

YOUR POOL



A Survival Guide for Every Pool Owner



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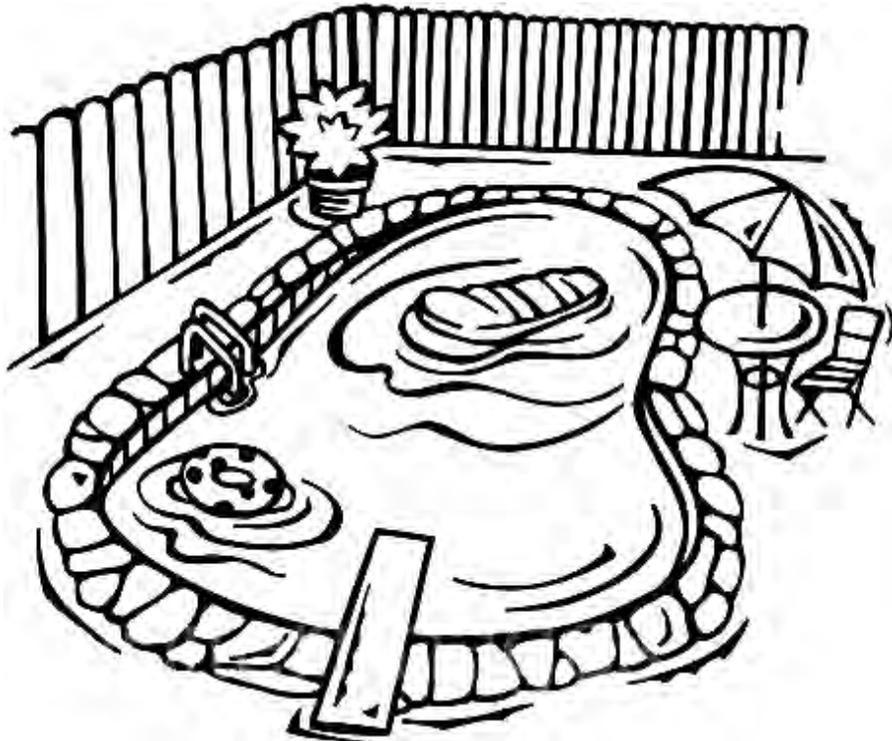
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Chapter 1 - Your Pool Should Be Fun!

TO THE READER

What Is “Your Pool – A to Z”?

"Your Pool – A to Z" is a tool for every pool owner.

Our pool came with our house. I kept asking the same questions every year. **Your Pool – A to Z** is the result.

Yes, YOU Can Manage Your Pool!

Your pool, no matter its size, should be a source of joy and comfort. Fun is the result of removing confusion and mystery about pool care. If you don't know a chlorinator from a pollinator, don't worry. This book tells you how your pool system works and how to tell the tools from the toys.

Pool care can be very simple. Unintentional neglect and "more is better" actions cause most pool problems. Being consistent and uniform in chemical treatment, vacuuming, skimmer and strainer basket clearing, and filter cleaning are the keys. There are times you will KNOW what is to be done and you will be able to do it yourself. Then there are times it will be smart to call in your pool professional. But problems seem to show up at the dealer's busiest time. By referring to this book, you can make the care of your pool a collaboration between you and your dealer.

The book treats pool management as if your pool is open year round. If you close your pool for the winter, you may refer to the chapters on opening and closing.

You'll find the generic names for lots of chemical products to help you maintain your pool and to solve water problems. Since many different brands have the same key ingredients, you'll be able to go to your pool store knowing the generic chemical name and describe your problem so the dealer can give you the right "cure". Count on your dealer to recommend the right brands and forms of chemicals to treat your pool water.

Your Supplier

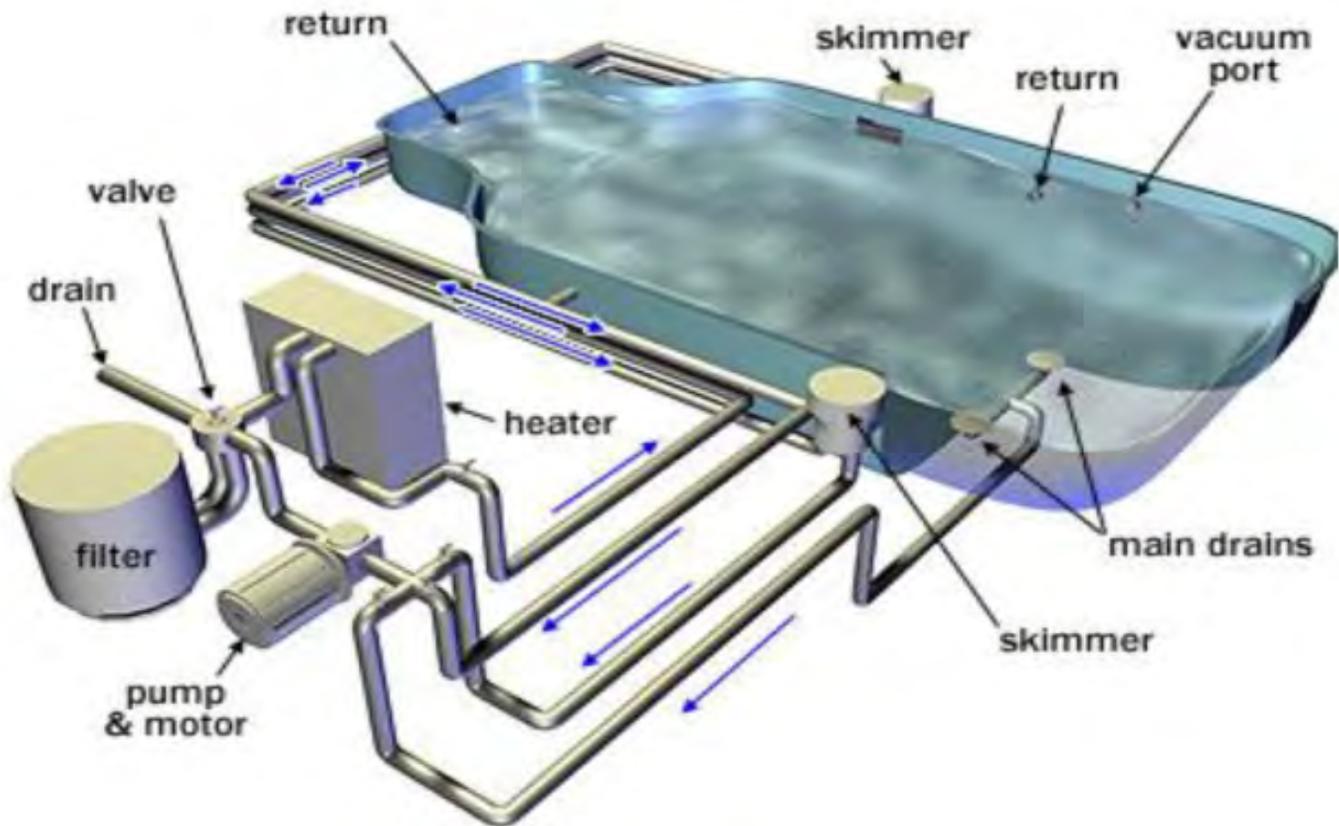
Some service people think the less you know, the more business you'll give them. A to Z believes that as an informed customer, you are more trusting, loyal, and more willing to refer your friends. Dealers are your partners in having your pool look great. They say the more you know, the more respect you have for their hard work and intelligence. They also figure the more you know, the quicker they can help solve your problems to give you more time to enjoy your pool. The less time dealers spend with each problem, the more customers they have time to help. **Your Pool - A to Z** is the pool owner's survival guide!

More Words for All Readers

This book is intended to be of help to dealers and owners. The suggestions are not chiseled in stone. Your way of doing something may be different than we suggest. Let us know how your methods differ. If you have a different approach to some situations, call us. We revise text every printing. The pool industry keeps growing, meeting new challenges, and introducing new products. It is our privilege to keep this book "ahead of the wave."



Pool Water Flow Diagrams



Typical Water Flow: In-Ground (IG) & On-Ground (OG) pools.

The valve in the photo above is shown in the open - vertical - position.

Entrapment Prevention in Pools

To avoid entrapment, professionals suggest having two or three suction drain points, or anti-vortex drain covers and extra wide grates.

Pools and spas can pose hazards if improperly designed, constructed, maintained and used. The American National Standards Institute (ANSI) accredited ANSI/APSP-7, American National

Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs and Catch Basins, represents the most current and

comprehensive approach to entrapment prevention by stating how existing technologies and methods can be used to protect you from entrapment hazards in both new and existing installations. This addresses methods to prevent all five recognized suction entrapment hazards; hair entrapment, limb entrapment, body entrapment, intestinal entrapment, and mechanical entrapment (jewelry, finger/toe) caught in the opening of an outlet or cover.

All submerged outlets of all sizes are required to be protected by approved covers and limit the flow rate of water velocity to the appropriate lower suction force.

The three basic underlying reasons that govern these hazards are water flow through an outlet or cover, mechanical concerns, suction or differential pressure. Many of these entrapment preventions previously used do not protect against all three problems, therefore do not protect against all five

forms of entrapment.

The Virginia Graeme Baker Pool and Spa Safety Act was placed in effect on December 19, 2007 which included several federally mandated provisions. 1) Residential Pool and Spa drain covers that are made and sold after December 2007 must conform to ANSI/American Society of Mechanical Engineers S.112.19.8. 2) Suction fittings for pools, spas, and hot tubs must be retrofitted with appropriate anti-entrapment drain covers. 3) All residential pools and spas must be enclosed by a barrier to entry that will effectively bar small children from gaining access.

Please check with your dealer on the latest ANSI/ASME safety precautions for your entrapment prevention.

Chapter 2 - Pool Chemistry

WHICH CHEMICALS & WHY

Pool Owner Alert!

Here's the lowdown on key chemicals used to manage your pool water. Be sure you know which chemicals can be mixed safely with each other in the pool. But NEVER mix chemicals together. First, always add CHEMICALS to WATER, never water to chemicals. Then add the SOLUTION to the pool. Knowing these guidelines, you and your dealer will become a dynamic team that can solve all your pool problems. Make a list of the chemicals you're using. Show them to your dealer if you're not sure what they are.

Common Pool Chemicals With Uncommon Names You Should Know



CAUTION: NEVER add chemicals to the pool if people are in it.

Sanitizer: primary use is to kill bacteria. Most common sanitizers are chlorine, bromine, and biguanide.

Oxidizer/shock: Oxidizer keeps water clear, burns off organic waste and kills algae so your pool sparkles.

pH adjusters: used to raise or lower pH to correct level which helps sanitizers work better, reduces

scaling and corrosion, and affects your eye and skin comfort.

Total Alkalinity adjusters: used to raise or lower Total Alkalinity which keeps pH from bouncing around.

Calcium hardness increaser: helps prevent deterioration of plaster pool and metal surfaces.

Algaecide (algicide): attacks and kills existing algae cells, often used with oxidizer or shock.

Algaestat (algistat): cuts off algae's enzymatic activity to slow further growth. Some remove phosphates to starve algae.

Clarifier: flocculent that clears up hazy or cloudy water.

Sequestering/chelating agent: prevents metal sourced staining of pool surfaces and water discoloration.

Enzymes: break slime into carbon dioxide and water.

Tile and vinyl cleaners: remove scale and scum lines.

Tetraborate compounds: another way to kill algae. Slime and water mold also become victims.

Why Chemicals?

Even fluoridated and chlorinated tap water left untreated will become host to all kinds of living organisms, including bacteria, algae and mold. Swimming pools need consistent application of certain chemicals to keep water clean and clear.

Before you mess around with your pool chemicals, have a sample of your water analyzed by computer at your favorite pool store. We dip water out of your pool with a clean plastic container and cover it with a lid. The dealer transfers a quantity into a test tube. The analysis is displayed on a screen and printed out. It's very scientific. The dealer will provide computer results and treatment recommendations to balance your pool chemistry.

Which chemicals does your pool need? The most important is SANITIZER. Sanitizers kill bacteria. Most pools are sanitized with either chlorine, bromine, or biguanide (pronounced BY-GWAN-EYED). Chlorine is the most widely used. Many prefer bromine or biguanides. Ionizers, ozonators, and mineral systems have ardent fans, too. Except for biguanides, a residual of chlorine usually is needed

to finish off the bacteria. Newer mineral systems boast increased capacity and incorporate a chlorine dispenser to assist the minerals to finish off the bacteria.

In what forms do sanitizers come? Chlorine comes in granular/powder, sticks, liquid, tablets, and for commercial use, gas. Bromine comes in tablets. Biguanide comes in liquid form. Measured amounts of chlorine also may be generated and fed into the pool using a saltwater chlorine generator. See page 21 and 44.



CAUTION: NEVER mix chlorine or bromine with a biguanide.



CAUTION: You may shock a BROMINE based pool with CHLORINE but NOT with a biguanide shock.

When chemicals are compatible, it means they have no adverse effect on each other in the pool. In fact, they may complement each other. See Chemical Mixing Chart page 12.

CHEMICAL BRANDS

Different brand names of chemicals are abundant, but the basic chemistry functions you read about here APPLY TO ALL BRANDS.

What BRAND should you use? The dealer who sold you this book believes in having informed customers. Trust your dealer's advice on the brands to buy and their use.

CHLORINE CHEMISTRY

How Chlorine Systems Work



CAUTION: NEVER mix BRANDS, TYPES, OR FORMS of chlorine - in or out of the water.

Chlorine comes in different forms combined with ingredients which may be totally incompatible or dangerous when mixed in the same container. Key Rule: DO NOT mix chlorine brands, types, or forms.

You may dissolve one type or form of chlorine in the water, such as tabs in a chlorinator, or

broadcast granular, or pour liquid directly into the pool. Your dealer can advise which forms of chlorine can be used together. Example: don't put tabs and sticks in the same container; nor granular and tabs in the same container, nor granular and sticks in the same container. Two different granular types mixed together are potentially dangerous, as are two different tabs mixed together. All chlorine works the same way once it is dissolved in water.

The two main types of chlorine are stabilized and unstabilized. Stabilized chlorine contains cyanuric acid, an agent which helps it last longer in sunlight than unstabilized chlorine. Stabilized costs a bit more, requires fewer doses, and less frequent testing.

You can instead use unstabilized chlorine and stabilize it by adding cyanuric acid to the pool to make it last longer in the sun. Unstabilized chlorine must be added daily unless you are using a feeder (chlorinator) which allows the chlorine to dissolve gradually. Unstabilized chlorine costs less, and usually requires more frequent attention. Ask your dealer which type of chlorine is best for your pool. Also ask about different types of chlorine feeders.

NOTE: An idea that is gaining favor: Put water in a plastic watering can, stir with a plastic spoon, slowly adding granular chlorine until it dissolves, then sprinkling the solution onto the pool water around the pool's perimeter. No blowing chlorine dust or big splashes! Undissolved granules can damage the liner. Same rules apply for making a solution of acid from the dry acid.



CAUTION: DON'T ADD SHOCK THROUGH THE SKIMMER. Better to broadcast, or use a floating, or an in-line automatic chlorinator.

Rapid Dissolving Chlorine Forms

New calcium hypochlorites, cal-hypo, (in chlorine crystal form) may dissolve before moving through just 3' of 68° pool water! Ask your dealer if other chlorine forms, such as sodium or lithium hypochlorite are right for you.

Absence Of Chlorine Makes The Pool Grow Greener

Lack of enough chlorine is the biggest cause of algae, haze, and foul odors. One part per million of free, available chlorine is SANITARY, and it is virtually impossible to contract a bacterially sourced illness. The water may be cloudy, or green, or blue, or brown, but IT IS SANITARY, i.e., you can swim in it without fear of catching something. Other concerns, however, are safety, visibility, slipperiness, and aesthetics. So, the solution... forgive the pun... is to bring the level up to within 1-3ppm (parts per million, or milligrams per liter - mg/l).

To keep water sanitary, clean, and clear, chlorine should be at a level of 1-3ppm, mg/l. In very hot weather, check your chlorine level at least once a day, and always before you get into the water. After some experience, you'll get a good idea of how much chlorine your pool requires. You won't need to test as often. No matter how much you have been adding, if the chlorine level tests too low, add more.

Rule of Thumb:

Many dealers say chlorine is your friend; keep enough in the water and you'll never have pool problems; it is possible, however, to overdo it. Too much can cause major bleaching and body tissue injury.

Odors, Eye, & Skin Irritation

If chlorine odors irritate you, chances are the chlorine level is low. At low levels, chlorine will combine with ammonia compounds, which get into pool water through perspiration, urine, and other "methods of introduction". The chlorine and ammonia combination is called "chloramines" or "combined chlorine".

Chloramines irritate the eyes and skin. If you are more sensitive than most, you may detect and act quickly on the problem. To be safe, test your water more often than less.

Testing for Chloramines

Test for chloramines with the "DPD" test kit. It shows the amount of "free, available chlorine", that is, chlorine that is doing its job, versus

"chloramines" which don't do much of anything. Shocking or superchlorinating gets rid of chloramines.

Superchlorinating: The ShockingCure!*



After testing for chloramines, to get rid of them in chlorine based systems you "superchlorinate" or "shock" the pool. Do this by raising the chlorine to a very high level, usually around 5-10 parts per million; follow your dealer's advice. Chloramines will break down and disappear like magic.

A day or two after you superchlorinate by adding shock, you will need to add regular amounts of chlorine as your basic sanitizer.

You need to shock the pool every 1-2 weeks on a regular basis. It also needs to be shocked after heavy use, heavy rain, when the water is hazy, or algae is visibly present.

EYEBALLING ALGAE: You can SEE algae beginning to form. It starts to show up as very pale yellow or green, barely visible splotches, turning to green in a matter of days, depending on the amount of sun and water temperature.

Shocking not only destroys chloramines, it also dispels cloudiness by burning off the organic matter on which algae feed.

A fast dissolving granular, calcium-based or liquid chlorine is best for shocking the pool. Dissolve granular in water in a plastic sprinkling can, then

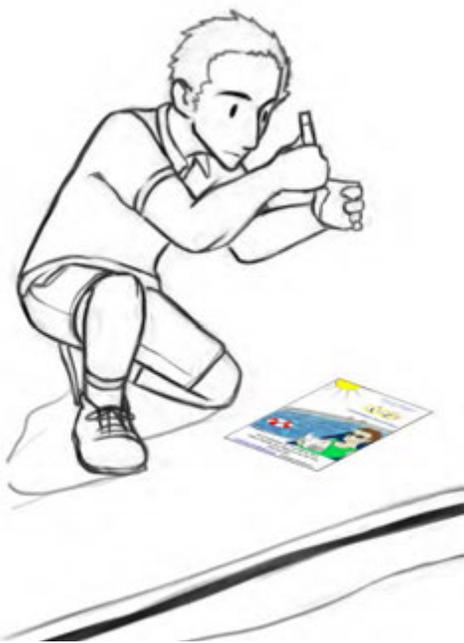
pour it in. Your pool will reach a high chlorine level which will dissipate quickly, allowing you to swim sooner.

Sadly, if you can't swim, adding chlorine won't teach you.

The equivalent of chloramines is found in bromine based pool systems and is called bromamines. Bromamines are shocked using heavy doses of fast dissolving chlorine. Read on about bromamines.

***Chlorine Based Systems Crystal Clear Advice:**

It may be hard to believe, but the best way to eliminate chlorine odor is to add MUCH more chlorine!



MORE CLORINE CHEMISTRY; BROMINE & BIGUANIDE CHEMISTRY

Bromine Systems

Bromine has two advantages over chlorine. When it combines with ammonia to form bromamines, it still sanitizes. Chlorine, as you now know, does not. Also, bromamines do not produce the irritation that chloramines do. However, bromine pools need to be shocked, too, since bromine is a milder "oxidizer" than chlorine and therefore is not as effective against algae. Bromine cannot be stabilized to slow down deterioration from sunlight. Bromine, like chlorine, should be kept between 1-

3ppm or milligrams per liter – mg/l.

Biguanide Systems

Biguanides (pronounced BY-GWAN-EYEDZ) is really a system that has three active agents, sanitizer, shock, and algaecide. Biguanides are sanitizers. They are a long-chain polymer with a chemical name a mile long. It's important to keep biguanides at 30 to 50ppm or mg/l. Test the sanitizer level only once a week and before swimming or sooner if you have had heavy rainfall or high pool usage. Biguanide sanitizers are not affected by heat or sunlight, so they don't burn off quickly in hot weather.

To shock, that is, to bum off organic matter in a biguanide pool, once a month use a liquid whose active ingredient is hydrogen peroxide. Wear rubber gloves and eye protectors to avoid bums. For recurring slime or algae, check the peroxide level with test strips, then confer with your dealer who may recommend adding more, or a higher percentage hydrogen peroxide solution.

If the brand you use is combined with algaecide, you may not need a separate algaecide. Otherwise, each week add an algaecide the manufacturer recommends. Vary the amount according to instructions for the biguanide brand you're using. Avoid "overdosing." Many algaecides tend to foam, and at high levels can interfere with test kit readings. Be sure that chemicals are biguanide compatible. Check the compatibility chart on page 12.

CHEMICAL BALANCE

The chemical balance of pool water determines how corrosive it might be or how much scale it might deposit.

You are the juggler of your pool's balance. Call on your resources. Involve your dealer: Take in water samples to test!

Your dealer uses a SATURATION (Langelier) INDEX to figure the right ratios of Total Dissolved Solids(TDS), temperature, pH, Total Alkalinity(TA), cyanuric acid, sanitizer and calcium hardness. You'll need to have the index in the correct range to prevent problems with your pool and equipment.

See chart on page 12.

pH

Adjust the Total Alkalinity, then the pH range BEFORE you add sanitizer. Test pH at least two times a week. pH is the measure of how acidic or basic the water is. The pH level determines bather comfort in the water. The pH of our eyes is about 7.5. I learned that "pH" is pronounced "pee-aitch" not "fuh". Fuh, that is, pee-aitch, is in its broad, proper range at 7.2 to 7.8. A closer comfort range for bathers is 7.4 to 7.6. On a scale of 0 to 14, 7.0 is neutral. Chlorine sanitizes best at the lower side of the proper pH range.

Supermarket quality baking soda is not meant for pools, so get the right pH adjusters from your dealer. Adjusting the level up or down is easy. Two different chemicals, sodium carbonate, pH plus, and sodium bisulfate, pH minus, are available. Some dealers say, "with your back to the wind, just sprinkle - or broadcast - a quantity over the pool surface." It may be preferable to premix each chemical by itself in water in a plastic bucket or plastic water sprinkling can and pour it around the pool perimeter.

ATTENTION: We cannot know YOUR particular pool's construction, equipment, metals, PVC, etc. Therefore, to avoid possible damage, we suggest you NEVER add chemicals directly into the skimmer, except perhaps, a flocculating clarifier. Always ask your dealer's advice.

Total Alkalinity

A Total Alkalinity, TA, test measures how resistant the pH is to change. It also helps determine how corrosive the water might be or how much scale it might deposit. The proper levels 80-150ppm, mg/1. You use an increaser, which is sodium bicarbonate, TA plus, to raise, and a decreaser, which is sodium bisulfate, TA minus, to lower total alkalinity. Nature - sun, rain, and time - may slightly lower TA. The above adjustment chemicals are OK for chlorine, bromine, or biguanide systems.

Muriatic acid can lower extremely high alkalinity and can be used by professionals as an acid wash to clean the sides of a concrete pool and to remove scale. However, it's messy, needs careful handling, and like all acids is very dangerous. Too much damages metal and plaster.

Calcium Hardness

Your bones and teeth need calcium. Without it, they will break and crumble. Are you surprised that if you have a plaster or painted concrete pool, or a vinyl pool with a heater, your pool water will need calcium too?

The right level of calcium, called calcium hardness, in the water protects plaster from etching and breaking down concrete pools. It also protects metal in heaters and other exposed metal surfaces from scaling and corrosion. The lower the level of calcium in the water, the more likely the water is to leach - or draw out - calcium from plaster. Calcium hard water also inhibits foaming. Your pool needs calcium. Test your water for calcium at your dealer. Calcium range should be 175 to 400ppm, mg/1.

To lower hardness level, just add water - unless your tap water is already high in calcium hardness. Have your dealer test your tap water or well water, too.

To increase calcium hardness, get calcium chloride crystals from your pool dealer. They are large, generate heat while dissolving slowly, and tend to clump together. To prepare a solution for your pool, add the crystals slowly to water in a plastic sprinkling can. Stir well with a plastic spoon to dissolve them. Don't sweat over the heat; it's normal. Then sprinkle, or broadcast, the solution into the pool. To avoid local overheating of equipment, never put the crystals into the skimmer, even with the pump running.

Other Clear Pool Aids

Algaecide (algicide) kills existing algae. It supplements shock to get the job done. What's algae? Yellow, green, brown, blue green stuff. It makes pools ugly and slippery. Hundreds of different algae types are found in water. Aren't you glad you are using algaecide?

Algaestat (algistat) retards algae growth. Clarifiers clear cloudy water, clumping and coalescing clusters of contaminants so they can be collected cleanly. Commonly, a flocculent or flocking agent.

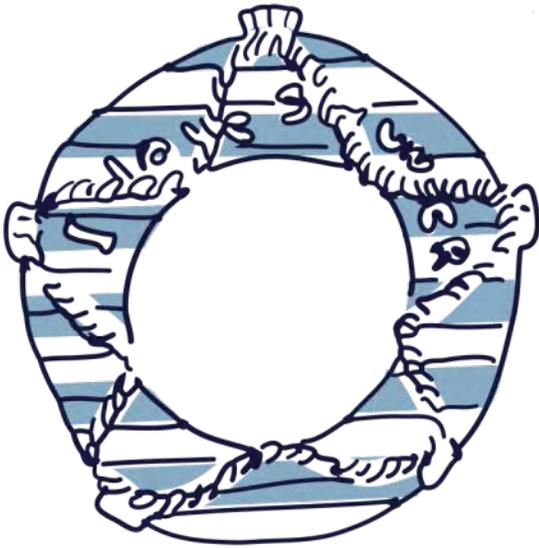
Enzymes break slime into carbon dioxide and water.

Sequestering or chelating agents prevent stains

and water discoloration by holding metal or mineral ions in solution so they don't settle to the pool floor.

Tetraborates kill pink slime, water mold, and algae.

Tile and vinyl cleaners remove scale and scum lines. Used in small amounts, they are sanitizer safe.



As soon as I get out of the pool I'm going to call 405-412-7861 and order my copy of **Your Pool A to Z!**

To order copies of **Your Pool A to Z**, call 405-412-7861 or send a check to Jack Werner, A to Z Inspections, 3625 NW McKinley Ave., Oklahoma City, OK 73118.

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CHEMICAL MIXING GUIDE

 **CAUTION: NEVER mix types of chlorine, or mix chlorine with any other chemical outside of the pool!**

Chart **below** shows chemical that **can or cannot** be mixed in your pool water.

 = Is a GO.

 = DO NOT MIX!

 = May or may not mix well. Ask your dealer.

Testing Schedule	Range	Who Tests	How Often
Combined Chlorine	<0.2ppm*, mg/l**	You	Daily
Chlorine & Bromine	1-3ppm, mg/l	You	Daily
pH: Aim for 7.4-7.6	7.2-7.8	You	Daily
Biguanide Sanitizer	30-50	You	Weekly
Total Alkalinity	80-150	You	Weekly
Cyanuric Acid (stabilizer)	0-50	Dealer	Monthly
Calcium Hardness	175-400	Dealer	Monthly
Shock	See Dealer	Dealer	Monthly
Iron	0	Dealer	Monthly
Copper	0	Dealer	Monthly

*ppm means parts per million ** mg/l means milligrams per liter

Chemical Mixing	Comments: read prior text first	Chlorine	Bromine	Biguanide
Chlorine	Makes haze, brown precipitates, green water			
Bromine	Makes haze, brown precipitates, green water			
Biguanide	Makes haze, brown precipitates, green water			
Chlorine Shock	Makes haze, brown precipitates, green water			
Oxygen-based Shock (monopersulfate compound)	Turns biguanide clear green; improves chlorine performance			
Hydrogen Peroxide	Neutralizes chlorine and bromine - if that's your goal			
Total Alkalinity Adjusters	Buffers pH bounce			
pH adjusters	Increase or decrease pH			
Calcium Hardness Increaser	Dissolve in water in a plastic can & pour into pool			
Algaecides & Algaestats	Some not compatible with biguanides			
Clarifiers	Particles flock together and are scooped up or filtered			
Sequestering/Chelating Agents	Prevent stains & discoloration. Holds metals/minerals in solution for removal by filter			
Enzymes	Enemies to pink slime, water mold			
Tile/Vinyl Cleaners	Best to avoid phosphate based cleaners in biguanide based pools			
Tetraborate Compounds	An enemy of algae, OK in all sanitizers			
Cyanuric Compounds	A chlorine stabilizer in tabs, sticks or liquid; no friend of bromine or biguanides			
Defoamers	Bursts bubbles			
Phosphate remover	Cuts off algae food supply. Use algaecide, too			

Copper Based Sanitizing Systems – Follow dealer's instructions.

Chapter 3 - Pool Care

YEAR ROUND POOLS

Whether you keep your pool open year round or close it seasonally, here is basic information about keeping your pool clear.

Stuff decays when left alone. It's called entropy. If you have been keeping your chemicals at the right level, algae and other situations won't get started, and pool maintenance may be confined to running your automatic vacuuming system, except perhaps, for removing occasional foreign objects that blow into your pool. They may require manual scooping or skimming.

Checking your pool:

Make a visual inspection

Water level at mid-level of skimmer

Remove debris - leaves, animals, plastic bags, etc.

Remove debris from skimmer and strainer baskets

Water clarity

Water color

Turn on pump

Listen for burps telling the water is moving in the lines

Check pressure gauge*

Look for water leaks at connections and along lines

Check circulation

Take a water sample

Do preliminary water tests with home kit

Bring to dealer for analysis if visual inspection dictates

Brush walls and pool bottom

Vacuum

If needed, using manual or automatic system

Check skimmer and empty the basket

Check strainer and empty the basket

Backwash

To flush out particulate matter from the filter. For DE filters, bump or change the DE, or clean the cartridges. Add chemicals and allow to

circulate for the manufacturer's recommended time before swimming.

*Filter pressure varies with every system. Note the normal pressure when everything is working well. If pressure is 8 to 10 pounds higher than the norm and flow is slow out of the returns, backwash until the water is clear in the sight glass.



Scooping, Skimming and Vacuuming



The built-in skimmer and its basket collect heavy debris before it gets into the strainer basket. They are key to preventing large, nasty stuff including leaves, insects, and small, unfortunate creatures from being pulled into the pump and ultimately into your filter. Be aware, as baskets fill, the pump becomes less effective, filtering is poor, and debris can rot,

encourage bacteria growth, and create odors. Haze can develop. It's wise to check your baskets every day.*

***Turn off the pump before you empty either basket.**

If you vacuum large bits and pieces from the bottom of the pool, the vacuum hose is apt to clog and slow down the cleaning process. Instead, start the process with the ingenious leaf vacuum. It uses water from your garden hose to create a vortex that draws clumps of soggy leaves off the bottom and into a nylon mesh bag. Fun to watch!

Pull the leaf vacuum out, untie the mesh bag and dispose of the stuff in a garbage bag.

Use the mesh net at the end of a telescoping pole to lift light weight floating debris off the surface of the pool: Insects, leaves, errant papers, and other wayward stuff.

Pool Wall & Floor Brush

Clip this soft bristle brush onto your skimmer pole. Curved ends work on tight corners. Brush silt-like deposits and dead algae off the walls in vinyl and fiberglass pools. Use steel bristle brushes only on concrete pools for dead algae, scale, and calcium deposits.

You could add a floppy air-foil type attachment to multiply the pressure against the wall. It's MUCH easier and faster. Vacuum after brushing.

Vacuum Cleaning Heads



The head has brushes and weights. It works

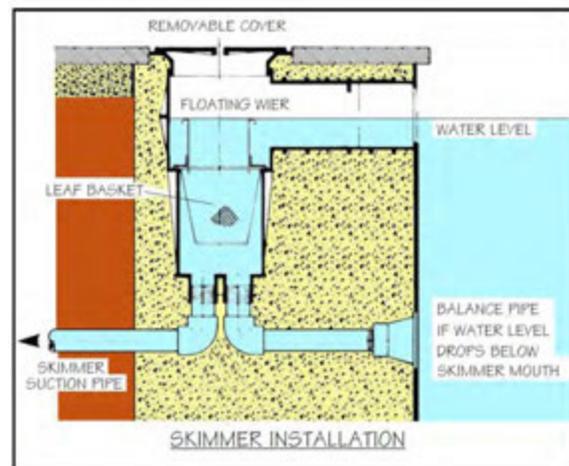
best and lasts longer when used on vinyl pools. The head with no brushes cleans concrete pools. It has wheels and weights so it can follow the pool floor. The vacuum hose attaches to the neck.

Vacuum Plate

To vacuum, some skimmers use a vacuum plate over the basket. Press or clamp one end of the vacuum hose to it. Clamp the other end to the cleaning head.

Skimmer Openings

Some concrete and vinyl pools have a pool skimmer slot. Gutters may run along the perimeter.



POOL CARE TOOLS

Vacuuming the Pool

The system above uses a Vacuum Plate. Your dealer may have other systems to show you. Pick up big clumps of debris from the bottom with the leaf net or leaf vacuum.



Leaf vacuum

Bolt a telescoping pole to the CLEANING HEAD and clamp one end of the VACUUM HOSE to it, the other to the VACUUM PLATE. BEFORE TURNING ON THE PUMP, set the backwash handle to FILTER. Pour buckets of water or spray water into the STRAINER BASKET HOUSING so it flows into the SKIMMER line. Screw the strainer lid on quickly to keep water in the line! NOW turn on the pump. PRIME the hose. Insert and center the vacuum plate in the SKIMMER QUICKLY until suction holds it securely.

NOTE: AVOID PUMP BURNOUT! Never operate the pump without water in the lines.

You may now vacuum the pool! Brush slowly to avoid clouds of fine debris.

HERE ARE 2 WAYS TO PRIME THE HOSE - before attaching to the vacuum plate: Guide the CLEANING HEAD to the bottom with the pole. Hold the open end of the hose above water level and feed it slowly, straight down until water pushes out of the opening. The hose is primed! Or, submerge and hold the open end against the flow from the return line fitting in the pool wall. The hose undulates and squirms as air exits!

HOSES & CLEANERS FOR A CLEAN POOL

The Hose Assemble



Three kinds of hoses help keep your pool clean.

The hoses you need are:

Your garden hose. It should have a squeeze nozzle on the end so you can have water without running back and forth to the valve. It's essential for quick bottom scavenging with the leaf vacuum, and for pump priming.

A pool vacuum hose. It links your cleaning vacuum head with the skimmer and lets you clean the pool walls and floor.

The automatic pool cleaner, APC, navigates your pool randomly, snarling up fine debris you can't grab with a leaf net. Some APCs connect to the pump with a vacuum hose through the skimmer or to a return fitting. Some have their own filter bags attached. Some are electric.

Hose Hangers

Sunlight destroys hoses. Hose hangers on a shady fence are a good idea to access your hand operated vacuum hose. To store it in a shed or garage, loosely coil it and return it to the original box.

Automatic Pool Cleaners - APCs

What are they?

Think of an APC (automatic pool cleaner) as a tiny submarine designed to make your life easier. Some move on wheels or tractor type-treads. Others billow and slither like many underwater creatures by ingesting and expelling water. Some wander randomly. Some may be directed remotely to cross the pool floor and to climb pool walls. The designs are specific to above ground as well as in ground gunite, vinyl, or fiberglass pools.

They all snarf up leaves, twigs, dead worms, sediment, even dead algae. They brush, force water out in streams, and/or vacuum.

Most navigate fairly well around ladders, raised drains, lights, and returns. Most don't like sharp angles at the bottom or corners.

Some connect to the skimmer. The vacuum at the skimmer draws pool water and debris into the skimmer basket.

Other models are driven by filtered water returning to the pool through the return fitting

and then through a series of connected hose sections to the cleaner mechanism. Some need a dedicated water line.

Some cleaners may have a strong electric motor with a rotating brush. They don't use pump pressure for locomotion; instead they connect to your home's electric current through a waterproof electric cord. Naturally, **no one is allowed in the pool when the electric is turned on and the machine is in operation.**

Where does the debris go? Usually into a mesh bag attached to the moving cleaner or into the skimmer basket. Either way, you get to empty the collected debris into a trash bag for disposal. But you save on chemicals: APCs reduce the amount of backwashing, too.

Fun to watch in action, they are more entertaining than a reality show. Get one to hook up to your pool.

Even more elegant automatic pool cleaners may be built into your next pool's system of anti-vortex, multiple main drains, and rotating cycle of circulation jets. See your dealer.

THE MULTIPOINT & SLIDE VALVES

General Backwashing Info

It's a good idea to vacuum out all the debris and to backwash BEFORE you add chemicals. **READ THE PRESSURE GAUGE.** Pressure varies from system to system. Filter pressure rises when it is getting dirty. Pressure drops when the pump is sucking air and when there are too many leaves in either the skimmer or strainer basket. A rule of thumb is to backwash after pressure rises 10 pounds (psi) above normal operating pressure of the clean filter. If pressure is low, check for low water level and for debris accumulation in the skimmer and/or strainer. Add water. Get water level right and debris cleared, then backwash. DE or sand filters may have a Slide or Multiport Valve.



Type One: The Multiport Valve

The Multiport valve has six settings: filter, backwash, rinse, recirculate, waste, closed, winterize. Here are the basic functions of each.

Filter: This is the normal position for routine filtering of pool water, and for vacuuming. Water comes into the valve, travels through the filter, and returns to the pool.



CAUTION: NEVER try to change valve settings when the pump is running!!! It may damage the valve.

Backwash: This position cleans the filter and carries dirty water out the waste line. Normally, you backwash when the pressure gauge reads 10psi over the start-up pressure, or when water flow out of the pool return fittings is very slow. When water is clear in the sight glass or clear coming out the backwash port, turn off the pump.

Rinse: This position sends loose debris from the filter out the waste line after backwashing. It prevents debris from returning to the pool when the valve is reset to filter.

Recirculate: This function bypasses the filter entirely. Water goes into the valve, directly out of the valve, and out the pool returns. This function is not used often, but comes in handy when troubleshooting the filter or heater.

Waste: Use this setting to remove debris or water directly from the pool without water going through the filter. It is useful when you have huge amounts of gunk in the bottom of the pool. Bear in mind, you will be losing water quickly since the water goes unrestrictedly out the waste line.

Closed: This position closes all ports of the valve. Use it ONLY when there is no reason to run the pump.

Winterize: In this position, the lever stays depressed leaving all the ports partially open to equalize pressure and to prevent blowing out the plugs in the lines.

Multiport Hint

To change the position of the valve lever,

TURN OFF THE PUMP. Then, to overcome the spring tension and avoid scraping your knuckles, extend your fingers and push the handle down with the palm of your hand. Then rotate the handle to the port you need.

Type Two: The Slide Valve

The slide valve has just two positions: FILTER and BACKWASH. It slides up or down from one position to the other. Never move the valve handle while the pump is running.

Filter Position: This is your normal every day setting to circulate water through the filter.

Backwash Position: This is the position used to clean the filter. Turn off the pump. Move the valve to backwash position. Turn on pump, move to rinse and run 20 seconds. When water coming out the backwash port is clear, turn off the pump. Move valve back to filter position and turn pump on. Follow General Backwashing information.

Type Three: The 4 Way Valve

The 4 way valve has two directional ports and one common port and performs many functions. It can direct and proportion water flow from either the skimmer and/or the main drain to the filter (suction side) or from the filter (discharge side). It can also completely shut off the water flow. Ask your dealer to demonstrate the lever positions for your particular type of valve and give you a manufacturer's diagram.

PUMPS & FILTERS

SAND & GLASS

Good news: Your pump needs nearly no service at all! Your filter, that's another story.

Pump Hints:

Let's get the pump out of the way right now. A leaky strainer lid O-ring or gasket seal will lower suction which can cause foaming and bubbles in the pool, make it hard to vacuum your pool, and could cause your pump to overheat. To prevent air leaking into your lines and to prevent early failure of the O-ring seal, apply a proper rubber

lubricant. **Note:** Vaseline® or oil will ruin the O-ring.

As an energy conservation opportunity, look into a variable speed pump at your dealer.

About Sand Filters

Sand filters use sand to filter the water. They are easy to backwash. Depending on the size of your pool and filter, the filter may contain between 50 and 300 pounds of sand.

Sand should be chemically cleaned at least once a year, twice or more if you're using a biguanide sanitizer. Chemical cleaning is less costly than changing sand in a large filter. With small filters, it may be wise to replace the sand annually. If using biguanide sanitizer, have the sand changed at least every 3 to 5 years. If you're using chlorine, sand can work in the filter for a long time - 5 to 10 years.

To a point, a sand filter works better when it's dirty, so don't backwash too often. Backwash either when the pressure gauge reads 5 to 10psi above what it was on clean start-up - or when the water coming out of the returns is sluggish.

Example: A clean sand filter will trap a particle 50 microns in size, while a dirty sand filter will trap a particle only 20-25 microns in size. If you are uncertain about your sand situation, ask your dealer what to do.



Cleaning Sand Filters



CAUTION: Some cleaners are caustic and can burn delicate tissues. **Wear rubber gloves and protect your face.**

Follow manufacturer's directions carefully!

For sand filters, add a chemical filter cleaner at least twice a year into the strainer basket. Be sure to backwash the cleaner out of the filter according to the label instructions to avoid pump and filter damage.

Pouring granular acidic crystals into the strainer basket housing could cause a caustic back splash. **WEAR GLOVES AND GOGGLES to avoid face or skin damage!**

Alternative Media

Glass Pack Filter Medium

Glass pack medium is an alternative to sand in your filter and is made from 100% recycled glass. Crushed glass has greater filtering capacity than sand in removing particles from water. It is earth friendly, economical and lasts a long time. Talk with your dealer about this alternative.

DE & CARTRIDGE FILTERS

DE Filters

DE Filters use a fine, white, siliceous (rhymes with delicious), fossil powder called diatomaceous earth. The powder coats fine nylon fiber screens - also called grids, and sometimes fingers - which hold the DE powder in place. As water passes through the screens, small particles of dirt and debris are caught on the surface of the DE; then clean water goes back through the filter valve to the pool.

To add DE, get a one pound DE plastic scoop from your dealer to measure it out. The scoop is better than using a one pound coffee can which holds about 0.7 pounds of the DE. Add it to the filter by pouring it slowly into the skimmer as the filter is running with the valve in the "filter" position.

Better yet, make a "slurry" by dissolving small

amounts of DE in a bucket of water then pour it into the skimmer. Note: Check the label on your filter to know how much to add. To prevent screens from clogging with dirt particles, never operate the filter without DE, or Alternative Medium.

As DE gets dirtier, read the pressure build up on the filter gauge. Every system is different, but a good rule is to clean or "backwash" the filter after the gauge pressure rises 10 psi over the clean start-up pressure.

DE Filter Cleaning

On pools open year round, chemically clean the DE filter at least four times, or twice per 3 to 6 month open season. Add DE after every backwash.

If your filter has a long handle or a round knob on the top of the tank and no backwash valve, you have a "bump-type" filter. It does not backwash. When the filter is dirty, turn off the pump and "bump" the handle. Dirt and DE drop to the bottom. Then restart the pump. This allows the DE to be used again. After the filter has been "bumped" on three different occasions, bump the handle, drain out the DE, and put in fresh DE.

To backwash a DE filter having a backwash valve: set the valve to backwash and turn on the pump for a few minutes until the water is clean in the sight glass (if you have one) or coming out of backwash hose!

CLEANING A DE FILTER

Remove the top to access the screens.

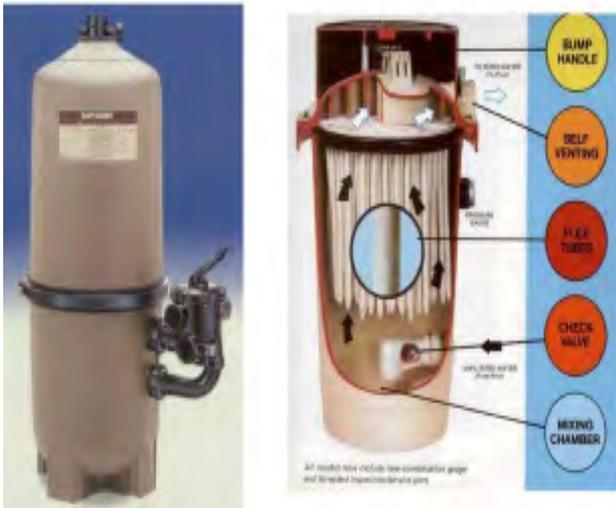
Better to work OUTDOORS. **Wear gloves and eye protectors.** Lift out the screens. Soak them in a filter cleaning solution. Two commonly used DE filter cleaners are: acid based, and detergent based. For chlorine and bromine, use the detergent based cleaner first, then use the acid type. For biguanides, clean with acid first, then detergent. Remove the screens from the bath and rinse them with water. New cleaners combining both detergent and acid are useful.

Cellulose Fiber Alternative for DE Filters

An effective alternative medium for a DE filter is cellulose fiber. Refined from wood chips, it's a fine, biodegradable, non-toxic, high efficiency filtration medium for grid OR vacuum filters. Longer filter cycles, uses 2/3 less media. Easier on equipment. Get dealer's info on using cellulose.

How to Maintain a Cartridge Filter

Cartridge filters consist of a cylindrical tank containing one or more "cartridges" made of a polyester-like material. They look like large automotive oil filters.



Cartridges are not backwashed. They must be removed from the filter tank and hosed clean. Chemically clean them at least twice every season the pool is open. To keep cartridges clean, buy an extra cartridge and a soak tank. Then you may be soaking one cartridge in cleaner while the other is in the filter. After a year or two, the cartridges become too dirty for effective cleaning and should be replaced.



CHEMICAL GUIDELINES:

Chart - Chemical Guidelines At A Glance



= Cool, Dry



= Pour Around Pool



= Broadcast with protective gloves



= Mix in Water, Pour into Pool

Attention: Since we can't know YOUR pool's particular construction, equipment, metals, PVC, etc., we suggest NEVER adding chemicals into the skimmer, except perhaps, a flocculating clarifier. Always ask your dealer's advice.

Chemical	How Often	How To Add	Notes	How To Store
Preventative Algaecide (liquid)	Once/week		To prevent algae	Away from Chlorine
Remedial Algaecide (liquid)	When Algae is visible		To kill visible algae	Away from Chlorine
Biguanide Sanitizer	As needed, test every 1-2 weeks		Bring to 50ppm, mg/l allow to drop as low as 30ppm, mg/l	Has long shelf life
Biguanide Shock	Once/month, or when you have problems with algae or haziness		For recurring problems with slime/mold maintain a residual Check with test strips	Make sure it's kept upright! Keep out of heat
Chlorine (stabilized tablets or sticks)	Never in a skimmer. Every 2-4 weeks in a chlorinator	Best placed in chlorinator; ask dealer	Dissolving rates differ Pay attention to tests Make sure chlorinator is for stabilized chlorine	Away from other chemicals in original container. Dispose of loose chlorine in pool.
Granular Chlorine	Daily		Some types need to be dissolved in water first - read label	Away from other chemicals in original container.
Liquid Chlorine	Daily		You may also use a liquid feeder to pump chlorine into the return line.	Away from sun and other chemicals, especially acids. SHORT shelf-life, use within a few weeks.
Total Alkalinity (TA) Increaser	As test indicates		First test for metals and correct; then adjust TA. Then pH	Cool, dry, can store near pH increaser and calcium harness increaser
pH Increaser	As test indicates		Adjust after you do TA	
pH Decreaser	As test indicates		Adjust after you do TA	
Muriatic Acid	As test indicates		To lower total alkalinity, pour one pint at a time into the deep end. Retest each time.	Away from everything. Try to buy only what you'll use immediately.
Calcium Hardness Increaser	As test indicates		Pre-dissolve, be sure filter is clean	
Liquid Clarifier	As needed		In pool or skimmer. Ask.	Long shelf life
Sequestering/Chelating Agents	As needed		As liquids or solids. Follow manufacturer's directions.	Most are acidic Keep away from bases
Chlorine Stabilizer	At beginning of season, if needed	Not in skimmer. Ask Dealer	Don't exceed 50ppm, mg/l Don't backwash or clean filter for 3-4 days after adding	Acidic, keep away from bases

Copper Based Sanitizing Systems – Follow Dealer's Instructions

CHEMICAL CARE

Handling Chemicals Safely



CAUTION: Wear protective eye and hand covering, particularly when handling shock and other corrosive chemicals.



CAUTION: Don't inhale chemical dust!

Some chemicals mix better when pre-dissolved in water as a slurry in a plastic bucket. Use different buckets labeled for different chemicals to keep one chemical mix from combining with other chemicals. Better yet use separate, labeled plastic watering cans. Follow chemicals' label directions carefully.

How much is too much to add? More is not always better. Your dealer's water test system will print out your exact dosage requirements. Sometimes an exact sequence for chemicals is specified. Sometimes, due to speed of absorption characteristics, the total dosage needs to be spread out in 2 or 3 smaller doses.

FIRST RULE

As a general safety rule, avoid direct contact with all chemicals. Wear rubber gloves and protective goggles. Instantly wash chemical splashes off your hands, arms, etc.

SECOND RULE

Add shock, sanitizer, clarifier, and calcium increaser into the pool, not directly into the skimmer. Concentrated solutions may damage the skimmer body, lines, pump impeller and seals.

THIRD RULE

Avoid bleaching the pool surfaces by not putting chlorine tabs directly in the pool. Also, pre-dissolve granular chlorine or salt in water first.

It's better to put liquid and powder chemicals into the water around the pool perimeter than to put them directly into the skimmer unless the label instructions say otherwise.

Putting Chemicals into the Pool

POUR: Wear eye and skin protection, then pour liquid sanitizers, shock, or clarifiers along the pool perimeter, not directly into the skimmer. Crouch low to minimize the chance of splashing chemicals on your clothes.

BROADCAST dry chemicals, such as pH adjusters, across the pool surface with the wind behind you to keep chemicals out of your eyes, nose, and mouth.

USE A CHEMICAL DISPENSER

Put large tablets in a CHLORINATOR - a canister which may be installed on your return line. Or, pre-mix granular chlorine by the WATERING CAN/SLURRY process; or add chemicals to the pool as the manufacturer directs. LIQUID CHLORINE FEEDERS are also available.

ANOTHER OPTION IS TO MAKE CHLORINE FROM SALT USING ELECTRONIC CONTROLS

SALT WATER CHLORINATORS - SWCs make chlorine from common table salt. Pre-dissolve in water and add it to the pool to 3000 ppm (parts per million or milligrams per liter -mg/l). Electronics control the amount of chlorine delivered from the salt water. Swimmers say the water feels better. Algae is better controlled and chemicals cost less. Saltiness is all but unnoticeable compared with sea water at 20,000 ppm. Ask your dealer.

HEATER CARE

Heater Types

Some pool heaters use propane or natural gas. There are two types: Standing Pilot and Electric Ignition. Also read about Heat Pumps & Other Heating Models.

The standing pilot type has a continuously lit pilot, ready to ignite the heater when needed. What little electricity it needs to open the gas valve and operate the safety features it generates on its own, so it needs no electrical connection. The pilot on a standing pilot heater must be lit when opening the pool or after the pilot has been blown out by the wind.

Basic Heater Steps



Caution: Resist tinkering with heaters. Gas can be dangerous. Call in your pool pro to light your standing pilot!*

Electronic ignition heaters use low voltage to fire the heater. There is no standing pilot. Just before the heater fires you will hear a clicking sound (sparking). These heaters are wired by an electrician.

GAS, ELECTRIC, PROPANE POOL HEATER



No Heat?

If the heater switch is on and the pilot, if you have one, is lit, and the heater is not heating, try this trick before you call for service: Set the filter valve to recirculate, or, if you have a cartridge filter, remove the cartridge from the filter and close the filter tank. If the heater will now start, your filter is dirty and must be cleaned. The heater will not heat unless enough water is going through it. When the filter is very dirty, water flow slows down. If it's too slow, the heater has a sensor which stops it from firing.

Careful Chemistry & Heaters

If the pool water becomes corrosive the copper heat exchanger will dissolve, causing water discoloration, and eventually, very expensive repair bills. Check and balance your total alkalinity, pH, and calcium hardness levels regularly. One way to avoid copper corrosion is to fit a heater with a non-corrosive titanium heat exchanger. See Chemical Guidelines at a Glance chart: page 20. **See your dealer!**

Heat Pumps & Other Heating Modes

Check out the heat pumps which are reversible and can heat OR cool your pool water with the flip of a rocker switch! A boon in hotter regions. Powered by house current, they remove heat even from the cool air around the pump and move it into the pool. Scale and rust free titanium construction.

Other electromechanical heaters are possible for your warm water desires. Solar pool covers and solar heating coils also make water warmer than the surrounding air.

Chapter 4 - Troubleshooting

Cloudy Water/Haze

General information. When your pool water looks hazy, it is hazy. The shallow end looks clearer only because you're looking through less water.

Three things you can check:

Circulation - Check circulation first!

Filtration

Chemistry

Circulation and Your Returns

Circulation is how well the water moves around the pool. Poor circulation is the cause AND effect of many problems: when you draw water just from the skimmer and have your returns pointed just to the surface, you are only circulating the top 6 inches {15cm} of water.

You want to draw water from the bottom as much as possible and return it to the top so as to fully circulate it. Point returns away from the surface, and if you have a main drain(s), open its valve(s).

Circulation Problems

First empty debris from both the skimmer and strainer baskets. Open your main drain; if you don't have one, turn on your pump, hook up your vacuum head and leave it in the bottom of pool overnight. Avoid top level circulation only! Point the returns down and towards the opposite pool wall! This stirs up the water and

actually helps the skimming action of skimmer.

Filtration Problems

Check for a dirty filter: Look at the pressure gauge. If it is close to 10 pounds over its normal pressure, or if water flow is sluggish coming out of the return jets, i.e. two-thirds of its normal force, you may infer a dirty filter.

A DE filter will filter things the eye cannot see; cloudy water may need a pH adjustment and better filtration. Too little D.E. can't do a good job. To be sure you are adding enough, check the label on the filter. If using an alternative medium such as cellulose fiber, follow the manufacturer's instructions for best results.

If you have a cartridge filter, you can add a pound of DE in the skimmer for every 50 square feet of cartridge to improve filtration. Within a day, you will have to clean the cartridge. Hose out all the dirt and DE, and if needed, repeat the DE dose. If the gauge still reads high after cleaning the filter, it may need to be chemically cleaned.

Other complications are possible with sand filters: hardening of the particles and calcium buildup. Build up will cause water to channel a large path through the sand rather than run conveniently through the individual grains. Result: lack of filtration. Change your sand.

Chemical Problems

Is the water unclean? No, not if the sanitizer is within its proper range and if the pool is being shocked regularly. A high pH number is the primary cause of cloudy water! Using incompatible chemicals also causes haze. See section on water mold for yet another cause.

ALGAE

If you discover algae, here are steps to remove it:

Brush loose algae off walls and floor as much as possible, and vacuum.

Adjust Total Alkalinity and then pH.

For Chlorine and Bromine pools, super-chlorinate and use a remedial algaecide.

For Biguanide pools, shock the pool and add algaecide.

To prevent algae, add an algaestat. Shock the pool every week for chlorine and at least every month for biguanides. Keep the sanitizer at recommended level.

Notes: Algae doesn't just disappear it must be vacuumed! Keep brushing and vacuuming. The filter may need to be backwashed much more often. Algae causes short filter cycles, meaning you need to backwash more often.

Discolored Water/Staining

Common cause: minerals/metals in water. Cure: sequestering or chelating agents - chemicals that bind minerals or metals so they don't react with the sanitizer to cause staining.

If you find your water looking clean, but green, iron in the water may be oxidizing from chlorine or shock. Is the answer to use less chlorine or shock? If you guessed it would be better to remove the iron, you would be right. Other metals may also get into your water. How? Mostly in your fill water, whether tap (i.e.) city or well water or from rain. Any metal content should be treated to avoid staining or discoloring your pool surface.

Use mineral test strips to see if you have iron or copper, in your fill water, then test the pool water. Add "sequestering" or "chelating" agents to round up metals any time you add one inch (2.5cm) of water or more. It's best to sequester the metals before adjusting pH. Be sure the chemicals are compatible with chlorine and/or biguanides. For new mineral systems, test the water and sequester, then retest before starting up the mineral system. Ask your dealer how to proceed.



Caution: Prevent bad stains. Once they occur they are difficult or impossible to remove.

Offensive Odors and Tastes

Chlorine odor and eye and skin irritation are caused by insufficient chlorine! The correction is to superchlorinate, that is, to add 6 to 10 times as much chlorine to the pool as is normally specified. See page 8.

If you are using a chemical packaged as "shock" follow the recommended dosage on the label.

In biguanide systems, bitter almond taste is from too much algaecide. Skip a dose until the odd taste goes away.

Water Level & Pump Activity

Constant circulation and hot days make for faster evaporation. Keep the pool water up to mid skimmer level. Add water when it has dropped an inch or two (2-5cm) below center. When constant filtering is needed to solve a problem, you may need to run the pump continuously, day and night for several days. When the water tests OK and looks clear, you may run the pump routinely 8 to 12 hours per day. For remarkable energy savings, look into buying a variable speed pump. An automatic timer will make life easier.

Water Mold, Pink Slime

Pink slime is commonly called pink algae, but it's really pink slime, a form of water mold. This problem needs to be corrected.

The condition looks - and sounds - worse than it is. The mold resembles shredded tissue paper. The primary cause is a soil bacteria that is harmless to humans.

Some indicators are: a rise in pressure, a decrease in water flow; weak circulation in the

pool. The filter gets dirty fast. Frequent backwashing is needed.

SLIME/MOLD IN CHLORINE POOLS

- Always brush the pool walls and floor, especially the affected areas. Backwash after brushing.
- Superchlorinate (Shock).
- Add a "wetting agent" which is a "quat" algaecide to help chlorine penetrate the outer slime layer.
- Add tetraborate to prevent slime from coming back. It's also good against algae. Follow the manufacturer's instructions.

SLIME/MOLD IN BIGUANIDE POOLS

- Add a wetting agent i.e. a "quat" algaecide.
- "Shock" the pool.
- Brush the affected areas to help break down slime coating.
- Shock more frequently to prevent mold or pink slime from returning as well as to maintain a shock residual.*
- You may also find tetraborate helpful.

*Residual may be defined as a little bit of left over chemical that influences later behavior.

TESTING & TEST KITS FOR HOME USE

Besides pH, TDS, TA, sanitizers, cyanuric acid, iron, copper, manganese, calcium hardness, phosphates, and much more, there are many things to test for. And many test kits, meters, tabs, strips, digital, and reagents that can help. Get your dealer's perspective on what to test for and get the kit(s) suggested for home use.



Chemical Problems & Actions Chart

Problem	Reason	Action
Haze	Circulation	* Check skimmer & strainer baskets; clean * Check filter pressure - backwash and chemically clean if necessary * Point returns down, make sure main drain is open
	Filtration (fine particle passing unimpeded through filter)	* Sand - use clarifier or filter aid * Cartridge - use clarifier or filter aid * DE - try to avoid clarifiers, see "Circulation"
	High pH	* Adjust pH
Algae	Possible chemical imbalance; insufficient sanitizer	* Adjust pH, etc. * Shock pool, bring sanitizer value up * Add "remedial" algaecide
Pink slime/water mold	Not a good thing	* Shock pool; make sure sanitizer value is up * Add quaternary ammonia algaecide (quat) * Brush and clean as much as possible * Talk to dealer about special chemicals, they can be complicated to use
Discolored water/stains	Metals, i.e. "hard" water	* Treat with sequestering and/or chelating agent
	High TDS or cyanuric acid levels	* Drain and replace water 1 to 2 feet at a time
Scale	High pH, total alkalinity, or calcium hardness	* Lower pH or TA (Total Alkalinity) * Can't lower calcium hardness

To dilute an accidental chemical excess, pump out no more than a foot or two of water, add fresh water and retest for normalcy. Repeat the process until the chemistry is correct. Always leave about 80% of the water in the pool to keep the walls from caving in.
*A pool with no water in it is in danger of wall collapse from the pressure of ground water.

Always defer to your dealer and/or manufacturers instructions.

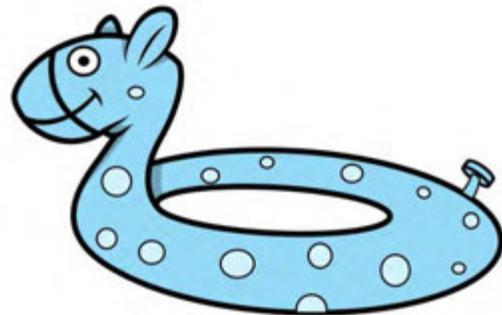
WATER LEAK DETECTION CHECK LIST

Possible Water Leak Sources & Fixes

Water loss could be from the pool itself or from the above or below ground plumbing. Note water level and raise it to mid skimmer. Turn on your pump.

- A loose hose clamp may allow a leak at the fitting or a hose may have a split.
- Drain plugs on pump and filter may be dripping. Drain plugs need a G-ring, teflon tape, or thread sealant.
- Pump housing may be cracked; plug lost or loose.
- A cracked multiport valve housing may leak externally; or internally at the backwash port.
- Cracked skimmer housing may leak into ground.
- Could be a cut or tear in the vinyl liner, crack in plaster, concrete pool wall or floor.
- Leaking seal around underwater light.

- A few drops of a leak detection dye such as phenol red near a suspected leak will be drawn to the crack or tear to reveal it.
- Underwater patches, self-adhering or with glue, may be all you need. Tell your dealer if your pool is vinyl, fiberglass, or concrete.



Air Leaks, Algaecides, and Foam

Your pool can be above ground or in-ground; no matter, air leaks happen, and foam proliferates.

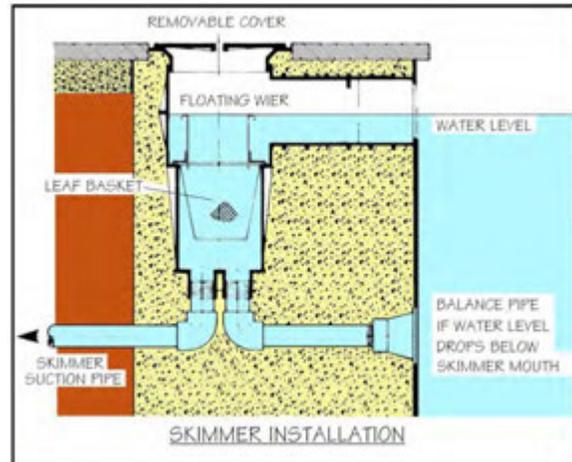
Uncorrected air leaks create an unsafe situation. Trapped air can be compressed, causing high pressure with the potential for causing a "mild" explosion. Find the air leak first. A temporary cure, however, for air leak induced foam is to add a DEFOAMER, usually a silicone based emulsion that pops bubbles. This temporary foam fix still leaves you with the need to find the leak. Low water level causes pumps to suck air, too. Just add water to about mid-skimmer level. Use the checklist below to find the leak. If foam remains after the leak is fixed and the pump is turned off, you may have too much quaternary algaecide. Use less algaecide, or use a non- or low-foaming algaecide.

Air leaks always occur on the "suction" or impeller side of pump, the side that draws water FROM the pool, never on the "pressure" side of pump.

Air Leak Detection Check List

Check the following conditions:

- A leak after the impeller is a water leak, not an air leak.
- Check pump lid for cracks and the O-Ring for breaks. Use a rubber lube. Wipe leaves and grass off the lid and pump mating surfaces.
- Check drain plugs on pump -should have O-ring, teflon tape, or thread sealant on the drain plugs.
- Check water level and bring it up to mid skimmer.
- Is skimmer weir (flap) stuck? Free it up. See page 27.
- Isolate the line with the leak by closing different valves.
- Pour water on suspect areas, i.e. ball valves, pump lid, fittings. If air bubbles in the strainer basket disappear, you have found the air leak.



Foamy Pool

If the surface of your pool is full of foam, it could be from a plastic bag blown into the pool, and stuck trying to pass through the flap or "weir" of the skimmer. This will wedge the flap partially shut. Some water will seep past it, but not enough to prevent the pump from drawing air through the "dry" skimmer opening. Each time the pump sucks up the small amount of available water, the pump will push air through the filter and back into the pool as bubbles. See Flap/Weir page 27.

The remedy is simple: pull the bag free of the skimmer flap; empty the skimmer basket of its normal load of grass and bugs, then put it back. Result: no more bubbles. Foam will clear itself up within a half hour.

Broken Hoses

Fireboats spray water high and far to fight fires on water. There is no fire in your backyard, a fountain springing from your hose is neither planned nor welcome!

If your pump-to-filter hose burst, it is necessary to turn off the pump promptly to keep too much chemically treated water from burning the grass.

A cordless screwdriver can make unscrewing the hose clamps much easier. Removing the old hose can be tough. It may take pulling, twisting, and rocking to loosen it. Buy a length of hose longer than needed. It must make a gentle arc so it fits straight onto the plastic fitting in the

housing. Hacksaw it to length.

Silicone spray - not glue - may help you press the new hose on. Double clamps may be necessary to assure a water tight connection.

Bugs, Leaves, & Stuck Flaps

Bugs and leaves build up on the water. The pump is pumping. Why is the skimmer not collecting those bugs?

Sticking Flap/Weir In Skimmer

It may be a stuck skimmer flap or weir. A vinyl pool's weir hinges on a flexible plastic rod in the skimmer box. The flap has a thick, buoyant piece of foam-like plastic causing the flap to float. The foam piece can slip out of the door and wedge the door closed, stopping the flow of floating debris. It was annoying to have to reach into the water and rap the door to free it. So, pull out the flap by flexing the plastic hinge rod. The buoyant stuff has only to be pressed back into the door's retaining dips. Then flex the rod again and snap the flap back into place. Now the door opens freely. Debris flows nicely into the skimmer basket. Note: Nearly all concrete pools have a skimmer opening but few have a hinged weir.

Can't Vacuum i.e. Poor Suction

- Be sure baskets are empty of leaves.
- Be sure vacuum hose is not clogged: Direct water at full pressure from your garden hose to flush out stuck debris. Reverse flushing is good.

Vinyl Liner Out of Track

- Boil water and pour it over the affected liner area. When the liner becomes malleable, pull up the liner bead and snap it back in the track.

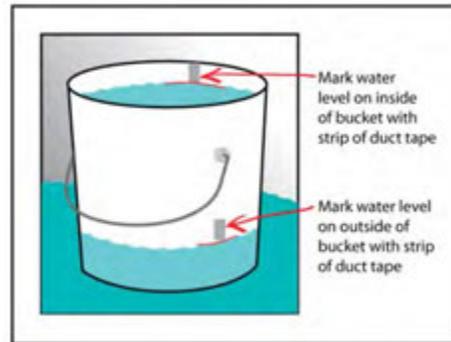
Water Leak – Bucket Test

Is it normal evaporation or is it leaking into your ground water? For subtle leaks, do the bucket test: For a sneak peek at fixing a leak, see also page 25.

- Place a bucket a few inches (several cm) into

the water on a step going into the pool. Add water to the bucket until it is even with the level of the pool water around it. Mark pool level outside the bucket and the water level in the bucket. Secure the bucket on the step so it remains in the pool and stays the same temperature as the pool water. Wait a day or so. Compare the level of the pool to the level of the water in the bucket. If the pool level is lower, you have a leak!

- Obvious leaks such as "I see water spewing" require immediate attention.



Pump Problems

- Pump motor won't turn: Circuit breaker is blown. Wait until it cools off. Try again. Could be a loose connection, low quality or too long an extension cord, or too many other items on the circuit.
- Pump motor hums, but doesn't turn: shut off power, take off back plate, try to turn the shaft with a screw driver or wrench, whichever fits. If you get the shaft to rotate, turn on the power. Spray a little penetrating oil into the correct hole on the motor housing. Ask your dealer which hole is the right one.
- Pump making a lot of noise: Could be low on water and the impeller may be destroying itself. Shut motor off. Go to the dealer immediately.
- If it comes down to needing a replacement part, compare costs versus benefits and consider buying a high efficiency variable speed pump.

Chart Mechanical Problems

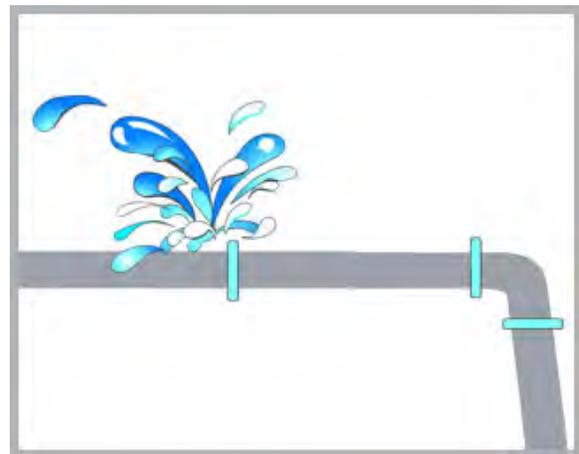
Problem	Likely Reason	Action
Slow Flow	Clogged baskets	* Check baskets
	Dirty Filter	* Clean or backwash * Chemically clean if necessary
Air Bubbles (causes foam)	Skimmer weir (flap) is stuck closed	* Get if free and replace if necessary
	Pump plugs not airtight	* Secure - use thread sealant or terflon tape or appropriate gasket/O-ring to prevent air leak
	Crack in pump strainer lid	* Replace
	Bad lid O-ring/basket	* Replace
Filter pressure keeps going up (short filter cycles)	DE grids may be old Cartridge may be old Sand may be old	* Chemically clean filter * DE - replace cartridge * Replace sand (3 to 5 years)
Heater won't come on	Dirty Filter	* Clean filter
Losing water	Leak in pool surface	* Bucket test. Call Dealer. Do you need a diver?
Pump	Breaker tripped	* Check circuit breaker
	Motor seized	* Lever motor armature with screwdriver
Pool light won't come on	Breaker tripped	* Check circuit breaker
	Bulb burned out	* Replace bulb
	Wire loose	* Call in pool expert

Mechanical Problem

Water Loss

Water passing through the multiport valve is under very high pressure. Changing the control valve lever position while the pump is on can break the seal inside the mechanism allowing some of the filtered water to pass through the waste hose and cause the pool water level to drop. A weak coil spring - a rare condition - or more commonly, a multiport valve wedged or stuck open can also cause water loss.

Check the exit end of your waste hose when you backwash to see if water is leaking. If water is leaking out the hose, it's a sign the multiport valve body or sealing gasket may be broken, the lever pressure spring may be broken, or the lever may be stuck or out of position.



Chapter 5 - Closing The Pool More Than Just a Reversal of the Opening Process

Your objective is to remove water from places where it can freeze: pump housing, filter body, heater, and water lines connecting all your equipment.

WHOA! BEFORE YOU SET ABOUT CLOSING YOUR POOL, YOU MAY NOT HAVE TO! If you live in an area where the temperature rarely drops below 40 or 50 degrees Fahrenheit (4 or 10°C), you may not need to close your pool. Which means you won't have to open it either. That's good news!

But what if it freezes at night? Won't I break my pipes and pump and stuff? Answer: on a freezing night where temperatures drop five or ten degrees below 32 degrees (3-6°C below 0°C), KEEP THE PUMP RUNNING. Moving water doesn't freeze as quickly as still. You will be circulating water warmer than the ambient freezing (air) temperature. Pool water holds heat well enough to not freeze unless sub-freezing temperatures prevail for days in a row. Take preventive measures. Act before the freeze comes.

See anti-freeze advice below.*

Closing Checklist

- Clean your filter before you close up. See the POOL CARE section on cleaning filters. Everything needs to be working to clean the filters.
- Add the compatible winterizing chemicals your dealer recommends, not antifreeze, and circulate the pool water for at least an hour.
- Some dealers suggest lowering water level below the skimmer. Others suggest keeping it in the middle of the skimmer. Ask your dealer.
- Turn pump off.
- Remove rails and ladders.
- Remove directional fittings or "eyeballs" from returns in the side of the pool.
- Remove strainer and skimmer baskets.
- Blow out and fit plugs into the return lines.

- Avoid a mess in the pool when you reopen.
- *Add non-toxic RV quality antifreeze, not auto, to the lines as an added precaution ONLY if you're unsure any water remains in the lines.
- Remove drain plugs from pump and filter. Be sure you find them all.
- Remove the sight glass and pressure gauge from the backwash valve housing. Be sure to blow out all water from the valve chambers.
- Drain your heater- if you have one - and disconnect and remove the pressure switch. Disconnect the chlorinator.
- Store all the loose fittings, plugs, sight glass and pressure gauge in either the skimmer or strainer basket. Put the strainer basket back into the pump housing with the lid on. Keep the skimmer basket in a safe and familiar place. See Page 33.
- Get a friend to help anchor and cover the pool, OR snap on a safety cover, OR set your automatic pool cover on CLOSE.

NOTE: ABOVE GROUND POOLS

- Plug up the lines before you disconnect the hoses. Prevents the accidental draining of the pool!

Closing the IG Pool - If you expect prolonged freezing

Blowing out water lines, especially in cool weather, is at best a wet job. At worst, it makes for wet and cold hands, arms, shirt, pants, and shoes. You need to connect a strong blower motor to the lines to force water out. A shop vacuum is used by some. We prefer to leave this job to the experts, then sit back and relax. Read on to see how you'll be spending your weekend if you don't let your pool service do it.

Remove the eyeball fitting(s) from the return line(s) in the pool walls.

Take out the skimmer basket.

A few pools have equalizer valves. If you have one, unscrew two long screws to remove it. Keep it in the skimmer basket.

Hookup the blower motor to the waste port on the backwash valve. Set the handle to

"winterize" or between any two positions. Turn on the motor. Air pressure forces water out of the skimmer.

The blower motor is still running. Screw the hollow plastic "gizmo" into the hole where the bubbles are emerging. Careful! Don't cross thread! Cross threading could strip the threads so it won't stay in place.

A wet job! Complete the tightening of the "Gizmo" or similar device. The blower is still on. In the North, that water is cold! In the South you would keep your pool open!

The return line now pushes out water by means of the continuing action of the blower.

While the air forces water and antifreeze through the line, insert the winter plug into the line. The blower is still running.

Freezing water can burst the filter tank and crack the pump housing. Remove the filter and pump housing plugs to drain the balance of water.

Now, turn off the blower motor. Stow the plugs in the strainer basket.

If your gizmo® is cracked, buy and fit a new one or one of the many variants of it to prevent ice damage to the skimmer housing. See page 25.

Having seen all the fuss and mess involved, perhaps you realize the wisdom of letting your pool service person take on this challenging and rewarding project.

Eight Steps to Covering the IG Pool

OBJECTIVE: TO FLOAT THE COVER ACROSS THE WATER SURFACE AND SECURE IT WITH WATER BAGS/TUBES.

Note: Double tube bags won't roll off the cover in the wind as do single tubes. The loops on the cover aren't needed to keep double tube bags in place.

1. Ask a friend to help you space empty bags evenly around the pool's perimeter.
2. Fill all the bags with water to 3/4's their

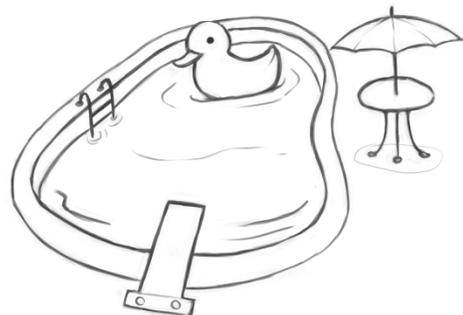
capacity to allow for expansion during freezing.

3. Press the tabs in snugly to prevent leaks.
4. Bring the cover out of storage and lay it near the deep end (not IN the deep end). If it's windy, start at whichever end of the pool - deep or shallow - will keep the wind behind you. An old sailor's trick.
5. Unfold the cover alongside the pool. The Z fold you made at closing will be of help now.
6. Slide bags onto the cover at the end where you're starting.
7. Grab two corners of the cover and float it across the pool surface. (When this works, it's the most joyful part of the job). Put bags on the edges as you work along one side, then the other side, then the other end.
8. Check your work to be sure bags are strategically placed on the cover.

To avoid the Cover & Bag ritual, get a safety cover, mesh or solid, or an automatic cover from your dealer.

How to remove and replace an IG Safety Pool Cover

A safety pool cover makes opening and closing quicker and cleaner. Algae growth is inhibited and large stuff can't fall into the pool with the cover on. Both mesh and flexible solid covers are available. The pool cover stretches over the pool perimeter and attaches with springs to brass anchors. It takes muscle and flair to stretch the spring eyes over the anchors. Anchors and lugs screw down flush when the pool is open. Let the dealer do the work. See page 39 for more.



SAFETY POOL COVER



Screw the anchors in place.
Anchor is now elevated to receive cover hook from slotted tube.
Stretch spring and hook over anchor lug with slotted tube used as lever.
Finish hooking springs over anchors around the pool.

This is how the spring looks hooked over the anchor.



Automatic Pool Cover

An option to the "Cover & Bag" ritual is to ask your dealer about installing an automatic pool cover which opens and closes like a horizontal window shade. At the touch of a switch, it rolls up on one end revealing the pool. And it unwinds to totally cover the pool. Some covers may be added to an existing pool. They may be rolled up or opened by manual cranking or electric motor. Others are incorporated into the pool when it is built.

CLOSING THE ABOVE GROUND POOL

The skimmer plate is held to the housing with

screws. The gasket keeps water out to prevent freeze damage.

You don't need to lower the pool level to install the winter plate. Remove the six screws from the face plate that line up with the holes in the cover plate. Don't remove the other four screws which hold the skimmer to the wall.

Thread in the six screws removed from the face plate to secure the cover and gasket to the face plate.

An alternative to the above ritual is a snap-on skimmer cover system: A cover snaps onto a matching skimmer face plate in seconds, without tools. A one-time effort to screw the skimmer adapter PLATE in place will let you snap the COVER on and off any time you want to close or open the pool. No more screwing needed. Nor will you have to lower the pool level. Regardless of the system used, disconnect the hoses between the pool and filter system. Remove drain plugs from the pump and filter. Store them in a safe place. Be sure to plug up the pool return.

Before covering – if there is no winter plate, drain water below skimmer and returns as you would in in-ground pool.

COVERING THE ABOVE GROUND POOL

Remove ladders and store indoors before covering the pool.

Inflate air pillow and tie loosely at ends so it floats in the middle of the pool. It's there to keep freezing water from damaging the pool surface.

Run the plastic coated cover securing cable through the cover grommets. Pull cover over pillow to edges of pool.

Attach cable to tiny winch and ratchet tightly. A winch helps you snug the cover around the pool circumference.

No cable? Press plastic clamps over the cover onto the coping.

Hose a couple inches of water on top of the cover to keep wind from shredding it. Consider a safety cover for your AG pool. Your dealer will applaud you.

Chapter 6 - Opening Your Pool

An Experience That Could Be Terrifying!

- What happened over the winter?
- What moved in and grew here?
- Will I ever be able to swim again??
- And Much More.

How do I tackle this mess?



BIG TIP! Leaving pool cover in place, poke your garden hose under the cover and add water. It will **LIFT** the cover and make it **MUCH** easier to remove.

Gooky Stuff & Water

Unless your pool is under a dome or indoors, the cover collects airborne pollutants such as leaves, sticks, lawn cuttings, plastic bags, trash, and cans. Blossoming trees contribute pollen and delicate, lovely flowers. Rain and snow build up water. Wind borne newspapers assemble and get soggy. Most trash is easy to remove.

Use a tool that won't puncture your cover to drag and lift off the junk. A metal rake is not a good idea. The leaf net is great to scoop leaves off the bottom of the pool or off the cover.

If you have a mesh safety cover, you avoid a lot of work. Only easily vacuumed fine particles, rain and melted snow go through it.

Cover Cleaning Tools

- Electric, submersible pump
- 50'(15m) 3 prong H.D. extension
- 25'- 50'(7-15m) garden hose - connect to pump.
- Long hose with trigger type water control valve to squirt debris off the pool cover from any point around pool
- Telescoping pole and leaf net
- Garbage bags for debris
- Mildew preventative
- A friend to untangle hose, turn faucets, empty water bags, help fold the cover

What You'll Be Doing to Open the Pool: The Checklist

- Pumping surface water off the pool cover.
- Directing the water to something green you want to grow.
- Dragging debris off the cover as the water level goes down.
- Pressure hosing debris from the edges of the pool cover towards the depression where the pump is working.
- Emptying the water bags: Onto the lawn if you used tap water to fill them; onto any area of your lawn where you're trying to kill crab grass or thistle IF you filled them with chemically treated pool water.
- Dragging the cover off the pool, hosing it down, drying it, spraying with mildew preventative, folding it, and storing it in a rodent free dry area.
- Finding the pool fittings you misplaced last year, attaching them to pump, filter, skimmer, and returns.

Removing Cover Water

Connect a length of garden hose to the submersible pump, aiming the other end onto the grass.



CAUTION: Do not plug the extension into the AC power outlet until the pump is in the water.

Swing the pump into the water, close to the center of the cover. The cover will indent where the pump lands. Water will run to the low part.

Plug the extension into an outlet. You should see a healthy water flow from the outlet side of the hose. With your regular garden hose, keep spraying the goop towards the pump. Get heavier debris up with your leaf scoop.

If the cover sinks lower as you pump off water, it's likely the cover has holes and you are pumping out pool water. Quit pumping and call in your pool dealer to set up your pool's more powerful filter pump to remove water faster than it leaks through the cover. Then, take off the debris.



Removing Bulky Debris

The versatile telescoping pole connects to a vacuum brush, a surface skimmer, or to a leaf net. Slide the leaf net tube into the hollow pole. Squeeze the plastic spring dips to snap these tools on and off.

Sometimes water bags become part of the debris. Rescue them with a long pole and your leaf net.

Scoop debris off the cover with your leaf net. Transfer leaves and other organic matter onto the lawn, a compost pile or into a plastic garbage bag.

Now Take It Off!

Goal: Remove the cover. Keep gunk out. You've already removed most of the water and bulky debris. Yet there's always something left on the cover. You could just try to use the cover as a big bag and drag it, leaves and all, off to the

side. But leaves and dirty water can fall into the pool.

Use a bucket to remove any water or debris left on the cover, it will be too heavy to try to get off any other way and you will either tear the cover or dump dirty water into the pool.

Better, with a friend, pick a calm day to empty all but two water bags into the pool, or onto the grass if the bags originally were filled with tap water. Keep the two full bags on the cover on a long side. Walk to the opposite side, lift up the corners, now walk back, folding the cover to where the bags are. Slide the bags out of the way, grab two end corners on the long side and draw the cover off the water onto the grass. Air dry the cover before you roll or fold it.

Fold the cover in a basic Z pattern first, then end over end.

Flatten the folds to make it less bulky.

The cover is heavy. If you're a lightweight, get help. Bend your knees when lifting. Store it in a dry, rodent free place.

Items Needed For Pool Opening

- Skimmer basket
- Pump/filter strainer basket
- Pressure gauge
- Silicone or other thread sealant or a roll of white vinyl sealing tape
- Glass inspection jar and flat rubber sealing washer
- Directional fittings
- Sometimes, an equalizer valve body, two screws, and oval O-ring seal
- Ladder bumpers
- Screwdriver; magnetic preferred
- ½" and/or 9/16" socket, ratchet, and extension

Where Are Your Missing Parts?

Where did you put those little fittings when the pool was closed up? A shelf in the garage, shed, or basement are obvious choices. Or an outdoor storage box. Also look in the pump strainer and pool skimmer baskets.

Look here first! The STRAINER BASKET in the pump housing is a great place to store the pressure gauge, inspection jar, tiny O-rings, and plugs for the filter and pump.

Another good place to find your other pool fittings might be in the SKIMMER BASKET. Keep the equalizer valve body and screws, the pool return eyeball fittings, and the ladder bumpers in the skimmer basket.

Another place to keep pool tools and fittings is an oversized molded box popular with crafts people and picnickers. Get a big one from your dealer, maybe combined with a seat.

Valves & Plugs

Remove the winter plug and fit directional eyeball plugs in the pool return openings.



Remove winter "plugs" from returns and gizzmo's from skimmer.

The Valve and Filter

To prepare the filter, do the things that require less bending first: Put the O-ring into the inspection jar hole.

Screw in the glass inspection jar. Finger tight is all that's needed.



Wrap the tapered threads of the pressure gauge with white vinyl sealing tape or thread sealant to prevent leaks. **DON'T overtighten it.** Your pump and filter may have more or fewer than THREE plastic drain plugs. The principle is the same: Fit a gasket to each plug. In this case, it's a silicone O-ring.



You will need to get on hands and knees to do this. Locate the drain hole in the bottom of the filter body. When you do, thread the plug into the threaded opening. Tighten enough to compress the O-ring but not enough to break the plug off in the fitting.

Pump & Strainer

The pump housing needs TWO plugs. One is on the inlet side of the housing at ground level. To find where the holes are, pour a pail of water into the pump basket housing. You'll find both holes quickly!



CAUTION: Don't try to operate the pump system until you are sure all the water-retaining plugs are fitted.



Locate the square notch on the rim of the pump strainer basket. Some have no notch. The

basket keeps fine debris from clogging or damaging the impeller.

Slip the basket into the pump housing, rotating it so the prong in the housing body engages the notch in the basket and seats squarely.

Screw on the pump housing plastic cover. Be sure no grass is caught between the huge O-ring and the top of the pump housing else air will leak, vacuum will suffer, and foam may form on the pool surface.

Prime pump with garden hose or dip water from pool with a bucket.

Turn all valves on each side of the pump to where you want the water to go. Turn on the pump switch.

Ladder Installation

Wash mud, cobwebs, dried grass, and things that may have grown inside the hollow tubes of the ladder.

Fit rubber plug bumpers into end of hollow tubes to protect the pool wall.



Press plugs in snugly.

Step between rails to carry the ladder. It's light, but otherwise awkward. Slide the white plastic flanges, "escutcheons" over the tubes before slipping the tubes into the receptacles in the concrete.

Turn around and regrab the tubes to lower the steps into the pool.

Insert the ladder legs straight into the sockets in the concrete.

Secure your ladder to the pool walkway with the clever wedging clamp in the ladder receptacle. Use a 3/8" drive ratchet with an extension and a 1/2" or 9/16" socket.

Protect toe stubbing bathers by sliding the flanges over the bolts.

Ready to step up, or in! Be sure that ladders are secure in plastic or aluminum deck flanges.

Chapter 7 - Salt-water Pools

What are Advantages and Disadvantages of a Saltwater Swimming Pool?

From Kevin Woodhurst, Precision Pools and Spas

A Salt-Water Pool is Often the Pool of Choice

It can be complicated deciding which pool is best for your family. Many questions revolve around salt-water pools or chlorine free pools. Salt-water pools are NOT chlorine free pools. A salt-water pool is simply one that utilizes a chlorine generator. Chlorine generators have been around for decades. As technology and materials continue to evolve, chlorine generators continue to improve in performance.

Why Salt-Water?

Ocean water has a salt content of around 35,000 parts per million ("ppm"). Humans have a salt taste threshold of around 3,500 ppm. Most chlorine generators require a salt content of 2500 to 6000 ppm in the pool. A unit that needs less than 3500 ppm to operate effectively is optimal. If the salt content is higher, that warm, salty water will be pretty distasteful!

Swimming in a mild saline solution is much like taking a shower in soft water.

Generally, when people swim in a non-chlorine generator pool (a pool with no salt water in it) they feel like their skin dries quicker upon exiting the pool. They may feel and/or see a whitish residual, chlorine flaking, on the skin. In a saltwater pool (one with a chlorine generator) the water feels smooth, your skin feels smooth and many people feel more refreshed.

What Does a Chlorine Generator Do?

A chlorine generator's main function is to produce chlorine for the pool so you do not have to buy it, store it or handle it. These are big advantages for many pool owners. Chlorine generators, when functioning correctly, produce chlorine constantly (when the pump is

running) with most units. This keeps a residual of chlorine in the pool that prevents algae from growing. The secret is keeping the cell free of calcium and mineral deposits--the cell itself is made up of precious metals--it must be maintained so it can continue to make chlorine. Through the process of electrolysis, water passing over the chlorine generator cell produces chlorine that is instantaneously transformed into hypochlorous acid. When any type of chlorine is added to water it ALL makes the SAME thing: hypochlorous acid. It does not matter if it is sodium hypochlorite (liquid chlorine), Tri-chlor and Di-chlor or Lithium based, Cal-hypo or even gas chlorine--it all makes hypochlorous acid. Hypochlorous acid is the active sanitizer; this is what kills algae and other harmful stuff in the water. Its effectiveness is totally predicated on balanced water conditions and, more importantly, proper pH. So, with a salt water system or chlorine generator, you still must maintain your water balance (pool chemistry) properly. As long as you do this, a chlorine generator is a good choice.

A Salt-Water Pool is the Pool of Choice for Many

Here is some additional information for consideration when selecting a chlorine generator for your swimming pool.

Types of Chlorine Generators

There are two types of chlorine generators in use today on residential pools. The first one is a brine unit. This unit does not require the pool to have salt added to it. A tank or chamber at the pool equipment area has a predetermined amount of salt in it. Through electrolysis, chlorine is produced and immediately injected into the pool circulation system. These units are messy and produce by-products that are not simple to dispose of. These are the less common of the two types.

The recommended unit is the type requiring that salt be added to the pool.

There are two types of these units. One has the chlorine-producing cell and the electronics

installed at the equipment while the other has the cell installed in the deck near the pool with the electronics usually located at the equipment. The deck unit works on the principle of convection. It makes chlorine even if the pump is off while the other more common unit makes chlorine as water is passed through the cell with the circulation system (pool pump on.) In both cases the cell must remain free of mineral deposits or it will not work properly. Of these two units, the in line unit with 24-hour circulation is the preferred choice. (Did you know that every commercial swimming pool in the United States requires 24-hour circulation?)

What About Polarity?

There are non-reverse polarity units and reverse polarity units. A reverse polarity unit reverses the electron flow through the cell causing mineral deposits to flake off. In some instances the now larger particles will get caught in the filtration system. So the claim that the units help keep calcium scum off the tile is partially correct. These cells do not require as much cleaning. (Don't believe a claim that a unit doesn't ever need to be cleaned.) A reverse polarity unit will cost nominally more than a non-reverse unit.

Bottom Line

Chlorine generators can help fight against waterline scum build-up. They create a better, healthier swimming experience for most people. It isn't necessary to handle or buy chlorine, and, if the unit is functioning correctly, chlorine residual will always be present in the pool, eliminating algae. This makes it nearly impossible to get burning red eyes from chloramines, which is usually the culprit. Even with a chlorine generator, you still must maintain your pool. You still must maintain correct water balance, and you must maintain the chlorine generator. The best pool will have 24/7 circulation, correct hydraulic design with an in-floor cleaning system for bottom up cleaning and circulation, a quality ozone system, and a chlorine generator for sanitizer residual. You can expect to pay at least \$1,000, and up to

several thousand dollars, for a quality chlorine generator unit.

DISCLAIMER: If you do not maintain a chlorine generator or maintain your pool chemistry you can destroy your pool's interior finish, decking and pool equipment. Chlorine generators and saltwater pools are great but they need care. You now have the recipe for a low maintenance pool. Enjoy, and swim safe!

How to Change to A Saltwater Pool (from e-How Home & Garden Editor)

Instructions:

How Saltwater Pools Work

Step 1. Add a chlorine generator to your pool's plumbing system. The generator works with salt added to the water to produce the active chlorine required to keep your pool water clean, so you don't need to continually add chlorine and other chemicals.

Step 2. Start the conversion by adding salt to your pool water. The amount of salt your pool requires will depend on the size of your pool, however a working estimate is 50 pounds of salt per 1,200 gallons of capacity.

Step 3. Install the chlorine generator system in your pool's water return lines (after the filter and heater) by cutting into the return lines and installing PVC piping to run water through the chlorine generator then back into the return line.

Step 4. Run electrical power to the chlorine generator and wire it into the pool pump circuit so that generator turns on and off at the same times as the pool pump.

Step 5. Now turning on the pump circulates the salty water through the system, including the chlorine generator. Through an electrolysis process, the salt molecules (sodium chloride) are separated into sodium and chlorine. Concurrently, a hydrogen atom is freed from the water molecules.

Step 6. Know that the hydrogen and chloride atoms combine to form sodium hypochlorite (chlorine) that actually purifies the water in your pool.

Step 7. After sanitizing your pool water, the chlorine chemically recombines with sodium, turns back into salt, and the process begins all over again.

Taking Care of Your Saltwater Pool

Step 1. Realize that maintaining chlorine generating systems is simple. Modern systems test for salt levels and have indicator lights to let you know if salt levels need to be adjusted.

Step 2. Consider that many chlorine generating systems are self-cleaning as well, using a built-in polarity reversal function to clean themselves.

Step 3. Test the salt level in your water periodically (using salt test strips available at pool supply stores).

Tips & Warnings:

At system start up and any time that adjustments need to be made, use a high quality salt that doesn't have added iodine or minerals. Water softener salt works well and is readily available at hardware and home stores. In addition to the environmental benefits by not using chemicals, you will quite likely save money on your pool's operation. Remember, the salt gets reused over and over again. So except when water splashes out, once the salt is in the water, it stays there. This means that you don't need to be constantly buying and adding chlorine and other chemicals to your pool.

Although the plumbing required for most chlorine generators is straight forward and well within the skill set of many homeowners or a handyman, wiring the chlorine generator into the electrical system is a job best left to a qualified electrician.

Since the quantity of salt in the pool water is so small, the water is considered to be "fresh" and should not damage any pool pumps or equipment. However before converting, check with your pool equipment supplier or manufacturer to be sure.

Chapter 8 - Safety

Precautions For Enjoying Your Pool



NO Glass in the Pool Area is an essential policy!

A Phone by the Pool

Don't run into the house to answer the phone leaving children alone in or near the pool. Always face the pool when children are present. Eyes open! No napping! No matter how well you plan, you may have a medical emergency. The most valuable tool you can have on a pool side table - out of water's way- is a cordless phone to call 911. If you use a cell phone, remember they can't find you to send help. Be sure you can dial the closest rescue source. You can give first aid while help comes.



AUDIBLE ALARMS



SKIMMER GUARD



SAFETY FENCING

Alarms

An Alarm Law may be in effect where you live! Find out!

Wave sensors detect motion on the surface. If someone falls in, the waves cause the alarm to sound. A gate alarm sounds a high decibel noise if an intruder opens it. Doors with direct pool access should have an audible alarm that sounds for thirty seconds. The alarm control must be a minimum of 54 inches high and reset automatically.

Diving - A Risky Business



Enter the water via your steps, ladder, or simply slide off the coping along the edge of the pool. We advise not to dive or jump into a pool. If you must dive, point hands up; dive on a flat plane. Avoid making even shallow dives from the side of the pool or the shallow end. If you have a diving board - we hope not - **don't attempt a head first, Olympic vertical entry dive unless a sign defines a designated point of sufficient depth to pull out of the dive. Best, confine any diving to a pool officially dedicated to sports diving.***

*There's much to learn about diving. One source is www.theapsp.org or call 800-323-3996 for a variety of publications on safe use of pools.

Fences & Gates

Fences are your first line of defense against uninvited pool guests, whether for an in-ground or above-ground pool. Keep the gate locked. Fences and walls should be at least 4 feet high and installed completely around the pool. Fences should be no more than 2 inches above the grade and openings in the fence should be a maximum of 4 inches. The fence should be difficult to climb over. Fence gates should be self-closing and self-latching. Latches should be on the pool side of the gate and out of reach of small children. Gates should open away from pool area.

Other Concerns

Furniture should not be near the pool to prevent tripping and children climbing and jumping from it. A clear view of the pool from the house should be ensured by removing vegetation and other obstacles that block the view.

Guests versus Visitors

Teach your kids to swim. Ask ALL guests if they can swim. And how well. It's your pool; if you can't swim, don't invite others to swim if they can't either. Take swimming and safety courses at your local high school or check with the "Y" or Red Cross.

Uninvited visitors are not guests. Tell them it isn't convenient to visit now, perhaps they can come another time, and send them away.

Humane EXIT Ramp



If you love your pets and have a fondness for all creatures great and small, buy an emergency exit ramp from your dealer. It looks like a washboard. It provides traction for little animals trying to exit the pool. The top hangs from the pool walkway and the other end trails in the water. Folds up out of way, won't hurt vinyl pool walls. It will spare you anguish when the occasional squirrel, mole, mouse, cat, dog, etc. needs a way out. Ask your dealer.

Insurance

Certainly your peace of mind is tied to knowing that insurance covers damage or injury

occurring to relatives or guests - invited or not - and will provide financial support for the aggrieved and for you. But insurance is no fall-back position for not taking proper safeguards to assure swimmers of safe conditions. It is your job.

Life Jackets, Floating Pool Toys...

They give a sense of security to non-swimmers who like to paddle into deeper areas of the pool. If they fall off a raft, it should be one with grommets and a safety rope running around it. Tots wearing flotation swim wear are safer, but **don't leave kids alone in the pool area.**

Life Saving

The most reassuring gift you can give yourself is to take a life-saving course.

Rough Play

It goes without saying that running, wrestling, and roughhousing can cause abrasions, broken bones, and other injuries. Lawsuits are a possible consequence. Require your guests to play by the rules.

Post the rules!

Safety Cover

A mesh safety cover stretched across the pool, prevents children and moose from falling in, and retards algae growth. In a big wind, lawn furniture also will be spared from dunking. Rain water, melted snow, and fine particles go through into the POOLWATER, but larger debris stays out. When you remove the cover, simply vacuum the pool. Peak under the cover after heavy rain or snow. If water has risen above the skimmer opening, lower your submersible pump to the pool bottom and pump out a few inches (several cm) until water is at mid-skimmer. A solid safety cover is available, too. It has either an automatic sump pump for the center puddle, or a center drain at the lowest point. Solid covers keep out more debris and fine matter. Look for the ASTM safety label.

Slides

If you insist on having one, a slide can be great fun. Kids, as well as adults, once over their fears, can obsess over climbing up and sliding down. A responsible adult needs to monitor slide activity closely. Keep the slide wet. Check manufacturer's safety requirements. One person at a time. Tots too small to climb the ladder safely can lose their balance on the slide and fall off. Going down backwards can backfire; sliders become disoriented when they hit the water; the pool is usually shallow enough at the entry point that body parts can bump the bottom painfully. Watch kids carefully. Slow them down. No running.

Unsupervised diving and sliding is dangerous for all kids.

Sunshine, Sunburn, and Tanning

Ultra-violet light is a great hazard. Put on sun screen lotion to protect your skin from immediate painful burning and the long term effects of the sun. Recent information has it that even dense sun block doesn't guarantee protection from the invisible effects of ultraviolet rays. Avoid prolonged exposure.

Pool Rules

Make sure everyone knows your pool rules. Post a sign.

How Deep is It?

You just can't tell by looking how deep a pool is. With water you can't tell if is eight feet (nearly 3m), or four (more than 1m) - or even

twelve (4m). You should post depth markers. Your dealer can get them for you.

NEVER JUMP OR DIVE INTO AN ABOVE GROUND POOL!



To order copies of **Your Pool A to Z**, call 405-412-7861 or send a check to Jack Werner, A to Z Inspections, 3625 NW McKinley Ave., Oklahoma City, OK 73118.

1 book..... \$22.95.....S&H.....\$3.00
12 books.....\$14.95 each.....S&H.....\$12.00
24 books.....\$12.95 each.....S&H.....\$18.00

Chapter 10 - Pool Talk:

Understand "pool speak" to communicate with your dealer. Here is a list of terms used in the pool business.

AG: abbreviation for the "Above Ground" pool.

AIR LEAK: what happens when connections on the suction side are not airtight. Pool pumps need to create a vacuum in order to work properly. Air leaks can be dangerous by causing high pressures which can damage the pump or filter, or both. Aerated water can cause foam.

ALGAE: small plant life which grows in pool water. It comes in green, yellow, and black, slimy in texture. Yellow and black are hardest to kill.

ALGAECIDE (ALGICIDE): a strong chemical which kills algae and deters its proliferation.

ALGAESTAT (ALGISTAT): a chemical which retards algae growth.

ALKALINITY (SEE TA, TOTAL ALKALINITY): a measure in ppm or mg/l of water's alkaline content. The reading shows how resistant pH is to change.

ALTERNATIVE METHOD: a substitute way of achieving the same goal or purpose.

ALUM: aluminum sulfate, commonly called Floc. Used to help clarify water. Causes small particles to join together so they can be trapped in the filter. Alum lowers the pH of the water. See Floc.

ALUMINUM SULFATE: see Alum.

ANTI-ENTRAPMENT COVER: see Listed Suction Outlet Cover/Grate.

ANTI-VORTEX COVER: an outlet cover designed to prevent air entrainment from the surface of the water. See also Listed Suction Outlet Cover/Grate.

APPROVED SAFETY OUTLET COVER: see Listed Suction Outlet Cover/Grate.

AUTOMATIC POOL CLEANER: a roving device which picks up debris in the pool automatically.

AUTOMATIC POOL COVER: rolls up like a window shade by manual cranking or electric motor.

BACKWASH: a means of cleaning which reverses the flow of water through the filter,

forcing water and dirt out via a "waste" line. This is done by setting the backwash valve to the backwash position. NOTE: Never adjust this valve while the pump is running.

BALL VALVE: used to regulate the flow of water and to shut off skimmers, drains, and other lines in order to vacuum or run a spa or water feature.

BIGUANIDE: a sanitizer which is part of a non-chlorine pool water treatment system. Most chemicals used with chlorine are incompatible with biguanide sanitizers, and vice versa. The shock recommended for biguanide treated pools contains hydrogen peroxide.

BRANCH PIPING: multiple suction outlet covers/grates: all pipe and fittings, including the tee, located between covers/grates and the single suction pipe feeding the pump or pumps.

BROADCASTING: distributing chemicals in the pool by scattering over the water surface.

BROMINE: a sanitizer similar to chlorine, often used in spas and some pools. Very effective against bacteria, cannot be stabilized with cyanuric acid, so is susceptible to deterioration by sunlight. Unlike chlorine it is still an effective sanitizer when it combines with ammonia compounds.

CARTRIDGE FILTER: filter with a pleated element which traps debris. Looks like a giant oil filter.

CATCH BASIN: a body of water supplied by gravity overflow from another pool. This is different from the terminology in storm water drainage.

CATCH POOL: the pool at the discharge of a waterslide or similar aquatic facility.

CAUTION: indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

CELLULOSE FIBER FILTER MEDIA: fine, biodegradable, non-toxic, high efficiency filtration media for grid or vacuum filters. A DE alternative.

CHECK VALVE: a mechanical device in a pipe that permits the flow of water in one direction only.

CHELATING AGENT: chemical which binds up

metals and minerals; used to prevent staining & discolored water.

CHLORINATOR: a canister which releases chlorine or bromine into the water as they dissolve. An in-line chlorinator fluids chlorine through the pool returns.

CHLORINE: a sanitizer and an oxidizer. As a sanitizer it kills bacteria in pools. As an oxidizer it kills algae. Calcium, sodium, and lithium hypochlorite are some choices.

CHLORAMINES: smelly organic by-products caused by ammonia mixing with chlorine. Eliminated by proper shocking.

CIRCULATION: the flow of water in a swimming pool. Ideally, water circulation in your pool should have no dead spots" (areas of stagnant water).

CLARIFIER: chemical used to remove haze from water. Usually works by causing small particles to join together so the filter can pick them up.

COAGULATING AGENT: see flocculating agent, clarifier.

COMBINED CHLORINE: chlorine unable to be free and active to oxidize organic matter.

COPING: the material which "joins" the pool wall to the deck. Commonly, concrete coping for concrete pools, aluminum for IG vinyl pools. AG vinyl liners usually attach to the pool wall with plastic coping.

COPPER BASED SANITIZING SYSTEM: a non-chlorine family of chemicals to control algae and bacteria.

CYANURIC ACID: stabilizes chlorine. Can be a part of chlorine, as in "stabilized chlorine" or can be added separately if using unstabilized chlorine. Helps prevent deterioration of chlorine from heat or sunlight. Avoid high levels (over 75 parts per million) which can cause discoloration, odors, and other problems.

DANGER: indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

DEBRIS REMOVAL SYSTEM: a system comprised of a large opening suction outlet, large diameter pipe and a debris collection basket, typically located in the deck or the pump basket. Because of unique challenges of passing debris through the drain cover and suction piping,

these systems are designed specifically for debris removal and are commonly sold as kits with detailed installation requirements to address suction safety.

DE - DIATOMACEOUS EARTH: a white powder commonly used to filter water. DE is added to the skimmer and as it goes into the filter, it coats the elements. The earth does the filtering, not the elements. When the DE is dirty, the filter is "backwashed" or drained and new DE must be added to the filter. Diatomaceous Earth is a fossil material.

DEFOAMER: a chemical which reduces and/or eliminates foam. It pops bubbles. Squirt it over water surface.

DICHLOR: a popular, stabilized form of chlorine.

DIRECTIONAL FITTING: "eyeball" type device which attaches to the pool return so that the water can be "directed" a certain way.

DRAIN: an obsolete term for suction outlet, which is a fitting, fitting assembly, cover/grate, and related components that provide a localized low pressure area for the transfer of water from a swimming pool, wading pool, spa, or hot tub.

DRAWDOWN: drawdown is the decrease of water level in a vented reservoir from the rest condition to operating condition.

ENZYMES: break down oily, gooey substances and convert them to water and carbon dioxide.

EQUILIZER LINE: 1. a pipe with a listed suction outlet cover/grate located below the waterline and connected to the body of a skimmer to prevent air from being drawn into the pump if the water level drops below the skimmer weir. 2. A pipe connecting two bodies of water to equalize water levels.

FEET OF HEAD: the resistance in a hydraulic system based on the equivalent to the height of a column of water that causes the same resistance (100 feet of head equals 43 psi).

FIBER OPTICS: lighting system which has light generated at a remote source. Light is then transmitted along fibers.

FILTER: a tank used to remove fine debris from pool water. Also, the act of filtering. Types of filters: Cartridge, Diatomaceous Earth (DE), Regenerative DE, Alternative media such as

Cellulose Fiber, and Sand.

FILTER MEDIA: filter material in which foreign matter is trapped. Examples: cellulose fiber, D.E., sand, glass pack.

FLOC OR FLOCCULATING AGENT: Floc added to water to coagulate particles that cause haze. To avoid a big vacuuming job, add directly into the skimmer rather than broadcasting. See alum or clarifier.

FLOW RATE: the quantity of water flowing through a pipe within a specified time, such as the number of gallons flowing past a point in one minute; abbreviated as GPM or liters/minutes, LPM (1 GPM = 3.7854 L/min).

FLOW RATING: the maximum allowable flow rate through a cover/gate.

FREE, AVAILABLE CHLORINE: active, unspent chlorine.

GIZZMO®: a hollow, collapsible, plastic fitting used to plug the skimmer, the gizzmo® can flex with the expanding ice. It's green and looks a lot like a thermos bottle.

GLASS PACK: a filtering medium alternative for sand.

GPD, GPH, GPM: abbreviations for gallons per day (GPD), hour(GPH), and minute(GPM).

GUTTER: overflow trough at the perimeter wall of a pool or at the bottom of a vanishing edge wall of a pool that is a component of the circulation system or flows to waste.

HAZE: "cloudiness" in water, caused by very small, floating particles. Turbidity.

HEATER: raises pool water temperature with natural or propane gas after it's filtered.

HEAT PUMP: electrically powered system, not gas, economically removes heat, even from cool air, compresses and transfers it to the pool, raising the temperature degree by degree. Commonly teamed with a solar blanket to retain heat. May be reversed to cool the water in summer's high heat.

HYDROGEN PEROXIDE: an oxidizer used with biguanide systems. Typically used once or twice a month.

HYDROSTATIC VALVE: a relief valve to allow rising groundwater to enter an empty pool to prevent flotation.

IG: abbreviation for the "In-Ground" pool.

INCHES OF MERCURY (in Hg): traditional units of measuring pressure below atmospheric ("suction" or "vacuum") (1.0 inch Hg = 0.4912 psi). See PSI.

IONIZER: a device which generates copper and/or silver ions needed to kill bacteria.

LISTED/LISTING: the published certification by a nationally recognized testing laboratory that a device, system, or alternate method has been tested and certified to be in conformance with the full intent of a standard.

LISTED SUCTION OUTLET COVER/GRATE – MANUFACTURED: a suction outlet cover/grate that has been tested, certified, and listed by a nationally recognized testing laboratory in accordance with the most recent edition of ANSI/ASME A112.19.8 *Suction fittings for swimming and wading pools, spas, hot tubs and whirlpool bathtub appliances*.

LISTED SVRS: a manufactured safety vacuum release system tested and certified by a nationally recognized testing laboratory in accordance with ANSI/ASME standards.

MANIFOLD: a branch pipe arrangement that connects several influent pipes into one chamber or pump or one chamber into several effluent pipes.

MAXIMUM PUMP CAPACITY: the maximum flow capacity may be determined by one of the following methods: simplified TDH Calculation (see definition); or, the maximum flow possible by a pump(s) as indicated on the manufacturer's pump curve. *Notice:* the flow condition of this method will likely be outside the pump's recommended operating range and shall be used only in the absence of a Simplified TDH Calculation.

MAXIMUM SYSTEM FLOW RATE: the flow resulting from the lowest possible total dynamic head (TDH) for a circulation system.

MONOPERSULFATE COMPOUND: an oxygen-based shock which enhances chlorine performance.

ON-GROUND POOL: a mostly above ground pool; shaped, serviced, and equipped like an IG pool, perhaps having a deep end and an all around deck.

OPERATING POINT: the condition at which the

pump will operate. It is the intersection of the pump curve and system curve.

ORGANIC WASTE: debris such as microorganisms, perspiration, urine, etc. which needs to be burned up or “oxidized” regularly to prevent haze, algae, chloramines, etc.

OVERFLOW PIPE: see Standpipe.

OVERFLOW SYSTEM: an outlet with flow across a fixed or movable weir and where there is a free surface interface with atmosphere.

OXIDIZER: chemical which burns up organic waste. See Organic Waste.

OXYGEN-BASED SHOCK: see monopersulfate.

OZONE: a form of oxygen which disinfects and deodorizes. It is generated and entered into pool water by an ozonator.

PARALLEL: a piping arrangement allowing flow through multiple points.

pH: potential Hydrogen. A measure of how acidic or basic the water is. pH of 7.0 is neutral. Pool water should be kept slightly basic. pH 7.2-7.8. Ideally 7.4-7.6.

PHOSPHATES: a form of phosphorus on which algae feed and thrive.

POOL SURFACES: not to be confused with the water surface, are the walls and floor of a pool. Common surface materials: fiberglass, plaster, painted concrete, vinyl, tile.

POOL TYPES: Above Ground, AG; In-Ground, IG; On-Ground, OG.

PRESSURE GAUGE: round dial located on backwash valve or on top of filter. Indicates in pounds per square inch the pressure in the filter. When the pressure reads 10psi or more above what it did when the filter was freshly clean, the filter needs to be cleaned.

PRIMING: filling the strainer or vacuum hose with water to help the pump push air out of the lines. If the pump won't prime, a full flow of water to the pump is being impeded by an air leak or restricted by clogged lines or baskets.

PROPERLY: according to the manufacturers' instructions or to workmanlike practices as taught in vocational schools.

PSI: an abbreviation for pounds per square inch.

PUMP: moves water through the filter and around the pool.

PUMP CURVE: also called the pump

performance curve. A graph that represents the pressure rise of a pump plotted against flow rate.

QUATS: short reference word for ammonia based algae control chemicals.

RETROFIT: the act of adding a component or accessory to the pool and spa that was not part of the original installation – for example, replacing a non-listed suction outlet cover/grate with one that is listed.

RETURN INLET: the aperture or fitting through which the water under pressure returns into the pool or spa.

RESIDUAL; RESERVE: the amount of shock such as chlorine, bromine, or hydrogen peroxide remaining in the water to oxidize organic matter.

RETURNS: the points at which water "returns" to the pool after having travelled through the filter.

SALT WATER CHLORINE GENERATOR: makes chlorine from dissolved salt water in the pool as it is pumped through an electronic cell and back into the pool.

SAFETY DRAIN COVER: See Listed Suction Outlet Cover/Grate.

SAFETY VACUUM RELEASE SYSTEM (SVRS): a system capable of providing vacuum release at a suction outlet in case of a high vacuum occurrence due to a suction outlet flow blockage. Methods may include, but are not necessarily limited to, venting the suction line to atmosphere and/or turning off the circulation pump, or reversing the circulation flow.

SAND FILTER: uses sand to filter pool water.

SANITIZER: a chemical used to kill bacteria. Generic names: Bromine, Biguanide (pronounced BY-GWAN · EYED), and Chlorine.

SATURATION INDEX: a dealer test to see if your water factors of temperature, total dissolved solids, pH, total alkalinity, and calcium hardness are in the correct range to protect from plaster etching, scale deposits, or corrosion. To learn more, go on line and find “The Langelier Saturation Index”.

SEQUESTERING AGENT: chemical which bonds with metals so they can't cause staining or discoloration. See also: chelating agent.

SHOCK: an oxidizer that "burns off" the organic wastes which cause cloudiness and algae. It's a generic term for a chemical used to oxidize organic wastes.

SIMPLIFIED TDH CALCULATION: a method of determining the maximum system flow rate using hydraulic calculations based on the lowest possible total dynamic head (TDH) for a circulation system. For example, using the shortest distance between the pool and the pump, omitting the calculations for fittings/valves, and using the best performance ratings for filters and heaters.

SINGLE OUTLET, ALTERNATIVE SUCTION SYSTEMS: a single listed suction outlet cover/grate and an alternative suction system, including a venture-driven system, turbine driven system, or any other mechanical means of circulating water without the use of a pump.

SKIMMER: white, box-like compartment or slot on the side of pool which "skims" the top few inches of water, drawing debris and oily film into a removable basket. Lighter debris continues to the pump strainer and filter. Empty skimmer basket daily.

SLURRY: a soupy mix of chemicals in water, usually in a dedicated plastic bucket or watering can.

SOLAR COVER: transparent or clear cover lets sun rays heat the pool water.

SOLAR HEATING COILS: accessory tubes through which water warmed by the sun heats the pool.

STABILIZED CHLORINE: See Cyanuric acid.

STANDPIPE: Vertical outlet pipe with open top end to control liquid level. Overflow Pipe.

STRAINER: a basket in front of the pump which keeps fine debris from reaching the pump's impeller area. Must be emptied periodically.

SUCTION OUTLET: the term Suction Outlet shall indicate a fitting, fitting assembly, cover/grate, and related components that provide a localized low pressure area for the transfer of water from a swimming pool, wading pool, spa or hot tub. See also Listed Suction Outlet Cover/Grate.

SUCTION SYSTEM PIPING: all piping on the suction side of the system between the pool

and the pump.

SUPER CHLORINATED: using high levels of chlorine to break down smelly chloramines.

SUMP: the vessel between the suction outlet cover/grate and suction outlet piping. This may be manufactured or field built.

SUMPS IN SERIES: an arrangement of outlets such that effluent of one sump is influent to another sump. It is commonly used in piping submerged suction outlet(s) to skimmer body(s).

SURFACE CRAZING: a network of fine cracks in the surface of a plastic part, such as a cover, grate, or ring.

SWIM JET SYSTEMS WITH HYDROTHERAPY

COMBINATION FITTING: combination fitting or fittings that incorporate(s) a suction outlet and inlet designed to move a large volume of water at high velocity in a single direction.

SYSTEM CURVE: a graph that shows the pressure difference required to induce flow through the entire piping system. It is plotted against flow rate.

TDH: Total Dynamic Head

TEE: a fitting in the shape of a "T" used to connect pipes. The "branch" is perpendicular to the two "run" connections.

TEST KITS: devices to see what concentration of chemicals, minerals are in your pool water.

TETRABORATE COMPOUND: generic term for a chemical commonly used to treat and prevent pink slime, water mold, and algae.

TOTAL DYNAMIC HEAD (TDH): the sum of all resistances in a complete operating system. See Feet of Head.

TOOLS:

LEAF NET OR SCOOP: like a surface skimmer but has a bag for picking up leaves.

LEAF VACUUM: powered by a garden hose, not the pool vacuum system, debris swirls into a nylon bag atop the leaf vacuum.

SURFACE SKIMMER: plastic, flat, mesh net used to scoop up floating debris.

TELESCOPING POLE: adjustable length pole can attach to the vacuum cleaning head and hose, or to a brush, scoop, skimmer, etc.

WALL/FLOOR BRUSH: a key tool to brush dead algae off pool walls and floors. Steel

bristles for gunite and concrete, nylon bristles for vinyl and other pools.

TA, TOTAL ALKALINITY: TA is a measure of how resistant pH is to change. A low total alkalinity level will cause the pH to fluctuate drastically whenever small amounts of acid or base are added to the pool water. A high total alkalinity level will make the water more susceptible to scale and high pH. See Alkalinity.

TDS, TOTAL DISSOLVED SOLIDS: TDS as the name implies, a measure of the solids dissolved in the water. A high level of solids interferes with sanitizer effectiveness.

TRICHLOR: a very strong, stabilized form of chlorine. Made in tabs or sticks. Popular for concrete pools.

VACUUM: a condition in which the pressure inside an outlet or suction pipe is lower than atmospheric pressure.

VACUUM HOSE: transports debris from the floor and slopes of pool to the skimmer. Hose attaches to the vacuum brush head on one end, and to the vacuum plate on the other.

VACUUM PLATE: provides a vacuum sealed connection for the vacuum hose allowing debris to be caught in skimmer basket rather than the pump strainer basket.

VALVES:

4-WAY: a device with a moveable flap that can direct and proportion water flow and shut it off as well.

EQUALIZER: device used in some pools where the main drain line is plumbed into the skimmer. Varies the flow from skimmer and main drain, usually adjusted before vacuuming. Not found in AG pools.

MULTIPOINT: a lever controlled chamber with a number of settings to allow you to backwash.

SLIDE: a manually controlled valve with two settings used to direct pool water flow.

VANISHING EDGE: a design feature incorporated into a pool wall wherein the water flows over the wall (edge) into a catch gutter or catch pool creating the illusion that the water vanishes.

VARIABLE SPEED PUMP: an energy saving way to reduce electric cost up to 80%.

VENTED RESERVOIR: a receptacle or container incorporated as part of a circulation system that is vented to atmosphere and receives water from the pool/spa or water feature by force of gravity, from which the pump draws its water supply. Systems including vented reservoirs are commonly referred to as gravity flow systems. Vented reservoirs include but are not limited to the following: catch pools or catch basins, surge tanks, collector tanks, skimmers open to atmosphere, atmospheric vent pipe tees, gutters, overflow gutters, or perimeter gutter systems.

WALL VACUUM FITTING: a fitting in the wall of a pool intended to provide a point of connection of suction for suction side cleaners.

WARNING: indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

WATER MOLD: a type of mold found in nasty looking pool water. White-gray or pink in color. Very slimy and difficult to eliminate.

WATER VELOCITY: the speed at which water flows through a pipe, expressed in feet per second (meters per second).

WETTING AGENT: a characteristic of quats (quaternary ammonia compounds) that allows the penetration of algae more readily.

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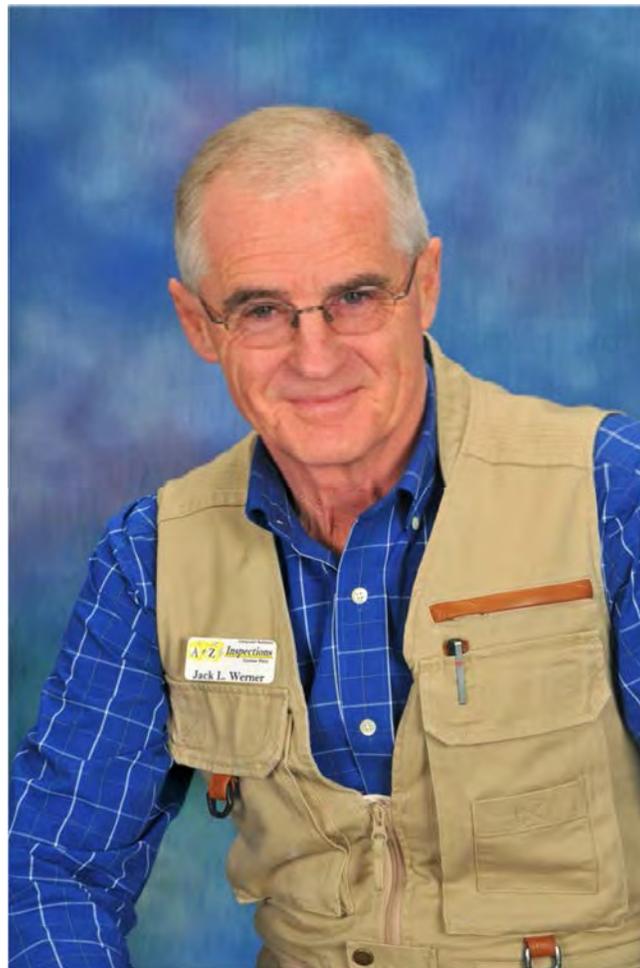
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