tombs of Amenophis II and Ramses II.

The Ancient Greeks and Romans used a variety of methods to improve the quality of water including settling basins; pools that would slow water coming from aqueducts and allow impurities to settle on the bottom. Occasionally the water would have to be shut off and slaves would climb down a 30' - 50' shaft to the bottom and shovel out impurities that would be hauled to the top in buckets. Around 500 BC Hippocrates invented the 'Hippocratic Sleeve' a cloth bag which trapped sediments that caused bad tastes and odors.

After the collapse of Roman civilization and the destruction of many aqueducts during invasions and for building purposes, water filtration theory had been largely forgotten.

During the Middle Ages (500-1500 AD), water supplies came from wells, rivers and streams. Also know as the Dark Ages because of the lack of scientific innovations and experiments, horror stories of the black plague and other diseases transmitted through drinking water strike fear into the hearts of anyone familiar with basic history.
The Renaissance period, (1300 - 1600), sparked a new period of scientific research, including the invention of the first microscope in 1590. Around 1627, Sir Francis Bacon tried his hand at sea-water desalination (with no luck). However, this inspired scientists to experiment with water filtration technology. In the late 1600s, an advanced microscope was developed which allowed scientists to view particles in water that had been presumed to be clean. The 1700s brought the first water filters used for domestic application and were made of wool, sponge and charcoal.

In 1804 the first municipal water treatment plant was built in Scotland and was based on slow sand filtration. Three years later, water pipes provided safe drinking water to residents. Without question, this was a milestone in the history of water filtration and distribution!

During the cholera epidemic of 1854, British scientist John Snow found that it was less severe in areas where sand filters were installed and that the direct cause of the outbreak was water pump contamination by sewage water. By applying chlorine to purify the water, he paved the future for water disinfection.

Temple and reflecting pool built in 1934 as a monument to the creation of the aqueduct that brings drinking water across California to San Francisco.

In 1974 the Safe Drinking Water Act (SDWA) was passed under the belief that every person in the developed world had the right to safe drinking water. By 1985, every city in the U.S. was required to install a water treatment plant, and under stringent demands, water quality began to improve. As a result of the success with modern water filtration techniques, todays pool owners have access to some of the best water filtration systems ever developed in the history of mankind.

And that's it for your history lesson. Now you can impress your friends and family with what you've just learned!

Swimming Pool Filters

Probably the more complex part of proper pool care, this section may take a little extra time. However, if you follow the directions, you will have a pool system that is working at peak performance.

Taking proper care of your filter is one of the most critical parts of proper pool service. If you don't clean your filter, or replace it every 12 - 18 months (cartridge filters only), you will have problems that could include algae buildups on the pool walls, excessive dirt on the bottom of your pool, and worse yet, a gradual deterioration of your pools' finish.

Which Filter Do You Have?

If you do not see your filter in the upcoming photographs, keep in mind that there have been a variety of filters developed over the past 30 years and it is impossible to show them all. More than likely you have a cartridge system, as they are the most common in the industry. They are simple to service, sturdy, durable and reliable. The most popular are manufactured by HAYWARD. Over the years, I have kept a sharp eye on this brand and have been surprised at how few problems they have given me. The following filter systems are current standards in the industry.

Sand Filters - One of the oldest and most popular methods of water filtration, impurities are extracted from the water using sand to collect and attract the debris. The sand bed inside the filter removes larger particles and as the bed loads with debris, the filter removes finer particles. Sand filters trap debris as small as 20 to 40 microns.

Cartridge Filters - Cover a greater surface area than sand filters, allowing for fewer clogs and easier maintenance. Cartridge filters are designed to run at lower pressure than sand filters which puts less back pressure on the pump, providing more flow and turnover. Cartridge filter elements trap debris as small as 10 to 15 microns.

Hayward C900

Hayward C900
Cutaway View

Hayward C1200

DE Filters - A very simple process, a DE filter system offers an extremely advanced system of filtering the water in your pool. They have internal elements that are coated with DE powder that strains dirt, dust and algae from the water. This powder is applied through the pool skimmer after a backwash or cleaning in order to restore proper filtration and has microscopic openings that look like tiny sponges. Water passes through these openings and small microscopic particles are trapped when they pass through the system. DE filters trap debris as small as 2 - 5 microns.

Pentair DE Filter

Pentair DE Filter
Cutaway View

Sta-Rite Filter Systems - Are used for medium to larger pools, possibly with a spa, although they have a filter cartridge, it is shorter and larger than a regular filter and a more complicated system to take apart and clean. There are potentially difficult/hazardous steps involved in taking it apart that involve high water pressure and a lot of plumbing that can be tripped over. If you decide to service this filter, go to the company website www.pentairpool.com for proper instructions. Clean the filter as you would a regular cartridge filter.

A few tips on Sta-Rite Filter Housings:

1) Under the cartridge filter is a 2” hole that allows water to flow into the filter that fits into a matching hole in the bottom of the housing. If it is not in proper position, you will never get the lid on.

2) The top of the housing should fit snugly on the bottom portion of the housing, if there are any gaps between the two, or, if it is sitting crooked, you will never get the outer lock ring on.

3) Lubricate O-ring on upper portion of housing. The top should go on easily until the lock ring clicks in place. While turning lock ring, if you get the feeling that it is not going on properly, trust your instincts, take it off, and check to see if top and bottom pieces are together properly. If this gets on crooked, you will have all kinds of problems getting it back off!

Assorted cartridge filters

Sta-rite cartridge filter

There are an assortment of cartridge filters on the market. When replacing them, be sure to write the number of the cartridge down (located on the top of cartridge) so your pool store knows the proper size. If you cannot find anumber, clean cartridge, let it dry, and bring it to the store so it can be matched properly. Be sure to turn your pool timer off at the breaker switch, or remove the on and off timer keys so your pump doesn't start when you have the filter out.

Although industry standards vary, filter cartridges should be replaced every 12 - 16 months (see page 10). I replace mine once a year just to be safe. Choose a birth-date or holiday in order to spark your memory that it is time to replace your cartridge or service your DE filter.

Before Cleaning Your Filter there is a good chance that your feet will get wet, make sure you aren't wearing a pair of Florsheims' and a tailored suit. Wear casual clothing that can get wet and perhaps a little dirty depending on how long it's been since you've cleaned your filter.

This is what you will need to clean a cartridge filter:

1. Garden Hose

2. Spray Nozzle - Available in hardware stores in the garden department. These particular nozzles eject a strong, steady stream of water that cleans your filter more efficiently than a standard nozzle. Don't use a regular garden hose nozzle as it will not clean the filter thoroughly.

3. Gasket Lube - Available at your local pool store.

4. Safety glasses or goggles

5. Pen to make notes in book

Cleaning Hayward and Standard Pump Cartridge Filters

1. Put on safety glasses or goggles to prevent debris from spraying in your eyes.

2. Turn off motor either from your timer box or breaker switch.

3. Open up the release valve on top of housing, and drain plug at bottom of housing (not all filters have one of these) to let out excess water and lower pressure. Close when drained.

4. Turn handle on top of housing counterclockwise, pulling gently on it as you unscrew it. Continue to turn handle until you can pull off the upper housing. If the top doesn't come off easily, gently rock it back and forth while pulling at the same time. If it still is troublesome and nothing you do can separate the top from the bottom, the clip that connects the inner bar to the handle may be broken. It is best to call for service to fix this.

5. Set upper housing on ground in a clean area and then lift the cartridge out of the housing and place it on a flat surface. Keep it away from the house as dirt may spray on the walls of your house and/or surrounding area. Ideally, you should set it on a flat walking stone or concrete area so it doesn't tip over when cleaning.

6. Attach the spray nozzle to your garden hose; making sure the nozzle is in the off position. Before you attach the nozzle, turn the water on to make sure there is no debris, or lizards in the hose. Trust me, if there is small critter in the hose napping in stale, warm water and you turn the hose on with the nozzle attached; well, it just isn't pretty! Turn on hose and slowly open the valve until a nice, steady stream of water comes out.

7. With hose and nozzle firmly in one hand, hold the filter at its top with the other hand. Spray out the debris from top to bottom in one section until you have covered the entire circumference of the filter. Don't get too close as you may get a face full of dirt. Next, turn the filter upside down and repeat. Repeat the entire process, each time getting a little closer to the filter with the water stream, paying close attention to dirt and excess debris in between the grids. Repeat as often as necessary until filter is clean.

Reassembly and Ramping Up the System

Insert filter into housing and put back together. Be sure to lubricate gasket and put a dab of lubricant on top of metal post to make it easier to tighten handle. Loosen air valve about two turns to let excess air out of system when turned on. Make a mental note of where the needle on the pressure gauge is sitting before turning on.

NOTE: When putting top of filter housing back on, position it with the pressure gauge facing you so you will always have a good visual. Pay attention to where the release valve is so when you open it to release air, it doesn't spray water on the timer or electrical boxes.

Empty pump basket (page 27) and then put basket into motor housing. Remove nozzle from garden hose and set hose inside pump basket. Turn water on until it overflows. You are getting rid of excess air in the system. Remove hose and put pump lid back on after lubricating gasket. Do not over tighten, although the lid should be firmly seated so no air comes in when pump is running. Turn on pump and open release valve. As pump primes, water will begin to flow into filter pushing excess air and water out of release valve, so stand a safe distance away. Once all of the air is out, turn off motor, tighten release valve, and turn pump back on.

IMPORTANT: Make sure that your water level is a least 2" - 3" above the bottom of the skimmer port. If it is too low, the skimmer will suck in air when running and your pump will never prime.

Now that you are done, go to the end of this chapter for instructions on how to check and adjust your pressure gauge.

Cleaning DE Filters

DE Filters require a backwash cleaning every 4 - 6 weeks; this process cleans dirt that is caked on the filter elements. Backwashing is very easy, presents no complications, and can be done in less than 10 minutes. However, these filters need a yearly maintenance that involves taking it apart and cleaning the grids. A professional should do this because if it isn't done properly, there are water pressure risks that can't be ignored (I have seen a top blow off the filter and over a house!). A tech can also point out potential problems and show you the wear and tear of the filter elements.

Every DE and Sand Filter has a waste port that dirty water is pumped out from the filter. Some are just an open port, which splashes water all over the place. Others have a drain hose, app. 2" in diameter, attached to the exit port by a clamp (you can buy this hose at a pool store). Some filters have pipes permanently attacked to the exit port, which drains water into an out of the way area of the yard.

IMPORTANT! DE Handle Facts: Familiarize yourself with the DE control handle and the different settings before cleaning • NEVER, NEVER, turn DE handle while pump is running as it will destroy the gasket inside the handle, or worse, damage the equipment. The handle should always be set in the FILTER position unless you are cleaning the filter. Not all DE handles are labeled the same and may have 4 - 6 settings. The following photos should be used as a basic reference only.

What each setting means:
FILTER - used when pump is running to clean and circulate water
BACKWASH - cleans filter
RINSE - follow up after backwashing
WASTE - perfect for lowering the water level if too high. Keep a close eye on water because it drains very, very fast. Do not let water level go below the halfway mark of your skimmer.
CLOSE - use if water level is below the skimmer opening.
RECIRCULATE - this bypasses the filter if you have a filter problem and keeps water circulating in pool.

Now, let's clean your DE filter…

1. Turn off motor. If you have a drain hose, make sure it is unrolled and lying flat on the ground. If it is twisted, water will back up into the system. Some systems have a drainpipe attached to the filter – make sure drainage area is clear with nothing blocking exit port.

2. Put control handle on **BACKWASH**, turn motor on and let run for about 30 seconds. You will see dirty water from the filter coming out the exit port or hose. There is a small glass vial on the side of the control handle. When you are backwashing, you will see this fill with dirty water from the filter; this allows you a second visual of the water changing from dirty to clean. Turn off motor.

3. Set handle on **RINSE** and let run for 15+ seconds. Turn off motor.

4. Return handle to **BACKWASH**, turn on motor and let run until water comes out clear (about a minute). Turn off motor.

5. Repeat steps 2 & 3 until the water runs relatively clear in **BACKWASH** mode. Your final rinse can run for 30 seconds or more if you desire.

6. With the motor turned off, move handle back to **FILTER** position. Remove excess water from hose by grabbing it by the exit port and squeezing the water out while walking along the length of the hose. Roll up hose and set next to filter. If hose fills with water when rolled up, there is a leak in the handle gasket.

7. Turn on motor and prepare to add DE powder (for DE filters only).

Adding DE Powder for DE Filters Only (Never use on sand filter)

Powdered Diatomaceous Earth (DE Powder) are tiny diatoms of fossilized exoskeletons that coat the grids in the filter housing. They act as tiny sieves, which remove debris as small as five microns. Once the filter is backwashed it is “recharged” with DE powder, which is added through the pool skimmer while using a 48-oz scoop. Each scoop is equivalent to 1 lb. of DE powder and can be purchased at a pool store. They are the approximate equivalent of two 10 ounce coffee cans.

In order to determine how much DE powder you should use, look on the side of your filter for the factory specifications displaying the square footage of the filter area. It will start with 24 and is listed in increments of 12. You will start with 2.4 scoops of DE powder for the first 24 feet and another scoop for every 10 square feet of filter area.

The formula below is also listed on the DE powder bag:

24 = 2.4 lb. = 2.4 scoops

36 = 3.6 lb. = 3.6 scoops

48 = 4.8 lb. = 2.8 scoops

60 = 6 lb. = 6 scoops

72 = 7.2 lb. = 7.2 scoops

Manufactures of DE filters recommend dissolving the DE powder in a bucket of water and slowly pouring it into the skimmer. Many pool techs just add the powder slowly into the skimmer with the understanding that no matter how you pour it in, the powder dissolves by the time it gets to the filter.

CAUTION: Do not breathe DE powder. Always wear a face mask and safety goggles. DE powder is typically purchased in 20 lb. bags. I encourage you to transfer it to a sealable container rather than working from the bag. Once in the container, I spray water onto the powder to keep the powder down. If you do this, don’t overdo the water, although you will be surprised to see how much water the powder absorbs.

DANGER: If you put off having your DE filter taken apart and cleaned professionally consider this: a pool owner called a local pool repair company because the top of his DE filter blew off, up, and over his house! This was a result of not properly backwashing once a month and there was excessive buildup of dirt, DE powder, and granular chlorine in the filter housing.

• Granular chlorine will build up in a DE filter if you use it constantly, even after back washing the filter. If you note a higher PSI reading on your pressure gauge, and it lowers only minimally after a backwash, call in a service professional to clean your DE filter properly.

Cleaning Sand Filters

Follow steps 1 - 5 of the DE cleaning procedure.

IMPORTANT! Do not put DE powder into a Sand Filter as the powder expands in the housing and could burst the casing. Don't ask me how I know this.

Adjusting the Pressure Gauge

The pressure gauge is located on the top of the filter housing and has a black needle that tells you how much water pressure is running through the filter (PSI = pressure per square inch) and when it needs to be cleaned.

After cleaning or replacing any of the above filters, turn pump on and when ramped up, make a mark on the pressure gauge with a black marker where the needle sits. Typically, your filter needs to be cleaned when the needle is 10 points higher than the mark you made. Some pressure gauges have green and red needles, which can be adjusted once the pump is running. They cost a little extra but are a worthwhile investment. NOTE: If the black needle fluctuates when pump is running, there may be a problem in the system.

If the black needle does not move when you turn the pump on, you need to replace your pressure gauge. To remove your old gauge, turn it counter-clockwise. With a new gauge in hand, wrap white plumbers tape on it in a clockwise motion 3 - 5 times (more than 5 may crack the housing and less than 3 may cause a leak). Before putting the gauge into the filter, clean out the debris from the screw socket. Gently insert new pressure gauge by hand while turning it clockwise and then tighten with open-end wrench - do not over-tighten as you may strip the plastic in the housing, an expensive item to replace.

Replacing Your Cartridge Filter

Some manufactures recommend replacing a filter every 16 - 24 months. If your pool is screened in and has minimal debris coming into it, you might get away with it. However, I have seen very few filters last longer than a year in Florida. Again, this is a minimal investment that ensures you don't have problems with your pool.

Replacing Your Filter Tip

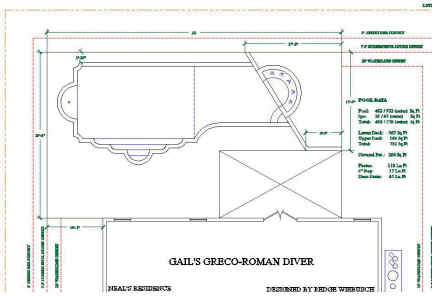
Pick a holiday, birthday, or special day in your life, and replace your cartridge filter, or, have your DE filter cleaned every year around that time.

Anatomy of a Pool

As I was planning this book, I was introduced to Redge J. Wiebusch II, a free lance artist and sculptor experienced in designing, drafting, mural painting, and an assortment of artistic mediums. When I discovered that he also designed swimming pools, I saw this as the perfect opportunity to expose readers to what's involved in building a pool.

One of his designs was a 16' x 40' custom pool designed for diving instructors. This innovative design was 5' in the shallow end and 9' in the deep end, perfect for diving instruction and practice. An attached spa in the deep end had a clear acrylic wall under the water and a spill-over waterfall. The shallow end had a saltwater aquarium with tropical fish, also with a clear acrylic wall. Imagine diving under the water and being able to look into the spa and aquarium. How cool is that? The aquarium, which had a separate filter system, came complete with coral, sand and an individual ecosystem for the fish.

If you are planning on building a pool and are inspired by these photos, I encourage you to contact Redge at Drgnstr@Yahoo.com, or 321.848.5832



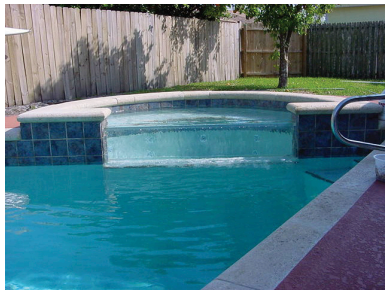
Blueprint of pool

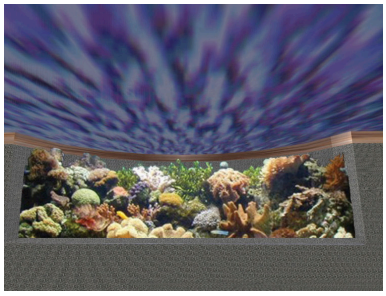

Shape of pool formed with rebar and wood braces


Fibercrete concrete sprayed onto rebar


Ready for surfacing


Finished pool


Spa with waterfall


Underwater view of aquarium

Chapter 3

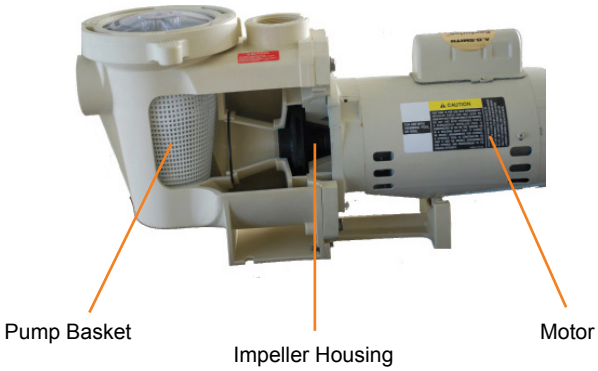
Pumps & Adjustments

Pumps & Adjustments

A pool pump and motor are very simple. A motor spins an impeller inside the housing which causes the suction that draws water from a pool and through the filter. It then sends a flow of water back into your pool. A basket inside the housing catches debris so it doesn't clog the impeller.

Standard Pool Pump

Cutaway section of Pump



An assortment of companies manufacture pool pumps, all of which make claim that they are the best. But the fact remains that no matter how good a pump motor is, it is usually exposed to harsh weather conditions year round. As a result, a motor can burn out in a year or two if some precautions aren't taken.

A new pump motor can cost a minimum of $300.00, or more, to have it replaced and installed. There are companies who rebuild motors but they rarely come with a warranty whereas a new motor typically comes with a one to two year warranty. Ideally, a pump and filter system inside a garage or with a housing built over it will give you many years of life, but not all pool owners are that fortunate.

Here are a few things that can help extend the life of your motor:

When it rains, does water pour onto the motor from the roof overhang, or, does the motor sit in a puddle of water? Do you have a sprinkler system that sprays water onto the pump area? If so, the chances of it shorting out are increased dramatically. If the motor sits in a pool of water after a rain, some sort of drainage system around it is a must. In harsh weather climates, build or buy a housing that can be put over the motor during winter. An inexpensive pump motor cover does a fair job of keeping rain water off the motor.

It is relatively easy to tell if your motor is going bad when it starts making a lot of noise. Usually the bearings inside the motor are shot and at this point there isn't much you can do. (unfortunately, oiling it is not an option). If your motor does burn out, before buying a new one, talk to the people at your pool store to help determine if this motor was the correct one for your pool. When housing developments are built, many contractors buy the cheapest filter systems available and the motor horsepower may not be the correct one for your pool. It is essential that you know the water volume of your pool (page 8) and the make and horsepower of your motor before shopping for a new motor.

Pump Lid & Basket - A critical part of the system, the pump basket collects debris from your pool and prevents it from going into your filter. If there is a lot of debris in here, it will affect the flow of the water into your filter and put a strain on the motor.

There are a variety of pump baskets on the market and most pump basket lids can be unscrewed in a counter clockwise motion. Some systems have two screws on either side of the top and have to be unscrewed until you can remove it. If you have a lid that unscrews, you should be able to loosen it by hand, but if the gasket is old, or the top has been over tightened, you may need to purchase a pump lid wrench at your pool store. If you do have to use this tool, approach this cautiously and assess where the pipes and valves are in relationship to the handle. If you push too hard while trying to unscrew the top, you could hit your hand on surrounding equipment, which really hurts!

NOTE: You should never over tighten the pump lid with the wrench as you could break the plastic housing. Lubricate with gasket lube and hand-tighten. If you still do not get a good seal, use the wrench sparingly.

Impeller - The impeller and housing are in between the pump basket and motor. Its primary purpose is to move the water from the pool, thorough the pump and filter, and then back into the pool. If it fills with debris it affects the flow of water into the pump and can put a strain on the motor.

If your pool doesn't have a lot of debris, or a screen covers it, it is unlikely that the impeller is jammed or dirty. However, if your pool does have a lot of debris and/or your pump basket is cracked, there is a good likelihood that your impeller may be clogged.

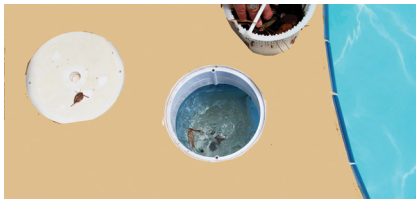
Do you have a palm trees around your pool? Let's face it, palm trees are filthy and can be your pool's worst enemy. Certain times of the year very fine debris will fall off the palms, into the pool, and clog the impeller. If you have a floor vacuum in your pool, a clogged impeller will affect its performance.

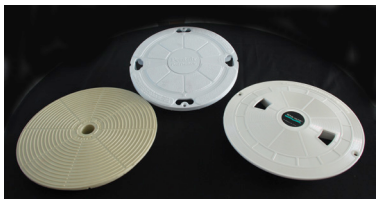
If you aren't sure if your impeller is dirty, clean your filter and observe how the pressure gauge needle lines up with your standard PSI setting or mark. If it shows a pressure lower than normal, your impeller may be clogged.

Adjusting Valves

Most pools without spas, or side ports, have a basic valve control and adjustment for the skimmer and main drain. These instructions are for a basic pool with one or two valves leading to the pump setting.

Skimmer is the housing at the side of the pool that pulls water, leaves and debris into the system and collects debris in a basket. There are a variety of skimmer baskets and lids on the market.





Main Drain draws water from the bottom of the pool into the filter system. They each have an individual pipe that converges into one pipe just before your pump and filter. Typically, there is a valve that allows you to adjust the water flow from these two pipes.

Side Port is an opening in the side of the pool for a floor vacuum attachment. If you have a side port, you will see a second valve leading into the pump.

Determining Skimmer and Main Drain Settings

All pools are different in this adjustment and this is strictly for a system that looks like this or, if you have a side port. Any pool with more than two valve adjustments should have a professional label them. The fact is, if you have the valves set wrong, you can prevent water flow to critical parts of the system, causing internal, or pump damage.

NOTE: The large end opposite the valve handle controls the flow of water going into the pipe it is facing.

1. Valve Adjustment - one valve. Turn on motor and let pool run for a few minutes, ensuring that there is no air in the system and that the water is flowing smoothly.

2. Loosen nut on top of handle just enough to allow smooth movement when turning. (don't forget to tighten it when done.) Turn handle to one side to shut off one of the pipes. Now go to the skimmer in your pool, remove lid and look inside to see of there is water movement by dropping a couple leaves into the water (do not put hand inside). If leaves move in circles, or are drawn into the skimmer in a circular motion, you have effectively shut off the main drain. If this is the case, with a felt tip marker, label pipe that is shut off with MD (main drain). Opposite this marking, label the other pipe SK (skimmer). If the water in the skimmer is not moving, turn handle in the opposite direction and then check skimmer and label appropriately.

3. Valve Adjustment - (two valves), If you have a side port, you will have to determine which one of these valves works the side port as the main drain and skimmer adjustments typically work off the same valve. This can get a little confusing so be patient. The best way to begin is to write A & B somewhere on the two valves in small letters. **NOTE:** Make sure that the side port does not have a closed safety cover on it in the pool as it will prevent water from coming through the pipe.

Establish the flow for the main drain and skimmer by shutting off valve B. Then go through the two step process above (step 2) with valve A. If you do not see a flow of water in the skimmer after trying each adjustment, you may have shut off the main drain and skimmer entirely. This is more than likely the side port adjustment.

Once establishing your main drain and skimmer valve, the second valve should be the side port. Label this pipe side port unless you have a floor vacuum that will be attached here, this valve should be shut off as it is a safety hazard if it does not have a cover on it.

Final Adjustments

1. Does your pool have a lot of leaves and debris falling into it? If so, you will want to partially close off the main drain, giving more suction to the skimmer. This is a very effective way to keep your pool relatively free of debris settling on the bottom of the pool. However, you will have to empty the skimmer basket frequently so it doesn't jam and interfere with the water flow. Ideally, empty basket right after motor shuts down so leaves don't float back into pool if your skimmer opening doesn't have a door.

2. If your pool is relatively free of debris and leaves, the valve can sit comfortably in-between the main drain and skimmer.

3. If you have an automated floor vacuum and your pool collects leaves and debris, refer to the automated floor vacuum chapter for proper adjustments (page 57).

Setting the Pool Timer

As high electric bills are becoming more and more of a concern in today's society, there is no need to have your pump running more than it needs to. The formula is simple: For every 10 degrees of temperature, it is customary to allow an hour for your pump to run. For instance, if the temperature is 80-degrees, your pool should run for eight hours a day. It is important that you don't set your timer too low as your pool could turn on you. Remember, you can never over filter the pool water.

Make sure the timer keys are tight and don't slip. If one of the keys slip, your pump could run for 24 hours a day. If you live in a climate where you winterize your pool and turn off the pump, be sure to take the timer keys out or, shut off the breaker switch. If your pump turns on and the water is below the skimmer, you could burn up your motor.

Water Flow Troubleshooting

If, by making the above adjustments and you see air bubbles blowing into the pool through the jets, or, no water coming out of the jets, go to the pump basket and check to see if the water is flowing through it smoothly. If not, remove pump basket lid and fill system with water from a garden hose until it is over-flowing. Close lid tightly and turn on pump motor. Be sure to let air escape from air release valve on filter.

Other potential solutions:

1. Valve adjustments are improperly set. Open up valves so they are set in-between main drain & skimmer. Then readjust them according to the prior directions.

2. Water level is below pool skimmer. Add water until 3 - 4" above bottom of skimmer. Be sure to turn off pump until water level is at the proper height.

3. Pump basket lid is not closed properly and/or gasket is bad and not making a proper seal.

4. Filter is extremely dirty - clean filter.

5. Air valve or filter housing is not properly closed. Do you see water leaking from the sides or top? Check to be sure upper housing is set properly and air release valve is closed. You will hear a hissing sound from the valve adjustment, or, water will be spurting out of if not closed properly.

If these steps do not resolve the problem, a professional should be called in to assess a potential problem and/or make proper adjustments. A clear sign of a problem is if your motor sounds like it is running high or the gears or bearings inside of it are grinding. Trust your intuition. If you have any doubts, shut down the system by killing the breaker switch so you don't burn out a motor.

INYOPOOLS.COM

Chapter 4

Pool Chemistry

Chemistry Made Easy

OK, I'll be the first to admit that I'm not into chemistry! I do however admire people who understand it; and I love having conversations with them because they have a passion about chemistry that has always impressed me.

While servicing pools, my eyes have opened about some aspects of chemistry, but the fact remains, it's not something that inspires me. As I was preparing to write this chapter, I did extensive research using pool related books, magazines and manuals. I also talked extensively with industry professionals. After all was said and done, I came away a bit confused and decided that as I write this chapter, I will keep it simple and easy to understand.

My belief is that when the average pool owner begins to read overly complicated manuals, they only get confused, frustrated and then lose interest in servicing their pool. My goal in this book is to keep it simple in order for you to be inspired by other unique chapters in this book.

NOTE: As I was in the finishing stages of this book, I discovered a website which had simplistic and easy to understand perspectives on pool chemistry. I contacted the former owner, Timothy Mott (he and his wife are now missionaries in Nicaragua), for permission to incorporate his text with mine. Mr. Mott, and the new owners, were gracious to accommodate me. They also sell a variety of pool related equipment and supplies. Please visit their website: **www.poolplaza.com**

Testing Your Pool Water

There are four ways to test the water in your pool:

Testing Kits

1. DPD Testing Kit can be bought at any pool store and use liquid reagent solutions in small bottles that come with it. They are very easy to use and involve nothing more than counting drops or comparing colors. **Taylor Technologies** (see page 37) makes one of the most popular kits on the market and I use their products extensively. The reality is, if you want to do it right, plan on spending around $50.00 for a professional kit. Beware of inexpensive kits not made in this country as they are far from reliable.

2. OTO Testing Kit contains the same tests as the DPD kit except chlorine is measured by an older style of chemistry that turns yellow instead of the pink created with DPD. For numerous reasons, I believe the DPD system is a more reliable method as it measures the amount of active chlorine that's available to kill germs. OTO cannot differentiate between active and spent sanitizer (chlorine). This book will feature only DPD Testing Kits.

IMPORTANT: You should always handle and store reagent solutions with care. Be sure to use the stopper that seals the testing container when it is shaken (but not stirred).

WHAT NOT TO DO: Some people drop reagents directly into the pool and judge the quantity of chlorine to add by the flash of color seen in the water. This is not accurate by any means.

3. Test Strips

This is an easy way to test your pool water simply by dipping a small strip of plastic with colored squares into your water and measuring the colors against a chart on the bottle the strips come in. The disadvantage of test strips is that the more they are exposed to air, humidity and heat, the less accurate the reading. The solution is to use high quality test strips and store them inside at room temperature. If you remove a strip from the bottle, reseal it quickly.

4. Electronic Reading - Advanced Photometers

To me, this is one of the best, and most accurate ways to read your water levels. Simply by putting a small amount of water into a hand held battery operated device, you get an exact reading at the touch of a button. As it is waterproof, you don't have to worry about dropping it into the pool.

NOTE II: In my research, I have discovered an American company, Industrial Test Systems, that manufacturer's high quality test strips and advanced photometers. I have done extensive research and comparison tests using these products with consistent success. Consequently, I will use them as a reference throughout this chapter.

Adding Chemicals to Your Pool

Never mix chemicals, whether liquid, granular or powder, in containers, or in the pool water. Be sure to read all warning labels on chemical containers and educate yourself and your children to the dangers of pool chemicals. When adding chemicals into your pool, make sure the pump is running so the chemicals circulate properly.

Adding pool chemicals into your pool in any combination, other than one at a time, is nothing short of dangerous! Chlorine and pool acid should be added into different areas of the pool because harmful vapors arise if they are poured in the same area of water. Never pour liquid chemicals into your skimmer as it could damage your pump system and pipes.

Chemicals should be stored in sealed containers and kept a safe distance from other chemicals. Use a new container to store chemicals. If you use an empty bucket that once contained pool chemicals, the chemical you put into it could mix with remnants of other chemicals and cause toxic fumes, or worse. Be sure all containers are properly labeled and written in large letters with a black marker.

DANGER: Chlorine in a small bucket mixed with pool acid or muriatic acid causes dangerous fumes that no one wants to be around, no matter how healthy they are.

IMPORTANT:

Color graphs on upcoming pages are not exact representations of the proper test color. However, the numbers under the readings are acceptable levels within the industry. Once you determine proper levels by the numbers on your DPD test kit or test strip, write down test results on the maintenance chart on page 127 for better understanding of chemistry applications.

NOTE: The testing levels for spas are considerably different than for pools. Consult with your spa specialist for proper levels.

What's the Right Water Testing Method for You?

When I first began this book, my vision was always to keep the chemistry chapter simple. Yes, there are over 16 ways to test pool water, but I have found that the main three; DPD Liquid Testing, Photometers, and Test Strips, work fine for the average pool owner. Are you looking for the intricacies of chemical testing and want to apply science and theory? If so, this chapter may not be for you. However, if you want to understand the basics of testing water and will be satisfied with a cleaner, happier pool; this chapter will be right up your alley!

DPD LIQUID TESTING - As I have used the DPD liquid system on a daily basis for a number of years, I know it is reliable. However, you need to hold the dropper bottles vertically when dispensing reagents to guarantee that every drop you add is exactly the same. The liquids can go bad if exposed to air or heat. Both translate into unreliable results.

TEST STRIPS - Over the years, I researched test strips with a variety of results. Some of the downfalls included: • Strips made outside of U.S. have low reliability. • Leaving the cap off the bottle, and storing outside, affects the strip reading. • Strip colors don't match up to the color chart on the bottle.

And then I discovered **PoolCheck™ Test Strips from Industrial Test Systems, Inc. (ITS)!**

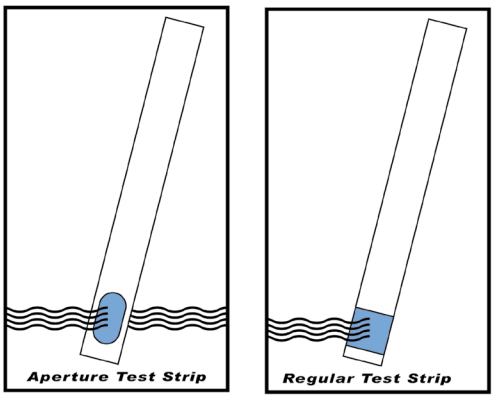
Upon extensive research, I found these to be the best on the market! What most impressed me is that when the labels are being printed, ITS representatives are always on hand to check that the test colors match exactly. If a color varies too much, the labels are thrown out. Also, the strips are not as sensitive to heat and contain only 1/100th of reagent chemicals compared to liquid test kits.

Combining sensitivity with safety (i.e.: SenSafe™), what makes some of their products unique is the patented aperture (window) technology which allows pool water to pass back-and-forth through the test strips. This process gives extremely accurate readings and much greater sensitivity. In fact, this is the only test strip method (for free chlorine) which has been accepted by the U.S. Environmental Protection Agency (2007 Federal Register Vol. 72, No. 47, Monday March 12 p.11204, ITS method D99-003).

Testing Procedure - Simply dip the strip into the water with back and forth motion, remove and shake off excess water. Then match the color to the label on the bottle.

Pool Check™ has a number of testing strips to choose from. For more information: 803.329.9712
www.poolcheckonline.com

Free Chlorine Water Check
EPA Approved



6 in 1 tests: Free Chlorine, Total Chlorine, pH, Total Alkalinity, Total Hardness, Cyanuric Acid

3 in 1 tests: Chlorine, pH and Alkalinity

5 in 1 tests: Free Chlorine, Total Chlorine, pH, Total Alkalinity, Total Hardness

Salt tests: Salt levels for salt water pools

Electronic Photometers

eXact® EZ Advanced Photometers

This test system impressed me the most! For those who desire 99% accuracy while removing any doubt in their mind about pool chemistry, this is the product for you! I have used other test meters in the past with fair results, but it was a bit involved and not all that convenient. The eXact® EZ Photometer (fo-tom-iter) has the competition beat! The meter is waterproof (IP-67), uses AAA batteries, and gives you an LCD reading of your individual chemical balance parameters. The process is simple:

Remove the particular eXact® strip from the bottle, turn meter on, select desired test and activate. Fill meter with water sample and set at zero. Dip the strip - which releases the reagent into your water sample - and read the results which are displayed on the LCD screen of the meter.

The eXact® EZ test kit comes in a sturdy plastic carrying case and costs around $399.99. Each kit contains 4 bottles of different test strips: DPD- 1 (Free Chorine/Bromine) • DPD-3 (Total Chlorine) • pH - (pH test) • and a liquid reagent to test Cyanuric Acid. eXact® strips for Total Alkalinity and Calcium hardness can be purchased separately. The manufacturers have eXact® strips and reagents available to test 21 water quality parameters.

Admittedly, this is an investment priced higher than some options. However, if you look at it from a long term perspective, this system eliminates the hassle and liability of matching colors and will give you accurate water level readings for many years to come. For more information: 803.329.9712 or www.poolcheckonline.com

Always Use Gloves and Face Mask When Handling Chemicals!

Always wear a face mask, goggles, gloves and protective clothing when adding chemicals to your pool. Keep a garden hose handy with running water to rinse any spillage on yourself or pool deck. If you spill any liquid chemicals on your deck, rinse it immediately. If you forget, someone could step into a puddle of chemicals thinking it is water and can chemically burn their feet.

When adding chlorine or pool acid into your pool, set the jugs on the edge of the pool, grasp handle firmly, and slowly pour into the pool. Avoid splashing the water as the chemicals could splash onto your face, skin, or clothing. Beware of the dangerous nature of chemicals you are handling. Do not mix chemicals with each other or in the same part of the pool. Wear safety gloves, goggles, mask and protective clothing. Beware of fumes. Some chemicals give off strong fumes that cause serious personal injury if inhaled in sufficient quantities.

11 Tips For Getting Accurate Results From Test Strips

1) Read the instructions before using; each manufacturer has unique instructions plus a manufacturer's may change over time

2) Keep strips dry before use - wet fingers can spoil a whole bottle of strips

3) Limit exposure to air and humidity by keeping the container closed when not in use

4) Don't touch the unreacted pads or put the pads in contact with anything else that might contaminate them

5) Expose pads to water exactly as directed - dipping, swirling, and swishing are different motions.

6) Don't flick off extra water unless so instructed

7) Let correct amount of time elapse for starting and completing the readings

8) Read test values in the order given

9) Prevent reagents running between pads by holding strip horizontal to the ground when comparing colors

10) Make color matches in natural light without sunglasses

11) Don't use strips past the expiration date

The Centers For Disease Control recommend people who use public pools and spas, like at the gym or a hotel when traveling, use test strips to test the water themselves before entering... just in case the operator has been negligent in keeping up with the sanitizer demand. For this reason, **Taylor Technologies** offers 10 test strips in a resealable foil pouch that fits into a pocket, purse, or gym bag (product #K-1305). For more information, visit: http://cdc.gov/healthyswimming/pdf/pool_user_tips.pdf - Courtesy of Taylor Technologies

Taylor Test Kits

The kit I personally have used the most is Taylor Technologies' Complete™ Kit. People in the business often refer to it by the product number: the "**K-2005**" or "the 2005 kit." Professionals favor this kit because it has an accurate all-liquid DPD test for determining the level of active chlorine (versus spent chlorine) in the water, and because it has all the tests for water balance. The 2005 kit includes a 64-page chemistry guide and a nifty round slide rule called a Watergram® that tells you, after you plug in your test results, whether your water should be treated to address scaling or corrosive conditions that can damage pool surfaces and equipment. The K-2005 has been on the market for 40+ years and has an excellent track record.

About 15 years ago Taylor came out with a variation on the K-2005 called the "**K-2006**" or Complete™ FAS-DPD kit. The only difference is the chlorine test, which employs a powder reagent plus the dropper bottles with liquids. Instead of matching colors to get a reading, with this method you simply count the number of drops needed to make the treated sample go colorless. Colorblind people can use this test successfully. The range of the chlorine test is greater too. It can read as low as 0.2 parts per million (ppm) and up to 20 ppm without the indicator color getting bleached out by a high level of chlorine. Although this kit is mostly used by health department inspectors and public pool operators, I've met homeowners who really, really like the K-2006. They are either very techie or they're among the 6-8% of men (and some women) who can't match the pink colors of the standard DPD test.

K-2006

K-1005

Most recently Taylor introduced a test kit that does for residential pool owners what the K-2005 does for industry professionals. Called the i-CARE Kit™, or "**K-1005**," it's priced lower partly because it doesn't contain the Watergram® or big chemistry guide. You go to Taylor's online water analysis program to plug your test readings in and get treatment recommendations (the "i" in the name stands for Internet), or use the charts provided in the kit. I've used the i-CARE kit and can recommend it heartily.

For those of you who are only interested in test strips, I should mention Taylor offers 4-way and 6-way strips in a unique shaker dispenser that prevents wet fingers from spoiling the contents. If you can't find Taylor's ***sure*TRACK® strips** in a store, they're available on the company's website, **www.taylortechnologies.com**. (FYI, their website has a wealth of information about pool/spa chemistry in the Learn More section.)

Taylor makes the only testing supplies recommended by the American Swimming Coaches Association

About Chlorine

What Is The Purpose Of Chlorine?

Chlorine (also known as Sanitizer) is one of the most important chemicals as far as swimming pools are concerned. It works as a sanitizer or disinfectant in pool and spa water to kill bacteria and algae. By oxidizing ammonia and nitrogen compounds such as swimmer waste, it literally burns up organic material in the water and reduces the load on the filter. As a sanitizer, chlorine kills germs in fairly short order, usually milliseconds. Keep in mind that if germs are not killed quickly, then swimmers can become infected by an assortment of unpleasant micro-organisms.

How Much Chlorine Is Necessary?

It is important to maintain a chlorine residual in the pool water at all times. A chlorine residual is the chlorine that is in the water waiting to oxidize or sanitize the “bad stuff”. Generally speaking, you need to keep it between 2.0 and 5.0 parts per million (ppm) of chlorine in the water. This requires that chlorine be added to the pool on a regular basis in order to maintain the proper level. By testing once a week, and adding chlorine when needed, in time you will establish a pattern on what works for you and how much to add. Be sure to use the maintenance chart on page 127 as a guide.

How Do I Maintain Proper Chlorine Levels?

To maintain proper chlorine levels, it is important to test your water regularly using a DPD test kit, electronic photometer, or reliable test strips. I encourage testing the water chemistry at least once per week, or more during times of heavy usage. Bring water samples to your pool store if you aren’t sure how much chlorine to add. Be sure to have your pool water volume and size with you (page 8).

Chlorine Adjustments

It is extremely important to maintain a consistent level of chlorine in the pool. If the chlorine level is allowed to drop to zero, the pool will develop algae and swimmers will be at risk of infection. Once again, testing your pool once a week cannot be overemphasized.

Important Terms & Information

Free Chlorine - The active form of chlorine available to kill bacteria and algae. This test tells you how much chlorine is working for you in your pool.

Combined Chlorine - Chlorine that has been combined with ammonia, nitrogen or other organic compounds that are in the water.

Total Chlorine - The sum of the amount of free chlorine and combined chlorine. This is a reference test only and should not be used to judge how much chlorine to add to your pool.

Chlorine Demand - the amount of chlorine that is needed to burn up all the contaminants in the water. Typically, a heavily used pool will have a high chlorine demand and will use a lot of chlorine while a lightly used pool will have a low chlorine demand.

Factors that increase chlorine demand - Heavy usage • Sunny weather • Hot water • Low stabilizer level

Factors that reduce chlorine demand: - Low usage • Lack of sunlight • Cold water

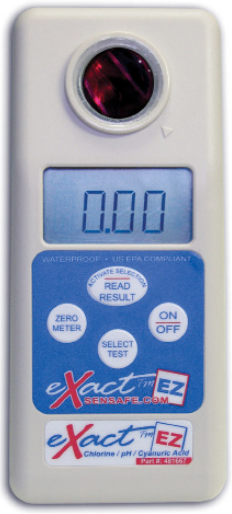
Testing Free Chlorine

Properly estimating chlorine demand is very important because if you do not, your pool will either run too high or too low on chlorine. Make notes on the maintenance chart (page 127) and pay attention to how much chlorine you add over a one - two month period. By doing this, you should see a pattern that will help you judge future applications.

1. Fill the small TAYLOR test vial, to the 9 mL mark with pool water. Add five drops of R-0001.

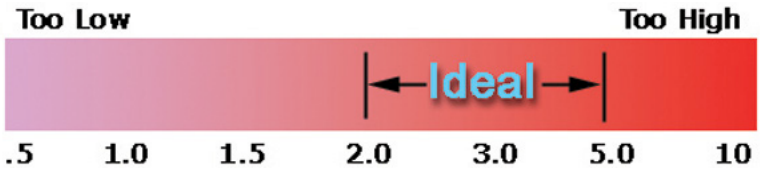
2. Next, add five drops of R-0002, put cap on container, mix well, and compare the sample color with the printed colors on the test vial.

3. An acceptable reading in the industry (depending on the state) is between 2.0 ppm - 5.0 ppm.

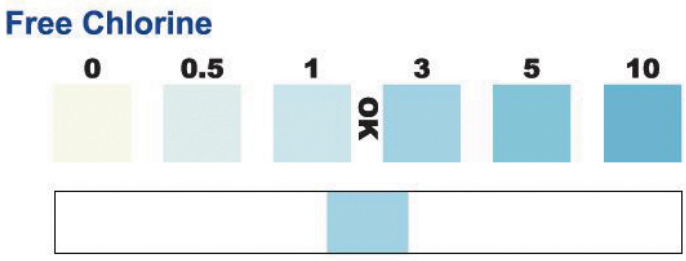


eXact® EZ Photometer

2.0 - 5.0



DPD Liquid Reagent Test Reading



PoolCheck ™ Test Strip

High Readings If the test sample color is 5.0 ppm, dilute and re-test according to the instructions, or, take a water sample to a pool store for a more precise reading. If the drops of R-0002 turn red for a second when they hit the sample and then turn clear, your sample may be bleaching out due to extremely high levels of chlorine.

Low Readings - Hot, sunny days, lots of swimmers, or a heavy rainfall can reduce the level of chlorine. If the chlorine is too low, it is important to quickly raise the chlorine level to keep swimmers safe and prevent an algae bloom.

If algae develops, raise the chlorine level and brush pool to expose the algae. Discuss how much chlorine to add with a professional. By adding the proper amounts of chlorine, you shouldn't have to buy any chemical additives.

IMPORTANT: If you have to add a lot of chlorine to your pool, keep children and adults out of the water until the sanitizer (chlorine) drops to under 5.0 ppm and has balanced to an acceptable level.

pH Balance

pH is a measure of how acidic or basic the water is in the pool. The concept of pH balance can be confusing, but it is actually fairly simple:

NEUTRAL pH is very good for your pool and the industry standard is between 7.4 - 7.6. This is the most common target point for pool water. Your eyes have a pH of 7.5. If the pH is high, your eyes will sting. If the pH is low, you will experience dry eyes.

ACIDIC (7.2 or lower) means that the water is generally "under-saturated" or "hungry" and is seeking something to raise the pH level. Soda Ash is usually used to raise the pH level. Some pool companies use Sodium Bicarbonate (baking soda) to raise the pH but it will also raise the Total Alkalinity (TA) of the pool water.

Acidic water tends to corrode or etch metal and copper pipes and your pool's surface. If you get lower than 7.2, you risk a corrosive environment in the water. High pH levels can corrode the heating elements of a heat pump and screw up your system and pipes. Salt cells in a salt system can also be damaged. Consult with factory recommendations for ideal pH settings.

BASIC (7.8 or higher) is generally "over-saturated"; meaning that it wants to deposit some of its excess material. Pool Acid is used to lower this level and bring it into proper range

Basic water tends to deposit scale or, carbonates, on your pool's finish or tile. It can also cause cloudy water which is a sure sign something is terribly wrong.

Pool Acid and Sodium Bicarbonate can be purchased at your local pool store. There are two types of pool acid. I prefer the "Non-Fuming" brand (versus Muriatic Acid) as the fumes aren't as strong.

pH Adjustment Tips

1. When adjusting pH levels using pool acid or Sodium Bicarbonate, usually, you can see a difference in the test readings in under an hour. Make sure the pool pump is running to circulate the water.

2. If the pH is way off, don't add excessive amounts of pool acid or sodium Bicarbonate with hopes of balancing everything out quickly. If this is the case, add chemicals and wait 24 hours and adjust again. If you still have problems, take a water sample to your pool store and have them test it.

3. High chlorine levels can cause the pH test to come out wrong. If the free chlorine is high, wait until the chlorine/sanitizer level is normal, then retest.

4. Fiberglass pools typically have low pH readings and you may have to use more Sodium Bicarbonate to raise the pH. If this doesn't solve the problem, get advice from your pool store professional.

5. Do not add more than 1 gallon of pool acid per 10,000 gallons of water at one time. If the pool requires more than this, add the maximum amount then retest 12 hours later and make further adjustments. This will help to keep you from over-treating the pool.

• A good rule of thumb - Once your chemicals are properly balanced, for every 2.5 gallons of chlorine you add to your pool, add 1/4 - 1/3 gallon of pool acid in the deepest area of the pool next to a return jet.

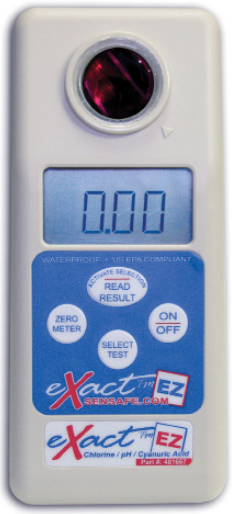
Testing pH

The pH test is fairly straightforward. It is based on a phenol red solution which turns different colors based on the pH of the water.

1. Fill the large TAYLOR test vial to the 44 mL mark with pool water.

2. Add five drops of R-0004, put cap on container and mix well. Compare the sample color with the printed colors on the test vial.

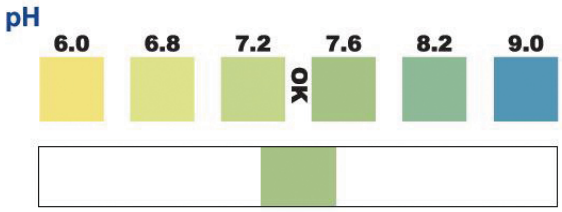
3. An acceptable reading in the industry (depending on the state) is between 7.4 - 7.6.



eXact® EZ Photometer

7.2 - 7.6

Phenol Red Liquid Reagent Test Reading



PoolCheck ™ Test Strip

Adjusting pH levels

Adjusting the pH is something that should be done incrementally. It is better to make slight adjustments when the pH gets a little high or low during your weekly testing.

LOW pH (7.2 or lower) - Start by adding about one scoop of a pool measurement cup (app: 20 oz) of Sodium Bicarbonate into the skimmer, or, pour it around the edge of the pool in the deep end. Don't pour it all in one place or it will cloud up the water.

HIGH pH (7.8 or higher) - To lower the pH level, add one quart of Pool Acid at a time (one quarter of a gallon bottle) around the deep end of the pool. Check in about an hour and note the difference from your original reading. Keep adding Pool Acid in small increments until you reach the proper pH level. Because there are so many variables in pool sizes, I have found this to be the best method.. a little at a time until you get the hang of it. (Be sure to make notes on the chart on page 127)

Total Alkalinity (TA)

If the water in a pool becomes overly acidic (the pH gets too low), the water becomes “hungry” and attempts to balance itself. It can balance itself in one of two ways:

1. It can dissolve some of the plaster, and the metal parts in the pump, filter and heater.

2. It can dissolve some of the alkaline materials (total alkalinity) in the pool water. Obviously, this is the preferable way to go, because it is a lot easier to replace the alkaline materials in the pool water than it is to replace the pump, filter, heater, or plaster.

Ideal Alkalinity will buffer pH swings so they do not attack the plaster or cause the pH to fluctuate excessively. A good TA reading is between 80 and 120 and helps to protect the water against pH changes.

Low Alkalinity (under 80) will cause the pH to swing up and down fairly wildly and damage the pool or equipment over time.

High Alkalinity (over 120) may cause the water to cloud up because the water is over-saturated and there is only so much material that it can absorb

The use of Sodium Bicarbonate (baking soda) can be used to raise the TA level, while Pool Acid is used to lower TA. Once you establish a consistent chemical balance after weekly testing, your TA level should stay relatively constant.

NOTE: Do not add more than 1 gallon of Pool Acid per 10,000 gallons of water at one time. If the pool requires more than this, add the maximum amount then retest 12 hours later and make further adjustments. This will help to keep you from over-treating the pool.

Testing Alkalinity Levels

The Total Alkalinity test involves the use of three reagents for a proper reading.

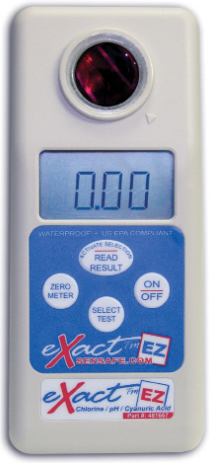
1. Fill the large TAYLOR test vial to the 25 ml mark with pool water and add 2 drops of R-0007 to neutralize the chlorine in the water. If your chlorine level is above 5 ppm, add one more drop in order to neutralize the chlorine.

2. Add 5 drops of R-0008 to the sample and swirl until you see a consistent green.

3. Add R-0009 drop by drop, swirl the water and count the drops until the sample turns from green to red. Multiply the number of drops by ten to get the total alkalinity reading. i.e: 10 drops = 100 ppm.

4. A good TA reading is between 80 and 120 and helps to protect the water against pH changes.

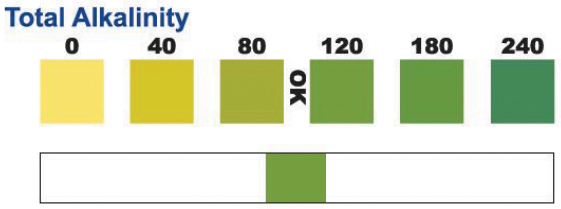
NOTE: If the chlorine level is high, the color may flash from blue to yellow instead of green to red. This can be solved by adding more neutralizer as described above, and then test again.



eXact® EZ Photometer

80 - 120
(Use Conversion Chart)

Liquid Reagent Test Reading



PoolCheck ™ Test Strip

Adjusting Total Alkalinity - pH and Total Alkalinity (TA) adjustments can affect each other. Always correct TA first, then pH.

Raising Low TA levels (under 80) - With pump on, add about one scoop of a pool measurement scoop (app. 20 oz) of Sodium Bicarbonate into the skimmer, or, pour it around the edge of the pool in the deep end. Don't pour it all in one place or it will cloud the water. Test in about an hour and add more if needed.

Lowering High TA levels (over 120) - Add one quart of Pool Acid at a time (one quarter of a gallon bottle) around the deep end of the pool and away from the return jets. This creates pockets of low pH, burns off alkaline materials, and brings down the TA without significantly lowering the pH. Check in about an hour and note the difference from your original reading. Keep adding pool acid in small increments until you reach the proper TA level.

Stabilizer (Cyanuric Acid)

Because chlorine is very unstable in the presence of sunlight, it dissipates very quickly, especially on a sunny day. Stabilizer is a chemical that is added to outdoor pools and keeps the chlorine from being used up quickly. If it is too low, your chlorine dissipates at a fast rate. If it is too high, the effectiveness of the chlorine is greatly reduced.

Stabilizer can be added by itself, or as part of chorine compounds called Trichlor Tablets, or Dichlor Granules.

IMPORTANT - A standard tab of stabalized chlorine, (trichlor) contains up to 5+% of stabilizer. If someone has convinced you that you can use trichlor tabs instead of chlorine, remember that each time you use a this tab, it raises your stabilizer level. NOTE: Cal Hypo tabs and do not contain stabilizer so be sure to discuss this product with the people at your pool store.

Any time you use triclor tabs, or, add dichlor stabilizer granules, you need to keep a close eye on your stabilizer levels. If the level exceeds 100 ppm, your chlorine becomes ineffective. Yellow algae and poor sanitization are among the problems you will encounter. You may have to dilute the water in your pool. If so, consult with a professional at your pool store.

Adding Stabilizer (Dichlor Granules**)**

1. Once you establish your stabilizer level on the next page, if the stabilizer is too low you will have to add the required amount to bring the level up. Typically, you will find the suggested dosage on the back of the container it comes in.

2. Make sure you clean your filter before adding stabilizer as the granules settle into the filter. If you clean the filter after adding stabilizer, you are literally washing your money away.

3. With pump running, remove skimmer lid and slowly pour the required amount of stabilizer granules into the pump system. ADD IN SMALL AMOUNTS! Do not put more than 1 pound of stabilizer* into the skimmer over the course of an hour as the particles could jam your pump basket. Wait 24 hours to read stabilizer level in water.

IMPORTANT! Be patient when adding stabilizer! If you put too much in at one time, you could have a “big ol’ mess” on your hands that jams the skimmer, or even worse... the plumbing system (don’t ask me how I know this).

* NOTE: Again, the above steps are dependent on pool size, so it may take some experimentation on your part. If you have a small pool, start with 1/2 lb of stabilizer or less.

• If, after testing your water and your readings makes no sense to you, have it re-tested by a professional. If you add too much stabilizer, you can’t remove it without diluting the water in the pool.

Testing Stabilizer

1. Your TAYLOR test kit contains a small, clear, plastic dispensing bottle. Fill this bottle halfway to the 7 mL mark with pool water and an equal amount of reagent R-0013, then mix vigorously for 30 seconds.

2. On the left side of your comparator block (test vials) you will see numbers on the back of the small vial ranging from 30 -100 and a black dot at the bottom.

3. Dribble the reacted test sample into the test vial until the black dot at the bottom of the vial is no longer visible and then take the reading from the markings at the side of the vial. If the water comes up to the 60 marking, the level is 60 ppm (the more stabilizer that is in the water, the cloudier the test sample will become).

4. A proper test level is 30 - 50 ppm. By 80 ppm, you run the risk of having too much stabilizer in your pool; inhibiting the sanitizing ability of the chlorine in the pool. Do not use any more trichlor tabs if you reach this level.

eXact® EZ Photometer

40 - 60

Liquid Reagent Test Reading

Calcium Hardness

Calcium hardness is a measure of the dissolved calcium in water. The calcium hardness level should be maintained at a minimum of 200 ppm. If it exceeds 500 ppm, then the pool water may need to be diluted. Normally, except in the western U.S., calcium hardness levels do not get too high unless the pool is using large amounts of calcium-based chemicals like Cal Hypo chlorine granules or tablets.

There are a couple of problems that can result from having improper calcium hardness levels: 1. If the calcium hardness is too low, then the calcium starved water may leach calcium out of the plaster, causing pitting. 2. If the calcium hardness is too high, then cloudiness or scaling (crusty deposits) may result. Typically, the majority of scaling problems occur right after the pool is re-plastered and is the result of plaster dust that adheres to the surface.

Testing Calcium Hardness

Because calcium problems appear under extreme conditions, take a water sample into your pool store every four weeks for a test. If they discover problems, research solutions or bring in a professional to asses the situation. The fact is, there are too many variables and if you take bad advice or do something wrong, you can take a bad situation and make it worse!

The Calcium hardness test involves the use of three reagents for a proper reading.

1. Fill the large TAYLOR test vial to the 25 mL mark with pool water and add 20 drops of R-0010.

2. Add 5 drops of R-0011L to the sample and swirl until you see a light red.

3. Add R-0012 drop by drop, swirl the water and count the drops until the sample turns from red to blue. Multiply the number of drops by ten to get the calcium hardness reading. i.e: 30 drops = 300 ppm (disregard any pink “floaters” caused by magnesium hardness in the water).

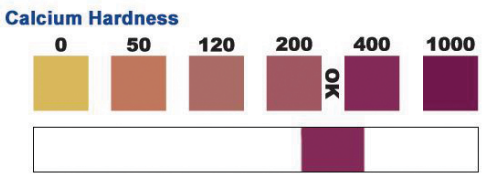
4. A good Calcium hardness reading is between 200 and 500. If the calcium level is above 500 consult with your local pool professional.

eXact® EZ Photometer

200 - 500

(Use Conversion Chart)

Liquid Reagent Test Reading



PoolCheck ™ Test Strip

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Chapter 5

Cleaning Your Pool

Cleaning Your Pool

OK, we are on the last leg of the journey: Vacuuming, brushing, netting and cleaning the tile along the top of the your pool. Before you begin, the following pages contain essential equipment you will need in order to do a proper job and impress your friends and family. Initially, it will be an investment of about $80.00 - $150.00 depending on the quality of equipment you buy. Just remember that unless you store these tools properly in a tool shed or in your garage, they will be exposed to sunlight and could deteriorate quickly. It may be worth your while to spend a little extra money on quality equipment.

Use this checklist to be sure you have everything you need to clean your pool:

_____ Pool Pole	_____ Vacuum Hose Cone
_____ Pool Net	_____ Vacuum Hose Coupling
_____ Pool Brush	_____ Tile Brush
_____ Vacuum Hose	_____ Tile Soap

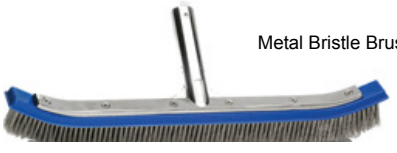
Pool Pole – I have seen a number of telescoping pool poles on the market. The most popular extend approximately 8 - 20+ feet. One of the most popular has a tightening handle in the center. My personal favorite self tightens just by twisting the inner part of the pole.

Pool Net – It never seems to amaze me of the variety of pool nets that are on the market, when in reality, a basic net that has a deep pocket about 10” will solve all of your needs. One of most inefficient pieces of pool equipment I have seen is the leaf rake, which is flat and designed to scoop small leaves or bugs off the top of the surface. The problem is that unless you have developed a constant up/down, in/out motion for scooping, you wind up leaving the mess back on top of the water every time you break the waters’ surface.

A net with a deep pocket is the only way to go, trust me. Some nets have an aluminum neck that clips into your pool pole. If you have light debris, this post is fine. However, if you have to scoop a lot of heavy, waterlogged leaves, in time, the aluminum begins to bend and break. My personal favorite is a deep pocket net with a plastic post. They are a lot sturdier than the aluminum posts.

Pool Brushes

There are three types of pool brushes:


Metal Bristle Brush

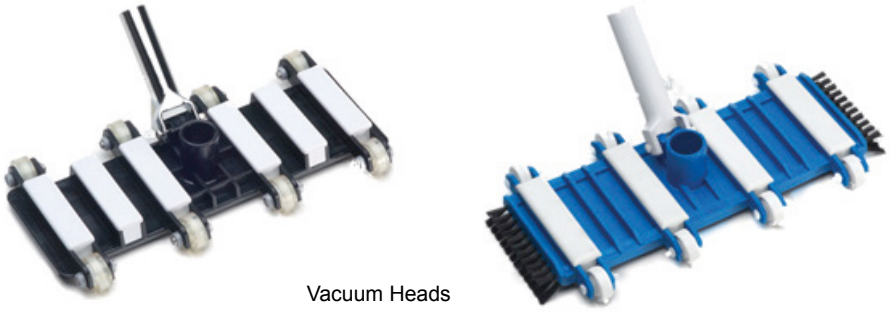

Nylon Bristle Brush


Metal/Nylon Bristle Brush

Metal Bristles - can be harsh on a pools' surface and wear down the pool finish a lot faster. This is good for a pool with a lot of stains on the walls (we will discuss stain removal in chapter 8).

Nylon Bristles - are soft and best used on a fiberglass pool as a metal brush will scratch the plastic finish. NOTE: Plastic bristles tend to break down quicker when exposed excessively to the sun and weather. This can be frustrating if you are brushing your pool and the bristles start to fall off and float on the water. Be sure you buy a brush that says "Nylon" on it.

Metal/Nylon Bristles - a personal favorite, the combination of metal and plastic bristles are perfect for just about any pool.



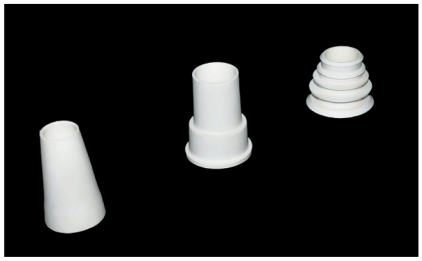
Vacuum Heads

Vacuum Head - again, there are many choices, but for the typical pool, a standard head is fine. If you can find one that feels a bit heavier than the rest, these vacuum heads tend to stay on the pool floor better because of the extra weight.

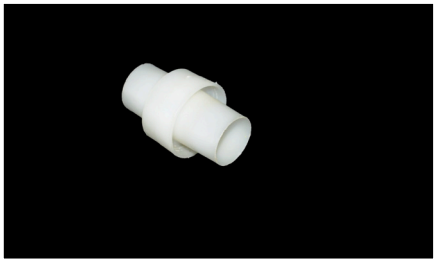
Vacuum Hose - I prefer a plastic hose that has a nice flexibility to it, which makes it easier to roll up when you are finished vacuuming. I am surprised at how stiff the plastic is on some hoses. Before buying one, try to test a sample hose in the store. My personal favorite is the "Bosun Hose" brand simply because they are easy to manipulate and wrap well when done. Ask for it by name. Before purchasing, you will want a hose that is long enough to stretvch from your skimmer to the furthest end of your pool. When measuring this distance, be sure to include the distance from the top of the water to the deepest part of your pool.

Choosing the Right Vacuum Cone

Vacuum Cones And Coupling - Two simple devices that make life easy, a coupling plugs into one end of your vacuum hose and then into the cone. When you put your hose into the skimmer port to vacuum, this ensures a tight fit. Be sure it is firmly attached to the hose.



Vacuum Cones A B C



Coupling

Cone attached to coupling and vacuum hose

Turn off pump so that there is no suction in the skimmer. With cone A attached to the coupling and vacuum hose, put it into the skimmer hole. It should fit snugly about halfway. Some skimmer holes are larger than normal and the “A” cone could be pulled into your pipe if the suction hole is too large. If cone A goes more than halfway into the hole, use cones B or C to create a solid seal. If this is the case, you will not need cone A as the coupling attached to your vacuum hose will fit nicely into either of these cones.

CAUTION: make sure the pump is off so your hand doesn’t get pulled into it from the pump suction. Once hose is firmly seated in skimmer hole turn on pump.

NOTE: Some skimmer bottoms have two holes, one of which may be sealed off. Be sure you are putting the cone into the correct hole that has the suction. If you put it into the wrong hole with no suction, you will be scratching your head trying to figure out why the vacuum hose doesn’t ramp up. If you aren’t sure which is the proper hole, turn pump on and put a couple leaves or grass into skimmer and watch which hole they are sucked into.

Tile Brush and Tile Soap

Cleaning Your Pool - Finishing Touches

Tile Brush And Tile Soap - Lets clean your pool like the professionals. A tile brush on an extending pole is the easiest and most efficient way to clean your tile. A gallon of tile soap will go a long way and is a minimal investment.

Bugs, Critters and Frogs

In the years spent cleaning swimming pools, I have saved thousands of helpless critters, bugs and frogs by skimming them out of the water with my net and setting them in the sun to dry out. When my time comes and I stand in front of the pearly gates, perhaps there will be a notation in the great book that says “Mr. Christensen has saved over 4,256 little critters from swimming pools.”

The fact is, it breaks my heart to see a little critter trapped in a large body of water that is not part of its natural environment. Although I’m not particularly fond of bugs or rodents, I take pleasure in saving the industrious frog who has sat on top of a skimmer basket for a week, or bugs and spiders clinging to an automated floor vacuum hose in hopes of rescue. When I’ve found a frog that has been in the water so long that its skin is white or grey, or, I have to fish a live snake or small rodent out of a skimmer basket, I wish that someone would invent a humane way to save them.

Critter Skimmer

My wish came true when I met Brian Meagher at the Orlando pool show in January 2008. He had just developed the Critter Skimmer, a revolutionary invention that allows critters to save themselves by crawling up a detachable spiral ramp and out the opening of a pool skimmer cover. Once they are out, they are free to go on and enjoy the wonders of Mother Nature.

Brian shared the same enthusiasm as I did for saving helpless creatures, and after years of finding frogs either dead or near dead in his pool skimmer, he went into his workshop and carved out the first Critter Skimmer and popped it into his pool skimmer. After that, it was just a question of time to see how effective his invention was.

During his morning ritual of “coffee-drinking and skimmer checking”, he never found a dead frog in his skimmer basket! Occasionally, a frog would be on the ramp that hadn’t found its way to freedom, but most mornings, he found nothing, even after it rained when unwelcome visitors to a pool are at their highest! When he removed the Critter Skimmer for 24 hours, he found 29 frogs in the skimmer basket with no means of escape. It was then that he realized that he had to share his invention with other pool owners and save frogs in pool skimmers throughout North America.

Some people might shrug their shoulder at frogs that wind up in their pool, but as the world climate changes, there aren’t as many frogs as there used to be! Considering how important they are in the natural life-cycle process, 2008 was designated the Year of the Frog by The Association of Zoos and Aquariums and marks a major conservation effort to address the amphibian extinction crisis.

It all comes down to this: No one wants to to dive into a pool surrounded by frogs and critters floating on their backs. I highly recommend this product to anyone who cares how their pool looks, as the Critter Skimmer is without question; the finishing touch to “The Perfect Pool”! Made from highly durable plastic far above industry standards, it fits most swimming pool skimmer holes, square or round. The cost is comparable to most new skimmer cover prices and is available at **207.450.0300 • www.critterskimmer.com**

Buy a Skimmer. Save a Frog!

Preparing to Vacuum Your Pool

Before you vacuum, look around your pool. Is there anything along the edge that you can trip over? You should have a minimum of 4' - 5' clearance around the pool without worry of tripping over anything. Are there toys or floats in the pool? Take them out as they can gather and hide leaves and debris.

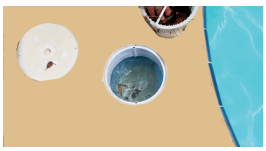
CAUTION: Is your pool deck flat all around the pool? Some pool decks have one or two steps around their perimeter. These steps can be your nemesis once you get into cleaning mode. There is nothing worse than walking around a pool and taking a step into air and falling because of a forgotten step. Mark the area with something colorful that is in your sight but not in your way.

1. Attach one end of vacuum hose to the vacuum head and the other end to the coupling and cone. Make sure you have a tight fit on both ends. If they are loose, a few strips of well-placed electrical tape can solve the problem.

2. Attach your pool pole to the vacuum head. The easiest way to do this is by laying both pieces on the ground and attaching pole to the vacuum head. Now extend your pole and drop vacuum head into pool as far away from the skimmer as possible. Lean pool pole firmly against side of pool so it doesn't float away.

As your hose uncurls, grasp it in your hands and stretch it straight until you get to the skimmer, then let it lie on top of the water. This ensures an easy vacuuming process without getting the hose tangled.

3. Walk over to your pump area, turn on motor and turn valve handle going into pump to main drain (MD) in order to shut it off. This leaves the skimmer (SK) all the way open for maximum suction.



4. Remove skimmer lid and basket and pay close attention to the water flow. Can you see water being sucked into the port at the bottom of the skimmer? If you aren't sure, throw a small leaf into the skimmer. If it gets sucked into the port quickly, you have good suction. If it floats, refer to Valve Adjustments on page 28.

5. Next, let's get water into your hose by creating a suction. This can be done two different ways:

a. Hold the hose over a side jet to fill it with water. Be cautious of the strong water pressure.

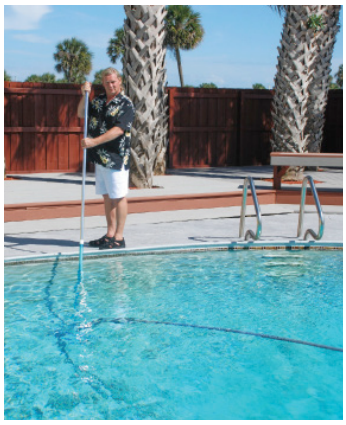
b. Hold the end of hose under the water and pump it up and down until you get water flow.

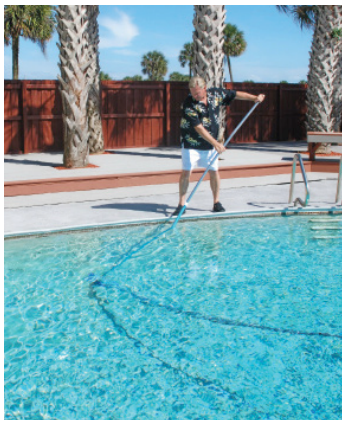
6. Place the end of the hose into the skimmer and push it gently into suction port to ensure it has a good fit. CAUTION: There is a strong suction here so keep your hands away from the skimmer suction port. To be safe, turn off pump motor while you put hose into suction port, and then turn it back on when firmly seated. Let pump suction take out any remaining air from hose. If there is air in the hose you will see air bubbles coming out of the side jets. When the bubbles are gone, you should have a good suction and are now ready to vacuum the pool.

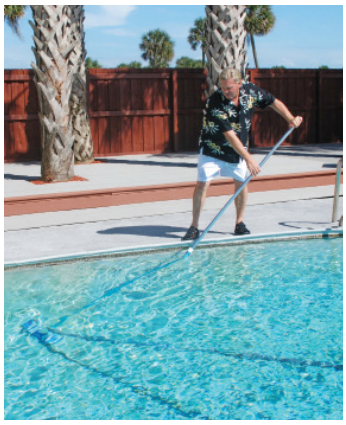
If the air does not dissipate and bubbles continue to come out of the side jets, you may have a problem with the pump not priming properly, or a potential leak in the pipe. (See page 30 for more info).

NOTE: On rare occasions, the vacuum suction is too strong and portions of the hose start to collapse. If this happens, reevaluate your valve settings and open the valve between the main drain (MD) and skimmer (SK) until the hose is OK.

Preparing to Vacuum Your Pool



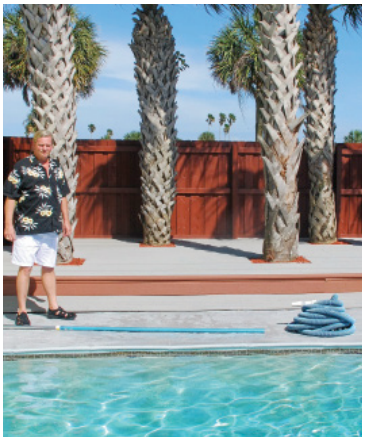




With pole firmly in hand, slowly move vacuum head on the floor of your pool. Choose an area to focus on and mentally divide your pool into four to six areas which you will vacuum one at a time. With a slow, easy sweeping motion, move the vacuum head back and forth. If there is lot of debris, you may have to go very slow until it is all picked up. Keep in mind that this debris goes into your pump basket and if it fills up, you may have to empty it during the course of vacuuming so it doesn't interfere with the water flow. If there is a lot of debris, use an in-line strainer (see page 65) to prevent debris from going into the pump basket. Vacuum the floor of the pool until it is to your liking.

Once you are done vacuuming the bottom, here is a trick: Set the pole and vacuuming head into the slight curvature of the pool between the wall and bottom and slowly push the pole in front of you, focusing only on this curvature. If you get good at this, you can push the vacuum head around a good part of your pool with minimal work.

When finished, turn off pump, and remove vacuum head from pool. Set flat on deck as far away from skimmer as possible. Leave other end of hose in skimmer. Turn pump on for a few seconds to draw excess water out of hose (this makes it easier to wrap) and turn off pump. Do not leave pump on for very long, or else you will get too much air in your system making it difficult to prime. If you do not feel comfortable with this method, remove hose from skimmer and elevate portions of hose until all of the water is out.



With hose now lying flat, drained and stretched across the water, leave pole attached to vacuum head and lie on deck. Pull hose towards you and roll it up around vacuum head in slow easy motions, clock wise or counterclockwise, which ever works best for you. Once rolled up, detach pole from head (when it is attached, the head doesn't roll away) and store in an out of the way place. Be sure to replace skimmer basket and skimmer lid.

Re-Priming Pump

(See page 20 for photos)

1. With the pump turned off, open the lid of your pump basket and empty any debris that was deposited from vacuuming your pool. Most baskets turn partially counterclockwise and lift out. Inspect basket. If it is cracked, replace it as debris will be sucked into pump and filter.

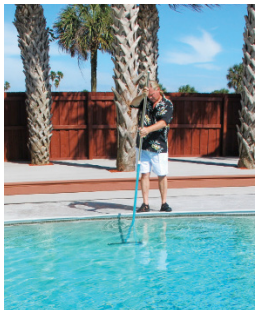
2. Put water into the pump with a garden hose until filter and pipes fill with water and the pump overflows. Turn off hose, lubricate pump lid O-ring, screw lid back on and set skimmer/main drain valve back to its original position.

3. Turn on pump and open the air release valve on the filter to let excess air out. It should ramp up pretty quick at this point. Watch the pump basket carefully until you see a good flow of water going into it. A few air bubbles may blow out of the pool jets, which is typical. Walk to your skimmer and remove lid. Do you see water movement? If so, you're set. If you aren't sure, do the leaf test mentioned above.

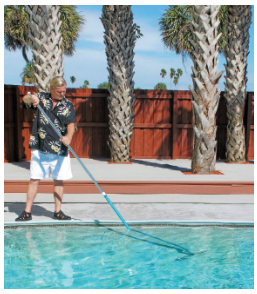
NOTE: If air continues to blow into pool, re-prime pump according to steps above. Make sure the pump lid is tight (don't over tighten) and creating a good seal. If air continues to come out of the jets, or, pump doesn't prime properly, you may have a leak in the pipes or pump. If so, turn off pump at the breaker switch and call for service. If water is not going consistently into the pump, or, you open the pump basket lid and the water is hot, you could burn out your motor. Call for service.

Brushing the Walls of Your Pool

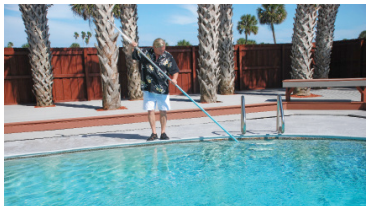
Attach brush to your pole and rev' up the ol' arm muscles. As simple as you would think this should be, there is definitely a right and wrong way to brush your pool.


THE WRONG WAY

THE WRONG WAY: Brushing in an up and down motion. I have seen many people do this and I get tired watching them. Just don't do it this way!


THE RIGHT WAY

THE RIGHT WAY: With pole firmly in hand and tilted at a 45 degree angle, apply even pressure on brush against the wall and slowly walk around your pool, brushing in an even, steady motion of 3' - 4' lengths. I have found that by walking and brushing at the same time, it is a lot easier on your arms and back. Be careful and watch where you walk so you don't trip (watch for steps). By brushing this way, you will find it much more efficient. Pay close attention to trouble spots and brush them a bit harder. Remember, a 45-degree angle works better whether you are standing or walking.

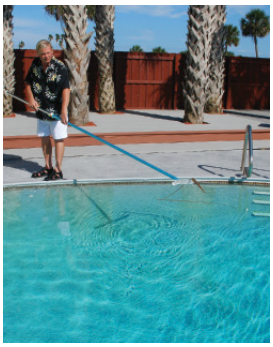


Next, walk around your pool with brush in hand and brush the upper tile to push any debris away from the wall. If there are stains on the tile, don't kill yourself with this brush; we will get to that in minute. Be sure to scrub any ladder steps in your pool. By getting deep into the nooks and crannies, you will prevent algae from discoloring the steps.

Brushing the Pool Tile

Let's do some fine-tuning. Extend your tile brush and pole to a comfortable position, wet the brush and pour a silver dollar size of tile soap onto the brush. Choose a small area and brush your tile in a back and forth motion. If your tile is very dirty, or you have turquoise colored tile from the 60s and 70s, focus on this dirt by moving the brush in an up and own motion. You are almost done!

Netting Palm Fronds



Despite all the TV shows and movies that show towering palm trees in neighborhoods lush with greenery, what you never see is the variety of debris they drop into a pool over the course of a year. Long thin palm fronds are particularly troublesome to net out of a pool and any one who has tried to do so has found this a frustrating experience as they continually fall out of the net and/or rip holes in it. Here's a trick: With your wall brush attached to your pool pole, gently put the brush under the center of the palm frond and slowly lift out of water. As it begins to come above the water level, do a quick jerk with the pole to throw the strand outside the perimeter of the pool.

Netting Your Pool

When you have brushed the walls and tile of the entire pool, attach the net to your pole and skim any leaves or debris from the surface. Empty net frequently if necessary. Perform this procedure as you did while brushing by walking around the edge of the pool. I like to net in the opposite direction of the way I just brushed the wall as the debris flows a little better into your net. Before we finish, let's do ...

The Very Last Step!

I'll assume that this is the first time you've really given your pool a good cleaning for a while. Let's start fresh and clean the filter and pump basket. You shouldn't have to do this every time you vacuum your pool but I do recommend a monthly filter.

Congratulations!
You have just cleaned your pool using the EX-Clear Pool Care System!!

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Chapter 6

Automated Pool Vacuums

Automated Floor Vacuums

Automated floor vacuums that run independently while connected to your filter and pump system are, without question, one of the greatest inventions ever made for pools!

Imagine not having to go through the hassles of vacuuming your pool and letting an automated machine do the work for you. Anyone who has ever vacuumed the bottom of a pool full of dirt, sand or leaves is certain to appreciate the convenience of a device such as this.

There are a wide variety of automated floor vacuums available on the market, but which is the correct one for your pool? Believe it or not, pool store employees, in most cases, are the wrong people to ask for advice unless they have serviced pools on a regular basis. This reasoning is quite simple; some pool stores encourage employees to push a certain model because of a better price from their corporate office or buyers. Unless they have serviced pools, they really don't understand what the best vacuum for a pool's specific needs are.

Although there are numerous models to choose from, floor vacuums for the average pool owner range from $300.00 - $400.00 (many have a $50.00 rebate). With that kind of investment, there is no reason that you should buy a model that isn't suited for your pools particular needs. This article will go over four basic models: Hayward Ultra, Zodiac/Barracuda, Great White, and Polaris.

Your Friend... The Automatic Floor Vacuum

It has always astounded me when I filled in for a pool tech that was sick, that their floor vacuums weren't working at peak performance. As a result, they would be vacuuming pools the traditional way, causing them excessive, and unnecessary work. Having said that, if the conditions are right, and you follow my guidelines for proper adjustments, your automated floor vacuum can be your best friend!

Quite honestly, if you have a floor vac in your pool, you should rarely, if ever, have to worry about vacuuming your pool. Of course certain adjustments have to be made for maximum performance, which is covered in this article.

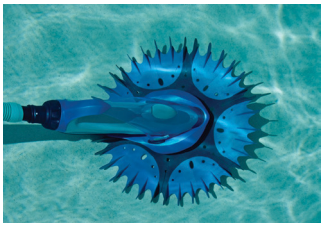
The Basics
An automated floor vacuum (to be referred to as a "Floor Vac" or "Vac" in the rest of this article) is typically attached to a hose similar to the 2" round diameter hose you use to vacuum your pool except these hoses are in 3' - 4' sections that interlock. They are generally attached inside the skimmer port, while some pools have an additional port on the pools' wall (known as a side port) that runs directly to the pump. The debris is then sucked into your pump basket and filter, which should be cleaned frequently. If you have a lot of debris in your pool, you will need an in-line strainer, which we will discuss later.

Many of the vacs that use a 2" hose are susceptible to jamming depending on the leaves that fall into your pool, unless they absorb water and soften over the course of a day or two. In Florida, where leaves from oak trees are hard, stiff, and large, they tend to jam the suction hole at the bottom of the vacs. Other geographical areas may have similar leaves that can cause problems. The only solution is to keep an eye on the vac if it stops moving and clean the opening of any debris.

All of these floor vacs run on the same schedule that your pump runs and if you don't have a lot of debris floating in your pool, you may consider disconnecting your floor vac a few days a week in order to save wear and tear.

The Hayward Ultra - My personal favorite, it is ideal for pools with light to medium debris. This vacuum never fails to surprise me as I have seen it pick up 4' long strands of palm fronds. It has a clever assembly of moving parts inside the housing, which to me, are the basis of its success. These parts do wear down over time and you may have to spend upwards of $100.00+ every couple of years to repair it. However, even by figuring in the cost of repair over time, these machines can last indefinitely, (I know someone who has an original model that is over 25 years old and is still running).

Zodiac/Barracuda - Originally known as the Barracuda until the company merged with the Polaris Corporation, this floor vac has undergone an assortment of changes over the years. Once a sensitive design with outer parts that could break easily, it is now a relatively sturdy and reliable design. There are no moving parts and the system works on a simple principal: suction from your pump pulls debris through a diaphragm that opens and closes as it moves around the pool. This works well for pools with light to medium debris. Generally, the diaphragm has to be replaced once a year or more (app: $39.00). The downside is that a small twig, large seeds, or other sharp debris can cut the diaphragm and you have to replace it. If you have a lot of twigs or oversize debris that fall into your pool, this may not be the best floor vac for your pool.



Zodiac/Barracuda - new model

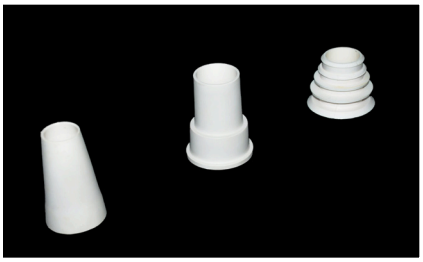
Barracuda - old model

Great White - A very simple design, there are only a few moving parts. To be honest, I haven't used it that much, but it seems to work well on screened pools with light to medium debris. The suction opening is a little larger than the Hayward and Zodiac, which allow, to some degree, larger debris, twigs and large seeds to be effectively picked up.

Polaris - Ideal for pools with oversize debris because of a larger opening on the bottom, this model works from a second pump that is plumbed into an existing side port to create a dedicated line just for the floor vac (this needs be installed by a reliable pool company). A 1" diameter hose is then attached to the side port, which leads to the vacuum. The pressurized water then travels through this hose into the floor vac and creates a suction that picks up debris, depositing it into a net attached to the vac. The net is a bit small so you may have to empty it frequently over the course of a week.

Attaching Floor Vacuum Through Skimmer

Most floor vacs attach directly into the skimmer with the hose leading through the opening in the wall of the pool. This is a very simple process which involves adjusting your skimmer/main drain valve (see page 28) and attaching a cone to the end of the hose and then into the skimmer port (the hose creates a good seal).



Turn off pump so that there is no suction in the skimmer. With cone A attached to the vacuum hose put it into the skimmer hole. It should fit snugly about halfway.

Some skimmer holes are larger than normal and the “A” cone could be pulled into your pipe if the suction hole is too large. If cone A goes more than halfway into the hole, use cones B or C and then insert your vacuum hose.

CAUTION: make sure the pump is off so your hand doesn’t get pulled into it from the pump suction. Once hose is firmly seated in skimmer hole turn on pump.

NOTE: Some skimmer bottoms have two holes, one of which may be sealed off. Be sure you are putting the cone into the correct hole that has the suction. If you put it into the wrong hole with no suction, you will be scratching your head trying to figure out why the vacuum hose doesn’t ramp up. If you aren’t sure which is the proper hole, turn pump on and put a couple leaves or grass into skimmer and watch which hole they are sucked into.

Once you have your vac hose seated properly, walk over to your pump area, turn on motor and turn valve handle going into pump to main drain (MD) setting in order to shut it off and prevent the floor vac from getting stuck over the drain. This leaves the skimmer (SK) all the way open for maximum suction. Put vac in pool, fill hoses with water, and watch it go!

Attaching Floor Vacuum Through Side Port

If your pool has a side port, turn off pump, put vacuum in pool, fill hoses with water and plug end hose into port. Usually the hose will stay in place but sometimes it needs a cone (see above). There are also safety covers for these ports which have a spring loaded door that closes once the hose is pulled out.

Once the hose is well seated, turn on pump.

Remember, a pump with a side port will have two valve adjustments. Adjust valves by closing off the main drain and leaving the skimmer open. Experiment with the side port valve until the floor vac moves freely and the skimmer pulls leaves from the top of the pool.

Floor Vac Troubleshooting

As the sun rises one weekend morning and you spring out of bed, you wipe the sleep from your eyes, stumble into the kitchen and make your first cup of coffee. Still comfy in your pajamas and robe, you decide to read the morning paper and sit pool-side at your patio table. As the birds chirp happily away, you bypass the problems of the world and dive for the reality of the comics or Dear Abby. As the rays of the sun warm your face and you yearn for the days when Calvin & Hobbes and Bloom County where highlights of the comic page, you realize that although your pool pump is running, your floor vac is sitting suspiciously at the bottom of the pool and not doing its job.

DON'T PANIC! We will go through a step-by-step process of troubleshooting.

Troubleshooting Vacs with 1" Diameter Hoses

Polaris

I rarely have problems with this vacuum other than having to replace the rubber wheel treads. In the event that the floor vac stops moving around the pool when the pump is running, take it to a pool store for repair as the moving parts and gears inside are probably worn. Be sure to empty the net frequently because if there is a lot of debris, the system could get jammed.

Should the hose tangle, twist, or it goes in circles, there is a small jet at the rear of the vacuum that moves from left to right. Think of this as a joystick and by turning the jet to the right, it pushes the vac to the right; push it to the left and it moves to the left. It also has up and down movements as well as a float that can be adjusted for better area coverage. Visit the Sta-Rite Web Site www.Polarispool.com for details on these adjustments.

IMPORTANT: Most of these vacs have a one or two year warranty. If you have recently purchased one and it falls under the warranty, bring to the store where you bought it and have them fix it.

Troubleshooting Vacs with 2" Diameter Hoses

1. Be sure that the end of the hose leading to the skimmer or side port is firmly seated. If it pops out, the floor vac will not work. A coupling and hose cone should solve the problem.

2. Does your pool get excessive amounts of leaves or debris? Turn off your pump and pull the vacuum out of the water to see if there is anything jammed in it. If there is, gently remove it with your fingers. If it doesn't pull out easily, relax, take a deep breath and in a few paragraphs we will discuss how to deal with each particular model mentioned in this article. If you have a Hayward Ultra, gently move the side arms up and down. Sometimes they stick in place for some inexplicable reason.

3. With the motor off, check your pump basket for excess debris. If this is full, it will block the flow of water to and from your pool and put an excessive strain on your pump motor. If you find yourself cleaning your pump basket frequently, read about in-line strainers on page 65.

4. Turn your pump back on, give the motor a chance to get a good flow of water going, and keep your fingers crossed. If your floor vac is spinning happily around your pool, congratulations, you can go back to reading your paper and sipping coffee.

- If the floor vac is still not moving, continue on:

5. Floor vac hoses get old and tend to crack, literally overnight, causing air to get into the system and preventing a good flow of suction into the pump. With the pump running, and after making sure the end of the hose is firmly in the vacuum port, start pulling the hoses towards you, lifting them out of the water one section at a time. If you hear any kind of air coming from the hose, it is bad and needs to be replaced. Don't hesitate to be a little rough on them and bend them. If they break, replace them.

The fact is, these hoses get old and deteriorate. If you are too gentle with them while checking them, you may not find the leak and will be very frustrated. NOTE: If all of your hoses were installed at the same time it is not unusual for two or more hoses to break at the same time. This happened to me once as five hoses broke over the course of two weeks. Of course my money was tight but I bit the bullet and replaced them.

- If all of your hoses are fine, let's try this:

6. When was the last time you cleaned your filter? If you have a lot of fine debris going into your pool, your filter may need to be cleaned two or three times a month (see page 18). After cleaning filter, turn pump on and see what happens.

- Still not working? Let's move into more advanced stages of troubleshooting:

POOL TIPS:

Your Pools Worst Enemies
Never drop nuts, bolts, pennies or change into your pool. They will leave a rust stain on the bottom almost over night. Avoid using fertilizer with iron in it within 10 feet of your pool. If you do, water it into the ground immediately. I have seen pools that turned into horror stories over the course of a week because someone put fertilizer in the grass around their pool and the wind, or rainwater washed it into the pool.

Getting Money Back From The Water Company
Any time you drain water from your pool, or, you have to fill it up because of a leak, you are assured a high water bill the next month. Some water companies will waive the tax, or give you a discount on large water loss. However, you have to provide them with a receipt from a licensed repair company.

Advanced Floor Vacuum Troubleshooting

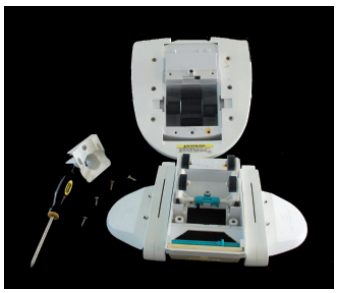
This section is for people who like to solve problems and have moments of mechanical aptitude. If you don't feel comfortable doing minor problem solving, take your floor vac to a qualified pool store for repair.

Hayward Ultra

Turn off pump and remove Hayward vac from pool. Turn upside down and partially put you're forefinger into the opening at the bottom. There is a small wheel similar to a water wheel inside. See if it spins around. If it does, shake the housing to see if anything rattles inside of it (small stones, palm seeds, etc.) and try to shake it out.

1. Remove Plug - If you still hear a rattle after shaking, the wheel inside doesn't spin, or the side arms don't move up and down easily, let's try some basic maintenance. The hole you just put your finger into is part of a 2" square plug that can be pulled out by unscrewing it with a Philips screwdriver. This screw is permanently attached so you don't have to worry about losing it. Remove the plug. If there are pieces of small debris inside, pull them out and spin the wheel to see if moves freely. If you are confident you have cleaned it properly, replace the square plug and tighten up the screw.



2. Bottom Pod - If the wheel is still not spinning or the side arms don't move, dismantle the bottom pod assembly by removing the two screws in the front and back of the frame. Gently hold the flaps back and remove screws with a Philips screwdriver (these screws are not attached so be careful that you don't lose them). Now, gently lift the entire bottom section from the frame and check for debris that may be interfering with the inside mechanics. Reassemble the pod frame by carefully aligning the screw holes with the inner workings of the floor vac and screwing it back together. Don't forget to put the square plug back in. Reattach vacuum to hose and put into water, letting as much air escape from the vacuum as possible. Then turn on pump.

This is a pretty basic, but often effective, problem solver. If your Hayward vac doesn't work after doing all of the above, it is best to take it to a pool store and have them fix it for you, as any other further disassembly is likely to cause you more problems than it is worth. At this point, let the pros handle it.

NOTE: The small rubber feet on the side arms and the wings at the side of this vac need to be replaced periodically and can affect performance. Check for wear.

Zodiac/Barracuda

1. After turning off the pump and checking to see if there is light debris in the opening, remove vac from hose. Hold it up to the light to see if there is anything stuck in the diaphragm. If so, grasp the base of the vac firmly in your left hand and unscrew the oversize nut near the top of the vac counterclockwise.

2. Gently pull out the entire length of long plastic tube that is attached to the rubber diaphragm.

3. While holding the length of the tube in your left hand, push down on the top with the palm of your right hand until the diaphragm is completely exposed.

4. Remove the diaphragm and inspect it for debris or for a rip in the plastic. If there is a rip, you need to replace the diaphragm. After cleaning or replacing the diaphragm, put it back onto the plastic tube, making sure that the round clip at the end is firmly attached.

5. Push the tube back into the housing and as the end comes through, pull the other end through until the diaphragm is ready to go into the housing. Align the diaphragm properly and gently, but forcibly, pull the entire tube and diaphragm into the main housing and tighten up the nut.

Age takes its toll on this vac. The large floppy vacuum disc and the plastic base (foot pad) that hold the disc wear down over time. Inspect these closely. If they are worn, it will drastically affect the performance. If the disc is excessively limp when out of the water, or folds under the vac when running, it is time for a new one (app: $75.00). The footpad may be worn also. You can tell by examining the tabs around the bottom. They are about 1/4” high when new. If they are worn, this needs to be replaced (App: $30.00). A sure sign that the disc and footpad are old is when your vac isn’t consistently moving around your pool.

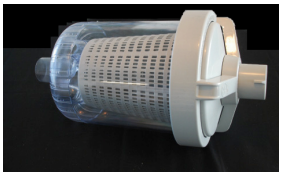
Great White

This vac is pretty simple. If it is not moving, turn off pump, take out of pool and check for debris jamming the opening or the side moving parts. The top that attaches to the vacuum hose twists off so you can access any debris. If any parts are loose or wobbly, take it to a pool store and have it fixed (call ahead to be sure they work on this brand).

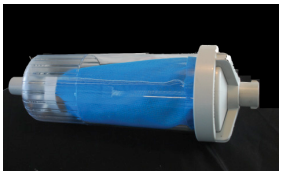
In-Line Strainers

Also know as “Leaf Canisters”, an in-line strainer is a must for any pool that has a lot of debris. They cost between $50.00 - $80.00 and prevent buildup in the pump basket, which can put an excessive strain on your motor. Made from molded plastic, it connects to your vacuum hose and floats just below the waters’ surface. Inside is a basket or net that collects material. By unscrewing the lid and emptying the basket when needed, you save yourself a lot of pain, heartache, and repair bills. A 4” section of floor vac hose attaches to the output opening and leads to the skimmer or side port (don’t forget to put a cone on the end of the hose). The other opening leads to the floor vac.

Hayward makes two models:



The smaller of the two, this is ideal for collecting leaves but not fine debris because there are small slots in the basket. As the basket ages, it becomes brittle and when too many leaves fill it up, it cracks and passes leaves into your pump basket. Examine frequently for cracks.



My personal favorite, this model has a larger capacity and a net inside to collect fine debris. This is ideal if you have palm trees that leave a mess in your pool. During certain times of the year in Florida, very fine strands from palm fronds fall into the pool. The net collects most of this but because they are so fine, some pass through and clog the bottom of the strainer so inspect it on a regular basis. If you have a bad problem with these strands, the impeller may be jammed (page 27).

In-Line Strainer Tips

1. Whenever you take them apart, be sure to lube the gasket in the lid as it makes it easier to put back together. If this gasket is stretched, replace it.

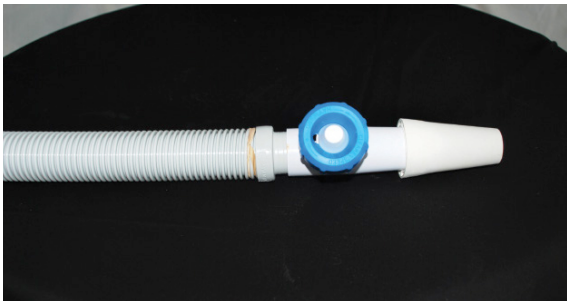
2. Rinse the lid and top of strainer periodically as fine sand and grit will interfere with the screw cap.

3. As the larger strainers get older, the plastic absorbs minerals in the water, causing it to become heavy, sink into the water, and interfere with the vacuum hose. By adding a small empty water bottle into the strainer, it adds enough buoyancy to keep it just below the surface of the water.

Great Tips They Don't Tell You

Valve adjustments by your pump/motor intake are very critical (see page28). Typically, we in the industry shut off the main drain control valve and leave the skimmer, or side port valve wide open. If the main drain suction is open, it could hold the vac over the drain when it goes over it.

Because many floor vacs work from the skimmer, leaves tend to float on top of the pool and aren't pulled into it. The theory is that the leaves will sink to the bottom of the pool to be picked up by the vacuum. If the leaves bother you, you can alternate days by taking the floor vac out of the pool and let the skimmer work it's magic. Be sure to install and empty skimmer basket frequently.



Regulators can be inserted firmly into the vacuum cone and by adjusting the side vent, will do a pretty good job of pulling leaves from the top of the pool. Keep in mind that the more you open it, the more suction you remove from the floor vac and can slow it down. You will have to experiment until you figure out the best setting. Once again, be sure your main drain is turned off. CAUTION! If your water level is below the regulator it will suck air into the system and could damage your plumbing system or pump. Always make sure your water level is at least 2" above the regulator.

Vacuum adjustment is too strong. It is rare that this will happen, but if you have a new pump motor, filter, hose cone, etc., and your main drain valve is shut off, your suction could be too strong for the vac, holding it in place on the pool bottom and preventing it from moving around the pool. Typically, the first reaction to this dilemma is to open the main drain valve and redistribute some of the suction. But, by doing this, the suction from the main drain may trap the vac over the drain. The best solution to this is to buy a regulator and open up the valve until the vac moves consistently around the pool.

Adjusting pool jets: OK, your Zodiac or Great White isn't going to every area of your pool. Look at the jets blowing water into your pool. If the water flow breaks the top of the surface, it pushes water onto the hoses and prevents the vac from going into certain corners or areas of the pool. (Hayward vacs don't have this problem).

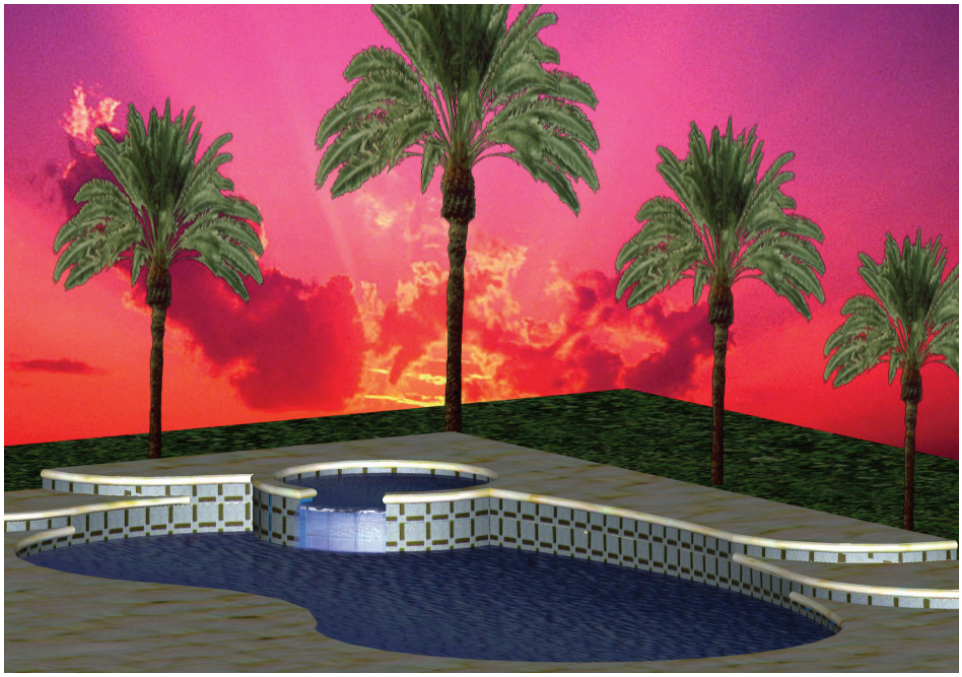
If you see a consistent pattern, you'll want to adjust your jets as follows: Point the jets towards the main drain at the bottom of the pool. This can be accomplished by turning off the pump, partially unscrew the outer ring of the jet by turning it counterclockwise, and then adjust the jet. Once you have it where you want it, tighten the outer ring. Depending on the style of the jet, this can get a little tricky so be patient and keep trying.

Turn on motor, stand a few feet away from jet, and assess whether the water flow is pointed toward the main drain. If this doesn't work and you've gone over everything in the troubleshooting section, take it to a pool store for repair. Keep in mind that your vac may be too old and not worth repairing.

Taking Your Floor Vac In For Service

You've tried everything but your vac still isn't working properly. Now it's time to take it to a qualified pool store for repair. When you do, be sure to get a quote. Never let anyone fix it for you without a quote because it may not be worth the investment. If you think it's too high, get a written quote and take your vac to a different company for a second quote.

My feeling is that if it's going to cost over $100.000 - $150.00+, you may be better off getting a new one. A new, standard model floor vac runs around $350.00 - $395.00 as of January 2008 and many companies offer a rebate after purchase. If money is tight, do a little research with your pool store. Hayward offers a two-year parts repair at no charge, an offer that shouldn't be refused! In the long term, you just may be better off buying a new floor vac instead of sinking money into repairs of an old one.



Innovative pool design by Redge J. Wiebusch II, Drgnstr@Yahoo.com, or 321.848.5832 (see page 24)

Chapter 7

Pool Safety

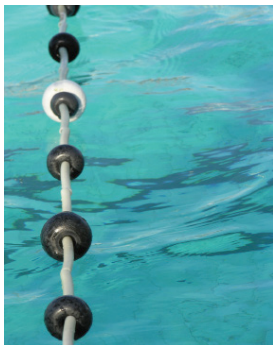
Pool Safety

Looking at your pool on a nice spring day, you take in the setting, smile, and think about the upcoming summer days and the countless hours you will spend floating comfortably in the water. As your favorite music plays in the background, you watch the wind gently blow the branches in the trees as the birds chirp happily away. Yet, despite all these pleasant thoughts, a lingering thought continues to nag at you: “Is my pool really safe?”

Surprisingly, with a little foresight and thought, you can confirm that you do have a safe pool setting. This chapter will focus on basics as well as extensive information that can benefit you.

Adult Supervision - Parent and adult supervision is your first and best layer of defense. While additional layers of protection add to the safety of your pool, nothing replaces proper supervision. Keep in mind, however, that supervision can and does fail. A study by the Consumer Product Safety Commission showed that 69% of drowning incidents occur when one or both parents were responsible for watching the child. In almost half the incidents, the child was thought to be inside the house. While constant supervision is key, additional layers of protection are crucial.

Safety Equipment - Every pool should have a safety hook that is easily accessible as well as life vests and a safety ring. A rope float that divides the shallow end of a pool from the deep end is an added plus and should be properly anchored as kids and adults tend to hang on them. Can your children swim well enough without a life vest? Once again, this is a minimal investment that can save lives.



Poolside Preventions - Easy access to all of this equipment is essential. • Rope floats should always separate the shallow end and deep end of a pool. • Markings showing depth should be stenciled alongside the pool deck. • Safety signs such as No Running, No Diving, etc., can be hung around pool; and of course the rules should be enforced.

Solar Pool Covers - I have heard horrible stories about people, children, or pets falling into a pool with a bubble pack solar cover that covers the entire pool. Apparently, the cover can wrap itself around you (not unlike quicksand) and it becomes almost impossible to move in order to save yourself. Add to that the adrenaline rush of panic and it isn’t difficult to imagine the end result.

Imagine this real life situation: A friends dog drowned under a pool blanket when a neighbor, with good intentions, caught his dog running loose and put it in his back yard which had a pool with a bubble cover. The dog was found under the blanket and the assumption was made that the dog attempted to walk on the bubble blanket. The blanket gave way and the dog was trapped under it and drowned. If you imagine this scenario with a child or adult, it doesn't paint a pretty picture!

Ideally, in the off-season, a strong reliable pool cover that is attached to the ground is the best solution to this problem. For those who live in areas that have year round swimming by using a heat cover, I encourage a safety fence around the pool.

Solar Sun Rings are a wonderful alternative to this situation as they consist of a number of 5-foot plastic rings that cover and heat your pool (page 90). If you fall into a pool, you can manipulate around them as the magnets that interlock the individual rings separate easily and prevent entrapment and envelopment.

There is a reasonable assumption in the pool industry that if a pool is covered by a solar blanket, small children and animals do not recognize the potential danger of drowning. Because they do not see the water, they assume that they can walk on the blanket, the consequences of which could be life threatening.

Until I talked with the owner of Solar Sun Rings, this is a scenario that I never thought about as I am a very strong swimmer and have recovered from a few tight situations in my life. I cringed when I found out that U.S. Navy Seals in full scuba gear with oxygen tanks, fins and knives, could not escape, or cut their way out from a bubble pack unaided. Since then, I keep my distance when I service pools with bubble wraps.

As one of the primary design criteria of the Solar Sun Rings was to reduce the chance of entrapment, the developers of this product feel that no other floating solar cover matches their design for safety. The rings are not a safety device or sold as a life preserver.

However, in a situation where a person, child, or animal falls into a pool, their ability to swim to the pool wall, or stairs, is enchanted tremendously because the solar blankets break apart when pulled.
• 951.296.6502 • www.solarsunrings.com

As with every pool, it is important never to leave children, persons, or pets unsupervised in a pool area. Pool covers should always be removed when bathers use the pool and any type of solar blanket should never be used as a flotation device or as a toy. Ideally, in the off-season, a strong reliable pool cover that is attached to the ground is the best solution to this problem. For those who live in areas that have year round swimming, I encourage a safety fence around the pool. In fact, many states require them by law.

Swimming Pool Safety Fence - Removable pool safety fencing has proven, over the past thirty years, to be the most practical and effective barrier against pool drowning short of putting up a permanent rail fence. Normally constructed of semi-transparent mesh and aluminum support poles, pool safety fencing is now readily available throughout the United States and a professional installer can have your barrier up in less than a day. Pool fencing comes in a variety of colors to meet backyard décor. Pool fencing laws are sweeping the nation and already exist in many of the Sun Belt states today. If you have a pool and young children, a removable pool safety fence is a MUST. Visit www.poolfence.com for more information.

Skimmer Lid - Is you skimmer lid safe? Often unnoticed and taken for granted, this can be one of the most dangerous pieces of equipment around your pool. Imagine walking or your kids playing around the skimmer lid. What would happen if the lid was old and someone stepped on it and it broke? If you're lucky, it could just mean a bruise. If you're not, perhaps a broken ankle or foot. What if someone stepped onto a bad lid, fell, hit their head, and fell into the pool? Not pretty things to think about...

The solution is simple. When was the last time you replaced your skimmer lid? Is it constantly exposed to extreme heat or cold conditions? If so, the plastic has most likely deteriorated and has caused structural damage. Another aspect to consider is that skimmer lids made 5 - 10 years ago were not designed with the safety requirements that are in affect today. If you were to look at an old skimmer lid compared to the exact same size made today, you will see notable differences in its design structure. Today, lids support a lot more weight. Take off your skimmer lid and check for any signs of deterioration. Try to bend and manipulate it. If there are any signs of cracks, replace it.

• Before you replace your skimmer lid, take a look at the **Critter Skimmer** on page 51. This skimmer lid is comparatively priced to most on the market but has one distinct feature that stands out far above the rest; it has a hole in the top that allows frogs, bugs, and other critters to crawl out of the skimmer.

Suction Ports - One of the most dangerous areas on a pool are the Main Drain, Skimmer, and vacuum ports on a pool and/or attached spa. Every now and then you read a horror story about a young child playing at the bottom of a pool or spa and their hair or limbs get sucked into the vacuum created by the pool pump. Under certain conditions, the suction from drains in swimming pools and spas can entrap swimmers underwater. There are devices that cover the main drain at the bottom of the pool and special side ports with hinges that seal off the suction port. Skimmers should always have a leaf basket in it to prevent someone from putting their hand into the suction area.

Entrapment Prevention!

- Replace old flat drain covers on the bottom of your pool. Never use a pool or spa with a missing or broken drain cover.
- Have a professional regularly inspect your pool or spa for entrapment or entanglement hazards. Ask them to clearly mark the location of the electrical cut-off switch for the pool or spa pump.
- Install a Safety Vacuum Release System (SVRS) to automatically shut off a pump if a blockage is detected.
- If someone is trapped against a drain, turn the off pump immediately.
- Pry a hand between the drain and the person's body to break the seal, instead of trying to pull the person away from the powerful suction.

Here Is A Simple Solution: Any time someone is in the pool, especially children, turn off the pump from the main power switch. The problem is now solved! Train your children to ask you to shut down the pool whenever they go in. The fact is, the pump does not have to be on when people are in the pool, even if the pool is heavily used in the course of a day. You can always turn the pump back on when everyone is out of the pool.

Electrical Connections - Take a close look at the pump area. Are there a lot of wires? Are any broken or exposed? If so, GET IT FIXED! There should be no open wires or exposed electrical boxes around this area. Open up your timer box. You will see a round wheel with an on and off switch. Do you see exposed wires beneath it? If you do, you stand the risk of getting a shock when you manually turn on and off the pump. Pool stores carry a plastic plate that covers this which costs less than $5.00. Quick! Run out and get one, NOW! Pool tech horror story: When I first began my job cleaning pools, over half of the 75 pools I serviced did not have a cover over the electrical wires in the timer box. When my filter-cleaning week came up, I was constantly receiving shocks. The next week, I put 40+ covers over all the exposed wires.

S**afety Alarms** - New technology offers a variety of pool alarms that attach to the side of your pool and go off whenever there is a sudden motion in the water. This is a great idea that should be on a pool that has children playing around it. The best alarms, however, are personal immersion alarms that a child wears on his wrist like a watch. When the wristband gets wet, the base station unit in the house alarms and alerts you that your child is in water. With these devices, you are protecting your child from ALL water hazards, including lakes, ponds, your pool, and even buckets filled with water. Also, personal immersion alarms are far less prone to false alarms than pool alarms that detect motion.

Automated Floor Vacuums - Should be removed so someone can't get tangled in the hoses.

Drinking, Drugs, And Swimming - What can I say, it's a baaaadd mix. Nuff' said.

Pool Chemical Balance - In the Pool Chemistry chapter, I go over how to balance your chemicals properly. Of course, in the summer when the pool has a lot of activity, you have to keep a closer eye on the balance of the water, so be prepared to spend a little extra time ensuring chemicals aren't over-powering.

When I was on a swim team as a kid, I still remember the chlorine smell on my body, swimsuit, and towel. One summer, my sisters' blonde hair actually turned green from being in the community pool constantly (as it turned out, it had a lot to do with copper piping and filter systems). Because I am so sensitive to the chlorine levels from my youth, believe it or not, I can put my arm in a pool, let the water dry, and in a few minutes tell you how much chlorine is in the pool!

Even with this book in hand and by going to the pool store for your pool water tests, understanding the delicate balance of chlorine and pH may take awhile. This is one of the reasons I encourage becoming familiar with the maintenance chart on page 127. If there is a lot of activity in your pool in the summer, you may have to keep a closer eye on the chemicals twice a week instead of just once.

Signs Of Too Much Chlorine
Do you or your children come out of the pool smelling strongly of chlorine? Are their eyes bloodshot? Is their hair turning green? These are signs that there is too much chlorine in the pool.

Many state and federal regulations call for an allowable level of chlorine that is considered acceptable within an industry standard of 3.0 - 5.0. Personally, I don't feel that this is for everyone and I ask my customers who use their pools frequently how they feel about the chlorine level. I prefer, but do not recommend, a setting around 2.5 - 4.0. Ask your pool store what the industry standards are for your state. This is the time to experiment if you feel the chlorine level is too strong.

Please refer to chapter 4 for in-depth details about chemical balance.

Teach Your Children Well - My sister and I were lucky when we were young. My mother took great interest ensuring we knew how to swim. We were also on the local swim team. Mom was always at our swim meets and as I came into my early teens, I knew that she trusted us and that we could handle ourselves in water.

However, she always made sure we never swam alone and that someone knew we were swimming. Although I never had a cramp while swimming, I remember seeing experienced swimmers at swim meets being rescued by lifeguards because an unexpected cramp hit them. Apparently, the pain is terrible and you can lose complete control of your swimming abilities. Having said that, make sure your kids don't swim alone. Introduce your children to the pump area and explain to them how dangerous it can be to operate equipment without adult supervision. Remember, a few minutes of extra precaution can save lives.

Swimming lessons - Moving to San Diego in the late 70s from the Chicago area, I was astounded whenever I met locals who didn't know how to swim. To me, with the ocean at their doorsteps, it was incomprehensible that their parents didn't ensure their children had swimming lessons. The cost of a summer of swim lessons is a minor investment that guarantees your children always know how to handle themselves around water. Even if you only have community pool access, or they aren't around water often, your children should have lessons. One of the things that upset me in life is to meet a grown adult who is scared of water. For your baby, look into infant survival training. Should your toddler make it through all the other layers of defense you have put in place, their ability to save themselves by rolling on their back or swimming to the edge could be the difference between life and death.

CPR Training - Your last layer of defense. Take the time to learn CPR and accident procedures. If not your own child, you may be able to save someone else's. Many local hospitals have programs for this type of training.

Not So Fun Facts

Here are some facts uncovered by the U.S. Consumer Product Safety Commission (CPSC) in a comprehensive study of drowning and submersion incidents involving children under 5 years old in Arizona, California, and Florida.

- Seventy-five percent of the submersion victims studied by CPSC were between 1 and 3 years old; 65 percent of this group were boys. Toddlers, in particular, often do something unexpected because their capabilities change daily.
- At the time of the incidents, most victims were being supervised by one or both parents. Forty-six percent of the victims were last seen in the house; 23 percent were last seen in the yard or on the porch or patio; and 31 percent were in or around the pool before the accident. In all, 69 percent of the children were not expected to be at or in the pool, yet they were found in the water.
- Submersion incidents involving children usually happen in familiar surroundings. Sixty-five percent of the incidents happened in a pool owned by the child's family and 33 percent of the incidents happened in a pool owned by friends or relatives.
- Pool submersions involving children happen quickly. A child can drown in the time it takes to answer a phone. Seventy-seven percent of the victims had been missing from sight for 5 minutes or less.
- Survival depends on rescuing the child quickly and restarting the breathing process, even while the child is still in the water. Seconds count in preventing death or brain damage.
- Child drowning is a silent death. There is no splashing to alert anyone that the child is in trouble.

Prevention Steps That Count

- Install anti-vortex drain covers. A simple retrofit to install anti-entrapment covers will minimize the risk and protect both children and adults from body and hair entrapment in the suction outlets.
- Limit access to the pool with physical barriers.
- Install fences and walls at least 4-feet high completely around the pool.
- Use self-closing gates with the latch positioned high and out of reach of small children.
- If your house forms one side of the barrier for the pool, doors leading from the house to the pool should be protected with alarms that sound when the doors are unexpectedly opened.
- Supervise young children.
- Knowing how to swim does not make a child drown-proof.
- Never use flotation devices as a substitute for supervision.
- Be prepared in case of emergency.
- Seconds count! If a child is missing, always look in the pool first.
- Keep rescue equipment and a phone next to the pool.
- Take CPR lessons

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Chapter 8

Automatic Controls & Salt Systems

Automatic Controls & Salt Systems

Automatic and electronic controls have made amazing advances the past few years. At the simple touch of a button, you now have the ability to control pool temperature, water level, lighting, and filter systems. Some controls even turn on your lawn sprinklers!

Imagine, floating lazily in your pool and with the convenience of a waterproof control in hand, you can open and close valves that turn on fountains and waterfalls. At night, while relaxing poolside, create a romantic setting by dimming your pool lights as well as outdoor lighting. Or, create your own pool light show.

Whether you have basic pool functions or an expansive backyard paradise, today's technology allows you to operate your timer from inside your house and program your pump to work at off-peak hours while saving you electricity in the process.

Some controls display water and air temperature, status of jets, lights and auxiliaries. Two-way communication and monitoring allows you to know what's going on in your pool at a touch of a button. Ranging from simple to complex, all are easily installed by a professional without drilling holes into your patio or pool walls.

Here are some of the many features that are available:

- Automatic memory recovery system that doesn't lose programing during a power outage.
- One-touch programming that allows you to access all pool functions.
- Backlit controls for night time viewing.
- Status reporting and controls that let you read and adjust the water temperature.
- Spa controls that allow you to adjust spa temperature, jets, and lights.
- Heater and salt chlorination controls.
- Software that can be upgraded.

Assorted automatic control boxes


Automatic valve control

Before investing in automatic controls however, research which is the right system for you. Here are a few reliable companies that manufacture automatic pool controls:

Jandy • 707.776.8200 • www.jandy.com
Pentair • 763.545.1730 • www.pentair.com
Goldline Controls • 800.294.4225 • www.goldlinecontrols.com
Polaris • www.polarispool.com

Chlorine Tablets & Tablet Feeders

By maintaining a constant chlorine feed, especially in the summer months when chlorine demand is high, adding excessive amounts of chlorine can be reduced. Chlorine tablets are a common way to feed chlorine into the pool and can be dispersed using a floating chlorinator or in-line feeder.

IMPORTANT - Chlorine tablets (tabs) are not a substitute for chlorine! By using only tabs, you won't supply your pool with the proper amounts of chlorine. Tablets also have stabilizer in them which will keep your stabilizer balanced, however, excessive amounts of stabilizer will lock your pool water up and cause problems over a period of time. Sometimes the only way to balance your pool is by diluting the water. If you are using 3" chlorine tablets, you are adding 1 lb. of stabilizer for every 2 tablets you put into your pool. If your stabilizer level rises over 100 ppm, your chlorine becomes ineffective and yellow algae and poor sanitization result. When you stop using tablets at summer's end, be sure to check your stabilizer level. • NEVER put tabs on your pools surface as it will damage the finish.

Proper Chlorine Tab Dispensing

Floating chlorinators - are a viable alternative during summer months if you do not have an automatic chlorine tablet feeder. Many people let them float around the pool which isn't very effective. Ideally, it should be tied to a part of the pool by a string that lies within a water flow path when the pump is on so the tabs dissolve properly. Avoid using a floating chlorinator in a pool with children as it can be opened easily and tabs can fall out or be handled by little fingers. (I still cringe when I think how we used to hold on to the chlorinators and swim around the pool when we were kids).

In-Line Tablet Feeder

One of the most basics of automatic pool equipment, an in-line tablet feeder is generally attached to the output pipe of your pool pump. It is usually only used during the summer months when chlorine demand is high. The chlorine is distributed into your pool through the pool jets as the tablets dissolve. It is important that chlorine is constantly fed when the pool pump is running and distributed at the proper rates to make up for the chlorine that is being used up.

Determining How Much Chlorine is Fed into the Pool

1. The number of tablets in the feeder controls how much can be fed. - As a general rule, only put as much in the feeder as will be needed over the next week. If you fill a chlorinator all the way up, you run the risk of putting more chemicals than needed into your pool. This way you have some control over the maximum feed. For instance, a spa might only use less than a pound of chlorine per week, but the chlorinator will hold 6-8 lbs of chlorine. If you were to fill it up, you would create a dangerous situation in the spa with very high chlorine levels and very low pH levels.

2. The knob controls how fast it will be fed. - In-line chlorinators have a knob that controls the flow of water through the chlorinator. The faster the water flows through the chlorinator, the faster the tabs are dissolved. The problem with most in-line feeders is that you have no idea of how much water is flowing through the feeder, so you have to be careful and observe the setting that produces optimal results.

DANGER: Use caution when opening a tablet feeder with tabs in it as fumes may build up inside and hit you in the face. It's pretty nasty, trust me! (make sure pump is off before opening)

Adding Water to Your Pool

While servicing 70+ pools a week, I am always amazed at how quickly water levels will drop in some of the pools. Granted, in southern Florida weather conditions can be extreme, especially during summer, but weekly water evaporation in any part of the country can cause water levels to drop, almost overnight.

I am surprised at how little emphasis some pool owners give this issue. The fact is, if your water level goes below the skimmer, and your pool pump timer turns on, the system could suck in air for hours and burn up the pump motor, a costly expense. Or worse, it could melt the pump basket and the entire pump and housing system has to be replaced. I have seen this, and it's not pretty!

When I have a pool with a semi-low water level that is not critical, I will leave a hose with water going into the pool on a slow trickle, knowing that when I come back the following week the water level will be where its supposed to. If I have a pool that desperately needs water, I'll leave a note for my customer to put water in their pool. Many do, but there have been times when they forget to turn off the water, the pool overfills, and their water bill skyrockets.

Electric Automatic Pool Filler

Over the years, I haven't been that impressed with the automatic pool fillers I have seen. Typically, most automatic pool fillers were attached to a garden hose, or exposed pipes and would sit on the edge of a pool and overhang into the water. When the water level reached a certain point, the pool would fill with water to a desired level. Problems arose when people would trip over the pipes or hose, or if the hose broke from built up water pressure, a terrible scenario if you are out of town.

A simple and uncomplicated system that saves time, water and energy, the Auto Pool Filler is a three part system consisting of a sensor, an electronic monitor, and an electric water valve which is attached to pump system and connected to a water source. Developed by Torcan Corporation of Fort Myers Florida, this is a minimal investment that guarantees that the water level in your pool is always constant.

Water Level Sensor

Electronic Monitor

Automatic Water Valve

The sensor probe is installed in the pool skimmer, or, mounted in the pool. When the water goes below a certain level, a signal is sent to the electronic monitor which is near the pool pump. A valve attached to the pump opens and water is released into the pool until if fills to the desired level. That's it!

The water sensor automatically keeps the pool water at a preset level and a monitoring device guards the pool pump. There is also an anti-splash circuit which delays the signal to the water valve when people are in the pool and the water is agitated. No supervision is needed and if you are away from your home frequently, this allows away-from-home convenience. Although it is not complicated to install, it is recommended that it is properly installed by a qualified pool service company.

Using cutting-edge technology, this pool filler can save you thousands of dollars in water bills and repair. It is available for under $300.00 and takes about 2 hours for a professional pool company to install.
• 239.768.0604 • www.torcancorp.com

Salt Systems a.k.a. The Natural Chlorine Generator

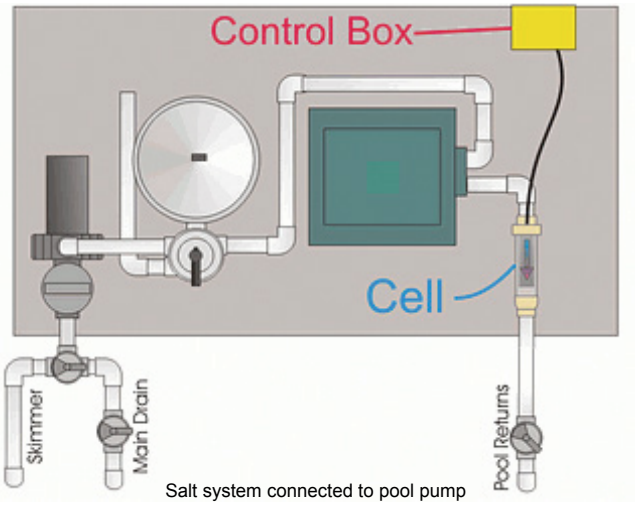
Contributed by Timothy Mott at www.poolplaza.com

Most people who consider themselves “sensitive” or “allergic” to chlorine are not reacting to the chlorine at all. The problem is packaged pool chemicals and the additives they contain. Those same swimmers who claim allergic reactions to chlorine typically experience no problems when they are in a salt water pool.

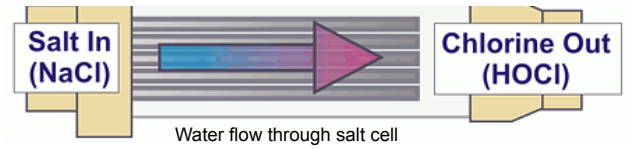
The answer isn’t the absence of chlorine. The answer is the absence of all the packaged chemicals and by-products in those chemicals. Salt systems create their own chlorine at controllable levels. This means you aren’t exposed to harsh applications of chlorine when you pour it into your pool.

Salt water pools used to be the exception, but now they are becoming a widely accepted method of water treatment in swimming pools. Many pool owners appreciate the soft feel of the water and a lot of builders are making salt water systems standard on their new pools. Most equipment manufacturers have also become aware of the fact that salt water pools are not just a passing fad. They are here to stay!

There is a common misconception that swimming in a salt chlorinated pool is like swimming in the ocean. The ocean has about 20,000 parts per million (ppm) of salt in the water, while a saltwater pool has only about 3000 parts per million salt. At 3000 ppm, you generally cannot even taste the salt. Any water under 6000 ppm is still considered fresh water. Your eye contains about 9000 ppm salt. Since the salt water system creates chlorine, the water is still blue and also very clear. A salt system gives your pool the best water quality you get in modern society.



Salt system connected to pool pump



Water flow through salt cell

Salt systems have three main components:

Salt Cell - The salt cell is a series of plates with opposite charges in a cell. As the water passes between the plates, electrolysis takes place, releasing the chlorine in the salt.

Salt - The second component is plain old salt. Salt makes the water conductive so that the electricity can pass between the plates in the cell. If the salt level goes too low, then the chlorine production simply stops. Salt is also the raw material from which the chlorine is produced. You have to have a minimum level of about 3000 parts per million of salt in the pool water.

Assorted Salt Cells

Control Box - The control unit is a device that sends power to the salt cell. The unit controls how much chlorine is produced by regulating how long the power is applied to the cell. If you turn the control knob down to a low setting, then the unit might apply power to the cell only 25% of the time, thereby producing less chlorine. If you turn the control knob up, then the unit would apply power to the cell for a longer period of time and create more chlorine. The control unit will often sense the level of salt in the pool and indicate the need to add more salt. Self cleaning units have a feature built into the unit that reverses the polarity of the voltage through the cell in order to clean any scale buildup on the cell plates.

Benefits of a Salt System

Most people do not buy a salt water pool system for the sole purpose of saving money. They buy it for the increased swimmer comfort. With that said, they do save quite a bit of money on pool chemicals, but it probably takes about 2-3 years before the system pays for itself.

The fact that you are not having to use packaged pool chlorine will save a significant amount of money in the long run. The real reason to go with a saltwater pool system is because of the fantastic water quality. The money savings are just icing on the cake.

Here is the best rationale for buying a salt water system: Pool owners spend $25,000.00 or more, to build a beautiful pool, so doesn't it make sense to spend $1000.00 - $2000.00 on the water quality. After all, shouldn't the best thing about the pool be the water? In the end, you get what you pay for. A little money spent on the salt water system will allow the typical homeowner to enjoy their swimming experience so much more.

Here are other benefits:

1. Lower Chlorine Levels: • Saltwater pools are balanced from 0.5 to 1.0 pp. chlorine
• Traditional pools are balanced from 3.0 - 5.0 pp. chlorine.

2. By not using harsh chemicals you remove the source of irritation that plagues most swimmers.

3. Saltwater pool systems virtually eliminate algae problems.

4. No "Chemical Bath Feel" because packaged or liquid chlorine is not needed

5. Minimal applications of soda ash or baking soda

6. Controlled stabilizer levels

7. Better swimmer comfort

NOTE: Technically, water is not officially considered to be "salt water" until you reach a threshold of 6000 ppm salt. The industry standard for salt systems is around 3000 ppm.

Installation

Since the water is still considered fresh water, it is compatible with all standard pool equipment (pumps, filters, heaters, automatic pool vacuums, etc.) If you have a stainless steel filter, check with the manufacturer as some are not compatible with salt systems. Hire an experienced professional to install these systems.

Saltwater System Maintenance

There are three things that are important when using salt water chlorination:

1. Keep the proper level of salt and stabilizer in the pool - Most salt water chlorinator require a 2500 - 3000 parts per million salt concentration in the water. This can barely be tasted in the water, but provides enough salt for the salt cell to produce the chlorine needed to maintain the pool.

If your salt reading is too low, the system will not be able to produce chlorine. Most systems have some sort of indicator in the control box to show low salt levels in the pool. However, they are not always accurate so bring a sample of water to your pool store and have it tested periodically.

Should this be the case, add rock salt to the skimmer or into the deep end of the pool. Although the salt quickly dissolves in pool water, read packaging and equipment directions carefully before adding. Bags of salt are typically available in 50 lb. bags. Try to purchase salt that says “fine salt” on the bag.

NOTE: If the system indicates a low salt level, be sure to test it with a salt test kit before adding salt. If a salt cell is failing or is scaled, it may give a false low salt indicator.

2. It is important to have a good stabilizer level (30 - 50 pp.) in the pool or the sunlight will burn up the chlorine and the saltwater system will not be able to keep up with the demand.

3. Adjust the control knob on the salt system which controls the amount of chlorine that is generated. This can be adjusted to keep the production of chlorine in line with the demand.

4. Make sure the pool is running long enough to produce adequate chlorine. The timer on the pool should be set to run during the hottest daylight hours, preferably from 10 am to 6 p.m. during the summer. This is when your chlorine usage is highest. The system will only produce chlorine while the pump is running so it is important to run the pool long enough.

Shocking a Salt Water Pool (Superchlorination)

If the chlorine reading gets too low then it is important to superchlorinate the pool in order to raise the chlorine level to avoid unsanitary water. The salt system should be sized to provide sufficient chlorine output, but in the event of very heavy chlorine demand (swim party, heavy rains, etc.), it might be necessary to supplement the chlorine feed by adding liquid or granular chlorine (if you check your readings weekly or bi-weekly, this is a rare occurrence). It is important to use only as much chlorine as needed as many salt system owners are sensitive to heavy amounts of chlorine.

NOTE: Simply adding more salt to the system will not solve the problem if you have a low chlorine level. Although it enables the salt system to make chlorine, it doesn't raise the chlorine level quickly enough to sanitize your pool properly.

Troubleshooting Salt Water Pools

Saltwater pool owners are generally a very happy bunch, but occasionally things go wrong. When this happens, it usually boils down to a few basic issues either with the salt system or with the maintenance procedures.

"I added salt, but the low salt indicator is still on" or, "The pH level seems to be going out of control"

Check the salt level in the pool using a salt test kit. If the salt reading is OK according to the kit, then inspect the cell. If there is scale on the plates of the cell, soak the cell in an acid solution according to manufacturer's instructions, or, purchase a new one.

"My system doesn't seem to be producing enough chlorine and/or there is algae on the walls"

1. Check the salt level in the pool with a saltwater test kit. Even if the system does not indicate low salt, the salt level indicators can fail, especially if the salt cell is going bad. If the salt level is low, add the proper amount of salt and retest a day or so later. You may have to shock your pool with chlorine (see prior article)

2. Check the stabilizer (page 44) - The purpose of stabilizer in the water is to keep the chlorine from being dissipated by UV rays. If there is not enough stabilizer in the water, then the pool will use chlorine at a rapid pace and the salt system will not be able to keep up. Salt water pools should have 60-80 ppm stabilizer readings.

3. Check the settings on the control box - Make sure the system settings are correct. Most systems can be set to run anywhere from 0 to 100%. If the pool is not using a lot of chlorine in the off season, the system setting can be lower. If the pool is using more chlorine, the system setting should be higher. • See manufactures recommendations that come with your system.

IMPORTANT: Do not set the control box dial any higher than necessary. Salt cells have a limited lifespan and if you constantly run the system at 100% you will end up with premature cell failure.

4. Check the timer (page 30) - The system will only produce chlorine while the pump is running. If you have the system set at 100% and it is still not producing enough chlorine, then it might be necessary for you to run the pump longer.

Choosing a Salt System

Once you have decided to convert your pool to salt water, it is important that you find the system that is best suited for your pool.

There are several issues to consider:

1. Every system produces a certain amount of chlorine per hour - If your system is not producing enough, it may require you to run the pump longer in order to keep up with the chlorine demand of the pool. This can add significantly to the cost of pool operation. Research different systems but be sure you know your pool size and water volume (see page 8).

2. Find a brand that you are comfortable with - Look at the control box. Are the controls easy to read? Is it weatherproof? Do the controls give you enough information and allow you to easily diagnose any problems?

3. Find a unit that will produce enough chlorine - Make sure that it will be able to handle your pool's chlorine needs even during times of highest usage. If you are not sure what size unit you need, see the salt system sizing chart at www.poolplaza.com.

4. Make sure your pool equipment is compatible with a salt system - Most pool equipment is compatible with salt, but there are a few pieces that are not. Check with the equipment manufacturer to see if your pump, filter and heater are compatible as warranties may be voided by the installation of a salt system. Some heaters and stainless steel filters are not designed for use with a salt system.

Here are a few reliable companies that manufacture Salt Systems.

Autopilot • 800.786.7751 • www.autopilot.com
Goldline Controls • 800.294.4225 • www.goldlinecontrols.com
Jandy • 707.776.8200 • www.jandy.com
Pentair • 763.545.1730 • www.pentair.com
Polaris • www.polarispool.com
Resilence • 866.322.POOL • www.resiliencepool.com

INYOPOOLS.COM

Chapter 9

Heating Your Pool

A Brief History of Heating Water

Of all the leisure activities in ancient Rome, bathing was considered an important part of the daily regimen for both men and women. Public facilities resembling modern spas or health clubs embodied the ideal Roman way of urban life.


Roman Bath in England

Small bathhouses, called 'Balneae', might be privately owned but were open to the public. The large baths, called 'Thermae', were owned by the state and often covered several city blocks. Some even included a gymnasium. Fees for both were very reasonable.

Roman rulers were expected to provide social and recreational activities to their citizens and a Thermae would be a pet project. The larger baths could house up to sixteen hundred people at one time and included individual rooms for cold, hot, and warm baths. The baths were often made of basalt, granite, or alabaster and featured ornate ceilings, porticoes, pillars, and statues. Gardens, courtyards, and libraries inspired reflections on the pleasures of Roman society.

The baths were ideal for social gatherings and were like visiting a modern club or community center where you would hear neighborhood gossip, business discussions, and intellectual conversations. Even wealthy Romans who owned private baths in their homes or country villas, would frequent public bathhouses in cities and towns throughout the empire.

Roman engineers in the early part of the first millennium devised ingenious systems of heating public baths and steam rooms. Water from aqueducts flowed into huge cisterns which were divided into numerous chambers. It then flowed by gravity through underground pipes to a complicated distribution system that carried water to cold pools, or to boilers over wood fires where it was heated for the warm and hot baths.
The floors of these buildings were raised off the ground by pillars and spaces were left inside the walls so that hot air from the furnace could circulate into the open areas. Rooms requiring the most heat were built facing the southwest where the sun light was the strongest, and were close to the furnace so heat could be increased easily just by adding more wood.
A network of tunnels was used to store the enormous amounts of wood required to fuel the furnaces and there could easily be 50 furnaces in a large bath. Some would heat the water and others would heat the steam rooms by a hot air system beneath the floor. Outlets in the floor of each room led to drains and underground pipes that took wastewater to municipal drains.
At a time when people had no source of heat at home, the public baths were often a place to keep warm during the cooler months. Mix that with the opportunity to socialize with your friends and associates, and it is easy to see how a Roman bath could be an enjoyable experience.

Heating Your Pool

Growing up in the suburbs of Chicago in the 60s and 70s, summer brought wonderful adventures to our backyard and community pools. Fun and swim team practice were daily events. As kids, we were delighted when the water temperature was above 70° and by the end of summer we were lucky if it was 78°. There were very few options in those days to keep your pool warm so if you loved to swim, you braved the temperature.

Today, water-heating technology is much more advanced and you have numerous options available to heat your pool. First, what is a comfortable temperature for you? Are the high 70s or low 80s fine in the summer time? If so, Solar Sun Rings, should suit your needs.

Do you prefer it warmer in the mid - high 80s or 90s when the weather is cold? If this is the case, a heater is a must and you can choose electric, gas, or solar heating systems. Just remember that these are expensive luxuries and each has its advantages and disadvantages.

NOTE: Heating water is measured in BTU's (British Thermal Unit) which is the amount of energy required to raise the temperature of one pound of water one degree Fahrenheit.

Solar Blankets

Also know as Bubble Pack Blankets are typically blue plastic (that look like bubble wrap) and are cut to fit the dimensions of the pool. They float on top of the water and to some degree maintain your existing water temperature but generates almost no heat. What heat they do generate is surface heat. Because it covers the entire surface of your pool, mustard algae will form on the walls and bottom due to lack of direct sunlight. Made of an inferior polyethylene, they deteriorate over the course of a few years, turn a milky color, become brittle, and tear easily.

The major disadvantage is that they are difficult to remove and roll up when you want to go into your pool. There is also a strong chance of falling into the pool while trying to remove it, a very dangerous situation (see Pool Safety Chapter on page 69.) Some solar reel devices will roll up the cover but are not easy to use. Recently, at a pool show, I saw an electric reel system manufactured by Odyssey Systems that might bear some looking into: www.odysseysytems.com. When all is said and done, the bubble pack blanket is inexpensive, inefficient and dangerous.

Solar Sun Rings

Now here's a 'Green' product that is nothing short of brilliant! When I first discovered Solar Sun Rings, I was so impressed that I was adamant about featuring them in my book. This concept of heating pool water demands accolades for Richard Rosene and David Bartoli, his associate who developed this product in 2004.

The Solar Sun Ring is a passive solar swimming pool heating device made from high quality U.V. resistant vinyl filled with air and floats on top of your pool. Each is 5' round and come either plain or with a colorful palm tree design imprinted on them; a festive alternative to inferior bubble pack covers that lie blandly on your pool.

Using the principle of physics to heat the water, as sunlight passes through the upper and lower layers of each ring, the water beneath the rings gets warmer. At night, the rings act as an insulating blanket and retain heat gained during daylight. Your pool should be covered up to 70% with the rings to work effectively.

Six magnets in each Sun Ring improve clarity and decrease hardness of the water. They are located every 60 degrees around the perimeter and are designed to link the Sun Rings into a single cover. The magnets are strong enough to allow one person to remove all Sun Rings from one location, yet are weak enough to easily separate and prevent entrapment and envelopment. (see Safety Chapter on page 71).

Solar Sun Rings are rated at 21,000 BTUs for each ring per day. This is accomplished by high efficiency utilization of the sun's energy which insulates entrapped air in the device. During summer when the sun is high in the sky, the rings will heat pool water an average of 15 - 20 degrees in northern parts of the country. In the Sunbelt states, it can heat water 20 - 30+ degrees. Winter in states such as Florida and Southern California allow you to leave the rings in all year and can generate temperatures in the 70s. Of course the rings must be removed in colder climates as they will be damaged by snow and ice.

Other features include: • Solar efficiency that surpasses bubble pack covers by over 500% and exceeds solar panels per square foot without running a pump at peak hours. • Can be turned over to cool your pool. • Limits chemical and water evaporation. • A triangle forms between each group of three rings, allowing some sunlight into the pool, which reduces mustard algae buildup. • Can be used on all chlorine or salt water system pools. • Works hand-in-hand with solar panel systems by giving your pool a double dose of the sun's energy during the day, and great nighttime insulation. • Compatible with automatic pool cleaners. • Are easily cleaned with a sponge and mild detergent.

The recipient of many awards, including the coveted 'Smart Approved Watermark' in Australia, as well as glowing accolades from research done at California Polytechnic State University in San Luis Obispo, Solar Sun Rings are without question, one of the finest products I have seen in today's market! Approximate cost is around $30.00 for each ring. **• 951.296.6502 • www.solarsunrings.com**

Solar Spa Cover

One of the biggest problems of having a spa attached to a pool is keeping heat in when you are done using it. The Solar Spa Cover is adapted to the special needs of a spa and reduces evaporation, saving you water, heat and chemicals. Remember that your spa requires some direct sunlight and needs to be uncovered from time to time in order to stay healthy. Be sure that your spa valve is set so water doesn't overflow into the pool or else you will lose all the heated water. Lightweight and easy to remove, the Solar Spa Cover makes uncovering your spa easy and convenient.

Swimming Pool Heaters

Some pool owners consider a heater an unnecessary luxury, but in cooler parts of the country, a heater allows you to enjoy your pool in the early spring and sometimes into fall. As the climate changes across the globe, some areas don't get the summer sun as much as they used to and a heater is a must, even in summer.

In warmer geographical areas, a pool heater offers the opportunity to use your pool throughout the year. It also increases the value of your pool and property. The most popular pool heating options are a gas heater that uses propane or natural gas, a heat pump, which uses electricity, and solar panels.

Gas & Propane Heaters

This process is relatively simple as the water from your pool flows from the intake port of your pool, passes through the pump, and then into the heater. The water is heated when it passes through the heat exchanger, exits the heating system, and then goes into the pool. Most heaters mix heated water with cool water to maintain a preset temperature.

Although gas heaters have become increasingly efficient in recent years, the way gas prices are rising; it's a tough call on whether to choose a gas or electric heater. You also need a large propane tank that needs to be filled periodically; some can be buried under ground while others sit above ground.

Electric Heat Pumps

When a heat pump is running, liquid Freon from inside the unit is pumped through the system. It then turns into a heated gas that is taken from the surrounding air and drawn through an evaporator by a fan. The compressor receives this warmer gas, compresses it to a higher pressure, and causes the Freon to reach a higher temperature. As the unit sends the heated gas through the heat exchanger, it is heated 3 to 5 degrees. The water, now warmer, flows back into your pool. The Freon then reverts back to its liquid state. About Freon: The Freon of today is a nonflammable, noncorrosive gas and does not contain the chlorine component of the Fluorocarbon that makes it environmentally hazardous.

Heating Your Spa

Many pools have an attached spa and the water overflows into the swimming pool when the pump is on. If you are buying a heater just to heat your spa, keep in mind that you will be heating your pool at the same time if you have a system that is set up like this. You may need special plumbing and valves that only heat your spa. Contact a pool specialist to evaluate your plumbing system before installing a heater of any kind.

Some systems allow you to hand turn certain valves in order to bypass the pool so the heat goes directly into the spa, but it tends to get confusing. If you close the wrong valve you could prevent water from going into the pump and could burn up your whole system.

Electronic controls that automatically open and close specific valves to mange your spa are available and make all the difference in the world. (see Automated Controls and Salt Systems on page 77)

Solar Heating & Panels

Solar panels collect and distribute heat to your pool by absorbing the sun's energy. They are normally placed in an area that receives maximum sunlight, such as a roof of a house. Some housing communities may not allow them because they may be considered unsightly.

Solar Panels generate heat at about 1000 BTUs per square foot per day and require a pump to be operated at peak hours to circulate the water. They are efficient but can be expensive and require the additional energy of your pool pump to work. Warning: If your solar panels are being installed or cleaned, never leave them on your lawn. The heat from the sun will almost instantly destroy the grass underneath (I saw this happen to a neighbor - he wasn't happy!)

Whatever system you choose, remember this: Over the course of a day about 30% of the heat that goes into the pool is lost by evaporation. Solar Sun Rings work hand in hand with your heating system and prevents minimal water evaporation and heat loss.

Buying the Right Heater

If you are interested in purchasing a heating system, I encourage you to research different companies and discuss your needs with a sales rep. Be cautious about going into a pool store to purchase a heater as many places will push a certain brand that they get a good deal on. This brand may not be the one for you and could cost you extra money on heating or gas bills. FYI: A gas heater heats a spa much more efficiently than an electric heat pump, but leaps and bounds have been made in heat pump designs over the years so be sure to do your research.

The following companies manufacture pool heating products that I am familiar with and have a good reputation in the industry.

Hayward - 908.351.5400 • www.haywardnet.com • Heat Pumps & Gas Heaters
Aqua Cal - 800.786.7751 • www.aquacal.com • Heat Pumps
Summit - 877.688.0779 • www.thermosummit.com • Heat Pumps
Gulf Stream - 800.446.4328 • www.advancesolar.com • Heat Pumps & Solar Heaters
Enersol - 800.884.6444 • www.enersol.com • Solar Heaters
Techno-Solis - 727.823.6766 • www.techno-solis.com • Solar Heaters

What to Expect from Your Service Tech

Some pool owners may choose to have a pool tech service their pool. Here are some tips:

1. A good company/pool tech will come to your pool once a week, on a specific day, and typically around a certain time. They should always leave a service tag letting you know that they have been there and performed certain duties.

2. Depending on the complexity of your pool, your service call should be a minimum of ten minutes. If you have a floor vac, and your pool is small, at least eight minutes. A lot depends on the complexity of the pool.
3. Filters should be cleaned once a month. An independent service may not agree, but you are paying for a service and quite honestly, it's not that difficult to clean a filter. Be sure to look on your service tag that your filter was cleaned during the course of the month

4. Are your chemicals balanced? Do your eyes burn when you are in the water? If so, talk to your tech and discuss this situation. A good tech will work with you and unless you have lots of kids in the pool, my opinion is that the chlorine doesn't have to be excessive, yet it must meet industry standards.

5. Is there is a problem with your pool? Does your tech let you know right away? If the tech works for a large company, do they notify you of the problem with an estimate? Your pool should never be down for more than two days without some notification. If there is a problem, is your tech licensed to do repairs? If not, they could make the problem worse.

A pool that sits for an extended period of time without a running motor will turn green quickly depending on the time of year. In certain geographical areas of the country, strange things start visiting the pool like tadpoles, frogs, and water snakes that can take over an unserviced pool in a matter of weeks. If your pool is down for an extended period of time be sure your tech keeps the chlorine and pH levels properly balanced so the water doesn't get stale.

6. Does your tech keep you up to date on the status of your filter? An old filter does not perform properly and your pool can go through a lot of changes very quickly. If your tech has told you need a new filter and you drag your feet replacing it, don't blame them when the pool turns green or yellow.

7. It is important to remember that too much chlorine, an overly high, or low, pH balance, improper stabilizer treatments, or excessively high calcium, can cause long term damage to your pool's finish. Has your pool turned yellow or green more than once since you've had a particular pool tech? If the answer is yes, you need to ask yourself if you are better off with a cheap rate that may be the cause of future problems or, a reputable company who is going to protect your property investment.

To sum it all up, a stubborn, irresponsible, or inexperienced pool tech can turn your pool into an unpleasant experience whereas a reputable company can make it a place of enjoyment. My words of advice are quite simple: Stay on top of your pool tech, introduce yourself to them and ask intelligent questions if you have a concern. And don't forget to tip them during the holidays!

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Chapter 10

The Perfect Pool

"Going Green" What's Your Prespective?

No matter what your perspective of "Going Green" is - whether it's recycling water bottles you drink from, or incorporating nothing but planet friendly and/or organic products in your life - it all comes down to this; Let's save the natural resources of our planet, and money, at the same time!

How "Green" Is Your Pool?

Do you have a "Green Pool"? Are you using environmentally friendly products whenever possible in order to obtain that crystal clear pool, or is your water actually green?

If it is the latter of the two, the fact is, when your pool turns green or yellow from lack of adding chemicals, you are hurting the environment because now, in order to get your pool back in shape, you will have to use excessive chemicals to balance the pool. You will also be cleaning your filter more frequently than before until the water clears. By doing this, excess chemical residue is deposited into the ground.

When you decide to be environmentally conscious, here are some things you'll want to think about:

- Respecting the overall environment in, and around, your pool
- Reducing the consumption of resources such as chlorine and chemical additives
- Saving money by saving energy
- Recycling product containers and waste

If you have the extra money, here are some items that will save you money in the long run while impacting the environment.

- Dual speed pool pump motors
- Automatic controls for turning equipment on and off.
- Solar Sun Rings and Solar Energy to heat your pool.
- Recyclable products
- Plastic reusable cups which are safer around the pool as they don't break like glass does.

Saving Energy

The foremost concern of pool owners is saving money. Whether it is in chemical use or heating the water of the pool, there are things that are easily overlooked that cost you hundreds of dollars (or more) every year in energy consumption. How old is your pump motor? Does it make noise when it is running? If so, this means the motor is running harder and using more electricity and as the gears and bearings slowly burn up, harmfully gasses are released into the atmosphere. A properly running pump and filter system is essential in saving energy and products. Here are some important factors:

Maximum Filter Efficiency

CARTRIDGE FILTERS

How old is YOUR filter cartridge? An ineffective filter cartridge causes dirt to pass through the filter elements which means the water never really gets clean. By not taking this factor into consideration, you may think the answer is to let the pump run longer and add more chemicals. By changing a filter cartridge every year, you are assured that your pool is staying clean with a minimal amount of stress on the system. Although many manufactures state that a filter can last upwards of 2 years or more, as a professional pool technician, I feel strongly that it is minimal investment every year to ensure your pool is in good order. Choose a holiday or birthday as a reminder every year to replace your filter.

DE FILTERS

DE Powder - Pool filters that use a DE cleaning system do a wonderful job of keeping your water sparkling clear. This is because a clay based powder (Diatomaceous Earth) is put into the system and absorbs finer particles of debris. Unfortunately, when the filter is cleaned you will see clouds of grey residue coming from the waste hose depositing potentially hazardous waste water on your lawn, in the street, or worse yet.. into public waterways. NOTE: There is a common misconception that DE powder is OK for the environment because the term Diatomaceous Earth seems to imply it is a natural product, which it is not. Add into the factor that there are potential dangers of breathing this powder, and suddenly your perspective of a DE filter system changes drastically.

However, here is good news! Purifiber® is a high performance cellulous filter media that is safe to use and easy to handle, and uses ¼ the amount used of DE when used as a DE replacement. This biodegradable “4 X’s concentrated” product offers superior water clarity and longer filtering cycles while using less material, saving you time, and money. Plus, this non-toxic product does not present any breathing hazards when handling. For more information, go to: www.Purifiber.com

Cleaning Your Filter ~ Saving Energy

How often do you clean your filter? A dirty filter puts excessive work load on your motor while slowly deteriorating the filter elements. Cleaning a filter once a month typically takes only a few minutes and assures you, once again, an energy efficient pool.

Where Is The Filter Water Going?

What is a simple process to most pool techs and owners, it takes a certain level of consciousness to realize that every time a filter is cleaned, the dirty residue is deposited onto the ground, potentially damaging the environment. If you think about it, dirty water can contain any number of the following: Sun tan lotions with an oil base, chemically colored hair and clumps of dead bacteria to name a few.

Chlorine Pools: If chlorine and acid levels are high, you can damage the grass, plants and flowers around the areas you clean the filter

Salt Water Pools: A high salt level in water can damage grass and areas around the waste hose. Although plants living in coastal regions located on or near an ocean may be accustomed to salt air, salt water will damage the root system.

The Perfect Pool

All pool owners want their pool to look its absolute best, but there are times when leaks, cracks, shell discoloration and broken tiles can take away from the beauty of your pool leaving you frustrated and unsure on how to address these issues. Fortunately, solving these problems aren't that difficult. Unfortunately, you are certain to be exposed to unreliable, shady, and fly-by-night repair and service people in the industry.

Here are some professional insights into standard pool issues to give you a better understanding, and what to expect, when hiring pool service companies.

Pool Leaks

A slow pool leak can be your worst enemy, especially in summer when water evaporation is at it's highest. Chlorinated water seeping into the ground will compromise the local environment, while constantly adding water into your pool costs you in chemicals and high water bills. Plus, it could damage your pool pump if the water level goes below the skimmer and the system starts to suck in air.

Here is some information that may raise an eyebrow or two: • A 1/8 inch hole in a metal or plastic pipe, at 40 PSI, can leak up to 2,500 gallons of water in 24 hours. • A leak the size of a pinhead can waste 360,000 gallons per year, enough to fill 12,000 bathtubs to the overflow mark.

If you do feel you have a leak in your pool, it is recommended that you shut the skimmer valve off so water flows into the pool pump through the main drain at the bottom of your pool. If you have a system that doesn't allow you to shut off the skimmer, turn your breaker switch off so your pool isn't running and consider the problem solving options listed below.

Sometimes leaks in a pool are easy to find, especially if it is in the tile at the top of your pool. If there is a crack or leak only in the tile, the water level generally does not go below it. Should the leak be below the tile, it becomes increasingly difficult to find.

Signs that you may have a leak: • If you turn the pump on for it's regular cycle and you lose 1/8" of water or more in 24 hours • You are constantly adding water and algae forms quickly in your pool after a chemical treatment. • Loose or falling tiles or pool deck cracks. • Your pool/spa has settled into the ground and cracks and gaps appear in the pool shell or concrete deck. • You find standing water, mushy spots, or uneven grass growth around the pool/spa area. • An out-dated, or inefficient automatic filler that is continually releasing water. ••• I have discovered a state of the art Automatic Pool Filler that is very reliable. Please go to page 81 for more information.

Should you decide to try and find a leak on your own before hiring an outside company, eliminate obvious leaks by examining the pool equipment for evidence of leakage or moisture. Check fittings that go in or out of the pool pump, filter, or heater, as well as pump lids, valves, and seals. Make sure that water isn't dripping from a multi-port valve or backwash line when pump is on.

If you aren't sure you have a pool leak, put water into your pool 3" - 4" above the bottom of the skimmer port and make a mark on the tile, or note where the water level is on the tile design. Let pump run its normal cycle and check to see if the water level has gone down in 24 hours. Still not sure? Let's try...

The Bucket Test

The “Bucket Test” will determine if water loss in a pool is due to evaporation or a leak. Evaporation rates vary in individual geographical areas but the people at American Leak Detection will be able to help you (see upcoming article). For a printer friendly version of The Bucket Test, visit: www.AmericanLeakDetection.com

1. Bring pool water to normal level.
2. Fill 5 gallon bucket with pool water about 3-4” inches from top.
3. Place bucket on first or second step of pool.
4. Mark water level inside of bucket.
5. Shut off pump and mark pool level on outside of bucket.
6. Resume normal pump operation.
7. After 24 hours, compare the two levels. If the pool water (outside mark) goes down more than the inside water level, there is probably a leak. In case of rain, repeat the test. Test is not valid after 24 hours.

NOTE: Wind and additional water features on the pool may enhance evaporation rate as well.

Dye Test

Simple underwater leaks in a pool shell can be identified with a dye test by pouring food coloring into the water around a suspected leak. Once you do so, watch closely to see if it is drawn into the pool. Suspect areas include cracks in the tile or plaster, inside the skimmer, and areas where return fittings, skimmers, or stairs join at the pool shell. If a crack is leaking and draws dye it should be patched or professionally repaired.

After doing the bucket test or dye test and you find that the water loss is minimal, mark the water line on the pool wall and let your pump run its normal cycle. If the water has dropped half an inch to an inch in a 24 hours period, consider this option before calling a pool leak detection service:

Fix-A-Leak

An affordable way to fix a small leak in a pool, spa,or hot tub without having to go to the expense of hiring a leak detection service. I have used a one-quart bottle of Fix-A-Leak on a pool with a minor leak and was delighted with the results. 905.374.2560 • www.fixaleak.com

Choosing the Right Leak Detection Service

I have seen a variety of leak detection companies work on problem pools. Some do a great job while others perform basic tests, seal obvious cracks, and never come back to see if they solved the problem. American Leak Detection Services is a reliable company that has reputable franchises throughout the world. 800.755.6697 • www. AmericanLeakDetection.com

Pool Finishes

There is nothing more frustrating than looking at your pools finish and cringing at discoloration and stains throughout the bottom and sides. For many cases, the problem can be solved easily, while others fit into the worst-case scenario category and need to be refinished (also known as resurfacing). Lets look at some options:

Why Is My Pool Finish Deteriorating?

Sometimes it's as simple as keeping the chemicals balanced to ensure that bad chemistry doesn't affect the finish. Numerous factors could be the culprits that are beyond the average pool owner's scope of understanding. It all comes down to how well the original contractor laid down the finish, and/or how well you serviced your pool over the years.

Acid Wash

How bad is your pool? Are there rust, yellow, or brown colors on the surface? Did you drop a screw or bolt into the water and now rust spots are glaring at you? If so, an acid wash may bring your pool's finish back to life. This process is simple: The water is drained from and the finish is scrubbed with brushes and muriatic acid. The pool is filled, and in most cases, it's as good as new. Call a pool company who specializes in this service. However, the residue from this cleaning is extremely bad for the environment. Before considering this option, look at Jack's Magic stain remover on page 102.

Resurfacing

Does your surface have cracks, large pockets or chunks of tile or pool finish falling off? When you look at the bottom of the pool, do you see large craters edged with black algae and imagine what the dark side of the moon looks like? If so, your pool needs to be refinished. This process is a lot more complex and expensive than an acid wash, the only similarity being that the water in the pool has to be drained.

A professional resurfacer will chip away damaged finish or tile, clean up the mess, and put a completely new finish on the entire pool. (this is a good time to replace your tile along the top of the pool). Like painting your house, a variety of quality finishes and tile products are available so don't pick the first sample you see. Research your options so you won't complain that you wished you had put that mermaid mosaic in the pool after everything was done.

IMPORTANT: Before you refinish your pool, did you have a leak of any sort? If so, there is a good chance that resurfacing will not solve that problem. Read about pool leaks at the beginning of this chapter and make sure the leak is fixed. Afterwards, wait a reasonable amount of time to ensure it the leak has stopped before proceeding with resurfacing.

Choosing the Right Remodeling/Refinishing Company

There is no question about it, remodeling and refinishing your pool is an expensive investment. A poorly renovated pool will cause you heartache for years to come as any imperfection, no matter how slight, is sure to irritate for a long, long, time! Talk to two or three companies and see who is the most knowledgeable and most importantly, has the best reputation in town.

Is This Refinishing Company Right For You?

Fly-by-night refinishers whose experience is based on doing a half dozen pools when they worked for a professional pool company for six months, are a dime a dozen. A professional pool refinisher should be able to perform the job in a week's time, weather permitting, unless there is extensive tile damage that needs to be replaced. How professional are they? Did they keep their original appointments? Were they on time? Woody Allen once said, "90% of success is showing up," a quote that certainly applies here. If they can't keep the original appointment, what makes you think they will show up when they are supposed to do your pool? Your contractor should have clear-cut dates, times and monetary requirements spelled out clearly in the contract.

Does their contractor's license stipulate that they are allowed to do the kind of work you require? Is their State Swimming Pool Contractors license current and up-to-date and not ready to expire? Look for The RP or CPC designation on their license. A permit is required by law! If they don't show up with the proper permit(s), don't let them near your pool. Check the permit to be sure it covers the work being done on your pool. Call the county permit bureau and confirm that this permit covers what you are getting done.

•• **INSURANCE** - Make sure, beyond a shadow of a doubt, that they have the correct insurance required to work on your pool. Call your insurance company and see what the contractors are required to carry and to check on them if possible. Are they a reputable company? In Florida, especially along the coastal area, "Pool Popping Insurance" is required. Because of unpredictable groundwater tables, if the water isn't drained properly, your pool could literally pop out of the ground! YIKES! If this is an issue where you live, be sure to get a copy of the insurance policy, and consult your insurance company.

•• **START UP PROCEDURE AND BALANCING CHEMICALS -** Once your pool is refinished and filled, the job doesn't end there! If your water isn't treated properly the first weeks after the job is completed, the finish will absorb metals from the water, and discolor almost immediately. In six months or less you could be right back where you started with stains all over your pool. 60% of the curing process takes place in the first 28 days and depending on the geographical area, can take up to ten months to cure. Does your contract state that they will return on specific days to balance the chemicals? If not, run like the Dickens.

Do you live in a part of the country where water is drained from the pool in winter? If so, it's not going to do you much good to have a pool refinished in August and three months later, be exposed to the harsh elements of winter. Immediately after a pools finish is redone, the chemicals have to be balanced in a specific way the following week and the walls brushed. Is your contractor knowledgeable about this? If they hesitate, or hem and haw when you interview them, don't use them!

After Your Pool is Refinished

If there is a strong iron or metal content in the local water you use to fill your pool? If so, discoloration could return in a short time. Any kind of ground water put into a newly finished pool is a potential recipe for disaster, especially if you have a leak and have to add a lot of water. If this is the case, I encourage you to research proper additives that will give your finish a long life. Be sure your refinisher give you proper instructions on how to maintain your new finish with chemicals and brushing.

A Beautiful Stain-Free Pool the Easy Way!

Most people assess the "well being" of a pool in 2 simple ways: 1) Is the water sparkling clear? 2) Is the pool itself free from stains and discoloration? As the leader in swimming pool stain identification, removal, and prevention for over 20 years, Jack's Magic has a comprehensive line of proven stain-fighting products and programs designed to keep your pool sparkling clear and free of stains.

A pool I once serviced had terrible brown and yellow stains, a result of concentrated metals in the ground water that was continually being put into the pool (the pool had a leak). I was sure only a complete draining of the pool water and an acid wash, or surface refinishing, could solve this problem. The owner of this pool consulted with Jack's Magic, bought the recommended Jack's Magic Stain Program™ products and followed the instructions. Over the course of a few months, I saw a 360-degree rebound and a pool finish that looked brand new. To say I was impressed would be an understatement!

An affordable alternative to a complete draining and acid wash or pool refinishing, the Jack's Magic Stain Removal Program has been developed to keep swimming pools looking beautiful and stain free. The program takes the guesswork out of maintaining a stain-free pool by identifying the exact product(s) to remove an existing stain. It also offers a comprehensive line of proven products to prevent stains from occurring. Here is how the Jack's Magic Stain Program works:

The Jack's Magic Stain Program™

NOTE: Your pool must be properly balanced as a prerequisite to beginning

Step 1 - Identification:

Identify the products to remove the stain with a Jack's Magic Stain ID™ Kit. Buy the Stain Identification (ID)™ Kit from Jack's Magic (app: $12.95) to identify the type of pool stain you have. This kit uses 4 simple topical tests that identify precisely which product(s) is best suited to remove the stain(s) from your pool.

Step 2 - Removal:

Remove the stain by using the product(s) the ID Kit recommends: Jack's Magic Stain Removal Products such as: • Stain Solution #1 Iron, Cobalt, and Spot Etching Stuff™ • Stain Solution #2 Copper and Scale Stuff™ or, • Stain Solution #3 O2 Safe Shock™

Step 3 - Stain Prevention & Preventative Maintenance:

Prevent stains from developing by using a specific preventative maintenance product: The Magenta Stuff™ • Blue Stuff®, • Pink Stuff®, • Purple Stuff® • Vinyl Liner Blue Stuff™, or • Ionizer Stuff®.

That's it! Simple and easy! Now all you have to do is "get with the program!"

The Jack's Magic Stain Program!
800.348.1656 • www.jacksmagic.com

Certified Stain Specialist (CSS)®

Your local Jack's Magic Certified Stain Specialist has completed extensive training and demonstrated proficiency in the following areas: Stain Identification; Stain Removal; Stain Prevention; Successful Pool Start Ups. A CSS is your local professional source for keeping your pool looking its beautiful, stain-free best.

The Importance of Properly Balanced Water

Properly balanced swimming pool water is an important prerequisite for getting optimum results from Jack's Magic products and programs. While it is always beneficial to maintain proper water balance in a swimming pool it is essential that a pool be within recommended balance ranges prior to using any Jack's Magic products or programs. If water is out of proper balance ranges in even one area (for example a cyanuric acid (stabilizer) level significantly higher than the recommended high end of 70 ppm), effective product performance may be impeded or even prevented.

A Must Have Product for Vinyl Liner Pools

Jack's Magic's The Step Stuff®, when used as directed, quickly removes yellow-brown stains from vinyl liner pool steps right before your eyes! This easy-to-use product utilizes a simple 2-part system to make your pool steps look like new. In most cases, as the water circulates in your vinyl pool, The Step Stuff will also clean your fittings and skimmer face. The great performance of this product also makes it ideal for the spring opening of your vinyl liner pool.

Thinking Green

It has been estimated that by treating swimming pool stains with the Jack's Magic Stain Program, approximately 200 million gallons of water are saved annually that would be lost to draining and acid washing. Whether a swimming pool has had a stain successfully removed or has never had a stain, by incorporating these stain prevention products into your pool maintenance, your pool will continue to look beautiful and stain-free, and you'll help conserve water.

Jack's Magic is proud to offer "green" products such as Purifiber®, a DE powder alternative which is 4 X's concentrated; using only ¼ the amount needed when used as a DE replacement in your DE filter system. Purifiber can be safely handled and backwashed without restriction because it is completely biodegradable and non-toxic.

Jack's Magic also features other "green" pool products which are non-toxic and completely biodegradable. • Surface Magic™ quickly gathers debris from the surface of a pool, concentrating the debris for easy clean up. • The Natural Clean Stuff™ is a super strength 100% biodegradable natural enzyme that prevents and removes swimming pool water build up (scum line) caused by body oils, lotions, and suntan oils.

Technical Support

If you have any questions after testing your pool water, or, you aren't sure of the proper treatment to use, your local Jack's Magic professional will be happy to help you. In addition to your local pool professional, you can contact the Jack's Magic Team at www.jacksmagic.com and 800.348.1656.

About the Author

Ken Christensen, author, artist and entrepreneur was born in a log cabin he helped his father build. Trudging through rain, sleet, and snow to come home with C average grades, he relentlessly pursued his education in the School of Hard Knocks and the College of Life, while studying the philosophies of Howard, Howard, and Fine. At the age of 17, he took on a summer job as a laborer for a brick layer and decided, then and there, that he was going to be an artist!

From 1990 to 2003, Ken researched, wrote, and published 24 books in the Romantic America Book Series which featured extensive information on quality Bed and Breakfast Inns, Hotels and restaurants in 43 of the continental United States. The aftershocks of 9/11 and a debilitating family illness gave him cause to refocus his life and he took on a job cleaning swimming pools in 2004. Turning lemons into lemonade; Ken saw the need for an easy to understand book on swimming pool maintenance, and after a five year hiatus, has produced his 25th book, I Love My Pool! - The Perfect Pool in Five Easy Steps.

Dedicated to Cindy Hollinger, the love of my life -
You were my heart, my soul, my inspiration...

Contributors

So many people helped to be part of this book in all stages, that I wanted to extend a special thanks to everyone:

Dave Rutkas - Who told me in 2004 that I should write on a book on how to take care of a pool.

Nancy Sommer - Proofreader, editor, friend and confidant.

Jill Wisth - Photographer - Took most of the pool products and instructional photos for this book. We spent an entire afternoon taking photos all over town one fine spring day, which went very, very smoothly.

Roy West - Technical Advisor - A master at pool chemistry and repair, Roy advised me throughout this book on critical information that had to be presented; ” Just right”.

Redge Wiebusch - Photoshop editing, flow chart design and assorted artistic contributions throughout book.

Steve & Diana Mugar - Who first tried my EZ Clear Pool Care system in Fall 2007 and let me take photos of my pool maintenance process at their beautiful home.

Timothy Mott - Original owner of www.Poolplaza.com who was kind enough to let me use and incorporate some of his chemistry and salt system information with my writings. Tim and I have the same perspective; keep it simple and easy to understand. He and his wife are now missionaries in Nicaragua.

Richard and Deb Marino - Let me take pictures of their dog, Sadie, playing in their pool.

Doug and Susan Hoyt - Who were big supporters of my endeavors right from the start, as well as Dana Eurich, David Rufel, and a host of my clients.

Kit Bauer - Told me I was wasting my talents and that I should buckle down and write my 25th book.

Tom Adams - Listened to my ideas and brainstormed with me.

DynastieBooks.com - Book Design & Layout

Resources

The following companies were kind enough to supply me with critical information that helped make this such a versatile book.
American Leak Detection Services - Detecting pool leaks for over 30 years • 800.755.6697 • www.americanleakdetection.com
Critter Skimmer - Skimmer lid which allows frogs to escape - 207.450.0300 • critterskimmer.com
Fix-A-Leak - Quality leak sealer • 905.374.2560 • www.fixaleak.com
International Testing Systems (ITS) - Cutting edge water testing supplies • 803.329.9712 • www.sensafe.com
Jack's Magic - Pool stain remover • 800.348.1656 • www.jacksmagic.com
Replications Unlimited - Artificial rock formations • 314.524.2040 • www.replicationsunlimited.com
Solar Sun Rings – Solar rings that warm your pool water • 951.296.6502 • www.solarsunrings.com
Torcan Industries - Automatic pool filler • 239.768.0604 • www.torcancorp.com
Towel Rack Genie™ - The perfect rack to hang towels on • 757.749.5798 • www.thetowelrackgenie.com
Websites
www.poolfence.com - Pool safety fences and extensive info on pool safety.
www.poolplaza.com - A variety of pool products - check out the pool school link for extensive information on pool chemistry.
www.poolsideplaza.com - Unique selection of products to enhance your patio, as well as some pool equipment.

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Index, cont'd.

MAINTENANCE SCHEDULE

On the next page is a 3 month pool maintenance schedule that should be filled out weekly as you test, and add chemicals. This can also be copied, and laminated at any office supply store.

Pool Maintenance Chart

When doing your weekly pool water testing, write down your test results and how much chemicals you added to the pool (See Chemistry Chapter for application recommendations). Over a period of time you will see a pattern which will give you insight into the application of pool chemicals. Although chlorine and pH levels should be tested weekly, Total Alkalinity, Stabilizer and Calcium hardness can be tested once a month.

	Free Chlorine		pH		Total Alkalinity		Stabilizer		Calcium Hardness	
	Test Reading	Quantity Added	Test Reading	Quantity Added	Test Reading	Quantity Added	Test Reading	Quantity Added	Test Reading	Quantity Added
Week 1										
Week 2										
Week 3										
Week 4										
Week 5										
Week 6										
Week 7										
Week 8										
Week 9										
Week 10										
Week 11										
Week 12										