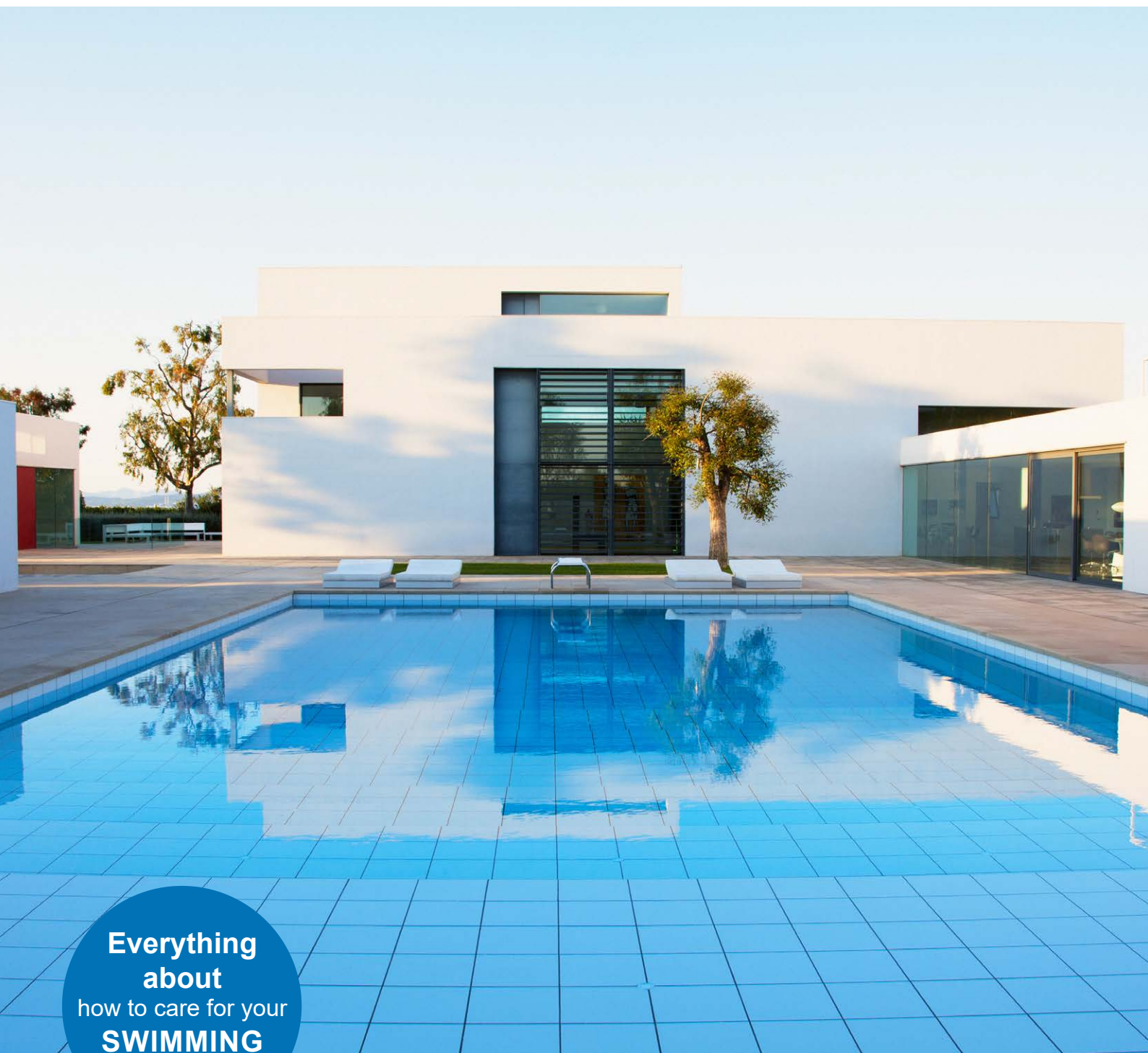


The pool guide

Are you having thoughts about water quality, maintenance, springtime start up, and winter closure?



Everything
about
how to care for your
**SWIMMING
POOL**



Products from Pahlén Pool System
for a trouble-free pool ownership.

For more information: www.pahlen.com

Pahlén 

..... Congratulations on your swimming pool. It will bring you and your family lots of joy and relaxing moments.



We have learned a lot over 40 years and we are more than happy to share.

..... Pahlén guides you through water quality, maintenance, winter closure, springtime start up, filtration, chemistry, and lots more!

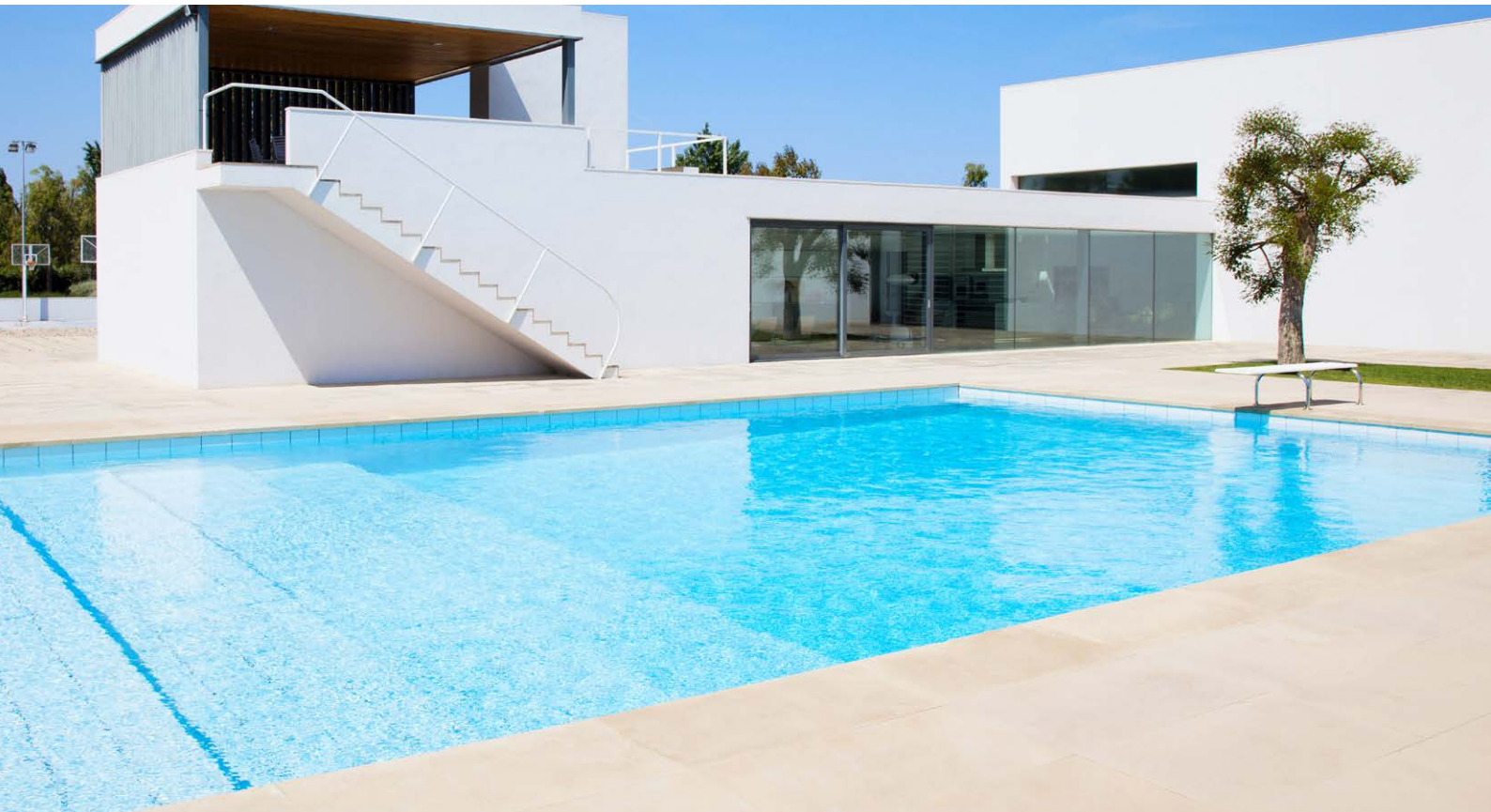
Pahlén has developed a **complete** care program for your pool, so that **you** as a pool **owner** should always have **crystal** clear pool **water** with **simplicity**.



This **guide** is **designed** for you as the pool **owner**, and **describes** the pool's **function** and how to **manage** your pool in order to get the most **pleasure** out of your **swimming pool**.



For you to be able to fully enjoy your pool, it is important that your water has the correct values. Then your water will be crystal clear and you can take pleasure in your pool!



Four simple steps to crystal clear pool water

■ Cleaning and vacuuming

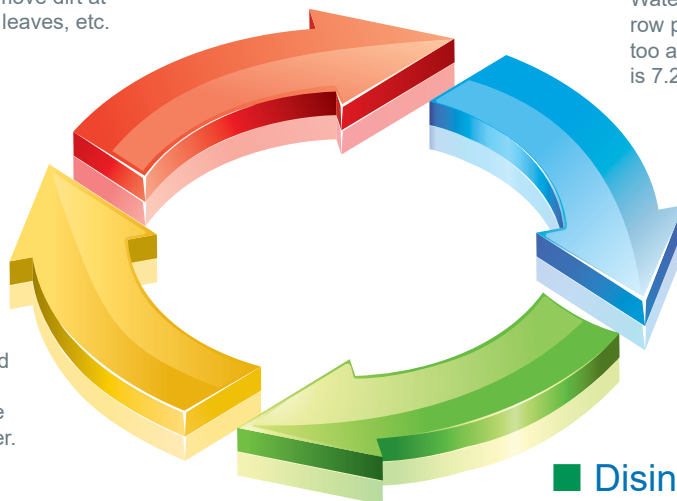
Grease detergents that effectively remove dirt at the waterline and the removal of dirt, leaves, etc.

■ pH regulation

Water disinfectants work best within a narrow pH range. The water should be neither too acid nor too alkaline. Optimal pH value is 7.2-7.6.

■ Flocculation

Flocculants are clarifying agents used to gather suspended particles that sink to the bottom of the pool and are removed by filtration via the sand filter.



■ Disinfection

The pool water is disinfected with chlorine to eliminate organisms such as bacteria, algae and fungi. Pool chemicals "burn out" impurities and make the water glistening and healthy.

Pahlén Pool System

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Pahlén Pool System



Two ways of owning a pool.

Either, you take a chance that all handymen will come as promised, that the various parts of the pool package fit together and that you yourself can jump in and fix things when needed.

Or, you choose a Pahlén system from a certified dealer.

A complete package of Swedish-developed quality equipment with installation, service and maintenance. It comes with a guarantee. That is to say: The trouble-free way to own a pool.



Pahlén Pool System is supplied in the form of complete circulation systems with efficient cleaning, heating and lighting for the most common pool sizes. They are sold in basic and premium versions, with or without various options.



Dare to invest in quality and good equipment!

A swimming pool is a long-term investment and materials such as stainless steel and bronze are your obvious choices in pool equipment and pumps.



With The Pahlén Pool System we offer overall solutions in premium design:

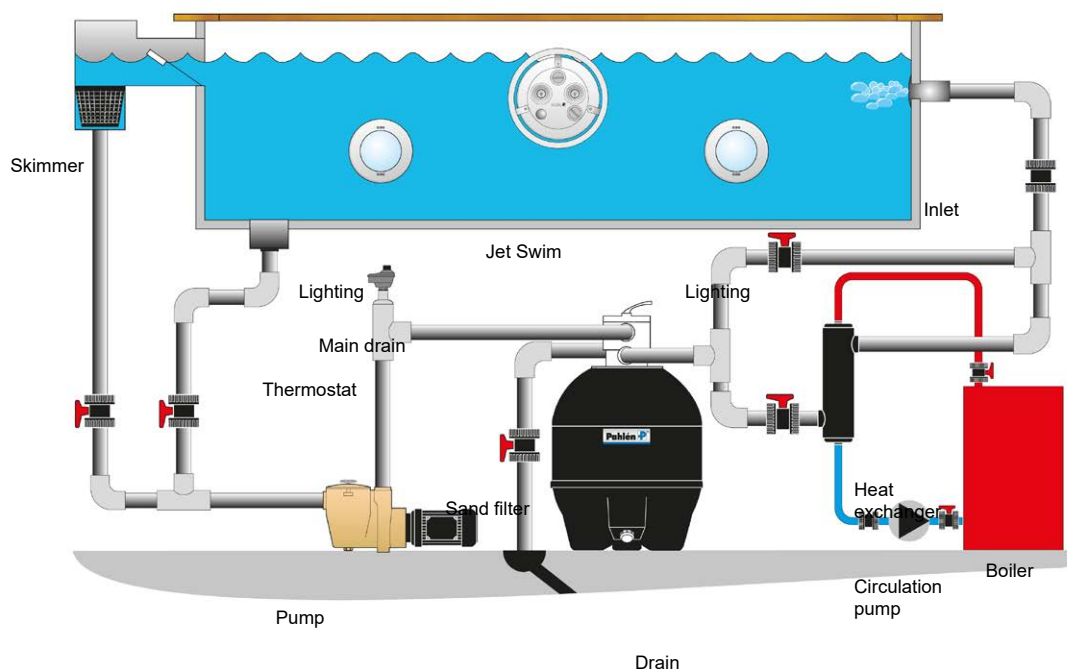
- Pool equipment in acid-proof stainless steel
- Circulation pump made of bronze
- Sand filter in fiberglass reinforced polyester
- Heating products such as heat pumps, electric heaters and heat exchangers made of stainless steel or titanium
- Lighting in acid-proof stainless steel
- Measuring and dosing equipment MiniMaster
- Chlorine reduction with Auto-UV titan
- Other choice of options like Jet Swim, pool covers, pool care etc.

Contact one of our retail dealers who will offer you a complete swimming pool with pool frame, liner and the Pahlén Pool System. Choose installation, starting up, maintenance training, and water quality control etc.

The trouble-free way to own a swimming pool.

A safe choice. Choose a Pahlén retailer who is qualified with extensive experience and who will still be around when you need future service. Choose Swedish made quality products from Pahlén. We have existed for more than 40 years and we build our business long term for a safe pool ownership. Welcome to the family!

There are mainly four **heat sources** for **heating** the pool; heat exchanger, heat pump, electric heater and solar panels. Here we show **installation examples** of the three most **common** sources.



Installation example with heat exchanger Maxi-Flo.

Pahlén supplies heat exchangers with capacity from 13 - 120kW in a wide range of models that suit all types of installations.



Maxi-Flo



Hi-Flo titanium

Heat exchangers for all types of pools.

Pahlén heat exchangers with cross flow operation produce high output and have excellent heat transfer capability.

Both are cross flow models, that is, the hot medium flows in the opposite direction to the cold medium, which gives a maximum output.

All the models can be installed and connected to electric, firewood, pellet or oil-fired boilers, and to a heat pump and solar panel systems.

Made of titanium or AISI 316L acid-proof stainless steel. Titanium is ideal for swimming pools with salt water or where a salt generator/chlorinator is used.



Products from Pahlén Pool System for a trouble-free pool ownership.

For more information: www.pahlen.com



Installation example with electric heater compact.

Pahlén manufactures electric heaters for spas, swimming pools and large adventure pools. Capacity range is from 1.5 - 72kW.



Electric heater compact is available in acid-proof stainless steel with heating elements of Incoloy 825, or titanium with heating elements of Nic-Tech. Suitable for all types of pools.



Electric heater made of thermoplastic with heating element of Incoloy 825 or titanium. Suitable for saltwater installations.

Pahlén's electric heaters heat the water easily and effectively.

An electric heater is easy to connect to the existing electrical power-mains and provides full power round the clock. The water from the swimming pool's circulation flows through the heater and is heated by the heating element.

The heaters are compact and can be installed in all types of pool or spa. The materials used are AISI 316L acid-proof stainless steel, titanium and thermoplastic.



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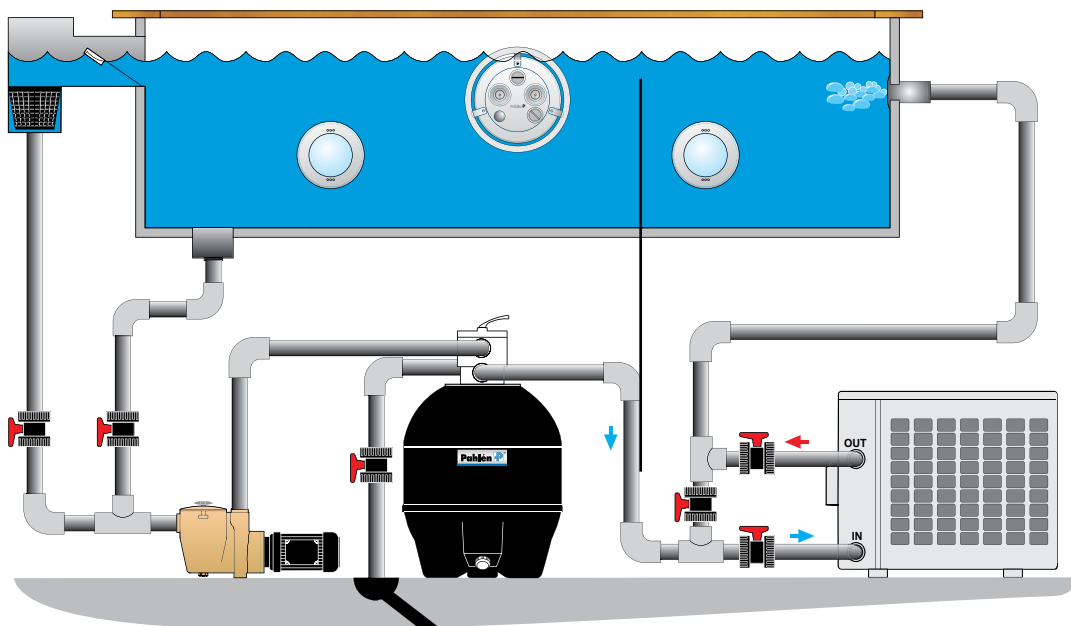
PVP Inverter

Wide temperature range with a superior energy efficiency. The inverter technique adjusts the capacity of the heat pump according to the pool and gives a very low heating cost.

Low noise emissions and starting currents. 5 year warranty for compressor and heat exchanger.



Latest inverter technology heat pump with superior energy efficiency and quiet operation.



A well-insulated pool cover is important for both safety and for reduced heating costs.

Always cover the pool when it is not in use, especially at night. About 70% of the heat is dissipated via the pool's water surface. Covering the pool reduces the heat pump's operating time, which leads to cheaper operating costs.

A good solid pool cover with optimal isolation function can lower your heating costs with up to approximately 60% compared to a pool without any coverage.

Pahlén has pool covers for all types of pools.





The children love to play in the pool with the invigorating bubbling currents, which also can be adjusted in strength.

Transform your pool into an olympic sized pool with the help of an exclusive and powerful counter current unit. Install a Jet Swim.

Jet Swim

If you are looking for extra training, a Jet Swim is the perfect alternative. It will transform your pool into an olympic sized pool, where you can swim against the jet streams without having to turn. The resistance is easily adjusted for individual needs.



Products from Pahlén Pool System
for a trouble-free pool ownership.

For more information: www.pahlen.com

Tip! Before start up

1. Make sure that you have chemicals at home. If you have left over chemicals from last year, use these first.
2. Make sure that your test kit/measuring instruments are working and that you have test tablets at home. It is important to have a good instrument for accurate measurements.

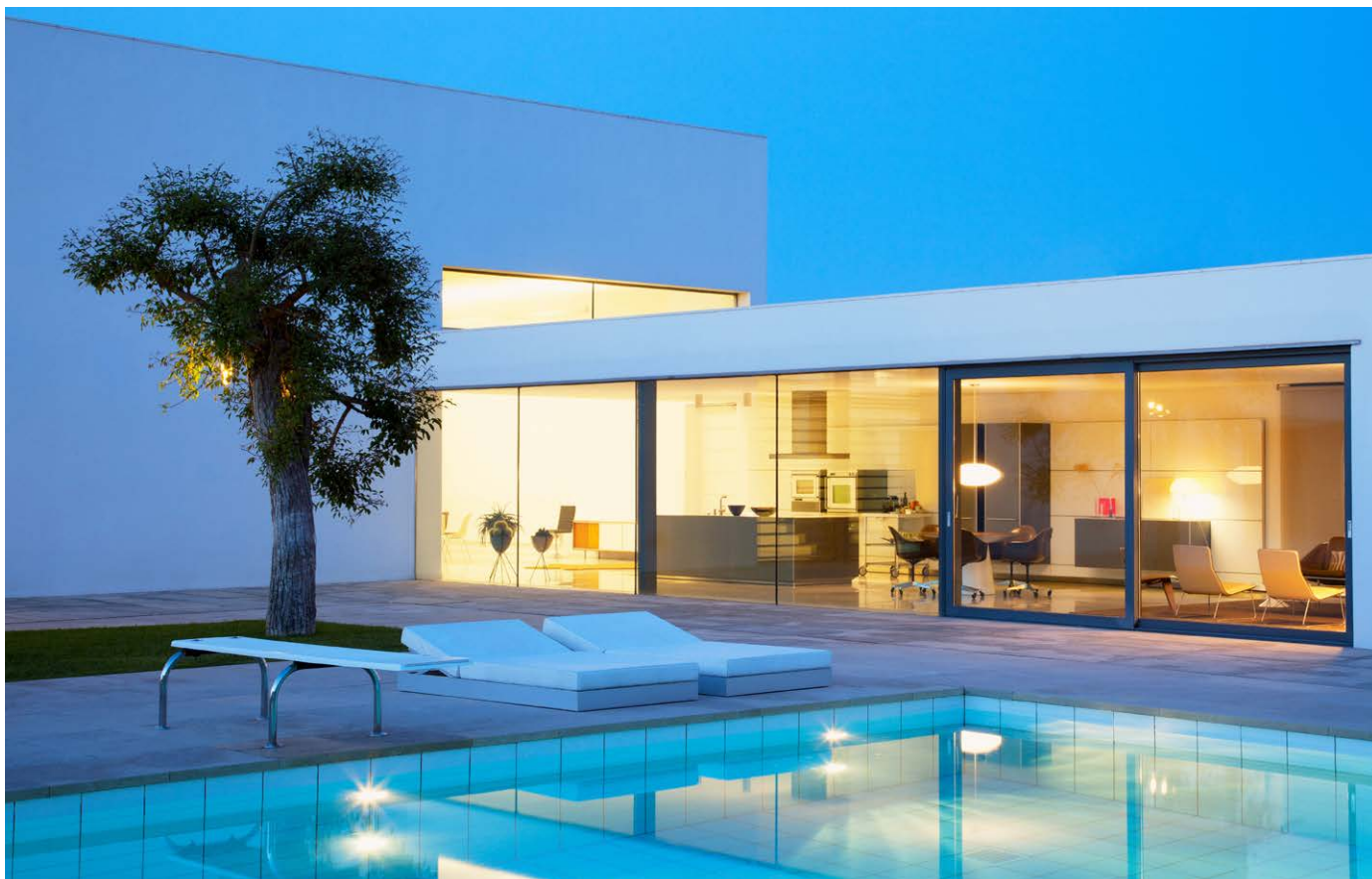
Pahlén does not recommend test strips, as it is difficult to determine the correct values.

3. Make sure that you have all the drain plugs that you removed when closing the pool for the winter. Without these, the pool cannot be started.

A TIP! A good place to store these things is in the pumps filter basket.



For **springtime start up** or a **newly filled** pool, it is **important** that the **pool** is started in the **right** way. **Follow** this **guide** and you will be able to **enjoy** your **pool** and have a **successful** bathing season.



There are many different types of pools. All pools are unique and conditions may vary. However, there are a few basic instructions that can be followed for all types of pools. This guide describes a pool with chlorinated water. For you that use Baquacil to clean the water, see your dealer's instructions.

Important steps to follow when starting up the pool.

1. When starting in the spring, re-install pool components removed for the winter, close drain valves and refit drain plugs. Empty the skimmers filter basket from debris.
2. Fill the pool until the water level is in the centre of the skimmer opening.
3. Fill the pumps filter basket housing with water.

NOTE! Never start the pump without water as this might damage the shaft seal.

4. Open the valves of the suction-, return- and drain outlets.
5. Turn the lever on the valve to BACKWASH. Press down handle for easier rotation.
6. Start the pump. When the pump has evacuated the air out of the suction line (after about 1-3 minutes) and water starts passing through the sight glass on the valve drain outlet, rinse for about 1-2 minutes or until the water in the sight glass is clear.

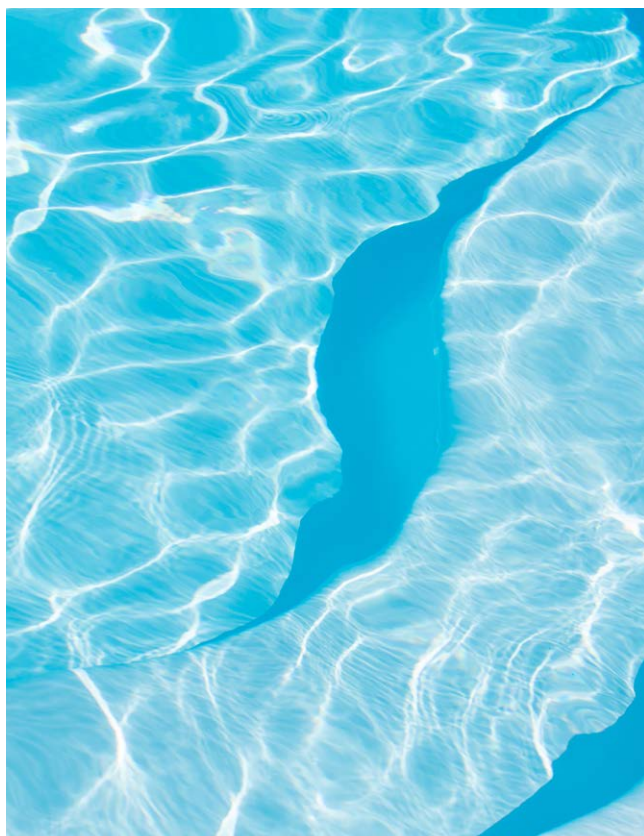
NOTE! Any electric heater must be off. Stop the pump.

7. Turn the lever to RINSE, start the pump and rinse for about 15-30 seconds. Stop the pump and turn the lever to FILTER. This is the normal operating position. Then close the drain outlet valve and start the pump

NOTE! Always stop the pump before moving the lever of the valve.

8. Check the pH and adjust it to 7.2 to 7.6. Shock chlorinate via the skimmer to a chlorine level of 2 ppm (mg/l). With repeated chlorine dosing, wait three hours between tests to give the chlorine time to dissolve. After 24 hours, brush the bottom and sides of the pool clean and vacuum the bottom of the pool.

Time for the first swim of the year! Pahlén wishes you a pleasant bathing season.



Autocheck 15

Autocheck 15 is a very simple but effective digital measuring instrument. Autocheck 15 helps you test your values quickly and accurately. Autocheck 15 measures with great accuracy the water's chlorine content (free and total), alkalinity, pH and cyanuric acid photometrically.

It is **important** that the pools **circulation system** works as it should, in order for you to be able to **enjoy** your **pool** and have many **pleasant moments** of bathing.

Filters

The pool's mechanical cleaning takes place via the pool filter, which filters out particles down to about 25 µm (thousandths of a millimetre). The central valve on the filter tank controls the water flow through the filter.

The filter is 2/3 filled with filter sand, grain size 0.6-0.8 mm. As the dirt accumulates in the filter, the back-pressure increases and is read off in the central valve's pressure gauge. The sand filter is backwashed once pressure increases by about 0.2 bars after the previous backwashing. This means reversing the flow through the filter so that the dirt is lifted from the sand and flushed down the drain.

The filter sand should be replaced after 6-8 years.



Pumps

Pool pumps create suction in the skimmer and then push the water through the pool filter, through the pool heater and then back into the pool via the pool inlets. The pumps pre-filter strainer basket must be emptied regularly, e.g. during backwashing.

Before start, make sure that the pump is filled with water to avoid damage to the pumps shaft seal. If the pump is located above the pool surface, water flows back to the pool when the pump's is stopped. When the pump then starts, it may take a while before the pump evacuates all the air in the suction pipe and start pumping water.

This can be remedied by closing the valve before closing the pump and then immediately turning off the pump. This retains the water in the suction pipe.



Products from Pahlén Pool System
for a trouble-free pool ownership.

For more information: www.pahlen.com

Skimmer

Water leaves the pool via a skimmer, equipped with a flap, which adjusts to the water surface.

This makes the flow rate at the surface increase and suck particles on the water surface into the skimmer.

The particles are collected in a filter basket, which must be emptied regularly, about once a week. If your pool has a main drain the flow must be controlled so that about 30% of the water is taken from the bottom and about 70% from the skimmer.



Skimmer in acid proof stainless steel for liner pool.



Classic inlet
in acid proof stainless steel

Inlet

The water returns to the pool cleaned and heated via the inlets. These should be directed slightly upwards to facilitate cleaning of the surface water.



Sand filters in fiberglass reinforced polyester.

Heating

After the filter, a heater that heats the pool water to a pleasant temperature is placed. An electric heater, heat exchanger connected to the building's boiler, solar panels or heat pumps, can heat the water. Adjust the thermostat to the desired pool temperature.



Heat Exchangers connects to existing heat source as a heat pump or solar panels.



Electric heater Aqua HL, with operational status indicator and digital pool temperature control



Electric spa heater, a small and compact heater for spa pools and small swimming pools



Products from Pahlén Pool System for a trouble-free pool ownership.

For more information: www.pahlen.com

The pH is a measurement of the acidity of the water.

The pH scale goes from 0 to 14, where pH 7 is neutral. If the pH is above 7, the water is basic, if it is below 7 the water is acid. The optimum pH for pool water is 7,2 - 7,6.

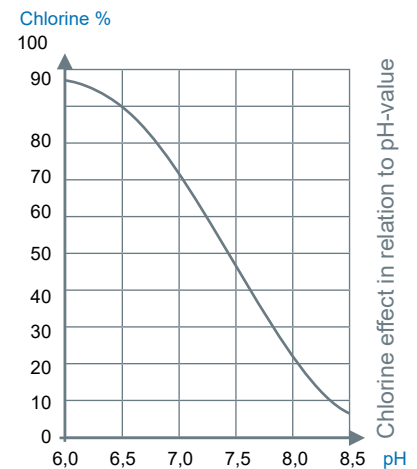
A low pH gives:

- Aggressive water, which damages the mechanical components of the pool
- Irritations of the eyes and mucous membranes
- Damage to the pool liner

A high pH gives:

- Poorer chlorine disinfection
- Skin irritation
- Lime precipitation
- Cloudiness

The guideline pH figure is 7.2 – 7.6. To lower the pH, use sodium bisulphate, to raise it use sodium carbonate.



Chlorine compounds; organic and inorganic chlorine.

Organic chlorine is trichlorisocyanuric acid (for weekly chlorination) and dichlorisocyanuric acid (dissolves rapidly and is suitable for small pools). Inorganic chlorine is calcium hypochlorite (for daily and shock chlorination) and sodium hypochlorite (liquid).

Common for organic and inorganic is that when a pool is dosed with either organic or inorganic chlorine it is free chlorine that attacks bacteria and contaminants. As the chlorine acts it is converted into combined chlorine. Combined chlorine (also known as chloramines) is ineffective, smells of chlorine and may cause irritation of the eyes and mucous membranes. To reduce the combined chlorine, dilute with fresh main water. The high chlorine content that forms temporarily on shock chlorination disappears quite quickly in an outdoor pool, but can also be lowered with chlorine reduction compounds.

Chlorine is continuously consumed in the pool and different factors determine the chlorine consumption, including bathing frequency, water temperature, and sunlight and pool size. A test kit is used to measure the chlorine content. Most kits measure free chlorine, but to measure the combined chlorine you need to measure total chlorine. Total chlorine is the sum of free and combined chlorine.

If organic chlorine (weekly chlorination) is used, cyanuric acid accumulates in the pool. Where the cyanuric acid content is above 100 ppm (mg/l), chlorine blocking may occur, making the chlorine ineffective. Cyanuric acid can be removed by adding water from the mains supply.

Cyanuric acid acts as a chlorine stabilizer, preventing the sunlight from breaking down the chlorine, for example. It is therefore advisable for outdoor pools to have a cyanuric acid level of 10-20 ppm (mg/l).

Guideline values for pH 7,4 and a pool temperature up to 35°C:

Free chlorine:	0,5-1,6 ppm (mg/l)
Combined chlorine:	0-0,4 ppm (mg/l)
Total chlorine:	Max 2,0 ppm (mg/l)
Cyanuric acid:	30-50 ppm (mg/l)
Salinity:	Max 250 ppm (mg/l)



Measuring instrument.

The DPD test kit is available in a manual version, in which the test water is compared with a colour scale, and a photometric version, in which the value is displayed digitally to two decimal places.

Every test kit is supplied with test tablets as follows:

- DPD no. 1 measures free chlorine/ bromine
- DPD no. 3 measures total chlorine
- Phenol red measures pH

Where the chlorine level is above 6 ppm (mg/l) the test water is bleached. The result may then indicate that there is no chlorine in the pool. If you suspect this, you can dilute the test water with 50% ordinary tap water and 50% pool water. Multiply the result by 2.

Avoid touching the test tablets with your fingers as this may cause incorrect results.

A test kit is used to check the free chlorine and pH of the pool. Some test kits also measure total chlorine, total alkalinity, and calcium hardness and cyanuric acid.



DPD-test kit for manual reading.



Autocheck 15, test kit with photometric reading.



Autocheck IIIi, test kit with photometric reading.

To obtain accurate readings, it is important to have a good measuring instrument.



With the **Auto-UV** you can **reduce** your pool's **chlorine content** up to **70%**.



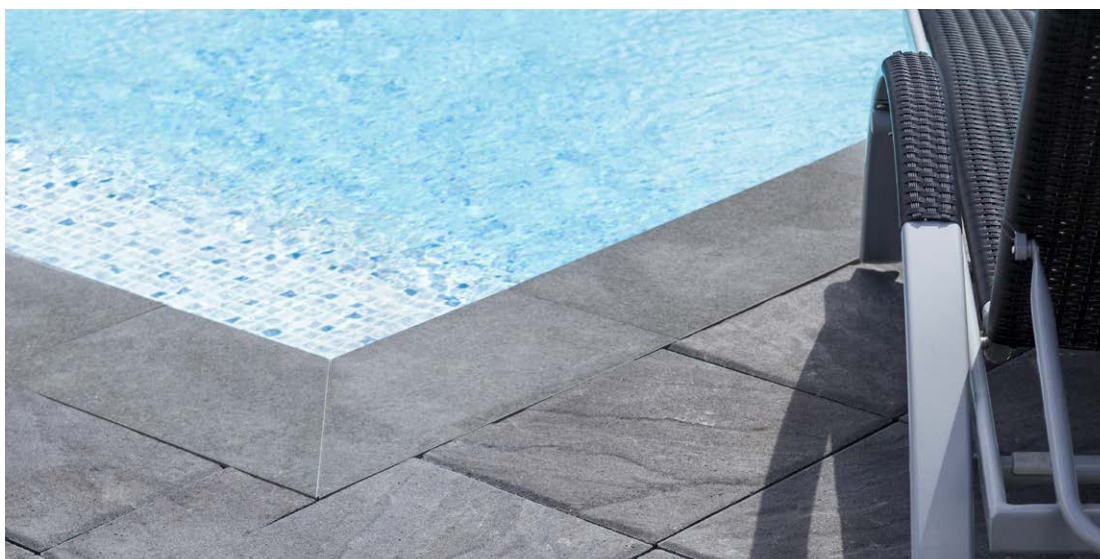
Safe and efficient disinfection of your pool water.

The Pahlén Auto-UV titanium is designed for disinfection of water in pools and spas. With the Auto-UV titanium you can reduce the chlorine content to approx. 0.5ppm. Guideline value without UV is 1.0-1.5 ppm. The result is a more pleasant bathing environment without irritations like red eyes, the smell of chlorine or the risk of allergies.

Optimal neutralization of bacteria, viruses and algae.

The UV lamp produces short-wave ultraviolet UVC radiation with a 254 nm wavelength. This wavelength is optimal for neutralizing bacteria, viruses and algae.

As a result your pool water is crystal-clear and pleasant. When the Auto-UV is in operation a blue indicator at the top of the unit shows this.



Reduces the occurrence of smell of chlorine, irritated eyes and mucous membranes.



Products from Pahlén Pool System for a trouble-free pool ownership.

For more information: www.pahlen.com

Measures and doses chemicals automatically. Provides optimal water quality with automatic monitoring.



MiniMaster

pH and chlorine. MiniMaster offers you continuous monitoring and automatic dosing (disinfection) of the water quality in the same way as in public baths and large hotel pools.

With a MiniMaster installed in your pool, you need never again worry about your water quality – because MiniMaster handles it all automatically.

Suits all types of pools

MiniMaster is available in several versions to suit all types of pools. The most advanced version of MiniMaster does virtually the whole job for you.

A MiniMaster equipped with all the options is a complete measuring and dosing unit. The water's pH level is measured with the help of pH electrodes and chlorine levels are checked using a chlorine electrode. Clear and easy-to-see LED show the status of your water quality.

A fully equipped MiniMaster uses dosing pumps for liquid chlorine and liquid acid, alt. CO₂ gas for pH adjustment.



pH-MiniDos gives you a safe and stable regulation of your pH-value with CO₂

pH-MiniDos is a control unit that is easily operated via MiniMaster. The MiniMaster measures the water's pH and sends signals to the pH-MiniDos, which with high precision doses the exact amount of CO₂ needed for the pool.

High safety with many advantages

With the pH-MiniDos, you can safely balance the pH value with carbon dioxide. One of the main advantages is that the handling of the CO₂ gas bottle is much easier than handling liquid acid.

You also get less maintenance and more time for swimming.



Products from Pahlén Pool System for a trouble-free pool ownership.

For more information: www.pahlen.com

Many believe that there is a lot of work taking care of a pool, but manage the pools circulation system and chemical purification described in this guide, and you can with relatively little maintenance look forward to enjoyable baths in a pool with clean and clear water.

Chemical cleaning

Mainly the pool filter removes the visible dirt. The invisible dirt is not just bacteria that can multiply very quickly and cause problems, but also algae and fungi of various kinds that spread to the pool, where they find a favourable habitat. They are usually fought and controlled with the help of chemicals.

pH	Min	Max	Tested
	7,2	7,6	1 time/week
Free chlorine	Min	Max	Tested
	0,5 ppm (mg/l)	1,6 ppm (mg/l)	1 time/week

Remember:

- Pool water should be shock chlorinated every 2-4 weeks, depending on bath load.
- Always dose chemicals in the evening after the last bath.
- Do not mix chemicals with each other, nor different types of chlorine.



The ideal pH range for the pool and the human body is between 7.2 and 7.6.

1. The way to clear water starts with pH regulation and disinfection.

To obtain optimal levels for pH value, a pH adjustment is needed. A pH-raising or pH-lowering agent easiest achieves this. Disinfecting agents work best within a narrow pH range. The water should be neither too acid nor too alkaline.

Dosage: Dose a small amount of pH-minus / pH-plus to lower / raise the pH by 0.1 pH units.

Handling: pH-minus/pH-plus granulates are dissolved in a bucket of water. Then, add the solution gently into the skimmer or along the edge of the pool. Measure the pH at regular intervals. Do not add the solution near metal parts. Allow the water to circulate approx. 12h and then measure again, adjust further if necessary. Never mix this product with other chemicals! Always read the label and product information on the packaging.

■ 2. Disinfection

Pool water is disinfected by chlorine to eliminate organisms such as bacteria, algae and fungi, and make the water glistening and fresh. The most widely used and effective agents are those that contain chlorine or bromine. Chlorine is available in different types for different purposes: calcium chloride, day chlorine, calcium chlorine, shock chlorine or weekly chlorine (multi chlorine).

Calcium hypochlorite daily chlorination.

Daily chlorination is the most effective way to disinfect pool water. Calcium hypochlorite in small tablets dissolve slowly and releases chlorine into the pool water.

Dosage: For seasonal start up, maintenance dosing or shock chlorination, see instructions on the package.

Handling: Place the tablets in the filter basket of the skimmer or in a chlorine dispenser. Always read the label and product information on the package.

⋮ Daily chlorination is a highly effective disinfection of the pool water!



Calcium hypochlorite, shock chlorination

Shock chlorination is the same as daily chlorination but in granular form. The granules dissolve quickly to give the pool water a rapid and powerful chlorine boost. Daily as well as shock chlorination raise the pH of the water.

Dosage: At the start of the season calcium chlorine / shock chlorine granules are added. During the season, if high bath load and / or high temperature, dosage should be increased. See instructions on the package.

Handling: Dissolve the correct amount of granulates in a bucket of warm water. Add the water before the chemicals. Then, add the solution gently into the skimmer or along the edge of the pool. Always read the label and product information on the package.

⋮ Balance the pH level with pH-lowering agents after each shock chlorination.

Weekly chlorination, multi chlorine.

For weekly chlorination use a product containing slow-acting trichlorisocyanuric acid. The tablets are placed in the skimmer or in a dispenser. Multi chlorine also contains flocculants and algaecide. When using weekly chlorination, regular shock chlorination with calcium hypochlorite is recommended.

Dosage: Weekly chlorine must be used with restraint. Pahlén recommends that 70% of the chlorination occurs with daily chlorine/calcium chloride.

Handling: Place the tablet in the skimmer or in a chlorine dispenser. The chlorine level should be checked every third day. The pool water should be shock treated every 2-4 weeks, depending on bath load. Always read the label and product information on the package.

Weekly chlorination **lowers** the **pH** of the water, which can be **balanced** by **shock chlorination**.



■ 3. Flocculation

Flocculants are used with advantage when the water is cloudy. Flocculant is a clarifying agent that constricts the small particles in the water to the flocks, which sink to the bottom or stick to the sand filter. Flocculant is available as both liquid and tablets.

Flocculant in liquid form is poured directly into the pool. Tablets (bag) is placed in the skimmer. Should the water still be cloudy after that, it is because of the organic pollutants. Use calcium chlorine / shock chlorine granules to shock chlorinate.

Backwash the sand filter 24 hours after flocculation.

Always read the label and product information on the package.

Only pools with a **sand filter** can be **flocked**.

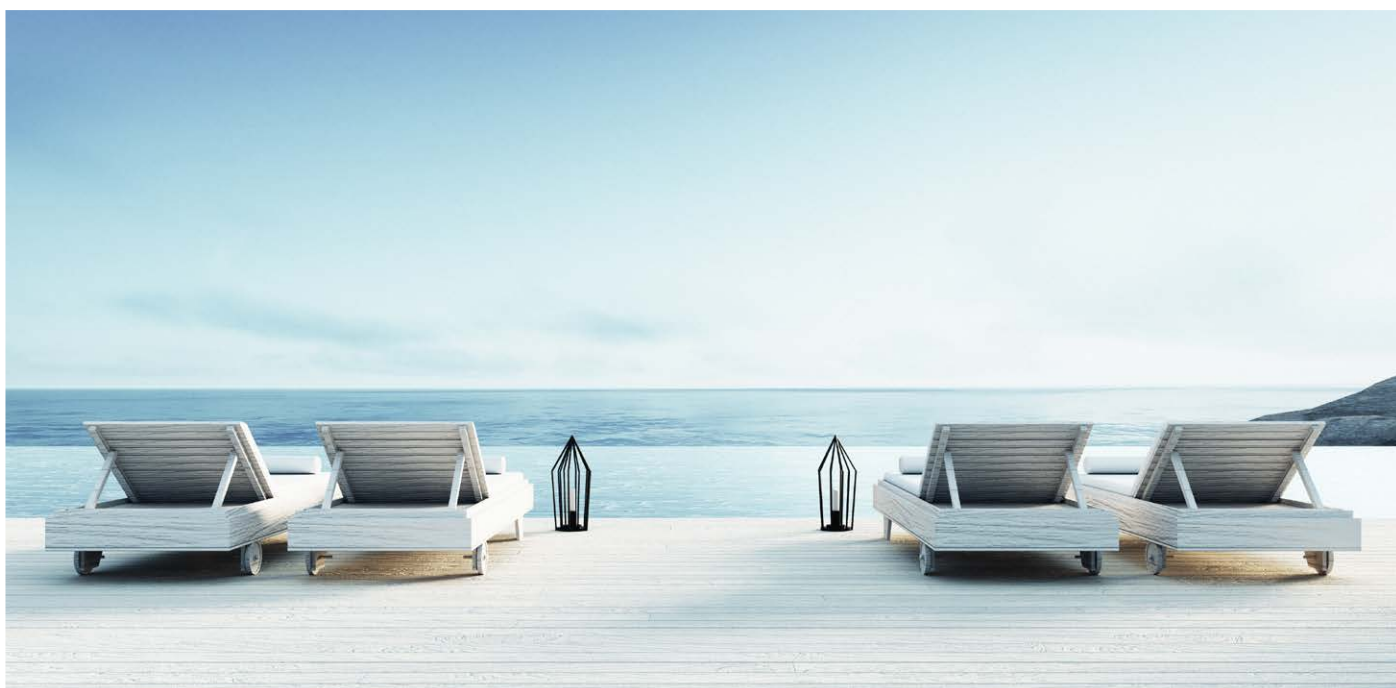
■ 4. Cleaning and vacuuming

Cleaning

Grease detergents that effectively remove dirt at the waterline. You prevent coatings by cleaning your waterline from time to time.

Handling: Depending on the degree of dirt, use detergent concentrated or diluted 1:1. Use a soft sponge or cloth. Some stains can be treated more than others. Use only detergents suitable for swimming pools.

NOTE! Do not mix chemicals with each other, nor different types of chlorine. Chemicals must be used safely. Always read the label and product information before use.



..... Treat yourself to some **comfort** with an **automatic** pool robot. Whilst it does all
..... the **work** for **you**, you can **enjoy** the **sun**!

Vacuum cleaning

Attach the vacuum head to the telescopic handle and attach the vacuum hose to the vacuum head.

Place the vacuum head on the bottom of the pool and feed the vacuum hose down under the surface of the water until the hose is filled with water and emptied of air.

Bring the other end of the hose to the skimmer. Fix the Skimvac over the filter basket and connect the vacuum hose.

If the suction at the vacuum head gets weaker, empty the skimmer filter basket. If the pool is very dirty, you may also need to empty the filter basket in the pump and backwash the filter.

After finished vacuum cleaning, switch off the pump and disconnect the Skimvac from the filter basket. Backwash the filter.



Vacuum head with side brush



Automatic pool robot Vortex 3

Halobrom, tablets.

Halobrom is in many ways similar to chlorine, but has the following advantages:

- Halobrom can be used alternately with or at the same time as chlorine.
- Halobrom retains its full disinfectant power within a significantly wider pH range than the chlorine products
- The typical chemical smell is non-existent. It is recommended for therapy baths, whirlpool baths and for individuals who are sensitive to chlorine.

Halobrom tablets can be placed in the skimmer or in a dispenser. The bromine demand depends entirely on how the pool is used. Dosing must take account of temperature and user frequency.

The bromine content must be measured regularly with a testing kit.

	Min	Max	Tested
Bromine	2 ppm (mg)	4 ppm (mg)	1 time/week

Bromine, an alternative for chlorine sensitive persons!



Marine, an exclusive collection of inlet, skimmer and lighting

Gives your swimming pool an exclusive look. Lighting, skimmer and inlet in a polished stainless steel front. A stylish and trendy collection to suit both new and existing pools. Lights are available in both LED and halogen. Suitable for all pool types and can be mounted on existing Pahlén original parts. Made of stainless steel.



The balance of the pool water is determined on the basis of simultaneous measurement of temperature, pH, calcium hardness and total alkalinity.

Calculation of the water balance gives an idea of whether the pool water is aggressive or whether it will cause limescale deposits.

An index value above +0.5 gives

- Lime-precipitating water.
- Cloudy water and lime scale deposits on the walls, pipes etc. of the pool

An index value below -0.5 gives

- Aggressive water.
- Irritation of the eyes and mucous membranes, as well as attacking the mechanical equipment of the pool.

The index value is calculated with this formula:

Index value = $\text{pH} + \text{TF} + \text{CF} + \text{AF} - 12.1$

pH pH

TF Temperature Factor

CF Calcium hardness Factor

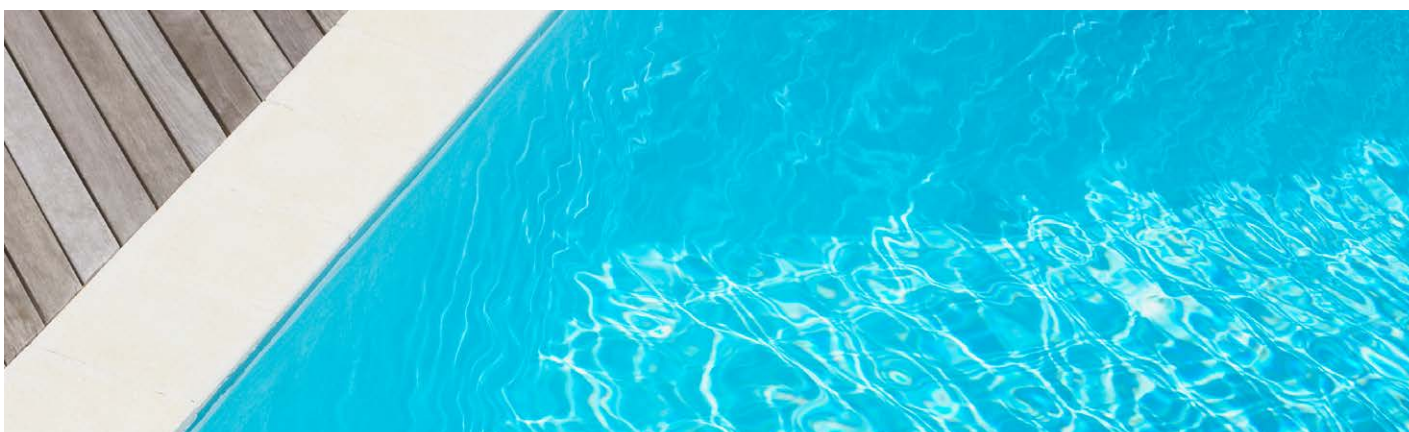
AF Total alkalinity Factor

12,1 A constant

See the table below for the factor for each parameter in the formula.

We recommend the Autocheck IIIi, photometric test kit for determining the water balance. This is in order to obtain an exact value for each parameter in the formula. Contact your dealer for measuring help.

Temperature °C	TF	Calcium hardness mg/l CaCO_3	CF	Total alkalinity mg/l CaCO_3	AF
20	0,52	25	1,00	25	1,40
22	0,56	50	1,30	50	1,70
24	0,6	100	1,60	70	1,86
25	0,62	120	1,68	80	1,92
26	0,64	140	1,76	90	1,96
27	0,66	150	1,80	100	2,00
28	0,68	170	1,84	120	2,08
30	0,72	200	1,90	150	2,20
32	0,76	250	2,00	200	2,30
34	0,8	300	2,10	300	2,50
41	0,9	400	2,20	400	2,60



Guidelines total alkalinity

	Min (mg/l)	Max mg/l)	Tested
Total alkalinity	60 ppm	120 ppm	1 time/ month

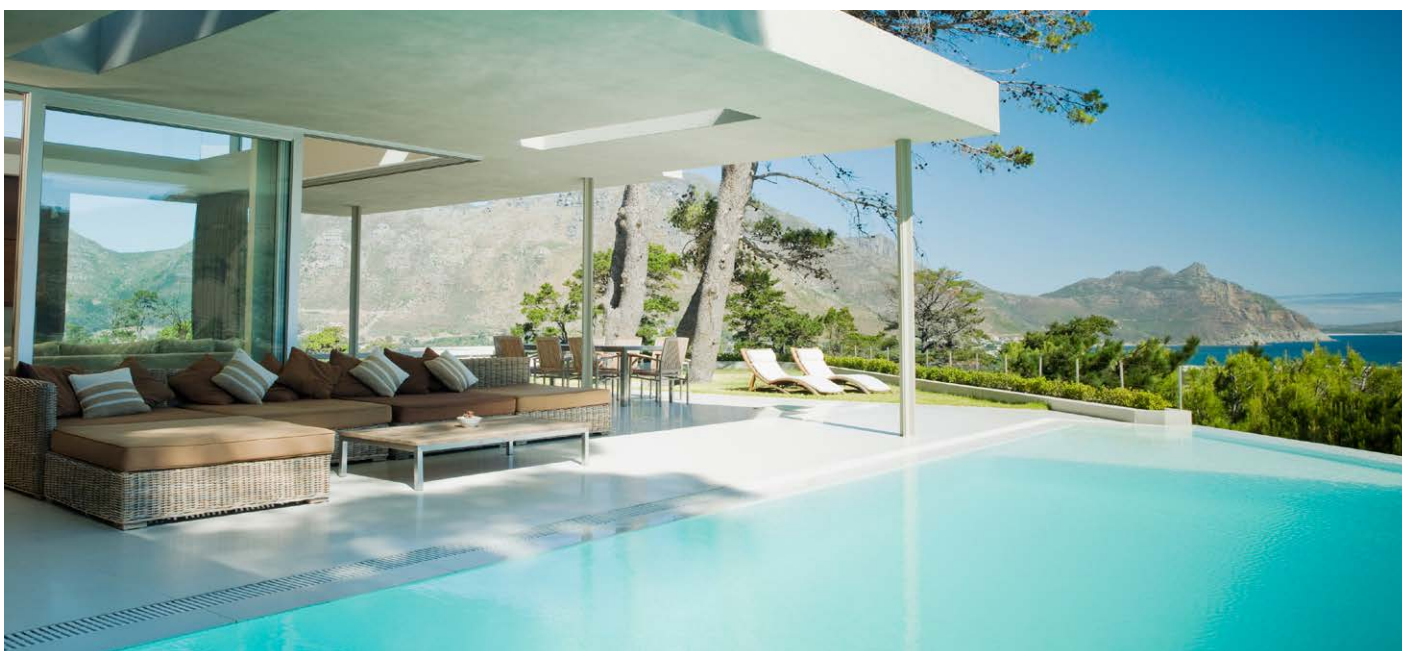
Total alkalinity (TA) Total alkalinity is a measure of the amount of alkaline substances in the water. The guideline for total alkalinity (TA) is approx. 60 - 120 ppm.

A low TA makes the water aggressive and the result can be one or more of the following:

- Rapid pH fluctuations
- Aggressive pool water, for both humans and pool parts
- Red eyes
- Skin irritations

Total alkalinity (TA) is increased with sodium bicarbonate. The TA value is a process that should not be accelerated. Add small amounts sodium bicarbonate every four days until the correct TA and pH value has been reached.

..... **Total alkalinity** represents the waters **buffer capacity** to **resist** changes to the pH level.



A high TA makes the pH difficult to adjust and the result can be one or more of the following:

- pH value difficult to adjust
- Cloudy, murky water
- Lime precipitation
- Red eyes
- Skin irritations

Total alkalinity (TA) is reduced with sodium bisulphate (pH-minus). To reduce the TA is a long process and can take several weeks. Add small amounts sodium bisulphate every four days until the correct TA and pH value has been reached. Contact your pool supplier if the problems continue.

Guidelines calcium hardness

Calcium hardness	Min (mg/l)	Max mg/l)	Tested
	100 ppm	300 ppm	1 time/ month

CH value of less than 100 ppm (mg/l) is described as soft water and draws lime out of, for example, the concrete of cast pools and tile grouting. Water with a CH value above 300 ppm (mg/l) is described as hard water and causes lime to be precipitated.

Low or high CH value makes the water aggressive and the result can be one or more of the following:

- Low value causes disintegration of the concrete
- Low value causes disintegration of the tile grouting
- High value causes limescale on the walls

The calcium hardness can be increased with calcium chloride. The calcium hardness can be reduced by dilution with fresh main water. Divide the dilution in stages in gaps of 4 hours. Test the water again and repeat the process until the desired level is reached.

..... **Calcium hardness (CH)** is a measure of the amount of **lime dissolved** in the **water**.
.....



Backwash the filter

After about 5-10 days, or when the reading of the pressure gauge on the pump side of the filter has increased by about 0.2 bars (20 kPa, 3 psi) since the last backwash, backwash the filter as follows:

- Stop the pump.
- Close the valves on the suction and return lines.
- Open the cover of the pump and empty the filter basket.
- Refit the cover.
- Open the valve to the drain outlet.
- Turn the lever to BACKWASH.
- Open the valves to the suction and return lines.
- Start the pump. Rinse the filter for about 1 to 2 minutes or until the water in the sight glass is clear.
NOTE: Any electric heater must be off.
- Stop the pump.
- Turn the lever to RINSE, start the pump and rinse for about 15-30 seconds. Stop the pump and turn the lever to FILTER. This is the normal operating position
- Close the drain outlet valve and start the pump. Switch on the electric heater if any.

Positions of the backwash valve

FILTRATION	Normal filtering position
BACKWASH	Cleaning the filter sand
RINSE	Stabilizing the filter sand
WASTE	For vacuum cleaning the bottom of the pool directly to drain, or for emptying the pool
CLOSED	Closed
CIRCULATION	Pumping water directly to the pool (no filtering)

In order for your sand filter to work optimally, it is important to clean the filter sand regularly.



Problems with the water?

Here you will find solutions to the most common water problems that can occur in a pool.

Symptoms	Cause	Action
Red eyes or skin irritations	Incorrect pH	Adjust the pH
	High combined chlorine	Dilute with fresh main water
	High free chlorine	Wait a few days or use chlorine reduction compounds
Limescale deposits	pH too high	Adjust with pH lowering agent
	Calcium hardness too high	Determine water balance and adjust
	Total alkalinity too high	
Bleached hair and swimsuits Possible eye irritation	Too much chlorine	Add chlorine reducing agent
	Incorrect test readings	Check the test equipment
Green algae, green water, slippery surfaces, cloudy water Spots of black algae	Not enough chlorine	Adjust the pH, scrub the surfaces with chlorine solution and shock chlorinate
High chlorine consumption	Large numbers of bathers	Shock chlorinate with calcium hypochlorite
	Severe contamination	
	High air and water temperature	
Cloudy water	Signs of algae formation	Shock chlorinate with calcium hypochlorite
	Poor filtering	Check the filter
	pH too high	Adjust with pH lowering agent
Green water	Algae	Shock chlorinate with calcium hypochlorite
	Copper corrosion (pH too low)	Increase the pH with pH-increasing agent
Discolored water Brown Black Blue-green	Iron	1. Adjust the pH
	Manganese	2. Shock chlorinate with calcium hypochlorite
	Copper	3. Flocculate the pool water with flocculants
High smell of Chlorine	High combined chlorine	Dilute with fresh main water and shock chlorinate with calcium hypochlorite
	High cyanuric acid	

How often should the water be tested?

pH	Min	Max	Tested
	7,2	7,6	1 time/week
Chlorine	Min	Max	Tested
	0,5 ppm (mg/l)	1,6 ppm (mg/l)	1 time/week
Bromine	Min	Max	Tested
	2 ppm (mg)	4 ppm (mg)	1 time/week

Guidelines for a good water quality!

Guideline values for pH 7,4 and a pool temperature up to 35°C:

Free chlorine:	0,5-1,6 ppm (mg/l)
Combined chlorine:	0-0,4 ppm (mg/l)
Total chlorine:	Max 2,0 ppm (mg/l)
Cyanuric acid:	30-50 ppm (mg/l)
Salinity:	Max 250 ppm (mg/l)

FAQ.

Here we have collected the answers to some of the frequently asked questions.

Will my pool become chlorine free if I install a salt chlorinator?

No it's just another way of adding chlorine. No manual addition of chlorine needs to be done when production of chlorine is via a salt chlorinator. You still need to measure your chlorine level just as in a normal chlorinated swimming pool. Even salinity need to be kept at a recommended level.

How long will it take to heat the pool?

To warm up a pool takes different amounts of time depending on pool size, weather, temperature, wind conditions and the heating power available, how the pool structure's bottom and walls are insulated as well as if pool cover is used.

An electric heater delivers the rated output marked on the product.

A heat exchanger transfers heat energy from another heat source to the pool. Which heating output it delivers all depends on the water flow and temperature differences between the pool and heating systems. One can never obtain a higher heating effect in the pool than specified output of the heat source.

A pool heat pump uses the energy from the air. The heat pump's effect is often quoted based on the weather and a pool temperature about 25 °C. Low weather temperature and warm pool water reduces the heat pump's rated output with up to 30%. High weather temperature and cold pool water increases the heat pump's rated output with up to 30%.

<div>kW</div> <div>Volume</div>	6	9	12	15	18	24	30	36	45	60	72
25 m ³	87	58	44	35	29	22	17	15	12	9	7
45 m ³	157	105	78	63	52	39	31	26	21	16	13
70 m ³	-	163	122	98	81	61	49	41	33	24	20

The amount of hours in theory it takes to heat up your pool based on volume and the capacity (kW) of the heaters. From 10-28 °C without any deduction of heat loss.

The bigger the pump the better the cleaning?

No, the pump function is to circulate the pool water. The flow is important for your pool to work optimally and a larger pump than necessary does not give better purification. It is important that the pump, filters, skimmers and inlets are dimensioned relatively to each other. Only a larger pump does not give better cleaning, it only increases water flow through the filter, which leads to poorer filtration and higher energy consumption.

Why does it smell of "chlorine"?

When the "free" chlorine reacts with organic matter, it turns into something called "bound" chlorine, and that's when you feel a so-called "chlorine smell".

Does the pool water need to be changed during the season?

No, not as long as the levels for pH, chlorine, total alkalinity, calcium hardness and cyanuric acid are kept within recommended values. Normally only a small amount of water needs to be replaced. New water is normally added to replace the water that is washed away during the regular backwash of the sand filter.

Winter closure

When the bathing season is over and winter is coming up, you need to check your pool and its equipment. Precisely when to do this depends partly on where the pool is geographically located and how the pool is used. Below are some tips on what to do when the bathing season is over. Under certain circumstances the surface of the water must be insulated and circulation must be maintained.

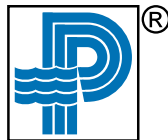
For pools that can withstand freezing:

- Adjust the pH to 7.2-7.6 and switch off the pool heating.
- Allow the pump to circulate the pool water and continue with reduced chlorination until the temperature of the pool water falls below +10°C.

Winter closure is an important part. Ensure that your pool can withstand that the water freezes.

The final shutdown procedure is as follows:

1. Brush the sides of the pool clean and vacuum the pool thoroughly.
2. Backwash the filter thoroughly approx. 3 - 5 minutes. Then set the backwash valve lever to FILTER.
3. Switch off the electric power on the main switch (fuse box).
4. Remove ladder, wipe it clean and store it in a dry place.
5. Remove the filter basket and flap lid from the skimmer. Then install an expansion flask or pieces of cellular plastic where the filter basket was located. These will take up the expansion of ice.
6. Remove the adjustable inlet nozzles (the balls). If the pump/filter unit is below the water level, install winter plugs where the inlet nozzles were removed.
7. Remove the lighting unit and store it in a plastic bag on the edge of the pool.
8. Drain the filter tank by unscrewing the drain plug in the bottom of the tank.
9. Remove the pump cover and take out the filter basket. Remove the drain plugs from the pump housing and the pre-filter housing. If the pump is outdoors, the motor should be removed and stored indoors.
10. Remove the pressure gauge on the backwash valve of the filter.
11. If the heater is not in a frost-free location, remove the drain plug. If there is no drain plug, disconnect the pipe coupling between filter and heater, so that all water is drained from the heater.
12. Add anti-algal as recommended on the packet.
13. Shock chlorinate by dissolving calcium hypochlorite in a bucket of warm water and adding it to the pool.
14. If the pool has steps of fiberglass, provide something around the steps to take up expansion, which will shrink when the ice moves, reducing any strain on the steps. This could be a few plastic containers partly filled with a mixture of water and anti freeze (glycol), held in place with a weight.
15. Place your pool cover over the pool. NOTE! Some pool covers cannot handle snow loads. In these cases, corrugated winter plates should be used.



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