



Introduction to Swimming Pools

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At the most basic level, a pool is simply a structure that holds water, but beyond that, every pool has its own unique personality.

The pool structure could be above-ground or in-ground. Its interior surface could be made out of plaster, vinyl, tile, or fibreglass. In Saskatchewan 95% of residential pool's are a vinyl liner pool.

Not all water is the same either. Though most municipal water is similar, regional differences in water quality and mineral content vary widely, based on its source.

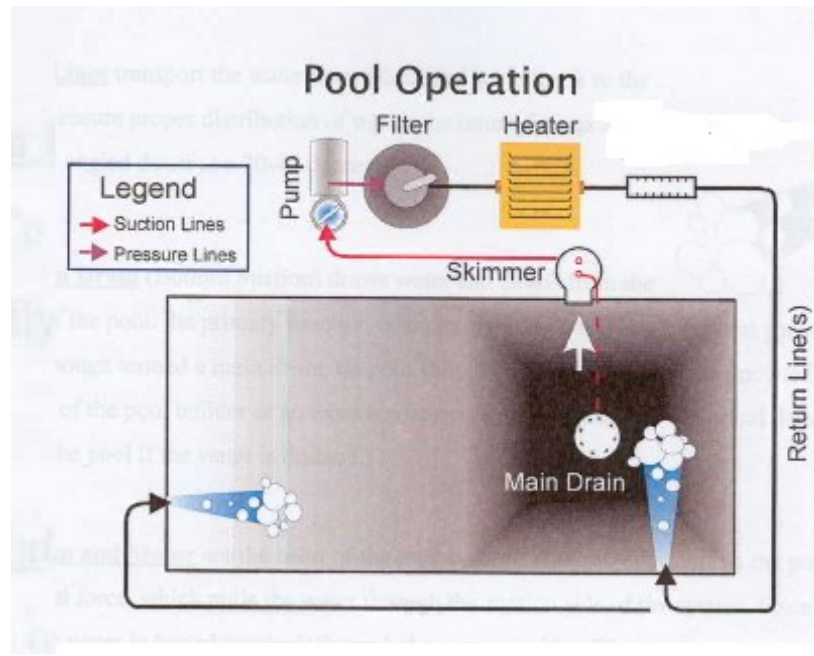
Common contaminants come from a variety of outside sources:

- Leaves, worms, insects, and other wildlife that fall into the pool
- Oils and cosmetics that wash off of skin
- Perspiration and urine from swimmers
- Pet hair

Organisms like bacteria, algae, fungus, and mould that, if given the opportunity, will grow and thrive in warm water, clinging to walls and other surfaces, forming a biofilm.

Naturally occurring elements such as calcium, phosphorous, nitrogen, and metals may affect mineral water balance while others affect sanitizer efficiency.

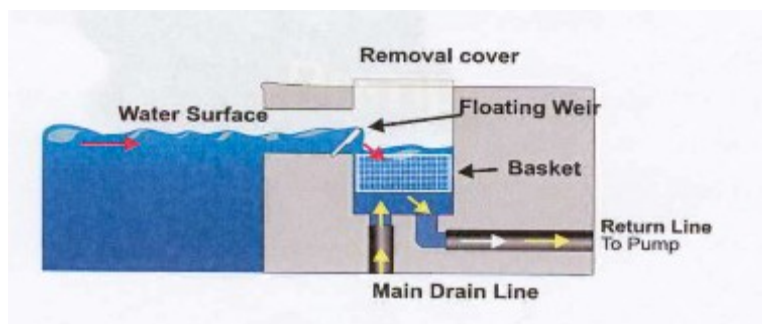
Movement of water:



The circulation system has a dramatic affect on the health of the pool. When water is in motion, it's harder for bacteria and algae to find surface on which to grow, and chemicals are more thoroughly distributed. In addition, as the water passes though the filter, debris is captured for easy removal.

Skimmer(s):

Draws water from the surface of the pool and captures floating debris into the skimmer basket. Some pools have two skimmers with dedicated lines to the pump.



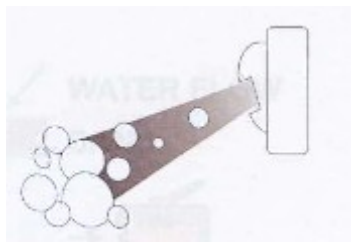
Main Drains:

Also known as bottom suction, draws water and debris from the bottom of the pool. Its primary function is to circulate water in the deepest part of the pool. Though termed main drain, no pool should be drained without the knowledgeable guidance of the pool builder or an experienced service technician. Major structural damage can occur to the pool if water is drained.

Some main drain lines are connected to the bottom of the skimmer, as shown in previous illustration. Newly constructed pools have dedicated lines for the main drain.

Return Lines:

Transport water from the filter and heater back to the pool. To ensure proper distribution of the water, the return fittings are generally angled down at a 30-45 degree angle, as shown in the following illustration.



Pool Pump:

The pump is the heart of the swimming pool circulation system. The impeller, within the pump, creates centrifugal force, which pulls the water through the suction side of the system. Once through the pump, the water is forced (pushed) through the pressure side of the system.

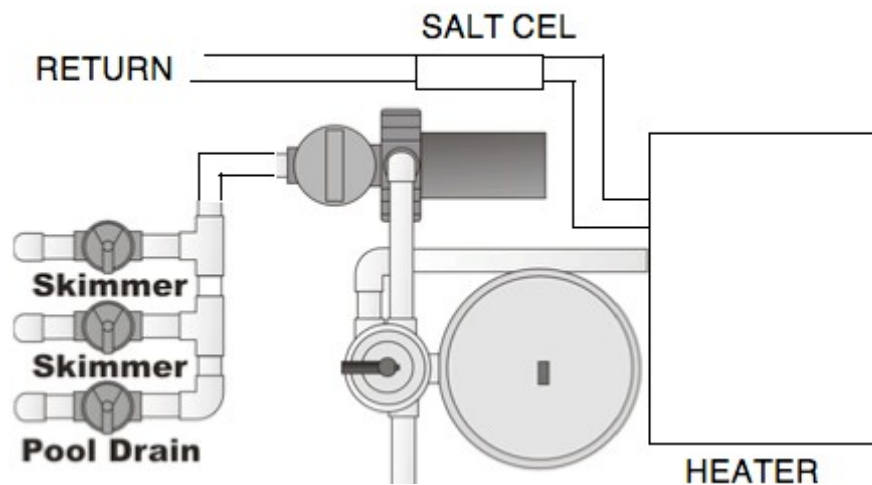
Filter:

There are three types of pool filters: sand, cartridge, and Diatomaceous Earth (D.E.). The filter strains the water and captures both large and small particles. A properly sized and operating filter is critical to keeping the water clean. As the filterable debris is collected on the surface of the filter, routine physical cleaning is required. Some of this debris is capable of being washed off, but a lot of debris can only be removed by chemically cleaning the filter.

Cartridge Filter:

Cartridge filters use a paper-type cartridge as a filter media. As water passes through the cartridge debris is filtered down to about 8-12 microns. The great thing about cartridge filters is that they are very user friendly. There is no backwashing required, no sand changes, and no coating the filter with DE powder. The filter pressure should stay between 10-20 PSI. When the pressure rises above this, simply turn off your system and rinse off filter with a garden hose. It is recommended that the filter be chemically cleaned once a year, but may require numerous chemical cleanings.

Pool Mechanical:



The above illustration shows plumbing that would be found in most pool sheds. Not all plumbing will look like this. Typically, older pools will only have one suction line, instead of two or three (as shown above). When there is a sand or DE filter, there will be a dial valve (as shown in illustration above) to control where the water is going. On cartridge type filters there is no dial valve and all of the water goes through the filter. To drain water from the filter tank or to lower your pool water to winterizing level, open the valve on the back side of the filter labelled 'waste'.

How to Vacuum:

1. Attach vacuum head to telescopic pole, and vacuum hose to vacuum head.
2. Extend vac pole and submerge vac head in water.
3. Grab vacuum hose at water level and slowly submerge hose working towards unattached end.
4. Once hose is completely filled with water, feed end through the mouth of the skimmer and attach hose to vacuum plate. Then place the vac plate over top of the skimmer basket.
5. Sometimes the hose has to be put over top of the deck into the skimmer through the lid.
6. Once the vac head is installed, go to the pool shed and slowly turn the Main Drain (Pool Drain) valve almost completely off. Doing this increases suction through the vacuum head.
7. Once vacuuming is completed, go back to pool shed and completely open all suction valves.
8. Return to the skimmer and remove vac plate and vac head and vacuuming is complete.

How to Clean Pump Basket:

Note: Prior to turning the pool pump off, it is important to turn pool heater off for a minimum of 10 minutes.

1. Turn off heater, wait 10 minutes and turn pump off.
2. Turn all suction valves to off position. This will hold water in the lines and make starting the pump easier.
3. Remove lid from pump and take out pump basket.
4. Rinse basket with garden hose and scoop out all loose debris. Do not bang basket on concrete, it will break.
5. Replace basket and lid.
6. Start pump and immediately open one suction valve half way. Wait to see if pump is pulling water and slowly open the valve the rest of the way.
7. Once pump is moving water with ease, slowly open the remaining valves one at a time.
8. Once system is completely open, turn on heater and set to desired temperature.

How to Clean Cartridge Filter:

Note: Prior to turning the pool pump off, it is important to turn pool heater off for a minimum of 10 minutes.

1. Turn off heater, wait 10 minutes and turn pump off.
2. Turn all suction valves to off position. This will hold water in the lines and make starting the pump easier
3. Open valve labelled **WASTE**. Usually found on the backside of the filter. Then open pressure relief valve on the top of the filter. This will allow water to flow down the drain line.
4. Once all water is drained from the tank, remove the tank lid and remove filters.
5. Rinse filters off with garden hose or if necessary have them chemically cleaned.
6. Re-install cartridges and lid (be sure to put them in the way they came out).
7. Close **WASTE** valve.
8. Turn Pump on and slowly open one suction valve.
9. Once pump is moving water easily, slowly open the remaining valves one at a time.
10. The pressure relief valve should still be open and should be hissing.
11. Wait until water sprays out of valve and then close. If you close valve prematurely the filter tank will be filled with air and will not filter properly.

Spring Pool Opening:

Pool water needs to be raised to operating level. Operating level is half way up the skimmer faceplate.

Never leave pool unattended while filling it with a fill line or a garden hose.

Fall Pool Closing:

Water level should be lowered 8” below the skimmer. If the pool has a main drain plumbed into the suction side of the pump, leave the pool circulating until the day before the winterizing is to be done. This will help keep the pool clean and free of algae.

It is recommended to have cartridge and DE filters cleaned during the off season to strip and oils and organic material that has built up on them over the pool season. It is recommended to hire an experienced pool service technician to properly winterize the pool. It is very important to have underground lines blown out completely.

When lowering pool water to prepare for winterizing, it is extremely important to watch pool drain and close waste line once desired water level is achieved. Major structural damage can occur if the pool is completely drained.

Water Balance:

Total water balance is important; it ensures that the mineral content of the water is in an appropriate state to protect the surface finish and equipment and make water more comfortable to swim in.

All types of water introduced into a pool or spa contain different minerals. A proper balance of the following chemicals is needed for the disinfectant to work properly and to prevent scaling or corrosion of the pool, spa, or related equipment.

1. pH (measure of acidity and the alkali nature of the water)
2. Total Alkalinity (works to maintain parameter levels)
3. Calcium Hardness (mineral content in pool water)
4. Cyanuric Acid (Stabilizer)

The “balance” is achieved only by balancing all factors together.

Ideal Pool Test Ranges:

Free Chlorine	1.0 - 3.0
Total Chlorine	1.0 - 3.0
Combined Chlorine	0.0 - 0.2
pH	7.4 – 7.6
Calcium Hardness	200-300 ppm
Total Alkalinity	80 – 125 ppm
Cyanuric Acid (Stabilizer)	30-70 ppm
Salt (for Salt Water Pools)	2700-3200 ppm

pH Scale

0		7.4		14
Corrosion Zone	Acidic	Comfort Zone	Alkaline	Scaling Zone

Chlorine and bromine work best in water that is properly balanced. Balanced water is also more comfortable for swimmers and safer on equipment. pH is the primary factor in balanced water.

What the Pool Owner wants to know about pH.

A typical pool owner only wants to know things that affect them. So what are the features of water with a proper pH? What are the benefits of these pH features?

- Swimmers are comfortable
- Water remains clear
- The pool equipment and surface last longer and perform better
- The sanitizers in the water work more efficiently

LOW pH

Faster chlorine loss
Chloramines form
Uncomfortable water, eye irritation
Liner wrinkling, damage to equipment

HIGH Ph

Poor chlorine efficiency
Clouds water
Uncomfortable water, eye irritation
Scale formation on surfaces and equipment

pH is constantly changing as everything that comes into contact or is added to the water changes the pH. This includes rain, fill water, bathers, and pool chemicals.

Weekly Maintenance:

It is good practice to test the pool water with a traditional drop test kit or strips every other day or so, depending on the usage. This will give you a good idea of where your chlorine and pH levels are at. As long as you keep your chlorine and pH levels at the recommended levels there is no need to have your water chemically tested more than once every two weeks. After time pool owners get to know their pool and become accustomed to the feel of the water. If the water is uncomfortable to swim in, have it tested. If it feels right and the water is clear, everything should be fine.

Sanitizer

Keeping available chlorine in the pool is necessary to keep the pool sanitized. This is traditionally done by stabilized chlorine sticks placed into a skimmer basket if there is no salt generator present. Free chlorine is easily dissipated by UV rays so manufacturers add cyanuric acid (stabilizer) to the sticks to help combat this. Stabilizer acts as a sun block for the pool to prevent UV rays from evaporating the chlorine.

Shock

When the free chlorine level and the total chlorine level have a difference greater than 0.2 ppm it is time to super chlorinate or shock your pool. Shocking the pool oxidizes chloramines (dirty chlorine) out of the pool. It is recommended to shock your pool once a week. This can be done using a granular shock bought from your pool specialist, or if you have a salt generator by switching the mode to Super Chlorinate for 24 hours, then switching it back to Auto when super chlorinate cycle is done.

Balancing

It is important to watch your pH level and other parameter levels in your water. Keeping levels in recommended ranges increases bather comfort and chemical efficiency. Bringing a water sample in every two weeks into your pool specialist is a good way to check the water chemistry.

Algaecides

Using algaecides on a weekly basis is always necessary. There are a lot of pools that never use algaecides except during openings and closing. It is a good idea to add an algaecide at the spring opening to help the water stay clear until chlorine levels increase.

Salt Water Pools:

An alternative to using chlorine pucks to keep free chlorine levels within range is converting your pool to salt water. The salt in the water gets converted into chlorine as it passes through the salt generator. This keeps free chlorine levels consistently within range and takes less effort. Salt water is actually easier to keep balanced as well because you are not adding additional chemicals to the pool that have their own pH (like the stabilized chlorine pucks and shock). As well as being much cheaper to run your pool, salt water also increases bather comfort and peace of mind.

