



LEISURE POOLS®
SWIMMING IN QUALITY AND STYLE®

LEISURE POOLS

INSTALLATION MANUAL

FOR THE INSTALLATION OF A **LEISURE POOLS**
FIBERGLASS SWIMMING POOL

Version 1

Note: This guide is intended to provide assistance during the installation of a Leisure Pools fiberglass swimming pool. Be aware that it is to be used in conjunction with state and local building codes and that should any discrepancy occur between the two then the state and or local building codes shall prevail in all instances. Any users of this guide acknowledge that the author and his agents are not responsible for misinterpretation, failure to understand, omission of instruction or information or any accident that may result.

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- Always refer to the Owner Instructions provided to you by the supplier for the correct operating procedures of all pool equipment, supplies and the use of chemicals.

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SAFETY FIRST: IMPORTANT INFORMATION PLEASE READ

SAFETY GUIDELINES FOR USING YOUR LEISURE POOLS SWIMMING POOL

POOL SLIDE GUIDELINES

Leisure Pools swimming pools and spas are not designed for pool slides. This means that each Leisure Pools swimming pool is not designed for the installation and use of a pool slide. Installing a slide into a Leisure Pools swimming pool could result in serious injury, paralysis or death.

OTHER SAFETY GUIDELINES

- Uses of alcohol or drugs do not mix with swimming pool activities and could result in serious injury or death.
- Never allow anyone to use the swimming pool under the influence of alcohol or drugs.
- Have a complete first aid kit at the swimming pool and be able to understand how to properly use its contents.
- Post a list of emergency telephone numbers by the phone nearest the swimming pool. The list should include the names and telephone numbers of the nearest physician, ambulance service, hospital, police and fire or rescue unit.
- At minimum one responsible person should be trained in artificial respiration and or cardiopulmonary resuscitation (CPR).

POOL FENCING

It is critical for everyone's safety that you are aware of your legal obligations in terms of fencing your swimming pool. In many jurisdictions **No water may go into a pool until it is properly fenced.**

There are strict laws in relation to the fencing of swimming pools. It is critical that you investigate with your local Council or Authority the fencing laws that apply to your location.



INTRODUCTION

Welcome to the Leisure Pools Installation Manual. This Installation Manual has been prepared in order to advise you of the correct method of installing a Leisure Pools fiberglass swimming pool. If you have any questions regarding the contents of this Installation Manual or wish to seek clarification on an issue please do not hesitate to contact Leisure Pools Head Office. Leisure Pools will only warrant pools that are installed in accordance with this Installation Manual.

TOOLS REQUIRED

In order to install a fiberglass swimming pool the following tools are required:

- String line;
- Long handled shovel;
- Wheelbarrow;
- Spirit level;
- Screed bar;
- 2 x Screed rails around 9' to 14' long
- 4 inch (10.16 centimeters) angle grinder;
- Hole saw;
- Power drill;
- Extension cable;
- Silicon caulking gun;
- Hacksaw;
- Tape measure;
- Rope;
- Laser level;
- Plastic rake;
- Black medium marking pen;
- 80 to 120 grit sandpaper;
- Common hand tools (screwdriver set, pliers, etc.);

MACHINERY REQUIRED

In order to install a fiberglass swimming pool the following machinery is required:

- A machine to dig the hole for the swimming pool. The machine can be an excavator, backhoe or bobcat. Alternatively, you can always dig the hole by hand if access is an issue for machinery;
- A method of removing the soil from the hole. Generally, you would use a dump truck if the dump truck can gain access to the dig site. If access is limited smaller equipment can be used such as a mini-tipper. Alternatively, if a mini-tipper cannot access the dig site a bobcat can be used to run the soil out to a dump truck. As a last resort a wheelbarrow can be used;
- A method of carting to the dig site backfill material. Similar machinery will be used as what was used on the soil removal;
- A mechanical compacter to compact the base;
- A crane (with spreader bar and chains) for lifting the fiberglass swimming pool shell into place;
- A water source to fill;
- A method of supplying concrete to the site for the bond beam. This can be done through either a concrete truck or on-site mixer.

MATERIALS REQUIRED

In order to install a fiberglass swimming pool the following materials are required:

- Base or bedding material. This is the material that pool floor rests on. The bedding material selected shall be non-cohesive, porous, evenly graded, readily screedable and of maximum aggregate size of 1/4" or 6mm. Crusher, cracker dust or sand is a popular choice as a base material. You will need enough to provide a 4" or 100mm thick layer underneath the pool

- Backfill material. This is the material that fills the void between the pool walls and the excavation. A suitable backfill shall be used which will not be subject to washaway or slumping behind the pool walls. The choice of backfill will depend on the availability of suitable material, but the backfill shall not include clay or organic soils or other materials subject to seasonal variations, swelling, shrinkage, or deterioration.

Suitable materials and methods are as follows:

- (a) Premixed cement/sand of minimum ratio 1:16 by volume.
 - (b) Premixed cement/fine crushed rock, suitably graded, of maximum size 1/2" or 12mm and of minimum ratio 1:16 by volume.
 - (c) Cement/sand (or suitably graded fine crushed rock of maximum size 1/2" or 12 mm) of minimum ratio 1:10 by volume, dry mixed by machine on site.
 - (d) Dry hand-mixed cement/sand of minimum ratio 1:6 by volume.
 - (e) Other materials and methods as specified.
- You will require enough backfill material to fill the void between the pool shell and the excavated hole. It is recommended that you do not over order backfill material, as it is always easier to order in more as required. You should bear in mind that the more accurate the hole is dug the less backfill material is required.
 - Bags of cement. Cement is required to be mixed into the backfill material (not base material). Use the proportions above to determine the amount of cement required.
 - Bag of lime, flour or spray paint to mark out the pool (flour is good – user friendly and easily available);
 - Sufficient lengths of 2" (50mm) PVC pipe with elbows and 45 degree elbows to cover the distance from the skimmer box to the location of the filtration equipment (this is your suction line);
 - Sufficient lengths of 1 1/2" (40mm) or 2" (50mm) PVC pipe with elbows, 45 degree elbows, and a T piece to run from the filtration equipment to the shallow end of the swimming pool (this is your return line);
 - Sufficient lengths of 1 1/2" (40 mm) PVC pipe with elbows (overflow or backwash connection);
 - A tin of red priming fluid;
 - A tin of clear (type N) or blue or green solvent cement;
 - A tube of neutral cure silicone sealant;
 - 9' (3 m) of slotted pipe fitted with a geofabric sock. This will be your sump tube or atmospheric pipe and can vary in size from a minimum 3 1/2" (90mm) up to 8" (200mm);
 - Pre-formed concrete slab (2' /600mm * 2' /600mm for cartridge filter system or 2' /600mm * 3' /900mm for a sand filter system);

LOCATING THE POOL

The starting point for installing a fiberglass swimming pool is to determine where exactly on the property you wish to have the pool installed. Issues to consider when locating the pool are:

- Size and shape of the property;
- Slope of the ground (fiberglass swimming pools must be installed in level ground so site works may be required);
- Drainage on the property (ensure that the natural drainage of water would not be in and around the pool – drainage works may be required to prevent this from occurring);
- Access to the proposed location of the pool for the excavator, bobcat and fiberglass swimming pool shell as discussed in detail below;
- Aspect of the pool to ensure maximum sun on the pool through the course of the day;
- Location of trees (consider leaves falling into the pool which increases the work load on cleaning and maintaining the pool);
- Location of pool to ensure maximum visibility from the house (a pool is an attractive feature on a property so it should be shown off);
- Local or Specific Easements or Limitations specific to the property;
- House and other structure foundations;
- Any underground or overhead obstacles (sewer lines, septic tanks, power lines, etc.) as discussed in detail below;
- Location of pool equipment;
- Power supply to pool equipment.

OBSTACLES

Once the proposed location for the swimming pool has been identified the first step is to obtain the site plans of the property and locate all the pipes, electrical lines, gas lines, communication lines or any other underground obstruction that runs under the ground to see if you may have to either relocate the pool or move a pipe. Talk to the local building departments to ensure that you are locating the pool the correct distance from the house boundaries and existing buildings.

ACCESS

Once the proposed location for the swimming pool has been identified the next step is to work out how you are going to get access to the proposed pool location.

You will require access for the following:

- Machinery to excavate the hole;
- Machinery to remove the soil;
- Delivery of the swimming pool shell;
- Machinery to bring in the backfill material;
- Concrete.

MACHINERY TO EXCAVATE THE HOLE

In regards to the access required for machinery to excavate the hole, the selection of machinery can vary depending upon the available access.

MACHINERY TO REMOVE THE SOIL

When you are excavating the hole you need to have a method of removing the soil from the excavation.

SWIMMING POOL SHELL

You will need access to get the swimming pool shell from the road to the excavated hole. In that regard, a mobile crane can be used to lift the pool shell into the hole.

If you are uncertain about what crane to use, then contact a local crane company. They will come and inspect the lift and advise you of the appropriate crane required.

MACHINERY TO BRING IN BACKFILL

You will need to be able to get backfill material to the swimming pool. If you have sufficient access this can be done by reversing a dump truck to the site and unloading backfill material. If access is limited, you can run the backfill material in using smaller equipment such as a mini tipper, bobcat or wheelbarrow subject to access.

CONCRETE

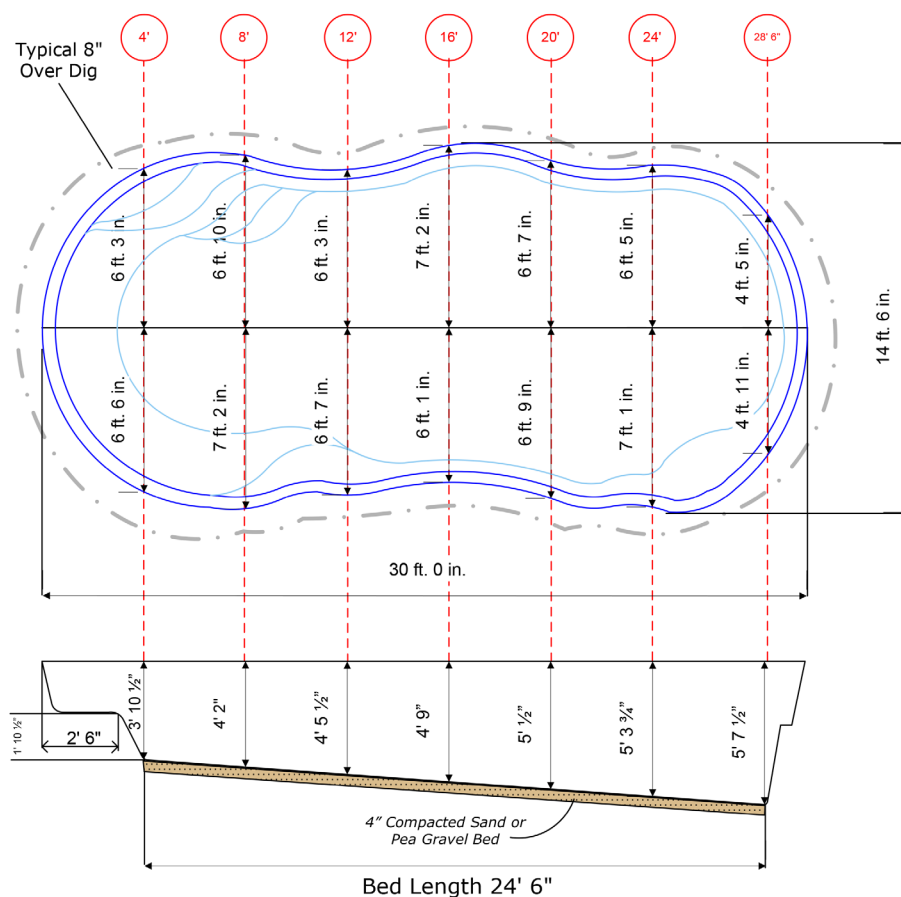
Similar to the backfill material, you will need to be able to get concrete to the hole. If you have sufficient access a concrete truck can reverse up to the hole. If access is limited, you may need to mix the concrete on site using a mixer.

LAYOUT OF THE POOL

Once you have identified where to locate the pool the next step is the mark-out process. Before marking out the pool it is necessary to clear the area where the pool will be located to ensure the ground is level. This level area should extend all around the pool area to allow for the coping and walkways. If the ground is not level take some time with the excavator to level the site properly.

Measurement Method

In order to use the measurement method you will need a Leisure Pools dig schematic for the pool. A Leisure Pools Dig Schematic is required to properly use the measurement method.



The first step is to define the center line of the pool. Once you have worked out where you intend to locate the pool place a steel pin into the ground at the proposed location of the center of the shallow end and at the proposed center of the deep end. Run a string line from the shallow end steel pin to the deep end steel pin. Measure the distance of the string line to ensure that is the correct length of the swimming pool. If the pool is a Moroccan 27 (8.2 meter) then in accordance with the Leisure Pools Dig Schematic the string line will be 26' 11" (8.2 meters) long.

Using spray paint, mark out along the center line the measure points in accordance with the Leisure Pools Dig Schematic. On the Moroccan 27(8.2 meter) the measure points are spaced at 4 foot (1.2 meters) intervals. Starting from the first measurement point, at the shallow end, measure out at exactly 90 degrees from the center line the measurements shown on the Dig Schematic and place another mark. Continue down the center line until all the marks on the Dig Schematic have been transferred onto the ground.

Now connect the measurement points to define the external dimensions of the pool. This line shows the pool edge but you will need to scribe a second line approximately 6 inches (15.24 centimeters) outside this line to use as the excavation line. This allows you room to work when the pool is lowered into the ground.

Now you have the external dimensions of the pool you now need to determine the length of the floor. Remember, the floor is not as long as the top of the pool as the walls of the pool angle inwards. In order to determine the length of the floor refer to the Leisure Pools Dig Schematic which will tell you the floor length of the pool to be installed.

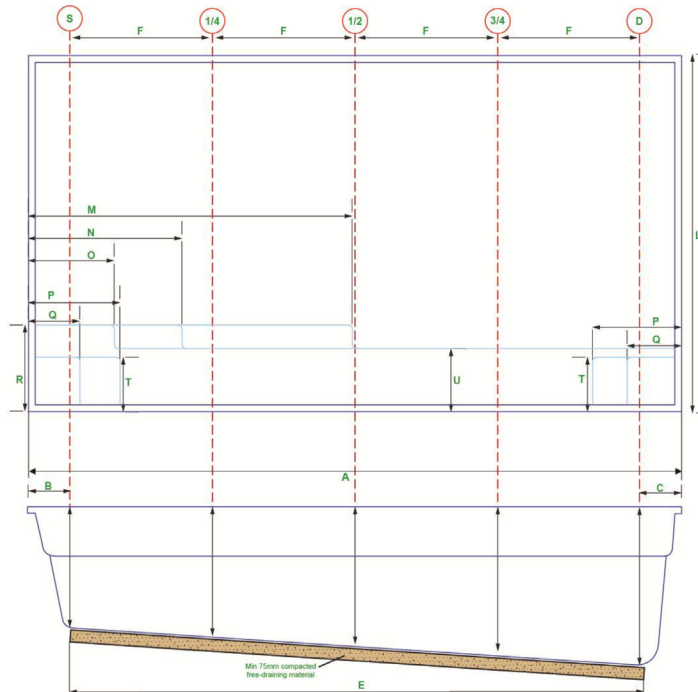
You should now have a picture of the pool on the ground with measurement points next to the pool defining the floor at the shallow, middle and deep end points. For increased accuracy repeat these floor marks down the other side of the pool. Take care when excavating that these marks don't get obliterated, referring to them frequently during the excavation if necessary.

Pools that are more regular in shape such as the Elegance or Reflection are much easier to mark out and can be done using an International Dig Sheet, an example is shown on next page. To mark out a rectangular pool use the dimensions shown on the International Dig Sheet remembering that these measurements are for the pool shell, so add a little extra to both the length and width measurements to allow for the over dig. It is important when marking these pool shapes out to ensure that they run exactly in line with any nearby buildings, walls or path lines.

Your International Dig Sheet will show either imperial or metric measurements depending on your location.

Ensure that the excavator digs out the deep end enough to allow for the sump tube.

INTERNATIONAL DIG SHEET - REFLECTION



LEISURE POOLS REFLECTION RANGE									
METRIC	A	B	C	E	F	S	D	1/4	
Reflection 7.00	7000	450	550	6000	1500	1280	1660	1375	
Reflection 8.00	8000	450	550	7000	1750	1280	1720	1390	
Reflection 9.00	9000	450	550	8000	2000	1280	1780	1405	
Reflection 10.00	10000	450	550	9000	2250	1280	1840	1420	
METRIC	1/2	3/4	L	M	N	O	P	Q	
Reflection 7.00	1470	1565	3800	3416	1626	902	940	540	
Reflection 8.00	1500	1610	3800	3416	1626	902	940	540	
Reflection 9.00	1530	1655	3800	3416	1626	902	940	540	
Reflection 10.00	1560	1700	3800	3416	1626	902	940	540	
METRIC	R	T	U						
Reflection 7.00	927	546	660						
Reflection 8.00	927	546	660						
Reflection 9.00	927	546	660						
Reflection 10.00	927	546	660						

Measurements are taken from the outside of the coping.

October 2013

SETTING THE GRADE

Grade is the name given to define the point at which corresponds to the finished height of the pool. This might not be the finished height of the overall job as you may pave over the top of the Leisure Pools fiberglass swimming pool coping later, which will lift the finished height by the thickness of the pavers and the mortar you use to fasten them down. The overall finish should be taken into account when setting the grade.

The next step is to set up your level in a spot that can see the entire pool site but not get in the way of the machinery that will be operating in the area. It is important that you correctly calibrate it and confirm its accuracy. Do not knock it or remove it from this position for the duration of the job. Have a plastic bag handy to cover it in case of rain.

You are now ready to excavate the hole.

EXCAVATION

You should keep the site as clean as possible as this is the part where the real mess starts. Before the excavator starts the dig ensure that the base/backfill material is easily accessible from all around the pool hole. Sometimes you will find that once the hole has been dug you will only be able to get the base/backfill material to one side of the job. If this is the case, get some of the base/backfill material into position before the dig starts.

The excavator will normally start at one end of the pool and dig backwards towards the other end. Ideally you will have a truck on hand to accept the excavated material as it is being dug and take it away to a pre-arranged dumpsite.



Keep the measurement points you made clear at all times. If necessary remark the measurement points during excavation. Use the grade rod and level once the excavator operator is getting close on the depths by placing the grade rod into the hole immediately adjacent to one of the measuring points that you made.

Make sure the walls of the excavation are vertical. Carefully check the areas that take any seats, steps or benches. If the excavator operator is at all unsure of the internal features of the pool have him remove all of the dirt. It will take a little more work later on to backfill them but will prove to be a much safer option than trying and failing to craft a perfect hole.

Always note that there will need to be additional excavation for the sump tube beyond the deep end of the swimming pool.

Once the excavator has finished the dig check all the heights carefully. The floor of the hole should be reasonably clean and free of any large lumps. As a guide, it takes approximately 4 to 5 hours to excavate a Moroccan 27 (8.2 meter) hole using a 5-ton excavator in semi-clay conditions.

SETTING THE BASE

The next step is to set the base of the hole. Take into the hole 4 steel pegs, a hammer and a string line. Place a pair of pegs at the shallow end of the pool exactly in line with the shallow mark on the Dig Schematics. Do the same for the deep end.

Now run the string around all 4 pegs being careful to set the height of the string to match the depths on the Dig Schematic. If you have excavated your hole correctly you should see the string line stretched tightly around the hole with a minimum 4 inches (100 millimeters) between it and the floor of the hole. A minimum of 4 inches (100 millimeters) of base material is required under all Leisure Pools.

Have the excavator now place the base material into the hole. Have the excavator place the majority of material down the centerline of the hole so that you don't upset your string line too much. Using a shovel move the base material around until it is evenly spread out in line with the string lines but leave the deep end alone for now.

At the deep end place the slotted drain pipe (sump tube) covered with geotech fabric into the trench that runs from the main drain pit and take it up the wall of the deep end clear of the surface of the hole. You will have to cut a number of slots into it to allow water to access it and cover the slots with geotech fabric.

Using your screed bar, screed the base material until it matches the string lines and looks even. Don't be too concerned about getting the base perfect the first time around.

Use the level and staff often during this process to check your heights. This will enable you to spot-check the parts of the floor that the string lines don't cover.

Once the floor has been screeded to your satisfaction place the tamper or mechanical compactor into the hole and thoroughly compact the base. Again do not rush this process. If settling occurs (and it should) then scatter more base material into those areas. Once you have removed the compactor from the hole you can screed the base properly.

Starting at the shallow end carefully place a screed rail, (this should be around 9' to 14' long,) next to the first string line and carefully dig it into the base material and pack it fully until the top face of the screed bar is flush with the string line for the entire length of the bar. Do the same for the second screed rail with the other string line. When you have finished you will have the two screed rails following the two string lines. Ideally the screed rails should be set around 1/2" or 10mm to the side of the string lines, this will prevent the string lines from being caught between the screed and the screed rail during the screeding process. If this does happen it is too easy to snap your string lines. Check their placement with the level and staff. Using your screed bar carefully screed the base filling in any low spots and cleaning off any high spots. As you get to the end of the screed rails just slide them down the floor alongside the string lines and repack them so that you can continue screeding right to the deep end.

Remove the steel pegs, string lines and screed rails from the hole taking care not to walk on the base material. Your floor should now look absolutely flat with just the two grooves running from the shallow to deep end where the screed rails were. Fill these grooves up with base material by walking only in the grooves and not on the rest of the bed. Use a plastic rake to smooth them over.

Some builders prefer to place their screed rails before the base material is added using lengths of 2" x 4" (50mm x 100mm) timbers fastened together to make up two continuous screed rails that run the full length of the floor. This is a perfectly acceptable method provided that you replace the steel pins at the shallow and deep ends with timber ones to enable the rails to be secured properly at the pool floor height.

Use string lines often to ensure that the rails are set true and don't sag during the screeding process. The picture below shows this method with the first timber screed rail being set

Take a step back and check the overall job, the floor should be completely flat and sloping evenly from the shallow end to the deep end of the hole where the standpipe will be leaning up against the wall with its bottom end disappearing below the bed.

DO NOT PROCEED UNTIL THE FLOOR IS PERFECT – If something does not line up take the time now to fix it, as you will regret it later if you rush this part of the installation.



SETTING THE SHELL

Make sure the access for the crane is clear and that you discuss the lift with the crane operator before you start. All Leisure Pool fiberglass swimming pools must be lifted using a spreader bar. This is a steel bar that spans the width of the pool. There is a minimum of 2 lifting points on each side of the pool and cloth slings or chains can be used to attach the pool to the spreader bar.

Attach a rope to each end of the pool, in order to guide the pool. Ensure the ropes are long enough to guide the pool while it is in the air. Only lift the pool in still conditions and never, under any circumstances, get underneath the pool.

When the crane operator lifts the pool for the first time, just hold the pool a few inches above the ground and check that the top of the pool is level and that it is not twisted. If it is not level then place it back on the ground and adjust the slings and try again. Be careful when placing it back on the ground that it goes back into its original position, as great care must be taken not to sit the pool on a rock or sharp object.

Using the guide ropes to keep the pool away from all obstacles, carefully maneuver the pool over the hole. Many hands do help here, as the pool should not touch the sides of the excavation but take care not to kick any loose material into the hole.

The pool can now be lowered into position all the way until it is resting evenly on the base material and the crane's lifting slings are slack. Taking care not to tread dirt into the pool (take your shoes off) get into the pool and walk over the floor checking that it is sitting firmly on the base material. Check that no part of the pool is touching the sides of the excavation as this will almost certainly mean that the pool will be 'hung up' in that spot.

Now using the grade rod and level check the height of the coping around the pool. Make sure that the grade rod rests on the inside edge of the coping in areas where there are no seats, steps or benches as these areas tend to drop slightly and give a false reading. Choose areas to check where the floor of the pool joins the wall and comes straight up to the coping. You can allow yourself a little leeway as small differences can be adjusted later.

As a guide, on the Moroccan 27 (8.2 meter) we allow ½ inch (10 millimeter) above and below the datum line as an acceptable margin. If the pool is not sitting level use the crane to lift the pool out of the hole and adjust the base accordingly. When all looks good remove the lifting slings and send the crane away.



SECURING THE SHELL

With the pool approximately level you can now secure the pool by placing the first of the backfill around the pool. Starting at the deep end, place enough backfill into the hole to cover the curve of the floor radius - approximately one foot. You can go slightly deeper at the deep end corners. Take care to pack this material firmly but don't ram it so hard that you move the pool.

Don't be too concerned if the long walls appear low in the level sights, they have a habit of hanging out slightly and thus appearing to be low when all they need is to be pushed upright which will cause the top of the coping to come level again. This is not really noticeable in the shorter pools but if your pool pools were over 27 feet (8.2 meters) long it would be advisable to brace the sides of the pool. This can be done simply by tying two ropes across the pool to the lifting points and tensioning gently until the walls are level. An alternative would be to brace them with timber posts placed into the ground midway along the pool and bracing back against the walls of the excavation.

If the pool needs to be lifted slightly at any point other than the overhangs (seats, steps & benches) it is easy to lift it at any point using a wide piece of timber placed underneath the coping. DO NOT however under any circumstances lift the pool using this method with water or any other weight inside the pool as you may crack or damage the pool. Furthermore, do not jump or jerk the timber when lifting the pool as this may also crack or damage the pool pool. Then pack the base and bottom radius.

Take care not to lift the pool too much and remember that when you move one area of the pool then you may have moved possible other areas. Check that the overhanging areas are low this is as it should be. If they are actually exactly right give yourself a pat on the back.

Keep checking your levels constantly while you set the pool, don't be fooled by the size of the pool, it is very easy to lift it too much or adjust it out of level. Take your time and keep asking yourself, "If I move this point here, what will happen to the rest of the pool?" and make sure you know the answer before you touch anything.

At the end of this section you should not be able to see any of the bottom radiuses and the pool should be level at all points except for the overhangs.



PLUMBING THE SHELL

The plumbing of the pool shell can be done anytime through the backfilling process. The pictures here show the pool being plumbed when the backfill is 3/4 done. This is a good time to run your pipework from the pool to the filtration as any pipework laid any earlier risks being damaged by backfill being shovelled into the excavation.

Leisure Pools recommends fitting the skin fittings early on and fitting the pipework as late as possible so the the pipe-work can be supported by the backfill.

Leisure Pools has supplied one skimmer, two main drains and three returns with the swimming pool. The first step is to cut out the skimmer in the deep end wall of the pool, (side wall on Roman models). Remove the skimmer face plate from the box and use this as a template for the cutout. Most Leisure Pools have a recess where the skimmer should go and it is merely a matter of centering up the plate within that recess and marking the cutout using a white board or non permanent marker.

Ideally situate the top of the plate approximately 2 inches (50 millimeters) down from the pool coping. The idea is that when the pool water level is at the correct operating level the skimmer box tunnel should be 3/4 full. Cut the skimmer out using an angle grinder and be sure to wear a mask and eye protection. Check the cut out by placing the face plate into the hole, check it is parallel with the top of the pool coping and that there is plenty of room for the screw holes. Leave the plate there and mark the screw holes with a marker (12 in all), then remove the plate and drill the holes – these should be a clearance hole so make sure that the screws provided fit cleanly without ‘grabbing’ the pool.

Returns are normally the second item located and attached. Return fittings should ideally be 14 inches (350 millimeters) below the coping. Before you drill these holes check the back of the pool to ensure that you will be drilling through an unobstructed flat part of the wall and not through a reinforcing section on the outside of the pool. The return jet flange face must be able to fit flush with the pool.

Using a grinder, smooth the back of the pool where the returns will be fitted to ensure the best seal possible. Do the same for the skimmer cutout making sure there are no sharp edges or protrusions that will stop the skimmer box from sitting flush to the pool. Using a clear neutral cure type silicone sealant on all surfaces (pool and skimmer) fasten the skimmer box to the pool using the supplied screws. Ensure that the silicone is squeezed out of the join between the pool and skimmer and the join between the pool and the escutcheon plate. Wipe off excess silicone with a clean rag and finishing the escutcheon plate by fitting the supplied cover caps or cover plate. Fit the return jet eyeballs in the same manner using the same silicone sealant.

Make sure that when you finish this section that you clean the interior of the pool completely.



SETTING UP THE EQUIPMENT

Once you have chosen the location for the pool equipment prepare the ground by leveling it off and placing a pre-formed concrete slab or other in to position.

All your equipment will be placed on this slab so ensure that it is large enough to do the job. Make sure that the trench from the pool runs right up to the slab and that the pool pump and the end of the salt chlorinator overhang the trench. If the equipment is to be set up lower than the pool water level you will need to install some 2 way valves in the suction and return lines so that should you need to remove any part of the system you can close off the valves and prevent water draining from the pool. If the filtration unit is set up higher than the pool water level the pump can sometimes have a hard job priming itself and it will be necessary to install a check valve in the suction line.

It can be a good idea to fit the plumbing without glue initially to check that the completed plumbing layout will work but if you do this you should then clearly mark every joint as you glue it to ensure that you don't forget one. Make sure that you have fitted a backwash line for the sand filter and check with your local building department to see where it should be plumbed.

If you have a cartridge filter you will need to install a 3-way valve in the return line. Connect a pipe to this valve and run it to either storm water or across your property as building code directs. The valve can be situated either between the pump outlet and the filter inlet or immediately after the filter outlet. This is your overflow pipe, which you will use only when you wish to drop excess water out of the pool. Unlike a sand filter, which dumps dirt by backwashing, this water is just excess pool water and is 'clean'.

BACKFILLING THE SHELL

In this stage you will be filling the pool with water so it is important to ensure that you have either your pool fencing or a temporary fence ready to enclose the pool. This can sometimes be hard on the fiberglass pool installer because of the immediacy of the project. It can be awkward to have a fence in the way when you are trying to wheelbarrow backfill material around the pool so ensure that the fence that you use is temporary initially and can be removed when you are working there and replaced whenever you have to leave the site unattended. It is critical to ensure that you comply with statutory fencing requirements before you start to fill the pool with water. If you fail to comply then you may be criminally liable.

If you have a bobcat or small mechanical bucket machine, it will make this part much easier. Make sure you pace yourself and do this a little at a time. The backfill can be placed around the edge of the pool.

Turn on the water. As the water level in the pool rises add the backfill material evenly around the pool to keep pace. The speed that the pool fills will dictate the speed of the install. You could be using the garden hose, water hydrant or a water truck. In all cases the important thing here is not to let the water get too far ahead or behind the level of the backfill. Keep them within 6 inches (150 millimeters) of each other.

Bulges are an indication that you have pushed the backfill in too early if the bulge is inwards or that you have let the water get too high above the backfill if the bulge is outwards. Keep checking your levels all around the pool every time the backfill rises by 6 inches (150 millimeters) and watch for bulging in the pool walls. The bulging will affect the levels shown on the level and the job will need to be stopped so that the bulge can be taken out before work resumes. Do not ram the backfill down along the long walls as this will almost certainly cause the wall to bulge inwards.

As the water level gets to each step backfill behind it. The areas under seats, steps and benches are the only areas where you can pack the backfill as firmly as possible. Make sure that the entire area is completely packed right up to the underside of each step.

Keep checking your levels, the idea here is to pack the benches up to the desired height with the backfill. There is little danger of the rest of the pool moving as there will now be a significant tonnage of water in the pool. Remember to stop the backfilling process when the backfill is 3/4 complete so that you can run your pipework. Make sure your pipework does not hang off the pool fittings and that it is properly supported everywhere.

Continue with the water fill and the back fill until the pool is full. This pool is full when the skimmer box entry tunnel is $\frac{3}{4}$ under water. The backfill should be left four inches (100 millimeters) from the top of the pool in all areas except for immediately behind the skimmer box and above the return jets. These areas should be left open exposing the pipes for a visual inspection.

Carefully check the back of the pool around these fittings for any signs of a leak. If a leak is found then you must empty the water level to below the level of the leak and replace the affected part. It is not possible to repair any leak properly by just applying a 'Band-Aid' to the outside of the area and a small leak that only drips a drop or two a minute will still leak gallons over a weekly period. Leisure Pools recommends pressure testing of all plumbing lines to ensure there are no leaks or problems.



LAYING THE BOND BEAM

All of the Leisure Pools range of fiberglass pools requires a concrete bond beam in accordance with the Leisure Pools engineer drawings. This beam should be 8 inches (200 millimeters) thick at the poolside and 6 inches (150 millimeters) thick on the outside edge. It should be reinforced with rebar and the rebar should be tied to the pool shell. Length of rebar is to be mandated by Leisure Pools engineer drawings and/or local code, whichever is the greater level of reinforcement.

This beam is structural and should be as big as is required on the engineer's drawings as a minimum. If you have not poured concrete before get professional help. The bond beam is structural and must be completed properly.

Pavers can be laid on the bond beam after the concrete has set. There are a number of different styles and sizes to choose from but in all cases when shopping for pavers check with the supplier that they are suitable for use as some pavers can leach an enormous amount of a white powdery substance that can detract from the appearance of the project. Also consider how slippery they might be when wet.



IMPORTANT INFORMATION

DO NOT EMPTY YOUR SWIMMING POOL

It is critical that you do not empty your swimming pool or lower the level of the swimming pool water below the skimmer box; to do so will void your Warranty.

Leisure Pools swimming pools are designed to be a membrane in the ground between the earth and the water. To remove the support of either the earth or part of the water will place enormous strain on the structural integrity of the Leisure Pools swimming pool resulting in possible damage to the structure of the pool.

Emptying or lowering the water below the skimmer box should only be done under the supervision of your pool builder. If in doubt, contact the manufacturer, Leisure Pools for advice.

If you empty your Leisure Pools swimming pool without the supervision of a Leisure Pools manufacturing representative and damage occurs then your swimming pool will not be covered by the Leisure Pools Warranty.

STANDPIPE / SUMP TUBE

Your Leisure Pools swimming pool should have been installed with a standpipe / sump tube. This is a pipe that travels to the bottom of the Leisure Pools swimming pool and enables you to measure the height of any underground water. The standpipe / sump tube will also enable you to use a pump to remove water around the pool should there be a build-up of ground water around the pool.

Excessive ground water around your swimming pool may cause structural damage to your Leisure Pools swimming pool that will not be covered by the Leisure Pools Warranty.

DRAINAGE

It is important that when you are installing your swimming pool and undertaking any landscaping work that you keep in mind the drainage of surface water. You must ensure that surface water does not run towards your swimming pool but rather away from the swimming pool. You must install sufficient drainage to keep the area around your swimming pool free of heavy surface and sub-surface water.

Excessive water around your swimming pool may cause structural damage to your Leisure Pools swimming pool that will not be covered by the Leisure Pools Warranty.

MODIFICATIONS / REPAIRS TO SWIMMING POOL

The good thing about the Leisure Pools swimming pool is that they are relatively simple to repair should any damage occur.

A certified Leisure Pools technician can only undertake repairs on a Leisure Pools swimming pool. Should you have any repair issues please contact Leisure Pools directly. To have repairs undertaken by someone not authorized by Leisure Pools may void your Leisure Pools Warranty. Please note that all warranty claims must be received in writing and accompanied by supporting information including pictures.

WINTERIZING

In some regions it is perfectly okay to leave your pool running all year long. In other colder climates, winterizing your pool is highly recommended. To insure proper winterizing you must first make sure that any rainwater naturally drains away from your pool. Then a regimen using skimmer plugs, and return plugs with a combination of blowing out the lines is used. Please follow your Leisure Pools Dealer recommendation for winterization. This will vary due to climate.

POOL CHEMISTRY

It is important to be aware that untreated or improperly treated pool water can be a health threat that could cause serious injury or death. Chemically balanced and sanitized water, on the other hand, will provide a healthy and visually appealing environment for you, your family and friends.

Pool water can be contaminated with algae and bacteria from a variety of sources, including wind, top-off water and swimmers. Controlling these influences is an ongoing requirement and involves:

- Chemically balancing the water to ensure it is neutral for swimmers, the Leisure Pools swimming pool itself and pool equipment;
- Sanitizing the water to oxidize contaminants;
- Filtering the water to remove oxidized contaminants;
- Regular testing and balancing your water to ensure that all acceptable levels are being maintained.

WATER BALANCE

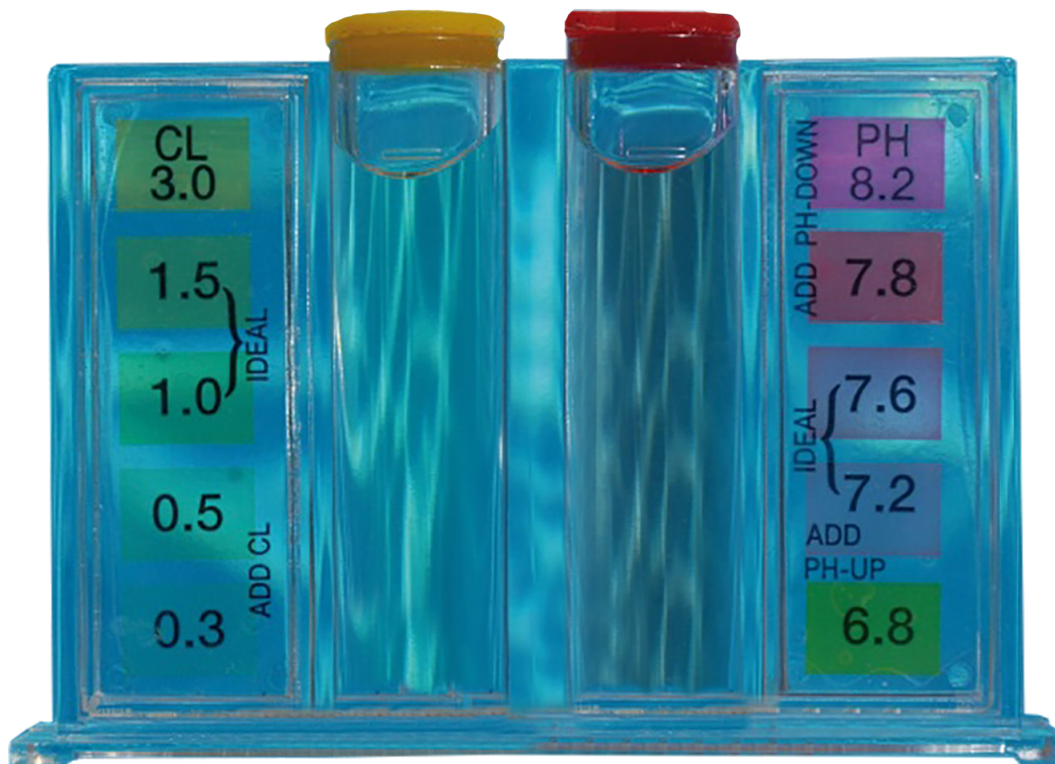
Your Leisure Pools swimming pool is a water container and the water it contains must be suitable for:

- Swimmers and pool users;
- Leisure Pools swimming pool.

Balanced water means that its chemical demands have been met. If the chemical levels are too low the water will aggressively seek the products it needs by attacking and damaging the pool surface and equipment. At the other end of the scale, high chemical levels will precipitate from the water and damage the pool surface and equipment.

Out of balance water can, therefore, cause expensive damage to your Leisure Pools swimming pool and equipment and may also inhibit the sanitation process. In simple terms, a scientific water balance program suggests that you should balance the following variables:

- pH
- Total Alkalinity
- Calcium Hardness



pH

pH is a measure of how acidic or alkaline the water is. The pH scale ranges from 0 to 14, with 7 being neutral. Values below 7 are acidic and values above 7 are alkaline.

With pool water we are seeking a pH balance suitable to the pool users, the Leisure Pools swimming pool pool and the sanitizer used. Leisure Pools strictly recommends a pH level of between 7.2 and 7.6.

Topping off your pool, heavy rain, heavy bathing loads and chemical additions can all change the pH level of your pool water. pH must be kept within the operating range because if it is too high or too low it may:

- Create swimmer discomfort;
- Interfere with the sterilization action of your pool sanitizer;
- Damage your Leisure Pools swimming pool.

Regardless of the chlorine type or chlorinator process you use, any pH drift above 7.2 to 7.6 will inhibit the sanitizing effect of your chlorine and damage your Leisure Pools swimming pool. In that regard, in order to maintain your Leisure Pools Warranty on your Leisure Pools swimming pool you must maintain a pH level of 7.2 to 7.6. You must keep a monthly written record of the levels in the pool in order to not invalidate your Warranty

Concentration of Hydrogen ions compared to distilled water	1/10,000,000	14	Liquid drain cleaner, Caustic soda	Examples of solutions and their respective pH
	1/1,000,000	13	bleaches, oven cleaner	
	1/100,000	12	Soapy water	
	1/10,000	11	Household Ammonia (11.9)	
	1/1,000	10	Milk of magnesium (10.5)	
	1/100	9	Toothpaste (9.9)	
	1/10	8	Baking soda (8.4), Seawater, Eggs	
	0	7	"Pure" water (7)	
	10	6	Urine (6) Milk (6.6)	
	100	5	Acid rain (5.6) Black coffee (5)	
	1,000	4	Tomato juice (4.1)	
	10,000	3	Grapefruit & Orange juice, Soft drink	
	100,000	2	Lemon juice (2.3) Vinegar (2.9)	
	1,000,000	1	Hydrochloric acid secreted from the stomach lining (1)	
	10,000,000	0	Battery Acid	

TOTAL ALKALINITY

This is a measure of bicarbonates, carbonates and hydroxides in your water. The recommended range is 80 to 120 parts per million with 100 parts per million being ideal. In that regard, in order to maintain your Leisure Pools Warranty on your Leisure Pools swimming pool you must maintain the total alkalinity between 80 to 120 parts per million. You must keep a monthly written record of the levels in the pool in order to not invalidate your Leisure Pools Warranty.

Lower total alkalinity will lead to the water attacking the walls of the Leisure Pools swimming pool. Low levels will also cause the pH levels to be very unstable with small additions of chemicals resulting in major shifts in the pH values. Your total alkalinity can be changed in the following ways:

- Adding buffer to your pool water to raise the total alkalinity;
- Adding acid to your pool water to lower pH and will also lower total alkalinity;
- Adding water to your pool will change the total alkalinity depending upon the total alkalinity of the top-up water.

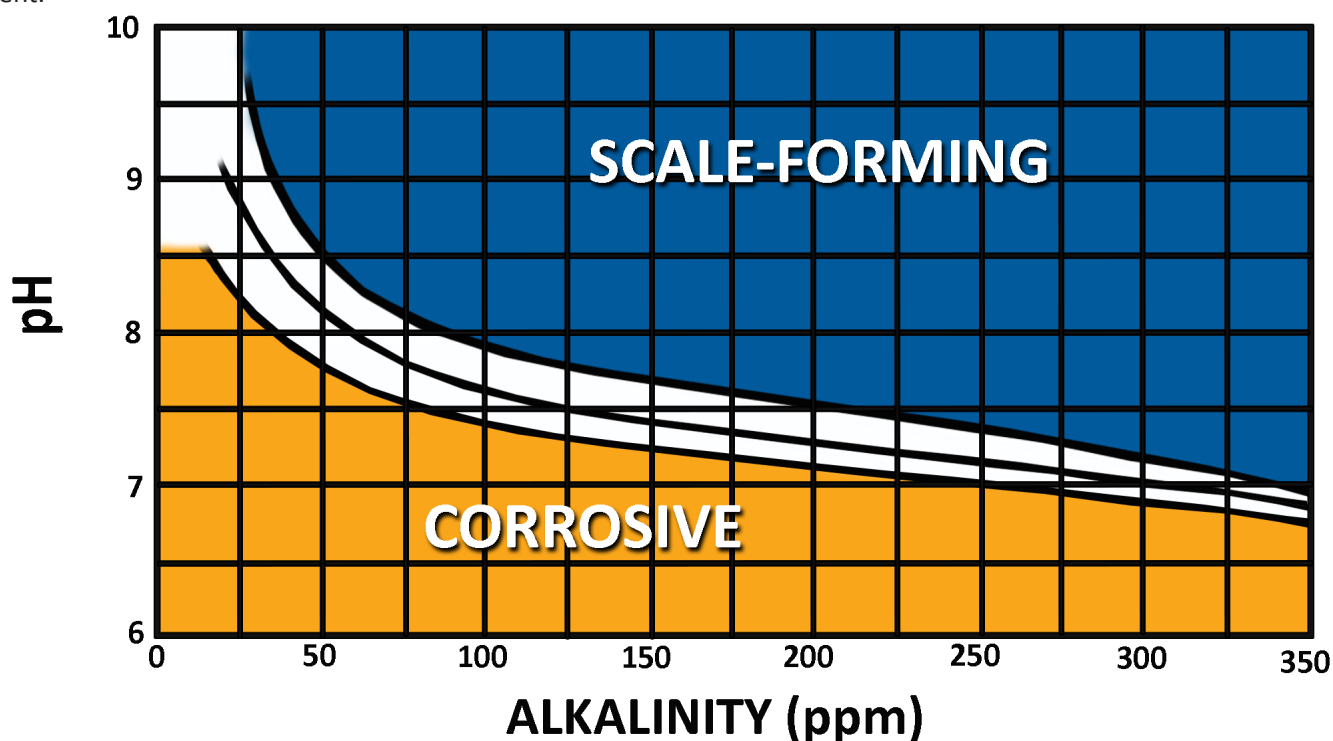
THE RELATIONSHIP BETWEEN pH AND TOTAL ALKALINITY

From the last section, it can be seen that acids will lower the pH and Total Alkalinity. There is a relationship between these two chemical components and because of this; they need to be adjusted together. The levels you are seeking to maintain are:

- pH 7.2 to 7.6
- Total Alkalinity between 80 to 120 part per million

Let's have a look at the relationship. Assume that the pH is ok but the total alkalinity is low. To raise the level, add "Buffer" (sodium bicarbonate) at the required rate. However, buffer is an alkali and will also raise the pH level. Acid, which is used to lower pH, also lowers total alkalinity. The trick is therefore to raise the total alkalinity artificially high so that when the acid is added, to lower the pH to the correct range, the total alkalinity is also reduced to the correct range.

Two acid types are used to lower pH. One is Hydrochloric Acid and the other is Sodium Bisulphate. Both will effectively lower the pH and total alkalinity. If using Hydrochloric Acid to lower pH it is vital that it be diluted (one part of acid to ten parts of water) prior to adding to the pool. Note that the filter should be running during addition and at least for one hour afterwards to ensure adequate mixing. No other types of acid should ever be used for pH or total alkalinity adjustment.



CALCIUM

Calcium naturally occurs in water. Different areas of the Country have higher and lower levels of calcium in the water. The higher the calcium concentration in the water, the more prone the pool is to calcium leeching. When the pH is maintained between 7.2 and 7.6 the calcium is balanced in the water.

Calcium levels should be maintained between 150 – 200 parts per million.

When the pH rises above 7.5, calcium begins to leech out of the water and cling to the swimming pool surface. The higher the pH is allowed to go, the more pronounced the calcification can become. Obviously the problem occurs more often in areas with higher natural concentrations of calcium in the water (also known as hard water).

All that is required for calcium to fall out of solution creating a layer of scale is a pH of 7.6 or higher and calcium hardness over 150ppm. The higher the levels, the more pronounced the problem will be. The current guidelines being used for adding calcium to water are based on concrete pool guidelines. There should really be no reason why you should add Calcium Chloride to your water for a Leisure Pools swimming pool.

If a swimming pool is exposed to high pH levels then an inconsistent discoloration below the waterline can occur. This whitening is due to calcium leeching from the pool water and clinging to the walls, steps and floor of the pool. It can be seen as a streak or solid area and is especially noticeable when the water level is lowered and the calcium dries.

If the swimming pool is exposed to high pH levels and a discoloration starts to occur the problem can be treated in the early stage, say 1 to 3 months, with a chemical solution. First, the pH must be lowered to 6.5. Then treat the swimming pool with Muriatic Acid and or calcium treatments available at your local pool supply store. Muriatic Acid refers to a technical grade of Hydrochloric Acid (HCl).

If the pool is equipped with a heater, heat pump etc. a bypass should be installed to isolate the unit(s) during the treatment to not damage the exchangers. Any other items that may be damaged from an extended low pH environment should also be removed or isolated. Once the problem is controlled, restore the pH to 7.2 to 7.6 and be sure to maintain it between these levels so the problem does not re-appear.

If the swimming pool is maintained with very high pH over a period of time, longer than 3 months then the problem can turn severe. The calcium begins to combine with the pool chlorine producing a chemical salt known as Calcium Chloride. This is shown as CaCl_2 and is a salt of calcium and chlorine. This salt attaches itself to the pool surface and causes the surface to appear significantly lighter especially when dehydrated. In advanced cases the Calcium Chloride is so bad that the pool even when hydrated (full of water) still shows the whitening.

If the pool has advanced Calcium Chloride but the gelcoat returns to normal when hydrated then the pool can be treated using a chemical solution outlined above. It will take up to 6 months to allow the treatment to totally dissolve the Calcium Chloride so it is best done over winter months. The pool will become more acidic so it is not recommended for swimming.



If the gelcoat has severe damage by the salt (Calcium Chloride) and it is visible when hydrated then the solution is to remove the salt from the surface of the pool. To date we have not been able to identify a chemical solution for the salt removal. As a result, the surface needs to be buffed and polished to firstly remove the salt build up and then to restore the luster of the pool surface. It is however very important that you speak with your builder before draining the pool (see section below on Not Emptying Your Swimming Pool).

Please note that some areas of the country have inherently high naturally occurring calcium levels. In these areas, we would suggest that you incorporate a stain and scale treatment as a part of general maintenance. Make sure to discuss this with your water care professional for suggestion of type.



SANITIZER

Chlorine is the most commonly used water sanitizer in the world. There are many forms of this highly effective product, including:

- Granular Chlorine (Calcium Hypochlorite) – Granular Chlorine can raise calcium levels (see above);
- Liquid Chlorine (Sodium hypochlorite);
- Stabilized chlorine (chlorine in two forms “dichlor” granular chlorine approximately 60% active and “trichlor” slow dissolving tablets approximately 90% active);
- Salt water chlorinators – these units produce chlorine through electrolysis of salt in the pool water.

Whatever form of chlorine you use, for it to work requires the pH to be in the correct range, and sufficient quantities of chlorine. It is recommended that free chlorine levels are maintained between 1 to 2 parts per million. Chlorine levels should not exceed 5 parts per million as this can damage the Leisure Pools swimming pool.

To check Free Available Chlorine use a DPD test kit.

STABILIZER

Ultra-violet light attacks chlorine. Stabilizing pool water involves adding the chemical Cyunatic Acid to reduce the amount of chlorine destroyed by sunlight. Up to 5 parts per million of free available chlorine can be destroyed in three hours in strong sunlight.

For health and financial reasons it is important to overcome this effect as much as possible. Stabilizing the water is strongly recommended in all outdoor pools. For the initial stabilizing of a new pool, Cyunatic Acid should be added to achieve the recommended level of 30 to 50 parts per million.

Stabilizer is lost through splash out and backwashing of the filter, and so will need to be replaced, especially during the swimming season. To do this it is necessary to first test for residual levels in the water. A water professional will be able to test the water in your pool and tell you how much stabilizer to add.

As you only need stabilizer in warmer months, adjust the level at the beginning of the swimming season and check it every few months during the season. Of course, if you have to pump out water, or lose a lot through splash out and backwashing more frequent testing and adjusting will be required.

CHEMICAL ADDITIONS

As a general rule you are far better off adding small amounts of chemicals, running the filter and testing the effect after several hours. Attempting large chemical changes by adding large amounts of chemicals can result in big problems.



WHEN ADDING OR DILUTING CHEMICALS TO THE POOL, ALWAYS REMEMBER TO NEVER MIX CHEMICALS WITH ANY OTHER CHEMICAL. ALWAYS ADD CHEMICALS TO WATER - NEVER WATER TO CHEMICALS. EXPLOSIONS HAVE BEEN KNOWN TO OCCUR RESULTING IN INJURY OR DEATH.

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