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CLEER CHOICE Model 123

Copper Generating Device
Controls algae in swimming pool waters

Reg. No. 21080 P.C.P. ACT
CSA Certification No. 20693

READ THESE INSTRUCTIONS BEFORE USING

SUMMARY/DIRECTIONS FOR USE:

Install according to directions provided. Turn on Model 123 and run until 0.2 ppm to 0.5 ppm of Copper is dissolved in pool water as determined by your test kit. Maintain this level of Copper to control algae in swimming pool waters.

WARNING:

Staining of pool surfaces may occur due to deposit of copper salts in contact with a chlorine oxidizer. Excessive levels of copper will increase the probability of this occurrence.

This unit must be connected to a GFCI (Ground Fault Circuit Interrupter) protected circuit as required by the Canadian Electrical Code. Failure to do so releases Pool-Tek from any damage claims resulting from this.

SPECIFICATIONS:

120 Volts AC 60Hz
0.1 Amps Maximum
Hours

30 Volts DC Maximum To Electrodes
Maximum Output: 57.6g Copper/24

Manufactured by:
Pool-Tek, 180 Station Street, Unit 6, Ajax, Ontario
L1S 1R9 Canada

Pool-Tek

Your pool of technology

OWNER'S MANUAL

for

CLEER CHOICE

MODEL 123

It's as easy as 123

SEPTEMBER 1989

(DEVICE LABEL)

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Ajax, Ontario L1S 2V9 Canada

FRONT VIEW OF IONIZER

((ILLUSTRATION))

1.0 GENERAL DESCRIPTION

Ionization by this device is the process whereby ions of a metal, copper, are introduced into the pool water by applying a low voltage current between a set of electrodes immersed in water. Ions are charged atoms of the copper metal and such ions dissolve in water.

Your pool-Tek ionizer injects these ions of copper into the return water supply from the pool pump back to the pool. Operation is very simple, requiring only the turn of a knob to alter the concentration of copper ions.

Copper is a proven algae fighter. In the concentrations

outlined, the ionizer's ability to control algae will be a valuable asset.

For reasons relating to safety in the sanitizing process a residual of 1.0 - 3.0 ppm of Chlorine or Bromine must be maintained in the pool water during times of use. Your ionizer will serve as added insurance to the Chlorine/Bromine in keeping your pool water free from algae, especially when Chlorine/Bromine levels fall below 1.0 ppm.

Proper use of the pool-Tek device cannot eliminate the need for regular maintenance tasks such as daily testing of Ph and Chlorine plus weekly testing of total alkalinity and copper residuals. Occasional addition of a non-chlorine Shock Treatment like Potassium Monopersulfate is required to oxidize the buildup of pool bather load. The exact maintenance pattern will become apparent, as each pool has it's own individual "personality"

If the owner keeps his water at the recommended test values, pool-Tek guarantees that algae will not appear.

1.0.1 SIMPLIFIED USE OF CLEER CHOICE

INITIAL INSTALLATION

1. INSTALL ION CHAMBER
2. MOUNT CONTROL BOX
3. TEST WATER OVERALL
4. BALANCE WATER
5. TURN ON CLEER CHOICE
6. MONITOR NEXT 1-14 DAYS & ADJUST

THE ABOVE MAY SPAN 1 - 2 WEEKS

NORMAL SEASON

- | | |
|----------------------------|---|
| DAILY | 1. CHECK CHLORINE, PH |
| WEEKLY | 2. ADD SHOCK (OXIDIZER)CHECK COPPER, TOTAL ALKALINITY |
| AS REQUIRED
(NOT OFTEN) | 3. ADJUST ANY READINGS OUT OF LIMITS |

1.1

THE BASICS

1.1.1 **PRESCRIBED LIMITS OF WATER BALANCE FOR BEST IONIZER RESULTS**

CHARACTERISTIC	MAINTAIN AT
Chlorine	1.0 - 3.0ppm
Ph	7.2 - 7.8
Copper	0.2 - 0.5ppm
Total alkalinity	80 - 120ppm
Calcium hardness	200 - 275ppm
Total Dissolved Solids	500 - 2000ppm

1.2 HELPFUL HINTS

1.2.1 **WATER CAPACITY**

It is very important to have a good approximation of your pool's water capacity. This is the basis for all calculations and/or tables determining how much of which substance must be added to the pool to bring readings into line. For your reference, record your pool's capacity below.

Capacity_____Gallons_____Liters_____

1.2.2 **FILTRATION**

Proper and adequate filtration is a must for every pool, in order to maintain clear, sparkling water. Be sure that your filter is operating properly, and that you backwash often enough to allow the filter to remain free of excess back pressure.

This will vary depending on filter and pool size, water turnover rate, bather load and once again, the environment. Once or twice a week can be considered normal backwashing rates.

Water turnover rate is largely determined by the pump's water pumping capacity. Water turned over twice daily is a normal

rate for residential pools. If your pump is turned off at night, you may not be achieving two cycles of water turnover. Consult your local pool supply store if you are unsure that turnover is correct. You must at least be able to tell them your pump's manufacturer and model number.

1.2.3 **WATER TESTING**

This needs to be done about once a week, so that problems arising from or imbalance, can be corrected before causing difficulty. A classic example is algae, which can result from an imbalance.

Total Alkalinity, which is important to maintain, can be thrown out of balance by acid rain or heavily polluted air/wind and should be tested weekly.

A non-chlorine oxidizer containing Potassium Monopersulfate should be added once every week, or two weeks, depending on the environment, bather load, etc. Unlike Chlorine, this allows swimming to resume almost immediately. The oxidizer effectively "chews up" organic substances such as suntan and body oils, wastes, dirt, leaves, etc. which can build up to cause cloudy water or waterline scum.

Pool-Tek recommends use of Taylor test kits, since in our experience, these are more consistent with "standard" readings from kit to kit. You can rely on them. The model K-1731 test kit does an adequate job for the model basic measurements- Ph and Copper. These are supplied with each CLEER CHOICE. For those wanting the full range of normal pool tests, we recommend the model K-2005 Kit.! Tests Chlorine; Ph; Total Alkalinity; Calcium Hardness; Cyanuric Acid and related characteristics. The kits and refills are available through Pool-Tek.

Water test samples should be taken from at least 18 inches (full arm's length) below the water's surface and while water is actively circulating. The best collection point is near the skimmer rather than at the water return jets.

Test kits should be stored in a cool, shaded location, out of direct sunlight. This will prevent the reagents from overheating(which can spoil them) and the colour standards from shifting colour. Test cells should be rinsed out with pool water after use to dilute any leftover test chemicals,

preventing them from permanently discolouring the cells.

AN EXCELLENT BOOKLET BY TAYLOR, ENTITLED "I NEVER LIKED CHEMISTRY" IS AVAILABLE FROM POOL-TEK, TO HELP YOU BETTER UNDERSTAND THE BASICS OF WATER TESTING.

2.0 **OPERATING YOUR CLEER CHOICE**

2.1 **GENERAL**

Your CLEER CHOICE ionizer consists of two separate pieces - the Control Box and Electrode Housing. The Control Box contains the power and control electronics to allow the system to turn copper ion production on & off, plus adjust it's output rate and monitor what the unit is doing. The Electrode Housing provides a convenient way to insert the copper electrodes inline with the water supply and provides access to the owner for easy inspection of the electrodes.

2.1.1 **CONTROL BOX**

The housing for the control box is weatherproof and splashproof if mounted vertically. The front hinged front door should normally be kept closed, except when checking the unit or making adjustments. The outer case of the control box gets warm during normal operation. This is no cause for concern. The circuitry within the unit is designed to shut itself off if overheating should occur. Also, if the unit draws more than 0.5 Amps from the AC line, it's circuit breaker (within the Power switch) will trip it off. Another measure of safety: if the unit is installed as directed, by plugging into a GFCI protected circuit, the slightest leakage of electricity between powered conductors and ground will trip the associated Ground Fault Circuit Interrupter. This is now mandatory in Canada for all exterior power outlets and is especially important in swimming pool installations. Do not, for any reason, remove the front panel screws. This exposes you to a shock hazard. There are no user serviceable parts inside. Leave this to qualified service people.

Controls and indicators

There are only three controls on the front panel:

1. POWER

This is the main power On/Off switch. If the "I" side of this rocker-style switch is pressed, power is turned on. This will cause a pilot light to glow from within the switch to confirm that power is present. To turn the unit off manually, the "o" side of the rocker must be pressed. As stated above, the switch also doubles as a circuit breaker- which, if tripped, shuts off the switch, requiring a manual press of the "I" side to reset it. If the switch does not allow resetting, contact Pool-Tek, since this indicates an internal problem.

2. CYCLE

This is a circular dial timer, which can be used to turn the CLEER CHOICE on and off. The dial face itself contains a 24-hour day/night clock. Time may be set manually by gripping the outer orange tumblers and turning the dial clockwise, setting time of day to coincide with the numbers appearing at the point of the time arrow. Do not force the dial to turn counter-clockwise. This could damage the timer. The orange tumblers must all be pulled up fully (not out) to allow the unit to be on continuously. If any tumbler is left down or pushed back down, the unit will turn OFF during that HALF HOUR period. Hence, it is possible to have the unit turn itself off & on automatically for as many half-hour periods as directed.

However, if the intent in turning the unit off is to decrease the overall copper ionization rate, this may also be accomplished by reducing the OUTPUT level with that control.

3. OUTPUT (Knob)

This may be thought of as a volume control. It allows adjustments of ion output level for copper. Full counterclockwise rotation reduces output to zero while the opposite direction produces a maximum output. The numbers 1-10 on the skirt of the knob allow for easy reference and repeatability in settings. This control is closely associated with the indicators above it.

The unit's indicators are a row of LED's (Light Emitting Diodes):

4. OUTPUT (LIGHTS) :

The three LED'S immediately above the OUTPUT control indicate the approximate ranges that this knob is set to and serve to

confirm that the CLEER CHOICE is working properly. The GREEN light represents a LOW setting and begins to glow just after leaving full counter-clockwise rotation. The YELLOW light glows to show MEDIUM output, during midway rotation of the knob. Lastly, the RED light glows to represent HIGH output, when the knob is close to maximum clockwise rotation. As the knob is turned from CCW to CW each light should come on in succession and remain on past that point, until the output knob is again turned down.

5. IONS:

This FLASHING RED light serves to tell the owner that power is indeed being transferred from the control unit to the electrodes. If, for some reason, the small cable from the control unit to the electrode housing becomes disconnected, the ION light will no longer flash. Water must also be present in the Electrode housing, between the two electrodes. If the pump is not operating or water is not flowing, there will be no ion production, hence no flash of the IONS light. Note that the flash rate of this LED is fixed and does not speed up as the output is increased.

In summary, the owner can quickly determine from the flashing IONS light, if the unit is working properly.

2.1.2 ELECTRODE HOUSING

A high quality industrial "T" fitting is used on this assembly. Although sealing instructions are given in the INSTALLATION section, it is important to note that the removable electrodes, if taken out for inspection, should be re-inserted without using extreme force--otherwise you may cross-thread the housing , plug, or both. Only HAND TIGHTNESS is necessary. For maximum efficiency, the electrodes should be installed so that the side screws are at the right angles to the water flow. This will ensure that water flows between them with minimum restriction. When the Teflon tape on the installed unit eventually wears off, wrap 6 layers distributed evenly, around the electrode assembly's threads in a CLOCKWISE direction. This will ensure that the when the piece is screwed back into the housing, the tape will tighten rather than loosen around it's threads. Do not use glue or grease to install the plug. If the electrodes need to be removed for a length of time, a spare closed plug, supplied with the system, can be inserted with Teflon tape, into it's spot. More Teflon tape is available from local hardware stores.

The electrodes themselves, are supplied with sufficient material to last 4 months on the average outdoor pool. If your electrodes are worn down, call Pool-Tek for replacements.

After many weeks of operation, you may find that a greenish-blue deposit has formed on the electrodes. This will vary, depending on local water characteristics. It will not substantially affect electrode efficiency. The deposit, if heavy, may be removed by using an old toothbrush, dipped into lemon juice. It is only necessary to remove the bulk of the deposit, rather than making the electrodes perfectly clean. In some localities a white, crusty, calcium-like deposit may appear on the electrodes. This tends to impede ionization and should be removed similarly.

2.2 CHEMISTRY & PRACTICAL OPERATING INFORMATION

2.2.1 GENERAL

Most of the important information relating to this subject was covered in section 1.1 THE BASICS. It is helpful for the owner to understand the differences between normal chlorine-treated pools and those employing copper ionization for algae control. This section will help to give you more insight.

2.2.2 CHEMISTRY

Chances are that you can approach this with a daily check of water balance. Here the measurements for Chlorine and Ph will generally suffice. Then, on a weekly basis, a check of copper level and total alkalinity should be done.

Since the CLEER CHOICE adds Ions of copper to the water, it is no longer necessary to regularly put additives like algaecides into your water. If, for some reason, you have not monitored your pool's levels in quite a while, you could find, due to poor sanitation, that a stubborn case of algae has developed. This is more likely to happen during the hottest weather and if a solar cover has been left on the pool for most of the daylight hours.

The use of a non-chlorine oxidizer containing Potassium monopersulfate for shock treatment is highly recommended. During hot weather, this may be needed every week or two weeks, less often when cooler. Again, this depends on your own pool & environment.

2.2.3 PRACTICAL OPERATING INFORMATION

Developing the good maintenance habits mentioned above, will help you to stay on top of any problems wanting to get a foothold. You must also keep your pool clean, by vacuuming and brushing regularly. A scum buildup should not be allowed to persist. Skimmer & strainer baskets should be emptied as required. Check all tools and equipment regularly. Remember the old adage:

AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE!

SYSTEM STARTUP

Immediately after installation of the CLEER CHOICE, you must determine what the water consists of, before starting to ionize it with copper.

1. CHECK RESIDUAL COPPER

It should read much less than 0.15 ppm. If you have a high initial copper reading(which is usual) it has most likely come from a source like your water supply, a water heater or copper plumbing. If the source is the heater or plumbing, it should be checked to see if it's still intact. Chances are, that Ph had been low (acidic) for an extended time period in the past, which has stripped copper from these sources. This excess may be diluted by partially draining water from the pool and refilling it. Should your water supply be high in copper(check it separately), this may be reduced by treatment with a sequestering agent, like M.S.R., or any other non-metallic Stain &Scale Remover/Reducer.

2. CHECK TOTAL ALKALINITY

This should be in the range of 80 - 120. To increase, add ordinary household baking soda(bicarbonate of soda). To decrease, add Muriatic Acid.

3. CHECK pH

This should always fall in the range of 7.2 - 7.8. To increase, add Ph Up or Soda Ash. To decrease, add Ph Down.

4. **CHECK CHLORINE**

Adjust to, and maintain a residual of 1.0 - 3.0 ppm.

5. **TURN OUTPUT ON CLEAR CHOICE TO HIGH**

The object at this point, is to load the pool with an initial dosage of 0.3 ppm of copper. This may take a day to two days for each 40,000 litres in your pool. A large influence on creating the initial dosage will be the water's conductivity, which determines how much current (and as a result, IONS) are generated across the electrodes. In extremely difficult cases, it would help to add five pounds of table salt to the water to increase conductivity.

6. **ADJUST OUTPUT FOR A GOOD "AVERAGE" SETTING.**

Generally, once Step 5. Is completed, a setting in the LOW (green) range of OUTPUT will allow you to maintain a constant 0.3 ppm of copper. If in the above, the copper has overshoot the 0.3 ppm level by a large amount, turn OUTPUT to zero and wait a day or more, until the level falls to 0.3 ppm. Then adjust the OUTPUT setting to a position below that which caused the overshoot to begin with.

WINTERIZING

1. Two days before closing the pool, turn the OUTPUT on the CLEAR CHOICE to high monitoring it until the copper reaches 0.7 ppm. At this level, you will have considerable spare copper in the water to fight algae over the winter. Ensure that the Ph is adjusted to 7.2 - 7.6. Most experts feel this is all that's necessary to treat the water to winterize it. Some owners feel better if they add an extra measure of full strength algaecide; plus Potassium Monopersulfate oxidizer.

DO NOT, UNDER ANY CIRCUMSTANCES, POUR FULL STRENGTH LIQUID CHLORINE INTO THIS WATER WHICH NOW HAS A LARGE CONCENTRATION OF COPPER. IF YOU DO SO, YOU RISK THE STRONG POSSIBILITY THAT LARGE BLACK STAINS OF PRECIPITATED COPPER MAY APPEAR ON YOUR LINER OR OTHER POOL SURFACES.

2. To summarize, on the day of closing, vacuum and clean the pool, backwash the filter, then drop the water level below the return jets, blowing out the pipes and sealing with plugs--or use antifreeze or foam rope inserted into the pipes. Remove

contents of skimmer and fill with empty, sealed containers. Remove all ladders and other necessary hardware. Next, put on the winter cover and secure. At the pump, drain the water from the filter and pump chamber, then insert plugs into the perspective locations. Although winter temperatures will not harm the CLEER CHOICE's Control Unit or Electrode Housing, it is suggested, in order to reduce weathering effects, that you disconnect the Control Box and take it inside. Also, you can unscrew the electrode plug from the Electrode Housing to make sure there's no residual water and stuff a rag into the opening to prevent rodents from nesting in it during the winter. The electrode plug can also be brought indoors. **If the manufacturer of your pool has given you alternate, specific directions, follow them instead.** The above is only provided as a guideline, should you not have alternate directions. The only new concern you need to have, is that you treat the water as mentioned in 1. above.

3.0 **INSTALLING YOUR CLEER CHOICE**

3.1 **GENERAL**

Your new ionizer is very easy to install and operate. It consists essentially of two pieces- the Control Box and Electrode Housing.

3.2 **ELECTRODE HOUSING**

Cut a 6-inch section out of the hose that traditionally runs between the pump and filter unit. This will likely be 1 ½ inch Spa hose, for which the proper barb-end hose fittings are supplied. Insert a hose clamp onto the hose on one side on the cutout. Push one barbed connector onto the hose with a firm, swivelling push. Adjust the "T" fitting of the electrode housing so that it is conveniently positioned to allow you to easily insert the electrode plug. An upside-down or sideways "T" is suggested as the most appropriate. Complete by tightening up the hose connector. Be careful not to overtighten the screw, otherwise the threads may strip. Repeat the same for the other side. Apply 6 layers of Teflon tape CLOCKWISE around the electrode plug's threads, then screw it HAND TIGHT into the electrode housing. The side screws should be at right angles to the water flow inside the fitting, to ensure minimum resistance to water passage between the electrodes and to minimize collection of debris inside.

Turn on the pump and let it prime, to determine if any water leaks are evident. If so, turn off the pump, tighten the joints up, then retest. DO NOT APPLY GREASE OR GLUE TO THESE POINTS. They were designed to seal without these. Turn the pump and power off again, while connecting up the Control Box.

3.3 CONTROL BOX

This unit must be mounted vertically to ensure weather tightness. It is suggested that it be located in a sheltered area, away from direct sunlight. This will prolong the life of the unit, although it is housed in a weatherproof box. Also, it should be mounted within 6 feet of the Electrode Housing, to allow the interconnecting cable to reach.

Mount the Control Box before you plug in the power cord. Start by inserting a *8 screw of appropriate type and length into the surface chosen. This will serve as the mount for the oblong slip-in hole in the middle of the back surface of the box. Leave a 3/16 inch space between the screw head and mounting surface. Now slide the rear of the box over this screw and pull down to secure the screw into the hole.

Then, unscrew the cable connecting cover from the bottom front of the Control Box and insert a screw into both the extreme left and right hand mounting holes. Align then tighten the screws and reinstall the cover to complete the mounting.

The electrode cable must be connected next. This is the one with red and black plugs on the end. Push them with a slight clockwise swivelling motion, into the holes in the screw heads of the electrode plug. Start with the red plug in the red screw and vice-versa. Secure the cable in place with cable fasteners.

The CLEER CHOICE comes supplied wired with a plug for 110 Volts 60 Hz. If you only have access to 220 V contact Pool-Tek. This can be taken care of. However, please note that YOU SHOULD NOT CONNECT THE CONTROL BOX AS SUPPLIED, TO 220 VOLTS. This will damage the unit.

IMPORTANT PRECAUTION: The Control Box must be connected to a GFCI (Ground Fault Circuit Interrupter) protected circuit as required by the Canadian Electrical Code. You have the option to utilize such a GFCI either by mounting the GFCI outside on the pump plug-in receptacle, or on your indoor, central power distribution panel. The CLEER CHOICE should be plugged into

the same circuit as your pump, so that the ionizer can only come on when the pump is on. If you are unsure about any aspects of your electrical connection, contact a qualified electrician.

See section 2.0 OPERATING YOUR CLEER CHOICE for an understanding of the Control Box features before proceeding to the following.

Plug the Control Box into the 110 Volt outlet and turn on the POWER switch. The pilot light behind the switch should be visible at this point. Turn the OUTPUT knob from completely counter-clockwise to fully clockwise, observing that the green, yellow and red lights come on in succession. Also, you should observe that the flashing red IONS light begins to flash just after the green light starts to glow. If this is not happening, check that the pump is on and water is circulating through the electrode housing. Also, check that the electrode cable connectors are on snugly.

Now, TURN OFF the POWER switch on the Control Box and read section 2.2.3-PRACTICAL OPERATING INFORMATION - SYSTEM START UP before proceeding to ionize your pool water.

Contact Pool-Tek if you have any difficulty with your installation.

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