2011-4533
2011-12-29

LABEL

WATERMAID ELECTROLYTIC CHLORINATOR MODEL
WM10LED-COMMERCIAL
CHLORINE GENERATING DEVICE
FOR COMMERCIAL POOLS AND SPAS
REGISTRATION NUMBER 28306
PEST CONTROL PRODUCTS ACT
KEEP OUT OF REACH OF CHILDREN

READ THE LABEL AND OWNERS MANUAL BEFORE USING.
Can treat a maximum volume of 150,000 litres
THE WATERMAID ELECTROLYTIC CHLORINATOR MODEL WM10LED-COMMERCIAL CONTAINS A POWER SUPPLY AND A CELL.
Controls bacteria and algae in swimming pools and spas.
Maximum output of hypochlorous acid equivalent to 691 grams of free available chlorine per day.
For swimming pools, a minimum of 1 ppm of free available chlorine must be maintained.
For spas, a minimum of 3 ppm of free available chlorine must be maintained. WARNING: Improper installation or operating the Watermaid electrolytic chlorinator Model WM10LED-COMMERCIAL without water flow through the cell can cause a build up of flammable gases, which can result in FIRE OR EXPLOSION

Registrant
WATERMAID PTY Ltd
24 Tepko Road
Terry Hills, NSW 2084
Australia

Canadian Agent
Watermaid of Canada Inc.
1497 Tenth Sideroad
Tottenham, Ontario
Canada
L0G 1W0

REPLACEMENT CELL LABEL

WATERMAID ELECTROLYTIC CHLORINATOR MODEL
WM10LED-COMMERCIAL
REPLACEMENT CELL EZY300

Registrant
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Replacement cell for the chlorine generating device WATERMAID electrolytic chlorinator Model WM10LED-COMMERCIAL
REGISTRATION NUMBER 28306 PEST CONTROL PRODUCTS ACT. This cell must only be used on this model of electrolytic chlorinator. Read the label and the Owners Manual for the WATERMAID ELECTROLYLIC CHLORINATOR Model WM10LED-COMMERCIAL before use.

REPLACEMENT CELL LABEL

WATERMAID ELECTROLYTIC CHLORINATOR MODEL
WM10LED-COMMERCIAL REPLACEMENT CELL QT300

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Replacement cell for the chlorine generating device WATERMAID electrolytic chlorinator Model WM10LED-COMMERCIAL.
REGISTRATION NUMBER 28306 PEST CONTROL PRODUCTS ACT. This cell must only be used on this model of electrolytic chlorinator. Read the label and the Owners Manual for the WATERMAID ELECTROLYLIC CHLORINATOR Model WM10LED-COMMERCIAL before use.

IMPORTANT SAFETY INSTRUCTIONS

WATERMAID ELECTROLYTIC CHLORINATOR MODEL WM10LED-COMMERCIAL
CHLORINE GENERATING DEVICE

COMMERCIAL

FOR COMMERCIAL POOLS AND SPAS

REGISTRATION NUMBER 28306 PEST CONTROL PRODUCTS ACT

When installing and using this electrical equipment, basic safety precautions should always be followed, including the following:

READ AND FOLLOW ALL INSTRUCTIONS IN THIS OWNERS MANUAL AND ON THE LABEL BEFORE USING

a) To reduce the risk of electric shock, the ground wire of this device must be connected to the grounding means provided in the electricity supply service panel with a continuous copper wire equivalent to the circuit conductors supplying the equipment.

b) WARNING: KEEP OUT OF THE REACH OF CHILDREN

c) WARNING: Risk of electric shock. Connect only to a grounding type receptacle protected by a ground fault circuit-interrupter (GFCI). Contact a qualified electrician if you cannot verify that the receptacle is protected by a GFCI.

d) Do not bury cord. Locate cord to minimize abuse from lawn mowers, hedge trimmers, and other equipment.

e) WARNING: To reduce the risk of electric shock, replace damaged cord immediately. To avoid hazard, the supply cord, if damaged, must be replaced by the manufacturer or its service agent or a similarly qualified person.

f) WARNING: To reduce the risk of electric shock, do not use an extension cord to connect unit to electricity supply; provide a properly located outlet.

g) CAUTION: to prevent electric shock, switch OFF the power at the electrical power outlet before dislodging the WATERMAID Power Supply. Do NOT remove the cover, as there are no user serviceable parts inside. Refer to a qualified service technician for repair.

h) Maintain water chemistry in accordance with manufacturer's instructions.

IMPORTANT

* The WM10-COMMERCIAL chlorinator is designed to run at a maximum salt level of 6000 ppm. *
This unit MUST be installed AT LEAST 3m (10 feet) from the inside wall of the pool.
* The WATERMAID QT SERIES Cells must be installed with a gas-trap to prevent any gases getting back into the filter.
* The WATERMAID WM10-COMMERCIAL Cell must be installed so that ALL the water from the filter passes through the WATERMAID WM10-COMMERCIAL Cell before any diversions or breakouts.
* Ensure that the WATERMAID WM10-COMMERCIAL Power Supply is OFF or in standby mode [refer to section 4] when adding salt to the water or water flow is restricted (e.g. backwashing the filter, blocked skimmers, etc) [refer to section 6(vi)].
* It is recommended that between 5Kg and 25Kg of Magnesium [Magnesium Sulphate ("Epsom Salts") or Magnesium Chloride] be added to the pool water per year.
* Do NOT add any products containing Calcium to the pool water.
* Use with a pump rated at 1 HP or above.
* Do NOT strike the Cell with any kind of instruments.

WARNING: Improper installation or operating the Watermaid electrolytic chlorinator model WM10LED-COMMERCIAL without water flow through the cell can cause a buildup of flammable gases, which can result in FIRE OR EXPLOSION

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NOTICE TO USER: This pest control product is only to be used in accordance with the directions on this label. It is an offense under the PEST CONTROL PRODUCTS ACT to use this product in a way that is inconsistent with the directions on the label. The user assumes the risk to persons or property that arises from any such use of this product.

Retain Owner's Manual for future reference
Can treat Maximum of 150,000 litres
Controls bacteria and algae in swimming pool and spa waters

Table of Contents

1. ESSENTIALS FOR A HEALTHY POOL OR SPA

Recommend daily levels for swimming pools and spas as determined by a testing kit

	Swimming Pools	Spas
Free Available Chlorine	1.0 – 3.0 ppm	3.0 –5.0 ppm
pH	7.2 –7.8	7.2 – 7.8
Total Alkalinity	100 –120 ppm	100 –120 ppm
Calcium Hardness	200 – 300 ppm	150 – 200 ppm

Check the expiry date on the test kit, as test results may be inaccurate if used after that date

There are three fundamental requirements in maintaining a swimming pool or spa:

a) FILTRATION
b) CHLORINATION
c) pH

A pool or spa should be looked at daily to check that the water is clean and clear and the finest details of the pool or spa walls can be seen at the deepest part. This will indicate whether the pool or spa has had enough filtration and chlorination for the load conditions that were applicable the day before. Any other condition requires testing and rectification before entering the water.

a) FILTRATION

It is first necessary to pass water through a filter to remove debris. A standard sized pool pump with normal filter pressures will pump about 10,000litres (2,642 gal) an hour, so an average 60,000 litre (15,850 gal) pool then requires six to ten hours of filtration a day in summer conditions. This will turn over the equivalent of 1 1/2 times the total volume of water. However, only about 65% of the actual water and debris will have passed through the filter.

Generally, at dawn and at dusk, wind dies down and these are the best times to commence filtration. Leaves and floating debris will be swept to the skimmer box without restriction if the pool is well designed.

For spas, the water typically turns over several times per hour with all of the water going through a filtration system. (refer to spa owner's manual for details.)

Longer filtration cycles can reduce the chlorine requirement and conversely, more chlorine can reduce the filtration requirement. The level of chlorine in the pool or spa is a function of what is going on in the pool or the spa.

b) CHLORINATION

The WATERMAID WM10LED-COMMERCIAL chlorinator takes care of the chlorination aspect of these requirements. As mild saline water flows through the WATERMAID WM10LED-COMMERCIAL Cell it is converted, by electrolysis, into chlorine as sodium hypochlorite.

After filtration, chlorine is required to react with any remaining debris (both visible and non-visible), to remove stains by oxidation and to sanitize the water of harmful bacteria. A chlorine residual (or reserve) is required for any imminent bather load.

A total of 1 to 3 ppm of free available chlorine for pools and 3– 5 ppm of free available chlorine for spas is required to maintain a clean clear condition.

Because of its instability, chlorine has a half-life of some 35 minutes in strong sunlight and even less in the presence of contaminants.
Therefore, the use of a chlorine stabilizer is strongly recommended for pools as it lengthens the half-life of chlorine to some 140 minutes and is the only way to help maintain a chlorine residual in the pool on hot sunny days.
At the beginning of the summer season, chlorine stabilizer (Iso-cyanuric acid) should be added to the pool and circulated by filtration.
Note: Indoor pools do not require the addition of chlorine stabilizer.
Due to the turnover rate in spas, chlorine stabilizer is not required.
For an average 60,000 litre (15,850 gal) pool, add 2 1/2 Kgs (approx. 6 lb) of chlorine stabilizer. After this initial dose, the pool should be topped up with chlorine stabilizer throughout the hot summer period to maintain a level between 30 and 100 ppm.

Factors such as sunlight, filter and pump efficiency, stabilizer level, bather load, debris, water temperature, salt level, water level, chemical balance and age of the Cell, ALL AFFECT THE FINAL CHLORINE LEVEL.

c) pH

pH refers to the acid/alkaline balance of the water. pH 14 is alkaline, 0 is acid and 7 is neutral.
Within the pH range of 7.2 to 7.8, chlorine will work most effectively as a sanitizer, and the precipitates formed will be at their maximum size and easily picked up by the filter. *At pH 8.0 - chlorine is only 21 % effective.
*At pH greater than 8.0 - the water is alkaline and can cause skin rashes.
*At pH below 7.0 - monochloramines are formed and will sting sensitive skin and eyes.

Marblesheen, pebbled, quartzon and tiled pools or spas stabilize naturally between pH 7.6 and 8.2 so the effects of chlorine are disadvantaged (compared to pools or spas with inert surfaces such as fibreglass, fibreglassed concrete, painted concrete and vinyl-liners). For marblesheen, pebbled, quartzon and tiled pools and spas it is recommended that pH buffer (sodium bicarbonate) be used as this will help stabilize the pH between 7.6 and 7.8 as well as raise the total alkalinity.

Total alkalinity is a measure of the alkaline chemicals in the water such as bicarbonates and carbonates. Keeping the total alkalinity between 100 and 120 ppm will help to keep the pH below 7.8. Adding sodium bicarbonate (pH buffer) will also help to protect newly surfaced marblesheen, pebbled, quartzon and tiled pools and spas, as it will react with calcium salts and form a coating of calcium carbonate over the pool or spa surface. This in turn will slow down the leaching out of lime from the fresh cement (which contains up to 60% calcium oxides), thereby making it easier to achieve the desired water balance. If hydrochloric acid is used to lower pH, it is advisable to add it SPARINGLY and only according to the instructions given by an Acid Demand Test Kit, as the acid will attack the walls causing the calcium level in the water to rise.

2. THE CHEMISTRY INVOLVED

The WATERMAID WM10LED-COMMERCIAL Cell, by electrolysis, produces sodium hypochlorite (NaOCl). In water, sodium hypochlorite dissociates into sodium (Na+) and hypochlorite (OCl-) ions.

It is the hypochlorite ions that form with the hydrogen (H+) ions (from the water) to form hypochlorous acid (HOCl), the active agent that destroys bacteria and algae, and oxidizes organic matter.

HOCl & THE IMPORTANCE OF pH

HOCl is more effective as a sanitizing agent at pH levels below 7. However, for swimming conditions it is recommended that the pH be kept within the range of 7.2 - 7.8.

3. INSTALLATION

The WATERMAID WM10LED-COMMERCIAL chlorinator may be installed by the owner, pool and spa technician or plumber. However, these instructions should be fully understood to ensure correct installation and safe operation. Incorrect installation may pose a danger and/or may damage the unit thus voiding warranty.
Where the owner is unsure what to do after reading the following, then an experienced technician or plumber should carry out the installation.

(i) MEASURE THE POOL OR SPA SIZE

Measuring the size of the pool or spa is important for determining the amount of salt to add. If the pool or spa is rectangular, then the length, breadth and average depth are multiplied. If the pool or spa has an irregular shape, then the average of the measurements can be taken.

(ii) ADDING SALT (sodium chloride) TO THE POOL OR SPA

DO NOT add pool/spa chemicals directly to the skimmer. This may damage the cell. Maintaining high salt levels above the recommended range can contribute to corrosion of pool/spa equipment.

If the chlorinator has already been installed, it should be turned off or to standby mode (refer to section 4) before adding salt. Watermaid recommends a salt concentration of 6000 ppm for pools and 1000 to 3000 ppm (parts per million) for spas (refer to section 7).

Add the required amount of salt to the spa or pool. For pools it is best to empty the required salt into the shallow end of the pool and run the filter and pump simultaneously while the WATERMAID WM10LED-COMMERCIAL chlorinator is off or in standby mode to circulate the water and dissolve the salt. Do not throw the salt bag into the pool or spa as chemicals and inks on the bag can interfere with the water balance.

If the pool has no main drain at the bottom, place a vacuum hose head in the deep end, and sweep the salt toward the vacuum head. The other end of the vacuum hose should be

placed in the skimmer box. Run the filter and pump with the WATERMAID WM10LED-COMMERCIAL chlorinator OFF to circulate the undissolved salt in the water. Quality pool and spa salt, sodium chloride (with low levels of iron and other impurities) should be used, with finer grades of salt usually dissolving faster. Alternatively, seawater may be used.

Salt may take 24 - 48 hours to dissolve in summer and longer in winter.

(iii) MOUNT THE WM10LED-COMMERCIAL POWER SUPPLY

The WATERMAID WM10LED-COMMERCIAL Power Supply should ideally be enclosed within a splash-proof housing (e.g. in a filter box) and mounted in a position that complies with local regulations.

1. Locate a suitable position for the WATERMAID WM10LED-COMMERCIAL Power Supply and that allows for box dimensions of 240mm wide x 315mm high x 150mm deep (9.4 x 12.4 x 5.9 in). [Allow at least 20 mm (0.8 in) from the top of the WATERMAID WM10LED-COMMERCIAL Power Supply to any structure or fitting above]

2. For Brickwork:
a) Drill 2 x 8 mm (0.3 in) diameter holes, 30mm (1.2 in) deep, that are 156mm (6.1 in) apart and level.
b) Insert 2 blue (8 mm or 0.3 inch diameter) wall plugs into the holes drilled.
c) Place the screws (provided) into the holes of the bracket (provided) and proceed to screw tight.

3. For Mounting onto Timber:
a) Drill 2 x 4mm (0.2 in) diameter holes into the timber, 30mm (1.2 in) deep, that are 156 mm (6.1 in) apart and level.

b) Place the screws (provided) into the holes of the bracket (provided) and proceed to screw tightly to the timber.

4. Lift the WATERMAID WM10LED-COMMERCIAL Power Supply onto the bracket ensuring that it is secure on the wall.

(iv) INSTALL THE WATERMAID WM10LED-COMMERCIAL CELL

Before installing the WM10LED-COMMERCIAL Cell, unplug the filter, pump and WATERMAID WM10LED-COMMERCIAL Power Supply. This is advisable so that the filter will not start inadvertently if a timeclock already exists. Also, close off the valves if the filter and pump are below pool surface level or if there are no valves, block off the inlet and outlet with cloth wadding or rubber stoppers.

TYPE P Pressure Solvent Cement (glue) must be used. Do NOT install the Cell too close to the heater or on the bend of the pipe work, as distortion of the Cell casing may occur. The WATERMAID WM10LED-COMMERCIAL Cell must be installed so that ALL the water from the filter passes through the Cell before any diversions or breakouts. And it is imperative that a gas trap be incorporated into the installation, so that NO gas generated by the WATERMAID WM10LED-COMMERCIAL Cell finds its way back to the filter, spa

blower or any other equipment.

WARNING: Operating WATERMAID ELECTROLYTIC CHLORINATOR Model WM10LED-COMMERCIAL without water flow through the cell can cause a build up of flammable gases which can result in FIRE OR EXPLOSION"

(v) ATTACH WM10LED-COMMERCIAL CELL TO POWER SUPPLY

Using a screwdriver, connect WM10LED-COMMERCIAL Cell wires to the Power Supply wires contained in the black junction box:

Red or Brown - TO - Red or Brown
Black or Blue - TO - Black or Blue
White - TO - White

The WATERMAID WM10LED-COMMERCIAL unit cannot function if the wires are connected incorrectly. It may appear to work for a brief period but may damage the Cell and Power Supply if left uncorrected.

(vi) CONNECT TO THE POWER OUTLET

For 110 VAC, insert the Power Supply's plug into the electrical power outlet. The outlet must be wired so that no power is available to the unit if the pump is off.

For 220 VAC models, the WATERMAID's WM10LED-COMMERCIAL's power cord should be hard wired by a qualified technician to run in conjunction with the pump.

4. THE POWER SUPPLY

The WATERMAID Power Supply converts the normal 110 VAC or 220 - 240 VAC electrical current from the power outlet to a low 7.4VDC system via a transformer and rectifiers. Automatic Electronic Overload Suppression (AEOS) circuitry senses and monitors the current on the secondary side and gas build-up in the Cell. The maximum current is preset to protect the transformer from overload and complies with existing Energy Authority regulations.
The WATERMAID WM10LED-COMMERCIAL Power Supply has been fitted with the following:

* CHLORINE PRODUCTION SCALE

The "+" and "-" buttons on the scale can be used to increase or decrease the amount of chlorine the Cell will produce. However, the maximum level of chlorine able to be produced is dependent on the salt level AND temperature of the pool or spa water. If the salt level or water temperature increases, more chlorine can be produced.

Other factors that can affect chlorine production include chemical balance of the water and contaminants on the Cell electrodes.

The time of year will influence the choice of setting on the scale for chlorine production (refer to section 9). If the red light is on, this indicates that no chlorine is being produced and either the water flow is not sufficient or there is a problem with the connection of the Cell to Power Supply [refer to section 3(v)].

It is important to note that if the Cell's gas sensing tang (the 12mm metal tang located at the top of the electrodes on the inside of the Cell) is not free of deposit, the Power Supply will be unable to check for water flow and therefore unable to start producing chlorine.

If the most left amber light is flashing, the unit is in standby mode. Press the "+" button to activate chlorine production. The unit should be in standby mode or off altogether when adding salt to the water, backwashing the filter or draining the pool or spa, otherwise damage to the Cell may result.
If the "+" button has been pressed several times, yet the lights will not light up past 50%, then the salt level may not be adequate or the Cell may require attention [refer to section 7(i)].

The blue "Auto Cell Clean" light indicates the WATERMAID WM10LED-COMMERCIAL unit is automatically self cleaning. Cell self-cleaning is discussed more thoroughly in the next section.

* CIRCUIT BREAKER
The circuit breaker may need to be gently pressed to reactivate the WATERMAID WM10LED-COMMERCIAL Power Supply in the event of current overloading or a power surge to the primary side of the unit.

Any interference with the circuitry or other components will void any warranty claim. Full protection afforded by copyright and design legislation applies to the circuitry in this unit.

Caution: to prevent electric shock, switch OFF the power at the electrical power outlet before dislodging the WATERMAID WM10LED-COMMERCIAL Power Supply.

Do NOT remove the cover, as there are no user serviceable parts inside. Refer to a qualified service technician for repair.

5. AUTO CELL CLEAN CIRCUITRY

WATERMAID Power Supplies manufactured from 2004 onwards contain unique Cell-Cleaning circuitry (patents pending). These Power Supplies are programmed to commence a Cell-Cleaning cycle shortly after start-up and will progress through the following cycle:

1. The Power Supply will start producing chlorine for about 5 minutes after all air is cleared from the circuit.
2.The Power Supply will begin its Auto Cell Clean phase for approximately 5-10 minutes, indicated by a blue light.
3.As the Power Supply reverts back to chlorine production mode, the red light may light for a few seconds while the unit checks the water flow and Cell connection.
4. The Power Supply will resume normal chlorine production until it cycles to Auto Cell Clean again.

As each pool and spa environment is different, the amount of build-up that is generated will differ from one environment to another. For example, pools or spas using seawater will experience higher levels of calcium in the water and so more build-up.

For best results on pool applications, it is recommended that the WATERMAID WM10LED-COMMERCIAL chlorinator be used in conjunction with a 1HP or greater pump.
The addition of 25Kg/Year of Magnesium Sulphate ("Epsom Salts") in the water will help control calcium build-up. Magnesium Sulphate softens the deposits that accumulate on the cell cathode. These softer deposits are more easily flushed off of the surface of the cathode through water flow and the self-clean cycle.

It is important that the pool or spa owner maintains water balance (refer to section 1). If there is an excessive amount of calcium in the water (i.e. levels above 200 ppm), it may be necessary to manually clean the Cell [refer to section 6(iii)].

The use of chemicals containing calcium (e.g. calcium chloride or "calcium hardness" and calcium hypochlorite or "powdered chlorine") are NOT recommended for use with WATERMAID Auto Cell-Cleaning units.

6. THE CELL

When replacing the cell, only use replacement cells having a label that clearly states that it is a replacement cell for the chlorine generating device WATERMAID ELECTROLYTIC CHLORINATOR Model WM10LED-COMMERCIAL, REGISTRATION NUMBER 28306, PEST CONTROL PRODUCTS ACT.

The WATERMAID QT300 and EZY300 Cells are capable of chlorinating pools or spas containing up to 150,000 litres (approx. 40,000 gal) of water. WATERMAID Cells have a proven cylindrical electrode design, which has been used since 1971.

(i) CHLORINE PRODUCTION

As a guide, the transformer is under load when the salt level exceeds 6000 ppm salt.
Good ventilation for the pump and chlorinator prevents breakdowns.

If the WATERMAID WM10LED-COMMERCIAL with the recommended salt level in pool or spa water is unable to display any green lights and therefore unable to meet the above guide, then one or more of the following may be the cause:

* The calcium level may be excessive, i.e. above 200 ppm and therefore the Cell may need to be cleaned manually [refer to section 6(iii)].

* The Cell may need replacing.

Chlorine production can be tested by taking a sample of water directly from the outlet

flow. This reading should be greater at the outlet than elsewhere in the pool or spa by approximately 0.5 ppm.

(ii) SCALE FORMATION

The scale that is inclined to form on the WM10LED-COMMERCIAL Cell electrodes is usually calcium carbonate, but can also include traces of magnesium, copper, iron, fats, oils and lotions.

If the pool or spa surface is fibreglass, fibreglassed concrete, painted concrete, vinyl-lined, epoxy coated or some similar inert surface, then the scale can originate only from the water supply or chemicals which have been added to the water. Therefore scale formation is usually insignificant for WM10LED-COMMERCIAL Cells chlorinating these types of pools or spas.

If the pool or spa surface is marblesheen, pebbled, quartzon or tiled, then the scale that is inclined to form on the Cell electrodes may come from either the pool or spa water, chemicals added to the water or minerals that leach out of the pool or spa walls.

The rate of scale formation is different for every pool or spa and is attributable to the: x Calcium hardness of the water.

As a guide, the calcium level of seawater is about 1700-ppm calcium, some bore waters 400 ppm and city water supplies can range from 60 ppm to 200 ppm. It is best to keep the calcium level in the pool between 60 and 120 ppm.

* Pool or spa water temperature.

As water temperature increases, so does scale formation. *

pH level. As pH increases, so does scale formation.

x Chemicals added to the water.

Powdered chlorine contains approximately 40% calcium and will contribute to scale formation. Adding pool acid to a marblesheen, pebbled, quartzon or tiled pool or spa will cause calcium salts to be released from the surface thereby increasing the rate of scale formation.

If the calcium scale is allowed to engulf the centre cathode and outer mesh electrode, any or all of the following may result:

* Restricted water flow
x Interference to the electrical current
* Nil chlorine production
x Cell damage, which may be beyond repair, voiding warranty.

(iii) MANUALLY CLEANING THE WM10LED-COMMERCIAL CELL

1. Turn OFF the power to the chlorinator and pump. There is no need to disconnect the WM10LED-COMMERCIAL Cell from the Power Supply when cleaning.

2 a) For QT SERIES Cells:

Unscrew the white barrel unions at the top and bottom of the WM10LED-COMMERCIAL Cell and remove the WM10LED-COMMERCIAL Cell from the pipe work. The top barrel nut is unscrewed anticlockwise and the bottom barrel nut is unscrewed clockwise.
Aim a strong jet of water from a tap or hose into the Cell. If all scale is removed successfully proceed to step 4, otherwise proceed to step 3.

b) For EZY300 Cells:

If the mesh electrode is clean, then separate the electrodes by pulling the brass plug out of its socket, unscrewing the barrel nut anti-clockwise and lifting the centre electrode out. The centre electrode only (being solid titanium) may be scraped clean. If all scale is removed successfully proceed to step 4. Otherwise proceed to step 3.

If both the mesh electrode and the centre electrode contain scale, then remove the entire Cell by unscrewing the T-Piece Barrel Nut
Do NOT attempt to clean the mesh electrode by abrasion. Proceed to step 3.
If the barrel nut is difficult to unscrew, the use of rubber gloves will give a better grip. Hot water can be poured over the union and/or a little Vaseline over the thread may make the next removal easier.

3. A dilute acid solution prepared according to the following procedure may be used. Alternatively, a PHOSPHATE-FREE premixed "Cell-Cleaning Solution" (available from a pool shop) may be used.

i) In a GLASS or PLASTIC container add 8- 10 parts of hot (not boiling) water.
ii) THEN add 1 part hydrochloric acid to the water.
iii)Either submerse the WM10LED-COMMERCIAL Cell or pour the dilute acid solution into the WM10LED-COMMERCIAL Cell. QT Cells can be submersed in the solution or the solution can be poured into the WM10LED-COMMERCIAL Cell if one end is blocked. One end may be blocked by using a cleaning cap with barrel nut, or sink plug.

For EZY300 Cells, avoid submersion of the brass plug and socket.
To clean both the anode and cathode, the EZY300 Cell may be turned upside-down as one end is blocked and the solution poured inside. To clean just the cathode, submerse only the electrode part in the solution.
The mixture may effervesce for up to 30 minutes, and thereafter should be discarded.
If the scale is stubborn, step 3 may need to be repeated.
4. Rinse the electrodes with tap water and return to pipe-work ensuring not to over tighten the barrel unions.

IMPORTANT:
* It is important to note that for BOTH EZY300 and QT Series WM10LED-COMMERCIAL Cells, the sensing tang (the small metal tang located on the inside of the WM10LED-COMMERCIAL Cell casing above the mesh electrode) also needs to be kept clean and free of scale.
* Do NOT tap the WM10LED-COMMERCIAL Cell casing with any instruments.
*Boiling water is NOT recommended in WM10LED-COMMERCIAL Cell cleaning as it may discolour the WM10LED-COMMERCIAL Cell casing.
*NEVER POUR UNDILUTED ACID DIRECTLY INTO THE WM10LED-COMMERCIAL CELL.
* ALWAYS ADD THE ACID TO THE WATER.
*WEAR RUBBER GLOVES when handling acid.
*Always have nearby either a hose or a bucket of water for accidental spills. Please read the manufacturer's safety precautions when handling acid.

(iv) DISCONNECTING THE WM10LED-COMMERCIAL CELL FROM POWER SUPPLY

*Turn OFF the power to the WATERMAID WM10LED-COMMERCIAL at the power outlet.
*Unscrew the cover of the black junction box located at the base of the WATERMAID WM10LED-COMMERCIAL Power Supply.
*Unscrew the single screw holding the WM10LED-COMMERCIAL Cell Cable, as well as the 3 brass screws holding the 3 wires.
*When reconnecting the wires, ensure the connection is TIGHT and that the wires are connected correctly [refer to section 3(v)].

(v) AGE OF THE WM10LED-COMMERCIAL CELL

After a number of years the active coating on the anode (mesh electrode) will wear away. At a much slower rate, the solid centre electrode will also wear away. Calcification, acid cleaning, current density and solids in the water contribute to the wear rate of the electrodes.
Generally, the precious coating on the anode is lost at a rate of 1 microgram per amp hour. This usually means a WATERMAID WM10LED-COMMERCIAL Cell will have a 5-10 year life. The use of undiluted acid solutions will deteriorate the precious coating of the electrode, drastically shortening the life of the Cell.
Poor water flow, overheating, and heavily encrusted electrodes allow chlorine gas to etch the titanium base and allow the precious coating to shed. Such conditions VOID WARRANTY.
Obvious signs of these conditions are a whitening of the Cell casing and a change in colour of the anode.

To check the WM10LED-COMMERCIAL Cell's performance, place it in a 25litre (approx. 7 gal) bucket of pool water with 6000-ppm salt. The Cell should produce a 1-ppm chlorine level within 5 seconds using the 7.4VDC WATERMAID Power Supply if the salt level is 6000 ppm and the water temperature is 20oC (68oF).
If the WM10LED-COMMERCIAL Cell fails this test and it has been cleaned, then a new WM10LED-COMMERCIAL Cell may be needed.

(vi) NO WATER FLOW AND THE WM10LED-COMMERCIAL CELL

If water fails to flow to the return-to-pool or spa line (e.g. in the case of blocked skimmers, closed valves, draining of the pool/spa or during backwashing) and the WATERMAID WM10LED-COMMERCIAL Cell is without water while it is switched on, hydrogen gas can build up, heat may generate and the WM10LED-COMMERCIAL Cell casing may expand and turn white, until the gas sensor switches the WM10LED-COMMERCIAL Cell off. This practice is NOT recommended.
N.B. Backwashing is the process whereby the water flow in the filter is reversed. In reversing the water flow, the accumulated waste material in the filter is flushed out. When no water flows through the return-to-pool or spa line, the WATERMAID WM10LED-COMMERCIAL Power Supply should be switched OFF or set to the standby mode (refer to section 4).

7. SALT LEVEL

At the beginning of the swimming pool season or every month for spas, the salt level should be checked to ensure that it is 6000 ppm (0.6 %) for pools and 1000 to 3000ppm (0.1%-0.3%) for spas. A salt level of 9000 ppm is isotonic with body tissue, and in the case of accidental immersion, will cause less damage to lungs and other body organs than water without salt.
Pool water at the recommended 6000 ppm is near isotonicity and the water is pleasant and does not irritate. Refer to section 3(ii) for adding salt.
Salt in the spa water at the recommended 1000 to 3000ppm is barely noticeable. Salt should be replaced after water has been lost from the pool or spa in any way.

SALT IS NOT LOST by the electrolysis process or when water evaporates. It can be lost, only in the following ways:

1. Backwashing - after 20 backwashes approximately 1 bag of salt is lost.
2. Pool or spa overflow (rainfall, flooding etc).
3. Splash out from bathers.
4. A leak in the pool or spa or in plumbing.

Each year, approximately one-third of pool water is lost so the salt level will need to be adjusted accordingly. If an excessive amount of salt has to be added then the pool may have a leak.

WHEN ADDING SALT:

It is IMPORTANT to switch the Power Supply OFF or to standby mode while undissolved salt is in the water. The best way to dissolve salt is to run the filter and pump (without the chlorinator), which will circulate the water.
To reduce the amount of salt lost by backwashing for long periods of time, place the garden hose, turned on full, into the skimmer box during backwashing.

8. RUNNING TIMES

(i) SWIMMING POOLS

The WATERMAID WM10LED-COMMERCIAL chlorinator and pump should run from late afternoon (e.g. 4pm) throughout the night as necessary. Remember that UV rays destroy chlorine, which is why a chlorine stabilizer is recommended [refer to section 1(b)]. The hours

of operation required for summer may vary from 8 to 14 hours or more. This is because it takes at least 6 hours to pass the total volume of pool water once through the filter.

(ii) SPAS

The running time of the chlorinator is dependant on the bather load of the spa. Daily testing will determine the required running time for your particular situation.

(iii) SWIMMING POOLS AND SPAS

(iv) A"rule of thumb" is one litre (2 pints) of chlorine per 20 bathers per hour.

Running times will depend on bather load, water temperature, time of year, pump efficiency, salt level, Cell age and condition, cyanuric acid levels, pH, sunlight, water chemistry and the effects of surrounding vegetation.

In addition to normal running hours, the WATERMAID WM10LED-COMMERCIAL chlorinator, pump and filter should be run whenever bathers are in the pool or spa.

On a monthly basis in summer the WATERMAID WM10LED-COMMERCIAL chlorinator, filter and pump should be run non-stop for at least 24 hours to super chlorinate and maintain a high polish in the pool. Super chlorination and chlorinator operation during bather load are IN ADDITION to normal running times. If a solar heater is installed and running times are set for chlorination and filtration in the daytime, extra chlorination in non-sunlight hours may be required. The only way to determine the needs of the pool or spa when varying the operating times between seasons is to monitor the pool or spa daily and make adjustments accordingly.

The overall aim of sufficient running times, operation during bather hours and super chlorination, is to produce a chlorine reading of 1 to 3 ppm for pools and 3– 5 for spas. The finest detail must be discernible at the deepest part of the pool or spa and the water should be clear.

For new pools, the WATERMAID WM10LED-COMMERCIAL chlorinator, pump and filter may need running continuously for a number of days before all debris is removed, stains oxidized and there is a chlorine residual in the pool.

9. CHLORINE DEPLETION

There are two main causes of chlorine depletion:

(a) The recent use of an algaecide. Most algaecides contain ammonium compounds and chlorine will degrade these compounds to nitrogen gas. Each litre (approx. 2 pints) of algaecide will usually contain approximately 20% algaecide (i.e. 200 grams [0.3 ounces] of 100% ammonium compounds).

For each unit of 100% ammonium compound, 9 units of chlorine will need to be produced or added before there is a free chlorine level.
If 1 litre (approx. 2 pints) of algaecide is added to the pool, close to 2 litres (approx. 4 pints) of chlorine will need to be produced or added to neutralize the algaecide alone. Also, any debris in the water will need additional chlorination.

(b) Bather load. With sufficient running times during bather load, the WATERMAID WM10LED-COMMERCIAL chlorinator will maintain a clean clear pool for about a 20-bather/hour ratio (e.g. 4 people/5 hrs, 10 people/2 hours etc).

It is important to note that contamination such as sunscreen oils and urine, as well as from animals will dramatically destroy chlorine.

10. ALGAE

A common problem for any type of pool or spa is algae growth. There are 24,000 known types of algae, all distinguishable by being single-celled organisms capable of photosynthesis (they produce their own food), mitosis (all cells can divide) and meiosis (reproduction is possible by combining with other algal cells).

The ideal environment for algal growth is when there are periods of zero chlorine. Algae blooms can take less than a day to turn a pool or spa green.

At the first sign of water adversity, the algae population goes into a reproduction phase to produce SPORES. The size of these spores is less than 0.2 microns. D.E. filters and sand filters are able to filter 5+ microns and 20+ microns respectively.
Algae will die from doses of chlorine as low as 0.05 ppm concentration, but spores can resist chlorine levels of up to 10 ppm.

Spores, however, cannot tolerate copper salts as copper attaches to the shell or endospore preventing germination. Hence, the most effective algaecides contain copper salts. For a few black algal spots, suspending 50 grams (approx. 2 ounces) of stabilized chlorine in a weighted nylon bag over the trouble spots may remove them.

For a more serious algae problem in pools, it is advisable to:

1. Lower pH below 7 [generally by the addition of up to 2 litres (4 pt) of pool acid] as this is an essential part of reducing algae resistance.

2. Use a registered copper based algaecide. Follow the use instructions of the copper product being used.
Note: Do not swim in the pool for at least 24 hours, as the copper treatment may discolour hair and clothing.

3. After about 12 hours a stainless steel brush and a garden hose fitted with a

brass jet gurney (available from hardware stores) can be used to remove algae from the pool walls.

4. Floc the pool with a clarifier. A blanket of debris will settle on the pool floor overnight and can then be vacuumed directly to waste (i.e. NOT through the filter). Following this, the pool should attain a clean, clear condition after a few days of constant filtration and chlorination.

5. Finally, the use of LANTHANUM CARBONATE (or "Starver") is recommended to reduce the phosphorous content to less than 1 part per billion. This starves algae of an essential element for growth.
Remember: if just 1 litre (approx. 2 pints) of an algaecide containing ammonium compounds is added to the pool, roughly 2 litres (approx. 4 pints) of chlorine will need to be produced or added in order to neutralize the algaecide alone.

As a guide, the WATERMAID WM10LED-COMMERCIAL chlorinator may need to be run non stop for 8-9 days at 20 amps/hour to overcome the addition of an algaecide containing ammonium compounds AND any debris. Otherwise, a sufficient chlorine reading may be impossible to obtain for up to 4 weeks.

For spas, it is often best to drain, clean and refill. Follow the manufacturers recommended procedures.

11. ELECTRICITY COSTS

When an Australian 240VAC model WATERMAID chlorinator is running at full capacity, it is using 420 watts of power.

{POWER (watts) = VOLTS X AMPS}
Therefore the cost to run a Watermaid chlorinator at full capacity is worked out using the following formula:

Operating Cost = no of watts used/1000 X no. of hours used X Cost per kilowatt-hour

As an example, a WATERMAID chlorinator run for 10 hours in Sydney, where the domestic cost of electricity is 9.71 cents/kWh, will cost a total of: = 420 W / 1000 x 10 h x 9.71cents/kWh = 40.782cents = 41 cents/day

TROUBLESHOOTING

The following is a list of possible causes to commonly encountered problems.

CHLORINE RESIDUAL LOW OR NIL

* Not enough chlorine being produced [refer to section 7(i)]
* Heavy bather load - insufficient running times to cope [refer to section 9]
x Strong sunlight conditions and/or insufficient chlorine stabilizer level [refer to section 1(b)]
* pH too high or low [refer to section 1(c)]
* Poor water circulation [refer below]
* Algaecide has been added within the last 4 weeks [refer to section 10]
x Excessive calcium level causing scale on Cell electrodes [refer to sections 5& 6(iii)] x Cell is old and needs replacing [refer to section 6(v)]

CHLORINE LEVELS HIGH IN THE MORNING AND NIL AT NIGHT

* Heavy bather load [refer to section 9]
x Extreme sunlight conditions and/or insufficient chlorine stabilizer level [refer to section 1(b)]

RED LIGHT

* Nil or insufficient water flow in Cell or poor circulation [refer below] x Problem with Cell connection [refer section 3(v)]
x Excessive calcium level causing scale on gas sensor [refer to sections 4, 5& 6(iii)]

NO GREEN LIGHTS

x Low salt level [refer to section 3(ii) and 8]
x Excessive calcium level causing scale on Cell electrodes [refer to sections 5& 6(iii)] x End of Cell life [refer to section 6(v)]
x Fault inside Power Supply

NO LIGHTS AT ALL

* No power to WATERMAID WM10LED-COMMERCIAL chlorinator [refer to section 3 (vi)]
x Problem inside Power Supply - refer to qualified service technician for repair

SCALE BUILD-UP ON CELL ELECTRODES

[for removal refer to section 6(iii)]
x Excessive calcium level in water [refer to section 5]

PH ALTERS RAPIDLY AND EASILY

x Low total alkalinity in marblesheen, pebbled, quartzon or tiled pools or spas and may be the result of contamination [e.g. debris, urine etc] [refer to section 1(c)]

POOR CIRCULATION

* Dirty and clogged filter
x Skimmer baskets full of leaves, hair, debris etc
Faulty pump
x Low speed pump
x Water level is low
x Cell is clogged with scale [refer to section 7(iii)]

FILTER PROBLEM

If the WATERMAID WM10LED-COMMERCIAL chlorinator is capable of registering maximum output, but the pool or spa water is cloudy, there may be a filter problem. x Filter may need backwashing [refer to section 6(vi)] [also refer to filter manual] x Body fat or oil build up on pads
x Sand filters: The sand in a sand filter should be changed every 5 years
* Diatomaceous earth filters: Insufficient diatomaceous earth over the pads x Cartridge filter: The filter should be replaced or cleaned

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