



Keeping Your Swimming Pool and Spa Healthy Environmental Health Guide

A swimming pool or spa can be an asset to your home, and provide the opportunity to take part in healthy relaxing activities.

However, with this opportunity comes the responsibility to ensure the swimming pool or spa is safe to use.

Water Treatment

Swimming pool and spa water is continually contaminated by dirt, chemicals, microorganisms and other pollutants which can make the water unsafe to swim in.

The microorganisms can produce infections and illnesses in bathers, including infections and illnesses in bathers, including the fatal disease Amoebic Meningitis.

Water treatment includes filtration and chemical disinfection.

Filtration

The purpose of filtration is to remove dirt and other suspended material from the water. Common types of filters include sand filters, diatomaceous earth and cartridge filters.

The filter system should have the ability to completely filter all of the water in a swimming pool within 6–8 hours, and spa pools within 30 minutes – 1 hour.

Always ensure the filtration system is operating when there are swimmers in the pool or spa and for at least one hour after the last bather gets out. As a filter operates, dirt builds up inside it, and needs to be removed. It is important to ensure filters are regularly cleaned to enable them to operate at maximum efficiency.

Many filter systems have a built in pressure gauge that shows the pressure levels inside the filter. Whenever the pressure levels increase, it indicates that the filter is becoming dirty and will need cleaning.

Systems that do not have pressure gauges should be cleaned whenever the flow of water from the filter back into the pool or spa noticeably decreases.

Sand filters are generally cleaned by backwashing. Diatomaceous earth filters are cleaned by either backwashing or manual cleaning, and cartridge filters are cleaned manually. All filters should be cleaned in accordance with the manufacturer's instructions.

Disinfection

To prevent transmission of infections, it is necessary to add a chemical to the water that can destroy microorganisms. The chemical must be able to rapidly destroy microorganisms in the water and oxidise chemical pollutants, without harming the bathers.

Chemical disinfection processes all involve a chlorine or bromine compound, as they are the most effective chemicals which can be safely used in a swimming pool or spa pool.

Types of Chlorine

Chlorine is available as a liquid (sodium hypochlorite), powder or tablet form (calcium hypochlorite). Both of these forms provide only chlorine to disinfect the water.



Chlorine is also available as a mixture of chlorine and cyanuric acid. In these forms, it is available as a powder (sodium-dichloroisocyanuric acid) with a trade name of “Dichlor” or in a tablet, stick or cartridge form (trichloro-isocyanuric acid) commonly known as “Trichlor”. These two chemicals add a mixture of both chlorine and isocyanuric acid (stabiliser) to the water. The function of a stabiliser is discussed below.

Types of Bromine

Bromine is commonly available in a tablet or powder form, in a chemical known as BCDMH – Bromo-chloro-dimethylhydantoin. The use of this chemical adds a mixture of chlorine and bromine to the water.

Bromine is more resistant to heat than chlorine alone, and therefore is generally used in facilities with warmer water temperatures, such as spas. It should not be used in outdoor pools, as it is susceptible to breakdown by UV light.

Salt Water Chlorination

Salt water chlorination systems produce chlorine by passing an electric current through water containing salt, via special electrodes. Some domestic salt water chlorinators may not produce enough chlorine to maintain the required level of chemicals in the water during periods of heavy usage. During hot conditions, pools and spas using salt water chlorination may need to be checked more frequently, and extra chlorine added if necessary.

Salt water chlorinators can be susceptible to a build up of white coloured scale on the electrodes, particularly if the water contains high levels of calcium. This can interfere with the efficiency of the system to produce chlorine, and so these units need to be manually cleaned on a regular basis, as recommended by the manufacturer. Many of the modern salt chlorinators incorporate self-cleaning functions that reduce the need for manual cleaning.

Stabiliser (Isocyanuric Acid)

Where outdoor pools and spas are exposed to direct sunlight, the ultraviolet light in the sunlight, rapidly breaks down chlorine in the water, increasing chlorine consumption. Adding stabiliser (isocyanuric acid) to the water in outdoor pools or spas shields the chlorine from the ultra-violet light, and significantly reduces the amount of chlorine consumed.

Stabiliser may be added to the water as two forms, either as pure isocyanuric acid, or combined with chlorine in the products Dichlor or Trichlor.

Isocyanuric acid dissolves slowly in water whilst Dichlor and Trichlor dissolve rapidly.

What Levels of Chemicals do I Need?

Disinfectants

To destroy any microorganisms introduced by patrons and other sources, a sufficient level of disinfecting chemicals must be continually present in the water, in an active form. In pools and spas using chlorine, the chemical is called free chlorine, and in facilities using bromine, the chemical is called free bromine.

Unstabilised (Indoor) Pools & Spas – Chlorine

At all times maintain a free chlorine level of at least 1.0mg/L (one milligram per litre) if the water temperature is less than 26°C and at least 2.0mg/L if the water temperature is more than 26°C

Stabilised (Outdoor) Pools & Spas – Chlorine

At all times maintain a free chlorine level of at least 2.0mg/L if the water temperature is less than 26°C and at least 3.0mg/L if the water temperature is more than 26°C

Bromine

Facilities that use bromine need to maintain a level of at least 2.0mg/L where the water temperature is less than 26°C and at least 4.0mg/L if the water temperature is more than 26°C.



Other Chemicals

Stabiliser (Isocyanuric Acid)

Isocyanuric Acid should be maintained at a level of at least 30mg/L and no more than 60mg/L. This chemical is only required in outdoor pools and spas that use chlorine, and where they are exposed to direct sunlight.

pH

The effectiveness of the disinfecting chemicals depends on the pH of the water. Chlorine and bromine work best when the pH reading (measure of acid or alkalinity) is between 7.2 and 7.6.

Copper Silver Ionisers

Copper-Silver Ionisers work by adding a mixture of copper and silver to the water in swimming pools and spas, and may assist by reducing the consumption of chlorine.

Ozonators

Domestic type ozonators produce small amounts of ozone gas, by passing a stream of air over and ultraviolet light, and injecting the gas into the pool or spa water. These systems reduce the consumption of chlorine or bromine.

It is very important that copper-silver ionisers and ozonators are used together with chlorine or bromine disinfectants, and that the concentrations of these disinfectants are maintained at normal levels.

Copper-silver ionisers and ozonators should not be used without chlorine or bromine. The levels of chlorine or bromine should not be reduced when using copper-silver ionisers or ozonators.

Water Testing

It is important to check the water chemistry levels regularly. The most important chemical levels include the free chlorine or bromine levels and pH levels.

Free chlorine and free bromine levels are generally measured using “DPD 1” reagents, whilst pH levels are generally measured using Phenol Red reagents. Both of these reagents are available in a convenient tablet form.

If you use stabiliser (isocyanuric acid) in your pool or spa you should also check the level of this chemical regularly.

During swimming season, test the water in swimming pools before the first swim in the morning and at least once again during the day. When the weather is hot and sunny or the pool is used by a lot of people, it is necessary to test the heated water more frequently.

Heated spa pools should be tested at least three times a day whenever they are in use.

If the test results show the chemical levels are too high or too low, corrective action should be taken. You should not add chemicals whilst people are in the water.

Contact your local pool shop for advice on the types of test kits available and how to use them.

Manual Dosing vs Automatic Dosing

Chemicals may be added to the water either manually or via an automatic dosing system. Automatic systems test the water chemistry and add the required amount of chemicals. Generally these systems produce more consistent water chemistry levels than manual dosing.

During swimming season, test the water in swimming pools at least twice a day. Test more frequently if the weather is hot and sunny or the pool is used a lot. Heated spa pools should be tested at least three times a day.

Make sure the chemical levels are correct.



Water Balance

Water balance is a measure of the concentration of calcium salts in relation to other chemicals in the water. It involves measuring the calcium hardness, total alkalinity and pH of the water. Whilst not related to health and safety, balancing the water will ensure you achieve the maximum life from your pool or spa, and prevent premature erosion or scaling of the surface, pipes, filters and other equipment. Your local pool shop can assist you to ensure the water in your facility is “in balance”.

Can I Use Bore Water to Fill My Pool or Spa?

It is preferable to use mains (scheme) water to fill swimming pools and spas, as it is treated and a safe supply. Bore water may be used, although it will increase the quantity and cost of chemicals needed to treat the water. Bore water may also cause staining.

All top up water should be added via the skimmer box with the filtration system running.

Expert Advice on Water Treatment

Advice on water treatment is available from your local pool shop, the Environmental Health Section of your local government, the Environmental Health Directorate, of the Department of Health, pool chemical suppliers, and pool maintenance and service companies.

Maintenance

All swimming pools and spas need regular maintenance.

- Keep the water clean and clear.
 - ▲ Leaves and similar material should be removed daily.
 - ▲ Vacuum regularly to remove dirt, sand and debris.
- Clean the skimmer and pump baskets regularly.
- Ensure the water is properly treated, and contains the correct levels of chemicals.
- Keep the pool and spa surfaces in good condition. Repair any cracks in the shell and tiled surrounds.
- Ensure the surrounds drain away from a pool or spa and do not collect puddles. Clean surrounds regularly.
- Keep pipes, filters and motors in good working order.
- Clean filters when required.
- Service all pool equipment according to manufacturer’s directions.
- Ensure all electrical equipment is maintained in good condition. All repairs should be performed by a licensed electrician.
- An automatic pool cleaner will help keep the pool clean and free of debris.

Keep the water clean and clear.

Make sure the chemical levels are correct.

Maintain all pool equipment in accordance with manufacturer’s directions.



Using and Storing Chemicals

Water treatment chemicals are concentrated and potent substances. They can react violently with many common household chemicals and with each other, and must be stored with care.

Safe Chemical Storage

Pool and spa chemicals should be kept in areas that are cool, dry and lockable. The chemicals must be kept away from petroleum products, such as grease, oil, petrol or liquid detergents. They should also not be stored with acids, alcohol, cleaners, soap powders or small quantities of water.

Liquid chemicals should be stored within an isolation bund that can contain any leakages of the material, and prevent chemicals from mixing in the event of a spill.

Safe Chemical Handling

Pool and spa chemicals also need to be handled with care.

- Only buy quantities you can use within the use by dates on the containers.
- Read and follow instructions carefully. If you do not understand something, ask the retailer or pool chemical specialist.
- DO NOT MIX CHEMICALS TOGETHER.
- Use only clean, DRY, non-combustible measuring scoops made from porcelain, recommended plastics or metal. Use separate scoops for each chemical.
- Add chemicals to water. DON'T POUR WATER ONTO CHEMICALS.
- Wash any spilt chemicals off clothes or skin at once, using plenty of water.
- If chemical is spilt, splashed, or wiped into an eye, flood the eyeball with clean running water and get to a doctor or hospital immediately.
- Dispose of water testing samples and spilt chemicals safely by diluting with water and disposing into the garden. They should not be put back into the pool.

Other Safety Issues

There are a number of other important safety issues which are not addressed in this brochure. These include the supervision of young swimmers, resuscitation training, electrical safety, first aid facilities, and the best location of your pool.

Information on these topics can be obtained from the Royal Life Saving Society on 9383 8200, or from the following websites: www.keepwatch.com.au and www.poolsafety.com.au

Information regarding requirements for security fences and gates can be obtained from the above websites, the Society and the building section of your local government.

Further Information

For further information on the topics covered in this brochure, contact your local government Environmental Health Officer

or

Environmental Health Directorate
Department of Health
PO BOX 8172
PERTH BUSINESS CENTRE WA 6849

Telephone: (08) 9388 4999

Facsimile: (08) 9388 4955

Produced by Environmental Health Directorate
© Department of Health, Western Australia 2006