

(PCP STICKER MINERAL SPRINGS TUBBY ENGLISH MAY 2006)

<p>KIK HOLDCO COMPANY INC. 33 MacIntosh Blvd. Concord ON L4K 4L5 1-800-268-6572</p>
<p>REGISTRATION NO. 28314 PEST CONTROL PRODUCTS ACT MINERAL SPRINGS TUBBY MODEL ST1 CHLORINE GENERATING DEVICE</p>
<p>One MINERAL SPRINGS TUBBY Model ST1 unit can treat a maximum of 1,500 Litres of spa water. Maximum output of Sodium Hypochlorite <u>equivalent</u> to 15 grams of free available chlorine per day. Controls Bacteria in Spa Water. Always maintain 3-5 ppm of free available chlorine or bromine in your spa water.</p>
<p>DOMESTIC - READ THE LABEL AND THE INSTRUCTION MANUAL BEFORE USING. KEEP OUT OF REACH OF CHILDREN. Warning: Operating the MINERAL SPRINGS TUBBY Model ST1 without water flow through the cell can cause a build up of flammable gases which can result in FIRE or EXPLOSION.</p>

CHLORINE GENERATING DEVICE FOR SPAS



**DOMESTIC
Installation / Operation Manual**

**MODEL ST1 REGISTRATION NUMBER 28314 PEST CONTROL PRODUCTS ACT.
Maximum output equivalent to 15 grams of free available chlorine per day.
One MINERAL SPRINGS Tubby Model ST1 unit can treat a maximum of 1500 Litres
of spa water. Controls Bacteria in Spa Water.**

PLEASE RETAIN OWNER'S MANUAL FOR FUTURE REFERENCE

TUBBY



CAN/CSA

IMPORTANT

**READ THE LABEL AND THE INSTALLATION/OPERATION MANUAL BEFORE USING
KIK HOLDCO COMPANY INC. 33 MacIntosh Blvd. Concord ON Canada L4K 7L5**

1-800-268-6572

Mineral Springs Tubby English Manual May 2006

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IMPORTANT SAFETY INSTRUCTIONS

READ AND FOLLOW ALL INSTRUCTIONS

EQUIPMENT RELATED, INSTALLATION AND GENERAL USE

Installation of all MINERAL SPRINGS TUBBY models

When installing and using the MINERAL SPRINGS TUBBY unit, basic safety precautions must always be followed, including the following:

- 1. Follow all aspects of the local and National Electrical Codes when installing the MINERAL SPRINGS TUBBY unit.**
- 2. During installation, mount the MINERAL SPRINGS TUBBY unit to ensure the least amount of direct exposure to rain, garden sprinkler water, direct sunlight or any corrosive environment.**
- 3. WARNING - Risk of electrical shock. Plug the unit into an approved G.F.C.I. electrical outlet (110VAC ONLY).**
- 4. WARNING - Do not use spas or hot tubs unless all suction grates are installed to prevent body and hair entrapment.**
- 5. DANGER - To reduce the risk of drowning from hair and body entrapment, install suction fittings with a marked flow rate that equals or exceeds the flow rate on the equipment assembly.**
- 6. WARNING - Install blower no less than 30cm (1 foot) above the maximum water level to prevent water from contacting electrical equipment.**
- 7. CAUTION - Maintain water chemistry in accordance with values set out on page 5.**
- 8. All field-installed metal components such as rails, ladders, drains, or other similar hardware within 3m (10 feet) of the spa or hot tub shall be bonded to the equipment grounding bus with copper conductors not smaller than No. 8 AWG in the U.S.A. and No. 6 AWG in Canada.**

IMPORTANT SAFETY INSTRUCTIONS

110V Models Only

- 1. 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. The conductors on the load side of the GFCI shall not occupy conduit boxes or enclosures containing other conductors unless the additional conductors are also protected by a GFCI.
- 2. The GFCI must be tested before each use.** With the MINERAL SPRINGS TUBBY unit operating push the test button on the GFCI. The MINERAL SPRINGS TUBBY unit should stop operating. Push the reset button. The MINERAL SPRINGS TUBBY unit should now start to operate normally. If the GFCI fails to operate in this manner, there is a ground current flowing indicating the possibility of an electrical shock. Disconnect the power until the fault has been identified and corrected.
- 3. WARNING -To reduce the risk of electric shock, replace damaged cords immediately.**
- 4. WARNING -To reduce the risk of electric shock, do not use extension cords to connect unit to electric supply; provide a properly located outlet.**
- 5. Do not bury cord.** Locate cord to minimize abuse from lawn mowers, hedge trimmers and other equipment.
- 6. Warning - Operating MINERAL SPRINGS TUBBY Model ST1 without water flow through the cell can cause a build up of flammable gases which can result in FIRE or EXPLOSION.**

General Use

- 1. WARNING - To reduce the risk of injury do not permit children to use this product unless they are closely supervised at all times. Children should not use spas or hot tubs without permanent adult supervision.**
- 2. WARNING - Risk of Accidental Drowning.** Extreme caution must be exercised to prevent unauthorized access by children. To avoid accidents, ensure that children cannot use a spa or hot tub.
- 3. DANGER - To reduce the risk of injury, do not remove the suction grates. Never operate a spa or hot tub if the suction grates are broken or missing. Never replace a suction grate with one rated less than the flow rate marked on the equipment assembly.**
- 4. DANGER - Risk of electrical shock. Do not permit any electrical appliance, such as a light, telephone, radio, or television, within 1.5m (5 feet) of spa or pool.**
- 5. To avoid injury, exercise care when entering or exiting the spa or hot tub.**

Health, General & Hyperthermia

General: WARNINGS - To reduce the risk of injury:

1. People using medications and/or having an adverse medical history should consult a physician before using a spa or hot tub.
2. People with infectious diseases should not use a spa or hot tub.
3. The maximum spa water usage temperature is 40° C (104° F). Duration in spa water at 40° C (104° F) should not exceed 15 minutes. Lower water temperatures are recommended for young children and when spa use exceeds 10 minutes.
4. Water temperature in excess of 38°C (100°F) may be dangerous to your health.
5. Pregnant or possibly pregnant women should consult a physician before using a spa or hot tub.
6. Since excessive water temperatures have a high potential for causing fetal damage during the 1st trimester of pregnancy, pregnant or possibly pregnant women should limit the spa water temperatures to 38°C (100°F).
7. Before entering a spa or hot tub, the user should measure the water temperature with an accurate thermometer since the tolerance of water temperature regulating devices varies.
8. The use of alcohol, drugs, or medication before or during spa or hot tub use may lead to unconsciousness with the possibility of drowning.
9. Obese persons and persons with a history of heart disease, low or high blood pressure, circulatory system problems, or diabetes should consult a physician before using a spa/hot tub.
10. Persons using medication should consult a physician before using a spa or hot tub since some medication may induce drowsiness while other medication may affect heart rate, blood pressure, and circulation.
11. Do not use a spa or hot tub immediately following strenuous exercise.
12. Prolonged immersion in a spa or hot tub may be dangerous to your health.

Hyperthermia

WARNING -The use of alcohol or drugs can greatly increase the risk of fatal hyperthermia in hot tubs and spas.

Consult your spa/hot tub manufacturer's manuals for the proper adjustment of water temperature. Prolonged immersion in hot water may induce hyperthermia. Hyperthermia occurs when the internal temperature of the body reaches several degrees above the normal body temperature of 37°C (98.6°F). Hyperthermia symptoms include drowsiness, lethargy, and an increase of internal body temperature.

The effects of hyperthermia include:

1. unawareness of impending hazard
2. failure to perceive heat
3. failure to perceive the need to exit the spa/hot tub
4. physical inability to exit spa
5. fetal damage in pregnant women
6. unconsciousness and danger of drowning

SAVE THESE INSTRUCTIONS

Specifications

TUBBY MODEL ST1

INPUT: 105 – 125 VAC, 50/60 HZ, 0.5 Amp.

OUTPUT: 3.5 VDC, 500 mA. (40°C/104°F)

MINERAL SPRINGS TUBBY Model C1 Cell: Maximum output equivalent to 15 grams of free available chlorine per 24 hours @max. dial setting of 100%

NOTE: The MINERAL SPRINGS TUBBY unit is designed to provide a chlorine/bromine residual whenever the spa IS NOT in use. With an average residential spa, this "non-use" time represents 95% to 99% of each day. Supplemental sanitizer/oxidizer should be added before and/or after EACH spa use, to maintain 3-5 ppm of free available chlorine/bromine.

Automatic Self Cleaning Feature

Reverse Polarity Function:

The Reverse Polarity Function is designed to automatically clean the cell blades, maximizing the cell's ability to manufacture chlorine or bromine. This feature is only enabled when the AC power is on and the L.E.D. light displays a solid GREEN color. The unit reverses polarity after the first hour of run time; then every three hours from that point on.

System Sizing

Use these three formulas to calculate the volume of water in the spa:

Rectangular: Length(M) x Width(M) x Average Depth(M) x1000 = Total Litres
 Length(Ft) x Width(Ft) x Average Depth(Ft) x7.5 = Total U.S. Gallons

Round: 3.14 x Radius (M) x Radius (M) x Average Depth (M) x 1000 = Total Litres
 3.14 x Radius (Ft) x Radius (Ft) x Average Depth (Ft) x 7.5 = Total U.S. Gallons

Free Form: Average Length (M) x Average Width (M) x Average Depth (M) x 1000 = Total Litres
 Average Length (Ft) x Average Width (Ft) x Average Depth (Ft) x 7.5 = Total U.S. Gal.

TUBBY System Production Capacity

IMPORTANT CONCEPTS**1 . Sanitizer Demand**

The rate at which sanitizer is consumed in any spa depends on the relationship of eight major variables. Since these variables can vary widely from spa to spa and season to season, precise prediction of the sanitizer demand for any one spa is difficult. At the end of this section, rules of thumb are provided for MINERAL SPRINGS TUBBY System Sizing.

THE VARIABLES ARE:

1. Volume and surface area of the spa being sanitized.
2. Average water temperature maintained: As the temperature of the water increases, the sanitizer demand will also increase. As the temperature of the water decreases, the sanitizer demand will also decrease. When this happens, the output dial should be decreased to compensate for this lower demand (which will also protect your equipment from excessive levels of sanitizers).
3. Cyanuric acid level maintained: This chemical, when added to your outdoor spa water, significantly inhibits sanitizer depletion from exposure to sunlight. Cyanuric acid also inhibits corrosion if your spa is equipped with any metal components. Minimum levels or better must be maintained to ensure that the sanitizer being produced is protected from UV breakdown.
4. Bather load: As the bather load increases, the sanitizer demand will also increase.
5. Amount of direct sunlight / LIV exposure: Spas exposed to larger amounts of direct sunlight are more vulnerable to increased sanitizer loss and algae growth. Indoor or screened spas have less sanitizer demand.
6. Exposure to vegetation and airborne debris: Dense landscaping near the spa, along with increased nitrate levels (urine, bird droppings, fertilizer, well water, etc.) greatly contribute to increased sanitizer demand.
7. Chemical dilution: Virtually all spa chemicals experience dilution through rainfall, adding of fresh make-up water due to evaporation, splash-out, filter backwashing, leaks, etc. When freshwater is added, sanitizer demand increases for a brief period.
8. Main filter pump runtime and your spa's circulation patterns: Waterfalls/Fountains and other water features operated by the filter pump can directly effect sanitizer demand. The main filter pump runtime and/or output dial may need to be increased to satisfy this higher demand.

NOTE: The MINERAL SPRINGS TUBBY unit is designed to provide a chlorine/bromine residual whenever the spa IS NOT in use. With an average residential spa, this "non-use" time represents 95% to 99% of each day. Supplemental sanitizer/oxidizer should be added before and/or after EACH spa use, to maintain 3-5 ppm of free available chlorine/bromine.

2. Sanitizer Production/ System Sizing/ "Rules of Thumb"

While sanitizer *demand* varies beyond precise prediction, and you may desire a higher or lower sanitizer residual in your spa, the following "rules of thumb" will assist you in properly selecting the correct MINERAL SPRINGS TUBBY feed rate dial setting.

1. A MINERAL SPRINGS TUBBY power supply with cell , operated at maximum output (100%), at 3000 ppm salt residual will produce 15 grams of free available chlorine in 24 hours of continuous operation.

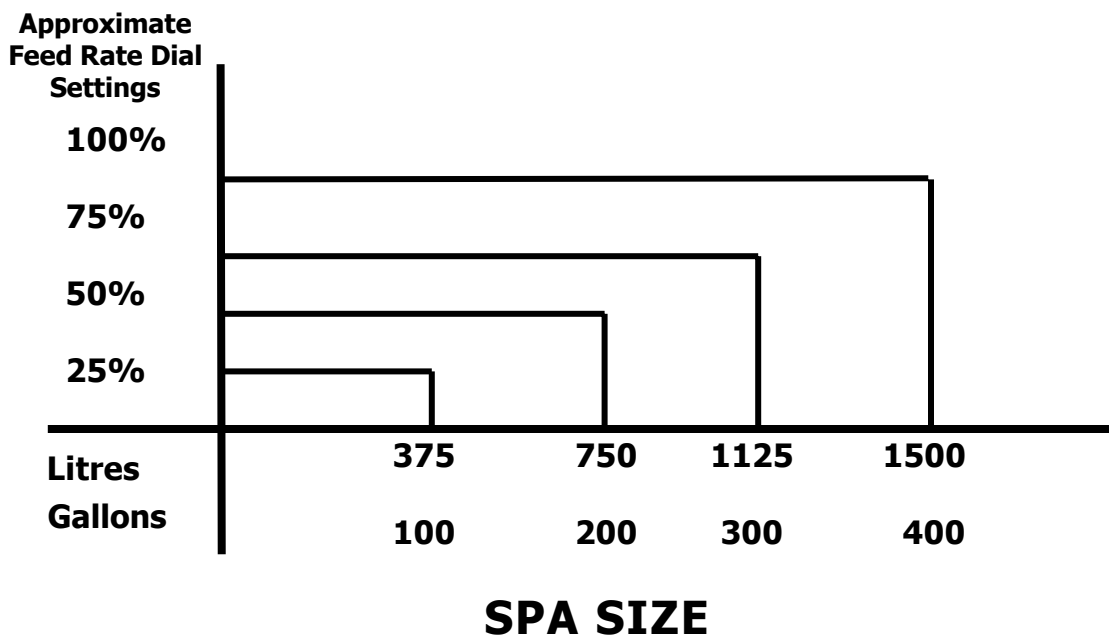
This amount of chlorine could satisfy up to 1,500 L (400 U.S. gallons) of spa water, depending on the 8 demand variables for sanitizer.

NOTE: Residual salt levels must be maintained above 2800 ppm and below 3200 ppm. Do not exceed 3200 ppm salt residual if you object to salty tasting water!

Normal System Sizing Guide

The sizing criteria below reflects "*normal*" conditions based on field experience and proper operation. Sanitizing "demand" varies from one spa to another. The chart below provides approximate feed rate dial settings required to maintain adequate chlorine (3.0 – 5.0 ppm) or bromine residuals (3.0 – 5.0 ppm) during "non-use" periods, based on spa volume.

For proper sanitation, spa must be completely drained periodically. The number of days between COMPLETE SPA DRAINAGE is equal to the volume of spa water in litres, divided by 10 times the maximum number of daily spa users. Refill spa with water and repeat the start-up procedure.



STEP 1 - Proper Water Balance Requirements:

Proper MINERAL SPRINGS TUBBY System operation is dependent on proper spa water conditions. Manually balance the SPA water chemistry to meet all suggested ranges of water balance factors listed below before start-up of the MINERAL SPRINGS TUBBY unit. From that point forward your MINERAL SPRINGS TUBBY System will assist you in keeping your water chemistry factors in balance. **BEFORE START UP, MAKE SURE THE SPA WATER MEETS THE FOLLOWING REQUIREMENTS: ALL WATER BALANCE FACTORS SHOULD BALANCE WITH LANGELIER'S SATURATION INDEX. WE RECOMMEND A VISIT TO YOUR LOCAL SPA PROFESSIONAL.**

MINERAL SPRINGS TUBBY System Required Ranges (And periods for testing water for these water balance factors.)

STEP 2 - Daily Checks

- | | |
|--|---|
| 1) Free Available Chlorine = 3.0 – 5.0 ppm | 4) Total Alkalinity 80 - 120 ppm |
| 2) Free Available Bromine = 3.0 – 5.0 ppm | 5) Cyanuric Acid 30-100 ppm (Outdoor) |
| 3) Calcium Hardness 150 – 200 ppm | 6) Salt Residual 2800-3200 ppm |
| | 7) Langelier's Index (water balance) + or - 0.3 |
- 8) pH 7.2-7.8 (NOTE: Check expiry date of the test kit as test results may be inaccurate if used after that date.)

STEP 3 - Monthly Checks: CAUTION: Excessive Free Available Chlorine(>5.0 ppm) or Free Available Bromine (> 5.0 ppm) causes corrosion of any metal components in contact with spa/hot tub water. Staining and premature failure of heaters, filters, and other metal components will be the result. Do not exceed recommended sanitizer ranges. NOTE: Standard (DPD) pool water test kits do not read chlorine/bromine levels above approximately 8.0 ppm. Test reagents, at high levels, return to a clear liquid. **AVOID HIGH SANITIZER LEVELS!**

STEP 4 - Salt Requirements: It is important that a suggested salt level of 3000 ppm be maintained at all times. Allowing less than 2800 ppm salt will activate a double flashing red CHECK SYSTEM light and stop sanitizer generation. The amount of salt required depends on the size of the spa/hot tub. Use the chart on the next page to determine the amount of salt to add, in pounds or kilograms, for a new spa/hot tub start up. Also test your make up water for its level of salt and compare it with the charts on the next page. Before adding salt to a spa/hot tub for the first time, turn your MINERAL SPRINGS TUBBY unit OFF, then pour salt around the perimeter of the spa.

NOTE: Homeowners with water softening/treatment equipment, which utilize salt, may already have substantial levels of salt in their drinking water. So before adding this water to your spa, test the level of salt, then determine the amount of salt still needed to be added to bring the level up to the suggested 3000 ppm start-up level. Before adding any make-up water to your spa, it is suggested that pre-testing the make-up water for high pH, total alkalinity and calcium hardness will aid in the adjustment of these levels before they become excessive.

NOTE: Maintaining constantly high levels of salt and bromine above the recommended range can contribute to corrosion of the pool equipment. Salt levels exceeding the recommended concentration can be reduced by diluting the spa water with fresh water. NOTE: Heavy uses of the spa (excessive contamination) may require longer recovery times (a return to a minimum of 3 ppm bromine). Recovery time may be reduced by adding a shock compound to the water. Follow instructions of the shock compound being used.

MANUAL CLEANING OF CELLS

In normal conditions, the MINERAL SPRINGS TUBBY unit should not require Manual Cleaning. If manual cleaning is required, check water chemistry for possible imbalances or call the factory for consultation, and use the following procedure:

STEP 1 - Remove the cell.

STEP 2 – Using a bucket, add 1 part muriatic acid to 4 parts of water. **PUT WATER IN BUCKET FIRST!**

CAUTION: Always add acid to WATER, never water to acid.

STEP 3 - Submerge the cell in the solution.

STEP 4 - After 10 - 15 minutes of foaming, remove the cell. Rinse with fresh water.

STEP 5 - If cell blades still have white crusty scale deposits on them, repeat the process, not to exceed 15 minute intervals.

NOTE: DO NOT try to remove any scale from cell blades with any tools. This may scratch or damage the coating on the blades and will VOID WARRANTY. The electrolytic cell has a life expectancy of 2 to 4 years under typical conditions of use. 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 MINERAL SPRINGS TUBBY Model ST1, Registration Number: 28314, Pest Control Products Act.

Salt Requirements Needed for 3000 PPM

Section 1 b

KILOGRAMS OF SALT NEEDED FOR 3000 PPM RESIDUAL

Salt Level Before Addition	Tub Volume in Liters			
	375	750	1125	1500
0 ppm	1.1	2.2	3.3	4.4
300 ppm	1.0	2.0	3.0	4.0
600 ppm	.88	1.8	2.6	3.5
900 ppm	.77	1.5	2.3	3.1
1200 ppm	.66	1.3	2.0	2.6
1600 ppm	.52	1.0	1.6	2.1
1900 ppm	.41	.81	1.2	1.6
2200 ppm	.30	.59	.89	1.2
2500 ppm	.19	.37	.56	.75
2800 ppm	0.08	.15	.23	.31

POUNDS OF SALT NEEDED FOR 3000 PPM RESIDUAL

Salt Level Before Addition	Tub Volume in U.S. Gallons			
	100	200	300	400
0 ppm	2.5	5.0	7.5	10.0
300 ppm	2.3	4.5	6.8	9.0
600 ppm	2.0	4.0	6.0	8.0
900 ppm	1.7	3.5	5.3	7.0
1200 ppm	1.5	3.0	4.5	6.0
1600 ppm	1.2	2.4	3.5	4.7
1900 ppm	.93	1.9	2.8	3.7
2200 ppm	.68	1.3	2.0	2.7
2500 ppm	.43	.85	1.3	1.7
2800 ppm	.17	.35	.53	.7

NOTE: Turn device off before adding sodium chloride/bromide and other chemicals, and wait until complete dissolution before turning it on.

Section 1 b

Cyanuric Acid Needed for 75 PPM

Cyanuric Acid / Stabilizer/Conditioner (Required with uncovered outdoor spas only)

Cyanuric acid, CYA, (also known as stabilizer or conditioner) prevents rapid breakdown of chlorine by direct sunlight. Maintain CYA concentrations between 30-100 ppm by diluting with fresh water. Regulations may exist regarding use of Cyanuric acid in spas; please consult your spa professional. Use the chart below to determine the amount of Cyanuric acid needed. Test water with a test kit that includes CYA testing, then use the chart below to determine the amount to add. Note: Indoor or bromine spas do not require the addition of CYA.

GRAMS OF CYANURIC ACID (CYA) NEEDED FOR 75 PPM RESIDUAL

CYA Level Before Addition	Tub Volume in Liters			
	375	750	1125	1500
0 ppm	28.0	56.0	84.0	112.0
10 ppm	24.0	49.0	73.0	98.0
25 ppm	19.0	37.0	56.0	75.0
40 ppm	13.0	26.0	39.0	52.0
50 ppm	9.5	19.0	28.0	38.0
60 ppm	5.5	11.0	17.0	24.0

OUNCES OF CYANURIC ACID (CYA) NEEDED FOR 75 PPM RESIDUAL

CYA Level Before Addition	Tub Volume in U.S. Gallons			
	100	200	300	400
0 ppm	1.0	2.0	3.0	4.0
10 ppm	.87	1.7	2.6	3.5
25 ppm	.66	1.3	2.0	2.6
40 ppm	.47	.95	1.4	1.9
50 ppm	.33	.66	1.0	1.3
60 ppm	.20	.40	.60	.80

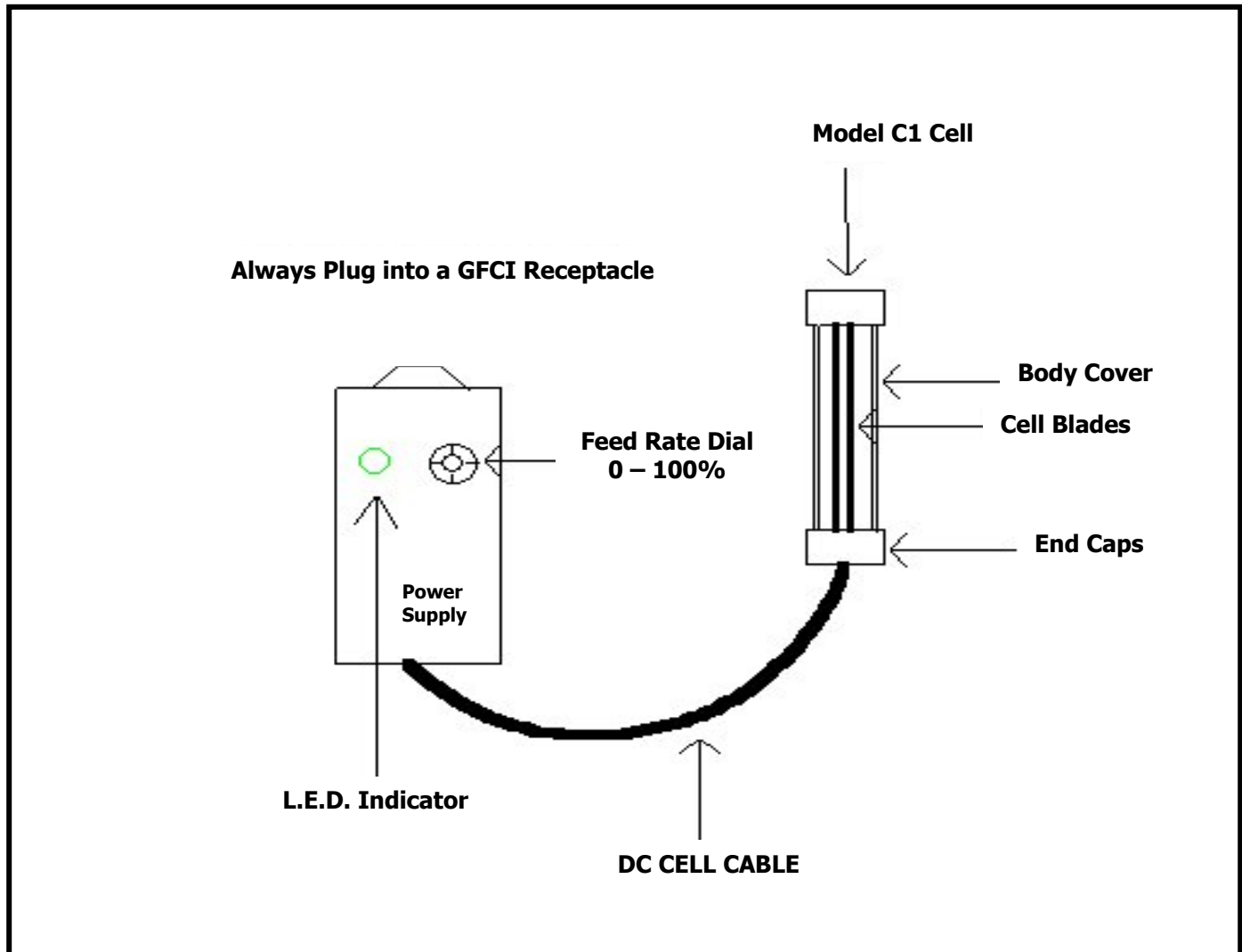
Power Supply

The Power Supply should be plugged into a 110VAC GFCI protected outlet and preferably away from direct exposure to sunlight. The Power Supply is equipped with a 1.5m (5 ft.) DC cell cord.

The unit comes complete with one of two cell types.

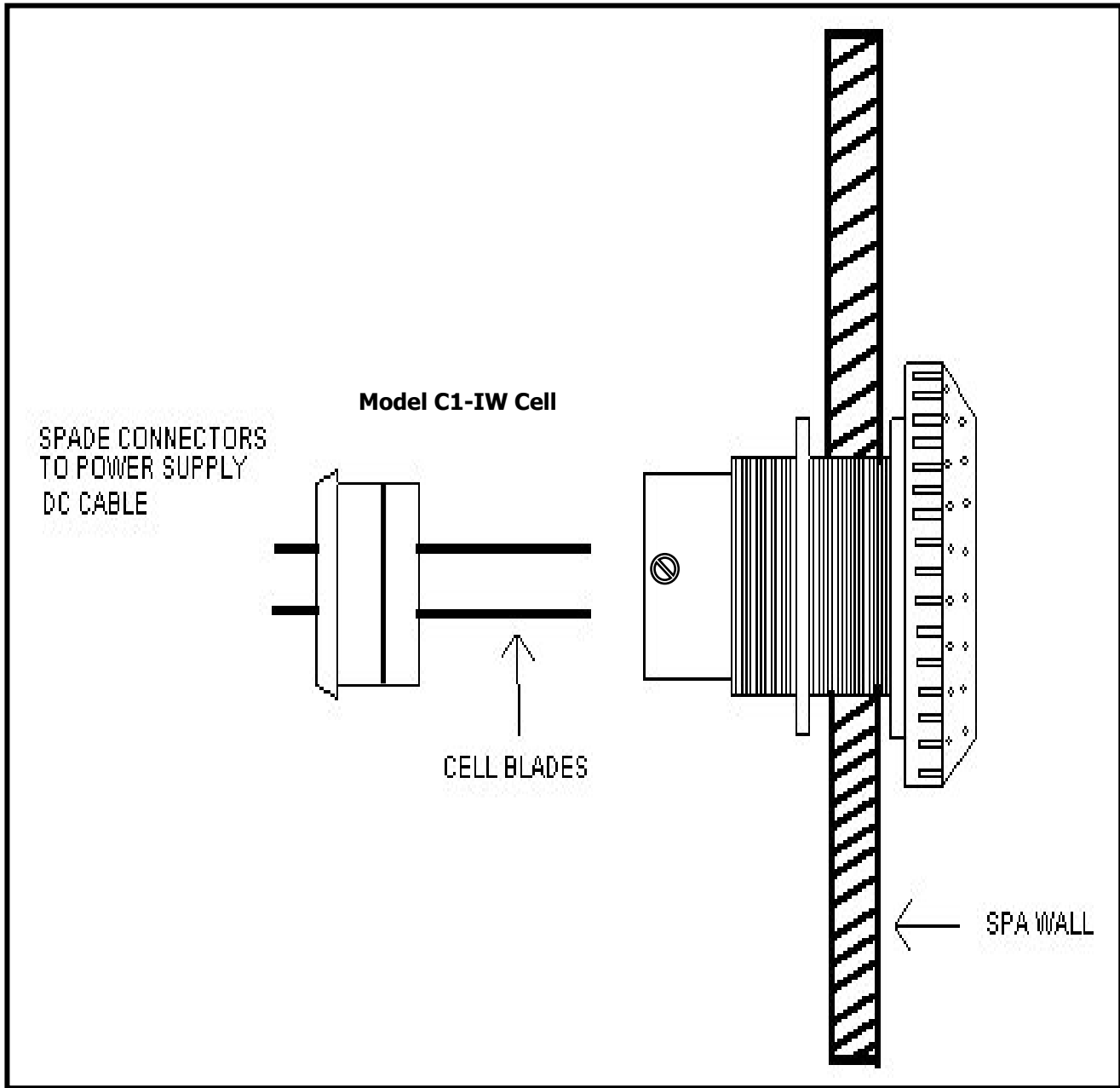
- For existing spas, the MINERAL SPRINGS TUBBY unit will be provided with the cell attached, for simple over the wall installation. The cell should be placed into the footwell of the spa. (Diagram 1)
- Where MINERAL SPRINGS TUBBY unit is a factory installed option, the cell will be glued into a standard spa fitting and installed directly into the wall of the spa. The in wall model includes a DC cell cord with spade connectors to allow for future servicing of the Power Supply. (Diagram 2)

Diagram 1

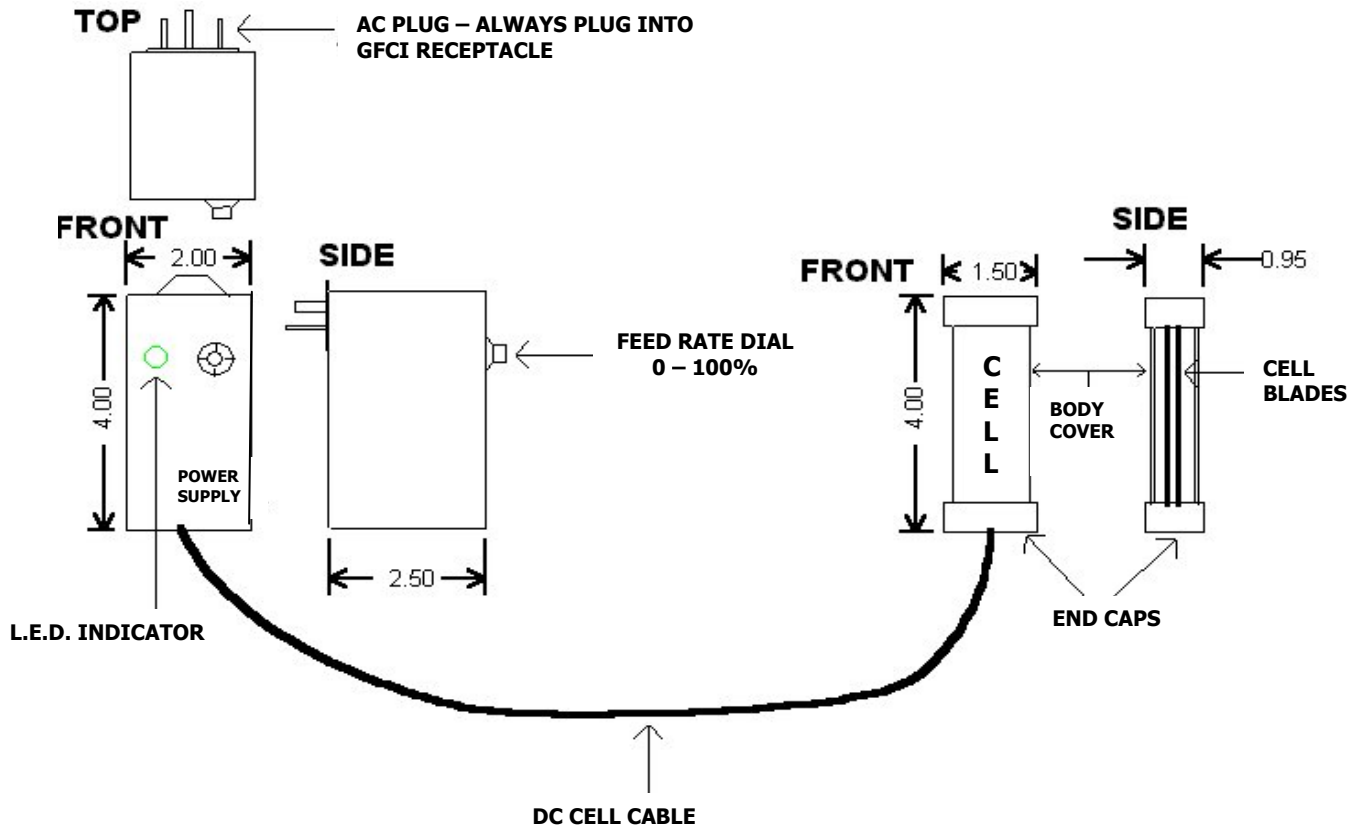


UNIT WITH CELL ATTACHED FOR "OVER THE WALL" RETROFIT INSTALLATION.

Diagram 2



UNIT WITH "IN WALL" FACTORY INSTALLED CELL.



Indicator Light

A. WHEN POWER IS FIRST TURNED ON:

The light will flash GREEN slowly (1 flash per second) for approximately 5 seconds while the MINERAL SPRINGS TUBBY unit self-tests.

B OK:

If your MINERAL SPRINGS TUBBY unit is operating properly, this indicator will display solid GREEN. This indicates AC power is being delivered to the Power Supply and/or the unit is producing sanitizer and your spa is being sanitized by Hypochlorous Acid (chlorine) or Hypobromous Acid (bromine).

C. CHECK SYSTEM:

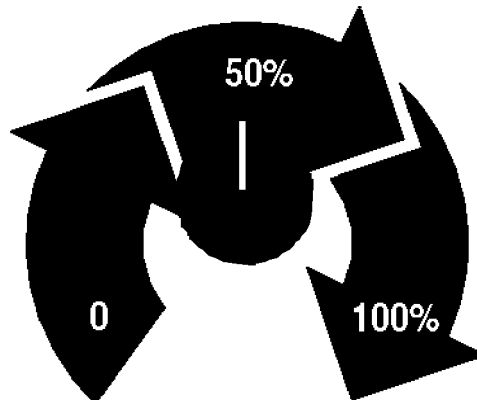
The light will flash GREEN rapidly (2 flashes per second) to indicate a component problem or failure. For further explanation of this indicator, please refer to the Trouble Shooting Guide beginning on page 12.

Output Control

The Output Control Dial is a percentage timer that regulates the amount of "on" time the system requires to maintain the chlorine/bromine residuals as indicated on page 4 of this manual. The output is regulated according to the setting of this dial. Remember the unit operates with convection. It operates independently from your filter pump run time.

NOTE: Any interruption of power will cause the current memory cycle to reset itself when power is restored.

Dial Setting	Approx. On-Time	Approx. Rest-Time
0	0 min.	180 min.
50%	90 min.	90 min.
100%	180 min.	0 min.



Use Of Sodium Bromide ***Once a bromine spa -Always a bromine spa.***

SODIUM BROMIDE (OPTIONAL) - 60 PPM

Where Cyanuric acid is not available or where its use is restricted, bromine can be used as an alternative sanitizer to chlorine.

The MINERAL SPRINGS TUBBY unit will convert sodium bromide to bromine in the same way that it converts sodium chloride to chlorine.

NOTE: Bromine spas do not require the addition of Cyanuric acid. Typical chlorine stabilizer provides no U.V. protection for bromine residuals. DO NOT MAINTAIN OR ADD CYANURIC ACID TO A BROMINE SPA!

To produce hypobromous acid (bromine sanitizer), we recommend adding 66 grams (2.4 oz.) of sodium bromide for every 2.2 kg (5 lbs.) of sodium chloride (salt) added to the spa. Always use a registered or scheduled source of bromide.

REMEMBER: For the MINERAL SPRINGS TUBBY System to produce bromine, the spa water must contain the recommended level of both salts as previously specified. (When used, sodium bromide is added in addition to the normal amount of sodium chloride required.)

Equipment Start-up Sequence

Section 3 b

Before operating the MINERAL SPRINGS TUBBY System, perform the following steps to ensure proper installation and operation:

A. Turn ON all circuit breakers to the spa equipment. Turn on jet pump. Add required type(s) and amount of salt to spa. Broadcast over the surface and allow salt to COMPLETELY dissolve (15 – 20 minutes). Place the cell in the spa (bottom of footwell). Plug the Power Supply into a 110VAC GFCI protected outlet and set the feed rate dial to 100%. The following indicators should display a series of green flashes for 5 seconds, followed by a solid green light. If this sequence does not occur please refer to the Trouble Shooting Guide starting on page 12 for further assistance.

NOTE: Be sure to test the chlorine/bromine level for the next few days and properly adjust the chlorine/bromine output dial as outlined on page 4 of this manual.

DO NOT EXCEED RECOMMENDED CHLORINE OR BROMINE LEVELS!

Make the required adjustment and allow the spa to react to this change a minimum of 2 days. After 2 days, retest the spa water and make any further "small" adjustments as required, until the MINERAL SPRINGS TUBBY unit maintains an adequate Free Available Chlorine or Free Available Bromine residual.

PROBLEM	CAUSE	SOLUTION
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1. Insufficient sanitizer production.

- | | |
|---|---|
| A. The test kit reagents or test strips are old or expired. | A. Retest with new reagents or test strips. |
| B. The unit is set too low in relation to the sanitizer demand. | B. Increase the feed rate on the output dial. |
| C. Sanitizer loss due to intense sunlight exposure. | C. Check the stabilizer level and add cyanuric acid if needed. (Refer to the Cyanuric Acid Needed for 75 PPM section, page 6.) If on bromine, replenish bromine residual. |
| D. The body of water being sanitized leaks. | D. Repair the leak and rebalance the water being sanitized. (Refer to the Spa Water Preparation section, page 5.) |
| E. Low salt | E. Check the residual salt level and add if necessary. (Refer to the Salt Requirements Needed for 3000 ppm section, page 6) |

2. Scale build-up within the cell.

- | | |
|---|---|
| A. The water being sanitized contains high pH, alkalinity and calcium hardness. | A. Calculate Langelier's Index to assure balanced water. (See page 5) Adjust the water chemistry and mix 1 part muriatic acid to 4 parts water. Allow the cell to soak in this solution for no longer than 15 minutes. Repeat if necessary. Rinse with fresh water and re- install. Dilute spa water with fresh water if necessary. |
|---|---|

3. DC plug and cell terminals burned (IN WALL MODEL ONLY).

- | | |
|--|--|
| A. The cell cord plug is not securely pushed onto the cell terminal allowing moisture to seep into the plug. | A. Ensure that the cell cord plug is pressed completely on the cell terminals. Check the cell terminals and clean with a dry cloth to remove all dirt and corrosion. |
| B. The cell terminals leak. | B. Return the cell to your retailer for service and repair. |
| C. Completely failed cell | C. Replace the cell. |

4. Premature cell failure.

- | | |
|--|--|
| A. Abnormally high cell usage due to an insufficient C.Y.A. level. | A. Check the stabilizer level and add cyanuric acid if needed. (Refer to the Cyanuric Acid Needed for 75 PPM.) |
| B. Debris in Cell | B. Inspect cell monthly and clean debris if required. |

5. White flakes in the water.

- | | |
|--|---|
| This occurs when excessive calcium hardness is present in the water being sanitized. This should cease after a few days. | Monitor the pH and adjust if necessary. (Refer to the Spa Water Preparation section, page 5.) |
|--|---|

6. No solid green "OK" light.

- | | |
|---------------------------------------|--|
| Incoming 110VAC power is not present. | Ensure that the MINERAL SPRINGS TUBBY'S circuit breaker is set to "ON" and functional. |
|---------------------------------------|--|

7. Rapid Green Flash – (Two flashes per second)

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|--|--|
| A. The cell is scaled. | A. Clean cell and re-install. |
| B. The cell DC cord is disconnected (IN WALL cell only). | B. Reconnect the DC cord properly. |
| C. Low salt | C. Check the residual salt level and adjust if necessary. (Refer to the salt requirements needed for 3,000 ppm section, page 6). |
| D. The unit is not reversing polarity. | D. Return the Power Supply to your retailer for service or replacement. |
| E. Possible cell failure. | E. Return Power Supply and Cell to your retailer for testing/servicing. |
| F. Very cold spa water. | F. Raise temperature to normal operating range (Max 104°F/40°C) |

To obtain service for your MINERAL SPRINGS TUBBY system, contact the Dealer/Service Centre listed below, or:

**KIK HOLDCO COMPANY INC.
33 MacIntosh Blvd.
Concord ON L4K 4L5
1-800-268-6572**

If warranty service is being requested, you must provide a copy of your registered warranty card as proof of purchase. Warranty service cannot be performed without this documentation.

<p>MINERAL SPRINGS TUBBY DEALER</p>
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WHEN CALLING FOR SERVICE - Please have the following information ready:

- 1. Power Supply Model:** _____
- 2. Chlorine Cell Serial Number:** _____
(Located on top of cell, stamped in plastic)
- 3. Installation Date: MM:** _____ **DD:** _____ **YY:** _____
- 4. Warranty Registration Number:** _____

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