Algoma
PUBLIC HEALTH
Santé publique Algoma

SPA OPERATOR'S MANUAL 2011

To: SPA OWNERS AND OPERATORS

Re: Operating and Maintaining Public Spas

The provincial government has recently enacted regulations governing the operation of public spas.

Their operation and maintenance is governed by Ontario Regulation 428/05 under the Health Protection and Promotion Act, 1990. To ensure compliance with these new mandatory requirements Public Health Inspectors will carry out routine inspection of public spas.

To assist you in meeting the requirements, Algoma Public Health has created the Spa Operator's Manual. It contains information and guidance to help maintain a safe and healthy spa. This manual is also available on our website at www.algomapublichealth.com.

Owners/operators are legally responsible for ensuring that spas are operated and maintained in accordance with provincial requirements. Failure to comply exposes bathers to unnecessary risks, such as water-borne communicable diseases and life-threatening injuries.

Public Health Inspectors will issue reports listing any contravention of the Regulation or the Act. These contraventions should be rectified immediately.

Public Health Inspectors are available for consultation on compliance issues. To reach an inspector, please call your local Algoma Public Health Environmental Health Program.

Thank you for your cooperation in ensuring a safe and healthy environment for spa users.

Table of Contents

Introduction

Spas have been implicated in numerous fatal or near fatal injuries. They have also been the source of ear, nose and throat infections, as well as stomach upsets, skin rashes and diarrhea.

This manual is designed to provide basic information on the minimum safety standards required to operate a public spa. It will help spa operators to comply with Ontario Regulation 428/05 (Public Spas) under the Health Protection and Promotion Act, Revised Statutes of Ontario 1990.c.H.7.

This manual is to be used as a reference document only. It is not a substitute for Ontario Regulation 428/05. As well, it is not a substitute for the professional expertise of spa maintenance companies or Public Health Inspectors.

Exemption from Ontario Regulation 428/05 (Public Spas)

Not every spa is covered by this Regulation. If the spa serves five or fewer units or suites then the Regulation does not apply to it provided a sign is displayed as set out in the Regulations.

Section 2

(1) *"In this section,*

"Class A pool" has the same meaning as in Regulation 565 of the Revised Regulations of Ontario, 1990 (Public Pools) made under the Act;

"Class B pool" has the same meaning as in Regulation 565 of the Revised Regulations of Ontario, 1990 (Public Pools) made under the Act."

(2) *"This Regulation applies to the following public spas, whether or not they are operated in conjunction with a Class A pool or a Class B pool, and to all buildings, appurtenances and equipment used in their operation"*
Refer to Ontario Regulation 428/05 (Public Spas) for details.

(3) *"A public spa operated on the premises of a hotel that contains five or fewer units of suites, for the use of its guest and their visitors, is exempt from this Regulation, if the following notice is displayed in a conspicuous place within the public spa enclosure, printed in letters at least 25 millimetres high with a minimum five millimetre stroke;"*

CAUTION

USE SPA AT YOUR OWN RISK
THIS SPA IS NOT SUBJECT TO THE REQUIREMENTS OF ONTARIO REGULATION 428/05 (PUBLIC SPAS)

Operator, designation and training

Professional spa service companies are increasingly getting involved in the day-to-day operations and maintenance of public spas with increasing numbers of spas in facilities such as hotels and motels, apartments and condominiums and fitness clubs.

Owners/operators need to ensure that persons performing water quality control and/or system component maintenance have the necessary training and are competent even if they are from a professional spa service company.

Section 3:

(1) *"Every owner shall designate an operator."*

(2) *"Every operator shall be trained in public spa operation and maintenance, filtration systems, water chemistry and all relevant safety and emergency procedures."*

Notification of public spa opening

The Regulation requires owners/operators to notify the Medical Officer of Health of their intention to open or re-open a public spa. Failure to notify may result in legal action and fines. In order to avoid such penalties, please complete the notification form (see Appendix Two – SPA OPENING FORM) and forward it to the nearest Algoma Public Health Office (see Appendix two) at least two weeks prior to the date of intended opening. This must be done in the following circumstances:

New spa

Section 4

(2) *"Before a public spa is put into use after construction or alteration, the owner or the owner's agent shall give to the medical officer of health in the health unit where the spa is located written notice of,*

- **(a)** *the building permit number issued for the construction or alteration of the spa;*
- **(b)** *whether or not all the preparations necessary to operate the spa in accordance with this Regulation have been completed;*
- **(c)** *the date that the spa in intended to be opened or re-opened for use; and*
- **(d)** *the operator's name and address."*

Re-opening a spa after construction

Section 4

(3) *"An owner who proposes to open or re-open a spa for use as a public spa after* ***construction*** *or* ***alteration*** *shall not open or re-open the spa without first obtaining permission in writing from the medical officer of health in the health unit where the spa is located."*

Re-opening a spa after closure (more than four weeks)

Section 4

(4) *"Every owner who intends to re-open a public spa after any closure of* ***more than four weeks*** *duration shall first give to the medical officer of health in the health unit where the spa is located written notice of,*

- **(a)** *the date that the spa is intended to be re-opened; and*
- **(b)** *the operator's name and address"*

Operation, general requirements

Under Section Five of the Regulation spa owners/operators are required to conduct routine checks on a daily, weekly or monthly basis. These checks include operational maintenance, servicing and component replacement issues.
To ensure compliance owners/operators are encouraged to develop a maintenance plan.

Section 5

(1) *"Every owner and operator shall,*

- **(a)** *maintain the public spa and its equipment in a safe and sanitary condition;*
- **(b)** *ensure that all components of the public spa and its equipment are maintained in proper working order;*
- **(c)** *ensure that all emergency equipment required by this Regulation is maintained in proper working order;*
- **(d)** *ensure that all surfaces of the public spa deck and walls are maintained in a sanitary condition and free from potential hazards;*
- **(e)** *ensure that carpeting or other water-retentive material is not installed or used in any area that becomes or may become wet during the daily use period;*
- **(f)** *if they are provided, ensure that dressing rooms, water closets and shower facilities are,*
  - ***(i)*** *available for use of the bathers before entering the deck, and*
  - ***(ii)*** *maintained in a sanitary condition and free from potential hazards;*
- **(g)** *ensure that no person brings a glass container onto the deck or into the public spa; and*
- **(h)** *ensure that no food or beverage except water is supplied or consumed in the public spa or on the deck."*

(2) *"Every owner and operator shall ensure that, except during the daily use period the public spa is inaccessible to persons who are not involved with its operation, inspection or maintenance."*

Water Treatment (Water Balance)

In order for the sanitizer (chlorine or bromine) to destroy harmful organic waste, the spa water must be in proper balance.

Proper balance means that the pH level, total alkalinity, calcium hardness, temperature and total dissolved solids must be kept at levels that ensure water is neither corrosive nor scale-forming. To ensure proper balance, maintain the range outlined in Sections 6(1) to 6(4) of the Regulation for these values.

Sections 6 (1) – 6 (4)

Water Treatment	
Total Alkalinity	Minimum 80 mg/l but not more than 180 mg/l ideal range 100 - 120mg/l
pH	7.2 – 7.8 ideal range 7.4 – 7.6
Free Available Chlorine or Total Bromine	5 - 10 mg/l
(if provided) **Oxidation Reduction Potential (ORP)**	not less than 700mV
Cyanuric Acid Ideal range 30 – 50 mg/l **Note: Cyanuric Stabilizer should be not added if the spa and its deck is totally or partially covered by a roof**	Maximum of 150 mg/l
Clarity Ideal to have a cover or fitting in a contrasting colour to the spa surface	Lowest outlet drain is visible when the spa is in a non-turbulent state
Filtration System	In continuous operation except during maintenance or repairs

Oxidation Reduction Potential (ORP)

An ORP reading on an automatic sensing device (controller) of a spa is an indicator of the sanitizer's (chlorine or bromine) ability to destroy harmful organic matter in the water, such as bacteria, viruses, human waste, etc. This is measured in milli-volts (mV).

The ORP value is affected by both the pH (hydrogen ion concentration) and the amount of cyanuric acid in the spa water. As the amount of cyanuric acid increases, the effectiveness of chlorine/bromine decreases resulting in a corresponding reduction in the ORP reading. Similarly, as pH increases there will be a corresponding reduction in the ORP reading.
However, as pH decreases the production of hypochlorous acid increases, resulting in an increase in the ORP reading.

The accuracy of an ORP reading is also dependent upon proper installation and maintenance of measuring equipment. The electrodes (probes) that measure the ORP are designed to operate with a set volume of water flowing past it. Probes must be kept clean and free of any deposits to give accurate ORP readings. Further information on the proper maintenance of such equipment can be obtained from the manufacturer.

It is important to remember that the ORP is a measure of the effectiveness of chemicals in the water. Milligrams per litre (mg/l) or parts per million (PPM) is a quantitative measure of the quality of chemicals in the water. A substantial difference between the ORP reading and the manual chemical test (mg/l) means that the automatic sensing device requires maintenance.

The Regulation requires an owner/operator to record the ORP reading one-half hour before a spa is open for use and once during the operating day.

Owner/operators must therefore establish the daily use period for the spa.

Section 6
Water Treatment

(d) *"If the public spa is equipped with an automatic sensing device, the Oxidation Reduction Potential value is not less than 700mV"*

Section 20
Daily Inspection

(3) *"If the public spa is equipped with an automatic sensing device, every operator shall determine the spa's water Oxidation Reduction Potential one-half hour before the spa is opened for use on an operating day, and thereafter, at least once more during the daily use period."*

Water Replacement

Maintaining water balance in a spa is more difficult than in a pool. However, problems can be easily corrected by replacing the water. Disinfectants, water clarifiers, oxidizers and other chemicals are effective in maintaining water balance, but do not remove all the contaminants. As contaminants (nutrients) in the water increase the ability of water to oxidize (destroy) the contaminants decreases. This creates the ideal conditions in the filtration system for organisms to grow, thereby creating a potential health hazard. This situation can be prevented by regularly cleaning the spa, replacing the water and super chlorinating the water. The rate at which the spa water is replaced is based on bather usage. Owners/operators are responsible for tracking the daily number of bathers.

Sections 7(1) – (4)

<table>
<tr><th colspan="3">Water Replacement</th></tr>
<tr><td>Spa of less than 4000 litres (smaller spas)</td><td>• Drain water form the spa and refill the spa with clean water in accordance with the following formula:

$$WRI = \frac{V}{10 \times U}$$
WRI = number of days between draining
V = total volume of spa in litres
U = total number of bather uses per operating day
• Before refilling inspect all parts of the spa e.g. drain cover, suction fitting and all emergency equipment.</td><td rowspan="2">  </td></tr>
<tr><td>Spa of more than 4000 litres (larger spas)</td><td>• Add make-up water during each operating day in an amount that is not less than 30 litres/bather use, to a maximum of 20% of the total spa area.
• Have a meter capable of measuring the volume of make-up water added.</td></tr>
</table>

Water Temperature

Hyperthermia occurs when the body's internal temperature rises several degrees above the normal reading of 98.6°F (37°C). Symptoms include dizziness, fainting, drowsiness, lethargy and an increase in the internal body temperature (similar to a high fever). Body mass has a direct correlation to hyperthermia. Thus, women who are pregnant, or who may be pregnant, and young children should not use a spa without consulting a physician. The owner/operator must ensure that the water heating device is equipped with a tamper-proof, upper-limit cut-off switch in order to limit the temperature to a maximum of 40°C (104°F). The switch must be independent of other temperature control devices, such as thermostats.

Section 8

"Every owner shall ensure that the public spa water heater is equipped with a tamper-proof, upper-limit cut-off switch that,

(a) *limits the maximum temperature of the spa water to* ***40°C /104°F****; and*
(b) *is independent of the spa's water temperature thermostat."*

Timing Device

A maximum time limit of 15 minutes is set in order to reduce any risk of injury due to hyperthermia. A bather is required to exit the spa and cool down before returning for another brief stay. The timing device should be in a location that requires bathers to exit the spa to reset it.

Long exposure may result in:

- a bather losing the ability to exit the spa
- failure to recognize how hot the water is
- failure to recognize the need to leave the spa
- unconsciousness resulting in drowning

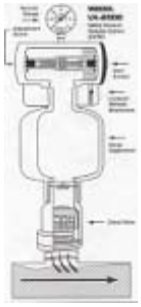
Section 9

(1) *" Every owner and operator of a public spa containing hydro-massage jet fittings shall ensure that the spa is equipped with a timing device that,*
(a) *controls the period of operation of the jet pump;*
(b) *can be set to a maximum of* ***15 minutes****; and*
(c) *is placed in a location that requires a bather to exit the spa to reset it."*

Suction System

Accidents due to entrapment and hair entanglement by suction fittings have occurred periodically, causing deaths and serious injuries. As a result, the province now requires that all spas be fitted with a device to prevent such incidents. **Note**: **The Regulation requires that these devices be tested every 30 day operating period.**

Section 10



"Every owner shall ensure that the suction system that serves the public spa is equipped with a vacuum relief mechanism that includes,

- **(a)** *a vacuum release system;*
- **(b)** *a vacuum limit system; or*
- **(c)** *another engineered system designed, constructed and installed to conform to good engineering practice appropriate to the circumstances."*

Install a Clock

Public spas are typically equipped with timers to control the hydrotherapy jets and air induction units. The common practice is to limit spa use to 15 minutes. However, bathers who do not use the hydrotherapy jets and air induction units must be able to determine how long they should remain in the spa. A clock in a conspicuous location will provide the required information. Signs conspicuously posted will inform bathers of the time limit. The combined actions of a timer, clock and sign will encourage bathers to exit the pool and allow their bodies to cool down. Also see hyperthermia on Page 11 under water temperature.

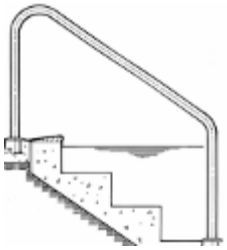
Section 11

"Every owner shall ensure that a clock is installed in a conspicuous location that can be viewed from anywhere in the public spa."

Steps

The Regulation requires that all steps entering or exiting a spa must be equipped with a secure handrail and a non-slip tread surface. The treads must have a band of contrasting colours along the entire side and top of the edges of each step. Visibility of steps is crucial in preventing injury.

Section 12



"Every owner shall ensure that, if a set of steps is provided for entry into and exit from the spa water, the set of steps,

- **(a)** *are equipped with a handrail;*
- **(b)** *have a non-slip surface on their treads; and*
- **(c)** *have a band of contrasting colour applied along the entire juncture of the side and top of the edges of each step."*

Emergency Telephone

The emergency telephone is one of the most important pieces of safety equipment used for getting help to an injured bather. The telephone must be within 30 metres of a spa and be connected to the local service provider. It must be tested daily. Time is crucial when emergency help is required.

Section 13

(1) *"Every owner shall ensure that there is a land line emergency telephone located within **30 metres** of the public spa that connects directly to an emergency service or the local telephone utility."*

Emergency Telephone Notice and Location

Section 13

"Every owner shall ensure that a notice indicating the location of the emergency telephone, in letters not less than 25 millimetres high with a minimum five millimetre stroke, is posted in a conspicuous location near the entrance to the public spa."

EMERGENCY PHONE LOCATED AT FRONT DESK

Emergency Telephone Test

Section 20

(4) *"Every operator shall ensure that the emergency telephone is tested before the public spa is opened for use on an operating day."*

Emergency Notice Content

Section 13

(2) *"Every owner shall ensure that a notice is posted at the emergency telephone that,*

- *(a) identifies the telephone as an emergency telephone in letters not less than 25 millimetres high with a minimum five millimetre stroke*
- *(b) lists the names, telephone numbers and addresses of persons who are available for resuscitation, medical aid and fires services; and*
- *(c) lists the full name and address of the public spa facility location and all of the facility's emergency telephone numbers."*

EMERGENCY SERVICES

In case of emergency
SPEAK CLEARLY AND SLOWLY

1. Dial 911
2. Ask for emergency service
3. Give Location
   a. Name of Spa_____
   b. Spa is located in the _____ of the building
   c. Address _____
   d. Main intersection _____
4. Telephone number of spa _____
5. State
   a. Type of emergency
   b. Type of accident
   c. Number of victims

_____
Owner/Operator

Emergency Stop Button

In an event of an injury or entrapment, bathers must have quick and easy access to the emergency stop button in order to deactivate the spa pumps and activate the audible and visual alarms. The button's location must conform to the Ontario Building Code for ground fault circuit interrupters (GFI). It is a requirement of the Regulation that owners/operators test the GFI daily before opening the spa.

Bathers should be encouraged to use a buddy system and **not** use the spa alone.

Section 14

(1) *"Every owner shall ensure that all pumps used in the operation of the public spa are capable of being deactivated by an emergency stop button that,*

a) *is separate from the spa's timing device is located within the immediate vicinity of the spa; and activates an audible and visual signal when used.*

Section 14

(2) *"Every owner shall ensure that the following notice, in letters at least 25 millimetres high with a minimum five millimeter stroke, is posted above the emergency stop button: IN THE EVENT OF AN EMERGENCY PUSH EMERGENCY STOP BUTTON AND USE EMERGENCY PHONE. AN AUDIBLE AND VISUAL SIGNAL WILL ACTIVATE."*

IN THE EVENT OF AN EMERGENCY PUSH EMERGENCY STOP BUTTON AND USE EMERGENCY PHONE. AN AUDIBLE AND VISUAL SIGNAL WILL ACTIVATE.

Other Emergency Equipment

This section describes the essential equipment that must be provided to safely remove and transport an injured bather.

Section 15

(1) *"This section applies to an owner of a public spa that has an inner horizontal dimension greater than three metres.*"

(2) *"Subject to subsection (3), every owner shall ensure that there are provided, in places conveniently located for emergency use,*

(a) *an electrically insulated or non-conducting reaching pole that is at least 3.65 metres in length;*

(b) *a buoyant throwing aid to which is securely attached a six millimetre diameter rope of a length not less than half the width of the pool plus three metres; and*

(c) *a spine board or other device designed for transporting a person who has incurred a spinal injury."*

Duplicate Emergency Equipment not Required

(3) *"Where an item described in clause (2) (a), (b) or (c) is provided under section 20(1) of Regulation565 of the Revised Regulation of Ontario, 1990 (Public Pools) made under the Act to a public pool that operates in the immediate vicinity of the public spa, an owner is not required to provide a duplicate item as long as the item is conveniently located for emergency use to the spa."*

(4) *"Every owner shall ensure that marking in figures not less than 100 millimetres high that set out the water depths indicating the deep points, the break between gentle and steep bottom slopes and the shallow points, and the words* ***DEEP AREA*** *and* ***SHALLOW AREA*** *are displayed at the appropriate locations on the deck."*

First-aid Box

Section 16

Every owner and operator shall ensure that there is provided in a place conveniently located for emergency use a first-aid box containing, at a minimum:

First Aid Kit for Spas

- a current copy of a Standard First Aid Manual
- 12 safety pins
- 24 adhesive dressings, individually wrapped
- 12 sterile gauze pads, each 75mm square
- 4 rolls of 50 mm gauze bandage
- 4 rolls of 100 mm gauze bandage
- 4 sterile surgical pads suitable for pressure dressing, individually wrapped
- 6 triangular bandages
- 2 rolls of splint padding
- 1 roll-up splint
- 1 pair of scissors
- 2 pairs of non-permeable gloves and
- 1 resuscitation pocket mask

Ontario Regulation 428/05

Maximum Capacity

To protect bathers, the maximum number of persons allowed in a public spa should be limited to that recommended by the manufacturer. This maximum capacity must be posted and should be included in the caution notice as required in section 18(1).

Section 17

"Every operator shall ensure that the maximum number of persons permitted to use a public spa at any one time is the lesser of,

(a) *one person per square metre of surface water area; and*
(b) *the maximum bather load identified by the manufacturer of the spa."*

Maximum Bather Notice

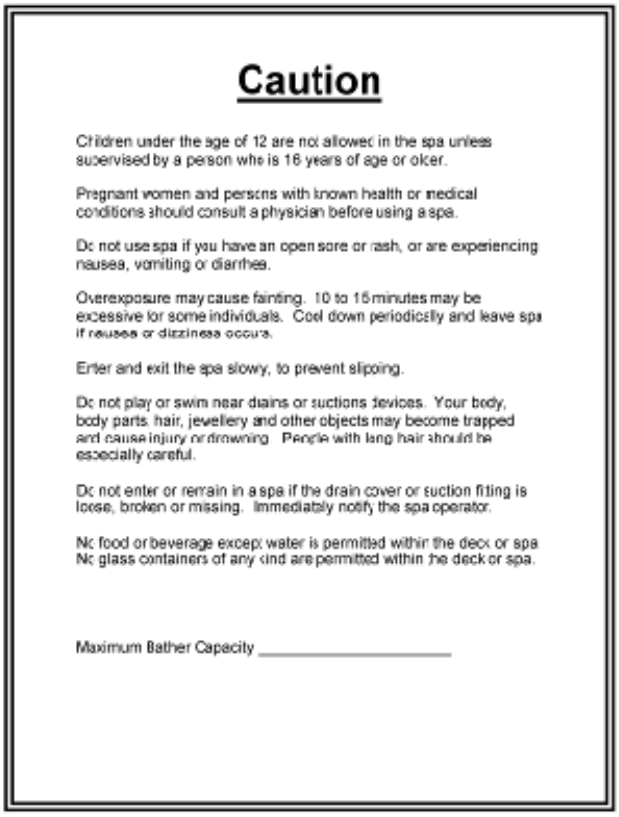
Section 18

(2) *"The notice described in subsection (1) shall include the maximum bather capacity of the public spa determined under section 17."*

Caution Notice and Location

Section 18

(1) *"Every owner and operator shall ensure that the following notice is posted in a conspicuous place at each entrance to the public spa with the word CAUTION in letters not less than 50 millimetres high, all other lettering not less than 10 millimetres high and with a minimum five millimeter stroke in either case."*



Caution

Children under the age of 12 are not allowed in the spa unless supervised by a person who is 16 years of age or older.

Pregnant women and persons with known health or medical conditions should consult a physician before using a spa.

Do not use spa if you have an open sore or rash, or are experiencing nausea, vomiting or diarrhea.

Overexposure may cause fainting. 10 to 15 minutes may be excessive for some individuals. Cool down periodically and leave spa if nausea or dizziness occurs.

Enter and exit the spa slowly, to prevent slipping.

Do not play or swim near drains or suctions devices. Your body, body parts, hair, jewellery and other objects may become trapped and cause injury or drowning. People with long hair should be especially careful.

Do not enter or remain in a spa if the drain cover or suction fitting is loose, broken or missing. Immediately notify the spa operator.

No food or beverage except water is permitted within the deck or spa
No glass containers of any kind are permitted within the deck or spa.

Maximum Bather Capacity _____

Bather Shall Shower

Section 19

(1) *"Every bather shall take a cleansing shower using soap and warm water before entering the deck."*

Bather Shall Shower Sign Location

Section 19

(2) *" Every operator shall post a sign in a conspicuous location near every entrance to the deck that indicates, in letters not less than 25 millimetres high with a minimum five millimetre stroke, the bather's duty to shower under subsection."*

Daily Inspection

Owners/operators must take the time to understand and familiarize themselves with this section. Injury prevention reports compiled from the daily record can be used by management to develop new objectives, such as training requirements, facility renovations and/or equipment installation/replacement.

Manual Tests

Section 20

(1) *"Every operator shall, by means of manual test methods, determine at the times set out in subsection (2) the following regarding the public spa water:*

1. *Total alkalinity.*
2. *pH value.*
3. *Free available chlorine or total bromine residual.*
4. *Water clarity.*
5. *Water temperature."*

Time and Frequency of Manual Tests

Section 20

(2) *"Measurements made under subsection (1) shall be made one-half hour before the public spa is opened for use on an operating day, and thereafter,*

(a) *at time intervals not exceeding one hour until the daily use period has ended; or*

(b) *at least once more during the daily use period, if the public spa is equipped with an automatic sensing device."*

Tests with ORP Unit

Section 20

(3) *"If the public spa is equipped with an automatic sensing device, every operator shall determine the spa water's Oxidation Reduction Potential one-half hour before the spa is opened for use on an operating day, and thereafter, at least once more during the daily use period."*

Ground Fault Circuit Interrupter (GFCI)

Section 20

(5) *"Every operator of a public spa with a ground fault circuit interrupter shall ensure that the test-button associated with it is activated before the spa is opened for use on an operating day."*

Water Meter Reading

Section 20

(6) *"Every operator of a public spa with a make-up water meter shall ensure that the meter is read at the end of an operating day."*

Daily Records

Owners/operators have a legal responsibility to keep proper records. These records play a significant role in every aspect of managing a spa. They show how the facility operates, help to reduce costs and liability and ensure staff and bather safety. Refer to Sections 20 to 22 in the Regulation to determine what must be recorded daily. Also refer to Appendices 22 and 23 for examples of daily, weekly and monthly records.

Maintain Daily Records

Section 21

(1) *"Every operator shall keep and sign a daily record that sets out, in relation to an operating day,*

- ***(a)*** *the results of the tests required under subsections 20(1) and(3), and the times they were performed;*
- **(b)** *the time of day that the emergency phone test and ground fault circuit interrupter test were performed;*
- **(c)** *the reading of the make-up water meter, if applicable;*
- **(d)** *the type and amount of any chemicals added manually to the public spa;*
- **(e)** *the estimated number of bather uses during the daily use period;*
- **(f)** *whether the public spa was drained, inspected and refilled in accordance with subsection 7(3) and (4), if those subsections apply; and*
- **(g)** *any emergencies, rescues or breakdowns of equipment that have occurred.*"

Record Keeping

Section 21

(2) *"The daily record shall be retained for a period of* ***one year*** *from the date of making the record and shall be available for viewing by a medical officer of health or a public health inspector at any time."*

Other Inspections

Owners/operators must ensure that safety equipment, such as the vacuum release mechanism, emergency stop button and gravity and suction outlet cover, is tested at least once every 30 operating days to ensure it is operating properly.

Cyanuric acid (stabilizer) is sometimes used in a spa to prevent rapid loss of chlorine. Tests for cyanuric acid concentration must be carried out weekly and recorded. See Appendix 24 – Weekly Test for Cyanuric Acid. Spas that are totally or partially covered by a roof must **not** use cyanuric acid.

Monthly Inspections

Section 22

(1) *"Every operator shall ensure that,*

- **(a)** *where a public spa has gravity and suction outlet covers, the outlets covers are inspected at least once within each period of 30 operating days;*
- **(b)** *the emergency stop button and vacuum release mechanism, if any, are tested and inspected at least once within each period of 30 operating days; and*

Weekly Inspections

- **(c)** *where cyanurate stabilization is maintained, the concentration of cyanuric acid is determined not less than once per week."*

Written Records

Section 22

(2) *"Every operator shall ensure that*

- ***(a)*** *a written record of the inspection required by subsection(1) is made and signed by the person who performed the inspections; and*
- ***(b)*** *the written record of the inspections is retained by the operator for at least one year from the date the record is made and is available for viewing by a medical officer of health or a public health inspector at any time."*

Public Spas **Signage Required**	**Lettering Size** **Stroke size**	**Ontario Regulation section**	**Location posted**
Timing device	25mm with 5mm stroke	9(2)	Posted at the timing device
Emergency Telephone is located at _____	25mm with 5mm stroke	13 (2)	Posted in a conspicuous location near the entrance to the public spa
Emergency Telephone	25mm with 5mm stroke	13 (3) (a)	Posted at the emergency telephone
<u>Emergency Services</u> In Case of Emergency **Speak Clearly and Slowly** 1. Dial **911** 2. Ask for emergency service 3. Give Location a. Name of Spa_____ b. Spa is located in the _____ of the building c. Address_____ d. Main intersection_____ 4. Give telephone number of spa_____ 5. State a. Type of Emergency b. Type of accident c. Number of victims _____ owner/operator	25mm with 5mm stroke	13 (3) (b) 13(3) (c)	Posted at the emergency telephone
IN THE EVENT OF AN EMERGENCY PUSH EMERGENCY STOP BUTTON AND USE EMERGENCY PHONE. AN AUDIBLE AND VISUAL SIGNAL WILL ACTIVATE	25mm with 5mm stroke	14(2)	Posted above the emergency stop button

Public Spas Signage Required (continue)	Lettering size	Ont. Reg. section	Location posted
DEEP AREA , SHALLOW AREA	100mm	15 (4)	Appropriate locations on the deck for spas greater than three metres
CAUTION Children under the age of 12 are not allowed in the spa unless supervised by a person who is 16 years of age or older. Pregnant women and persons with known health or medical conditions should consult with a physician before using a spa. Do not use the spa if you have an open sore or rash, or are experiencing nausea, vomiting or diarrhea. Overexposure may cause fainting. 10 to 15 minutes may be excessive for some individuals. Cool down periodically and leave the spa if nausea or dizziness occurs. Enter and exit the spa slowly, to prevent slipping. Do not play or swim near drains or suction devices. Your body, body parts, hair, jewelry and other objects may become trapped and cause injury or drowning. People with long hair should be especially careful. Do not enter or remain in a spa if a drain cover or suction fitting is loose, broken or missing. Immediately notify the spa operator. No food or beverage, except water, is permitted within the deck or spa. No glass containers of any kind are permitted within the deck or spa. Maximum Bather Capacity _____	50mm for Caution 10mm for other wording both with 5mm stroke	18(1) 18(2)	Posted in a conspicuous place at each entrance to the public spa
Every bather shall take a cleansing shower using soap and warm water before entering the deck	25mm with 5mm stroke	19(2)	Post in a conspicuous location near every entrance to the deck

APPENDICES

Appendix 1

Glossary

Acid
- A chemical compound which releases hydrogen ions in water solutions.

Algae
- Plant life of many colours which grows in water in the presence of sunlight and carbon dioxide. In spas, algae produces slippery spots and cloudy, uninviting water.

Automatic Sensing Device
- A device that determines and continuously displays
  a) sanitizer residual and
  b) pH value of the water and
  c) regulates the operation of chemical feeders to maintain sanitizer and pH levels in accordance with the Regulation.

Chemical feeder
- A mechanism that automatically adds chemicals to spa water. May be a proportioning pump, injector feeder, pot feeder operating on a water pressure differential, or a dry type feeder.

Circulation system
- A system that (a) maintains circulation of water through a public spa by pumps; (b) draws water from a spa for treatment and returns it as clean water and (c) provides continuous treatment that includes filtration and chlorination or bromination and other processes that may be necessary to treat water

Clarity
- The degree of transparency of water. Characterized by the ease with which the lowest outlet drain is visible when the spa is in a non-turbulent state.

Clean water
- Water added to a spa after treatment in a circulation system.

Chloramines
- Organic compounds made up of chlorine and nitrogen containing substances such as ammonia (organic matter) which causes skin and eye irritation and has a strong unpleasant odour.

Chlorine gas
- A heavier than air, green highly poisonous gas compressed into liquid form and stored in heavy steel cylinders. Used in spas as a bactericide and algaecide. Extreme caution must be used in handling.

Chlorine generators
- Equipment that generates chlorine gas, hypochlorous acid or hypochlorite on site for disinfection and oxidation of water contaminants.

Combined/Total Chlorine	• Chlorine which is available as a bactericide in water, but which is combined with another substance, usually ammonia. Combined chlorine is usually less effective against bacteria. It is the total of free available chlorine plus chloramines.
Daily use period	• Daily period of time during which a spa operates.
Disinfectant	• A product (chemical/energy) used to kill pathogens (disease-causing organisms) in water.
Deck	• An area immediately surrounding the spa.
Free available chlorine	• The amount of chlorine remaining in pool water at any given moment after chlorine demand has been satisfied.
Hotel	• A hotel , inn, motel, resort or other building or premises operated to provide sleeping accommodation for the public.
Make-up water	• Water added from an external source.
Operating day	• A day on which the spa is in use.
Operator	• A person designated by the owner of the spa as being responsible for its operation.
Owner	• A person who is the owner of a spa.
PPM	• Parts per million. Calculated in weight units. In dilute water solutions, the weight-volume relationship of milligrams per litre may be substituted.
Public Spa	• A hydro-massage pool containing an artificial body of water that is intended primarily for therapeutic or recreational use; that is not drained, cleaned or refilled by individual users and that utilizes hydro-jet circulation, air induction bubbles, current flow or a combination over the majority of the pool area.
Total Alkalinity	• The degree or extent of the alkaline nature of water. The amount of alkalinity is determined by a filtration measurement. If excessive alkalinity is present, the acid demand index indicates how much acid to add to bring the water to the desired level.

Class A Pool

O. Reg. 428/05 (Public Spas)

Section 2(1)

" Class A pool" has the same meaning as in Regulation 565 of the Revised Regulations of Ontario, 1990(Public Pools) made under this Act"

O.Reg.565/90 (Public Pools)

- a pool to which the general public is admitted,
- a pool operated in conjunction with or as part of a Young Men's Christian Association (YMCA) or similar institution or an educational, instructional, or physical fitness or athletic institution supported in whole or in part by public funds or public subscription, or
- a pool operated on the premises of a recreational camp, for use by campers and their visitors and camp personnel.

Class B Pool

O. Reg. 428/05 (Public Spas)

Section 2(1)

"Class B pool" has the same meaning as in Regulation 565 of the Revised Regulation on Ontario1990 (Public Pools) made under this Act."

O.Reg.565/90 (Public Pools)

- a pool operated on the premises of an apartment building that contains more than five dwelling units or suites, a mobile home park or a nurses' residence, for the use of the occupants and their visitors,
- a pool operated as a facility to serve a community of more than five single-family private residence, for the use of the residents and their visitors
- a pool operated in the premises of a hotel, for the use of its guest and their visitors,
- a pool operated on the premises of a campground, for the use of its tenants and their visitors,
- a pool operated in conjunction with a club for the use of its members, and their visitors, or a condominium, co-operative or commune property that contains more than five dwelling unit or suites, the use of the owners or members of their visitors,
- a pool operated in conjunction with a day nursery, day camp or an establishment or institution or the care of treatment of persons who are ill, infirm or aged or for persons in custodial care, for the use of such persons and their visitors, or
- a pool other than a Class A pool, that is not exempt from the provisions of this Regulation.

Algoma PUBLIC HEALTH Santé publique Algoma

SPA OPENING FORM

This is to notify the Medical Officer of Health of the intention to open the spa in accordance with Sections 4(2) (a)-(d), 4(3), 4(4) of Ontario Regulation 428/05 made under the Health Protection and Promotion Act R.S.O. 1990, Chap. H.7.

Spa	☐ **Indoor** ☐ **Outdoor**	**Intended Date of Spa Opening:** Month/ Day / Year
Building Permit ☐ **Yes** ☐ **No** ☐ **N/A**	**Permit Number**	**Date Spa Built:** Month/ Day/ Year
Spa Information		
Name of Spa:		
Address:		Phone # at the Spa:
Registered Owner of the Premises (Company):		
Mailing Address:		Phone:
Name of Operator (Print):	***has been designated by me to operate the spa.***	
Signature of Signing Officer:		Date: Month/ Day/ Year
Operator of Spa		
Pool Company:		
Address:		Phone:
Name of Signing Officer (Print):		
Signature of Operator/ Signing Officer:		Date: Month/ Day/ Year
Building Management		
Company:		
Address:		Phone:
Name of Signing Officer:		
Signature of Signing Officer:		Date: Month/ Day/ Year
Superintendent's Name: Apt:		Phone:

Note: Any changes to the above mentioned information shall be immediately indicated in writing to Algoma Public Health. In order to meet a request for the Public Health Inspector to attend the premises prior to the opening, **two weeks advance notice of the Opening Date is required**.

The personal information on this form is collected under the authority of the **Health Protection and Promotion Act, R.S.O. 1990, Ch. H7, and Revised Regulations of Ontario 565.** It will be used for the enforcement of the Act, Regulation, By-Law and in the administration of the program.

Jan 2006

Please return completed applications and mail or fax information to the regional office closest to your spa. Regional offices listed below.

Sault Ste. Marie

☐ Algoma Public Health
Environmental Health
99 Foster Drive
6th Floor Civic Centre
Sault Ste. Marie ON P6A 5X6
Phone: 705-759-5286
Fax: 705-541-7346

Blind River

☐ Algoma Public Health
Environmental Health
PO Box 194
9B Lawton Street
Blind River ON P0R 1B0
Phone: 708-356-2551
Fax: 705-356-2494

Elliot Lake

☐ Elliot Lake Public Health
Environmental Health
Algo Centre Mall
151 Ontario Ave
Elliot Lake ON P5A 2T2
Phone: 705-848-2314
Fax: 705-848-1911

Wawa

☐ Algoma Public Health
Environmental Health
PO Box 1908
18 Ganley St
Wawa ON P0S 1K0
Phone: 705-856-7208
Fax: 705-8561752

CRITERIA FOR CLOSING A PUBLIC SPA

A spa is subject to immediate closure when any of the following conditions are observed:

- Water clarity is poor.
- Fouling (e.g. Faecal or chemical).
- Filtration or circulation system is not operative or malfunctioning.
- Power outage.
- Drain cover or fittings missing or not in good repair.
- Suction system missing or malfunctioning (e.g. Vacuum release).
- Emergency telephone missing or malfunctioning.
- Lifesaving safety equipment is not available at a spa >3 metres.
- Emergency stop button missing or malfunctioning.
- Audible and visual signal missing or malfunctioning.
- GFCI missing or malfunctioning.
- Spa temperature is greater than 40°C (104°F).
- Disinfectant not detected in the spa water and not available on site immediately to rectify the lack of disinfectant in the spa water.
- A swimming pool that has been closed and access to the spa is in the same room.
- Any other conditions that may be considered a health hazard (e.g. sharp objects such as broken glass in water, confirmation of pathogenic agents such as cryptosporidium) subject to consultation with your manager.

Public Health Concerns

Many outbreaks involving thousands of people have been reported where the source of the infection was found to be a public pool. Pool water usually contains human body oils, dirt and other organic material. If not properly disinfected, pool water can allow the spread of organisms that cause gastro-intestinal diseases or skin, ear, eye and upper respiratory tract infections.

Illness can be acquired by ingesting pool water contaminated by a person who has been ill with diarrhea. It can take several days or weeks before symptoms appear, so people don't often connect their illness with the pool. Since diarrhea is common, most people don't seek medical attention for it and incidents often go unreported.

Cryptosporidium has been associated with outbreaks at public schools. This parasite is highly resistant to chlorine and can survive many days at normal operational concentrations. In people the parasite may cause only a mild illness but the infected person can continue to excrete cysts for several weeks after his/her symptoms have resolved. Those who do not have a healthy immune system are at most risk of developing severe or life-threatening illness if infected with Cryptosporidium.

It is important that operators help educate the public that they share the water with everyone in the pool. Swimming while ill with diarrhea threatens the health of other users. Showering before entering the pool helps remove the source of contamination. Not swallowing or spitting in the water helps avoid risk of infection.

Fecal Accident Response

A diarrheal accident is a higher risk event than a formed stool accident. Diarrhea can contain hundreds of millions of infectious bacteria that quickly spread throughout a pool from a single fecal accident. Other users then acquire infection through ingestion of the water or just by contact, particularly with eyes, ears or other mucous membranes.

Staff should strongly encourage users to shower prior to entering the pool and should post signs advising users not to enter the pool if ill with diarrhea within the last 2 weeks.

Germ inactivation times for chlorinated water with 1 mg/L FAC (Free Available Chlorine Residual) at pH 7.5 and temperature 25°C.

Organism	Time
E.coli 0157:H7	Less than 1 minute
Hepatitis A virus	16 minutes
Giardia parasite	45 minutes
Cryptosporidium parasite	6.7 days

It takes time for disinfectant to do its job. If a fecal accident occurs, it is important to respond immediately.

Formed Stool

- Evacuate and close the pool
- Shut off recirculation system and chemical feed system
- Remove waste with a scoop and discard in a toilet
- Clean scoop and leave it immersed in the pool while the pool is disinfected
- To disinfect the pool increase free available chlorine/bromine residual in pool water to 2 mg/L, maintain pH between 7.2 and 7.5, and recirculate for 30 minutes
- Restart chemical feed system
- Reopen the pool when all pool chemistry meets regulation
- Document incident on the Pool Maintenance Record

Diarrhea

- Evacuate and close the pool
- Shut off recirculation system and chemical feed system
- Remove waste with a scoop and discard in a toilet
- Clean scoop and leave it immersed in the pool while the pool is disinfected
- Backwash the filters
- To disinfect the pool, superchlorinate to a minimum FAC concentration of 50 mg/L for 3.5 hours
- Restart recirculation system and chemical feeder
- Reopen pool when all pool chemistry as test per regulation
- Document incident on the Pool Maintenance Record.

Water Contamination

Blood

Coming in contact with blood in spa water is unlikely to spread illness. Bacteria and viruses found in blood, including HIV, do not survive long in a properly chlorinated spa. However, patrons do not always clearly understand the risk involved and operators are encouraged to close the pool for a short period of time to retest chemical disinfectant levels and to allay patrons' concern.

Vomit

Vomiting is common when swimmers ingest too much water, then exercise vigorously. Vomiting can also be a symptom of another illness or of prolonged exposure to heat.

Public health risks associated with vomitus are usually from Norovirus as this virus family is both resistant to chlorine and highly contagious.

As a guideline, if the full stomach contents are vomited into a pool we recommend you follow the procedure for formed stool.

Body Fluid Spills on Pool or Deck Surfaces
Body fluids including blood, feces and vomit are all considered potentially contaminated with harmful bacteria. Spills of these fluids on the pool deck or in change rooms or bathrooms should be cleaned up and the contaminated surfaces disinfected immediately. Regular sanitizing of change room floors and showers will also control the fungus responsible for athlete's foot.

Clean Up Using Bleach Solution

Bleach Solution
1 part household bleach
9 parts cool water
Add bleach to water and mix gently

- Close access to area until cleanup and disinfection is completed
- Wear disposable gloves
- Wipe spills using paper towels or other absorbent material and place in garbage bag
- Gently pour bleach solution onto surface to be disinfected
- Leave this solution in place for **20 minutes**
- Wipe up the remaining bleach solution
- Mops, scrub brushes, etc. that are not disposable should be immersed in bleach solution and air dried
- Remove gloves after disposing of garbage and wash hands with soap and water.

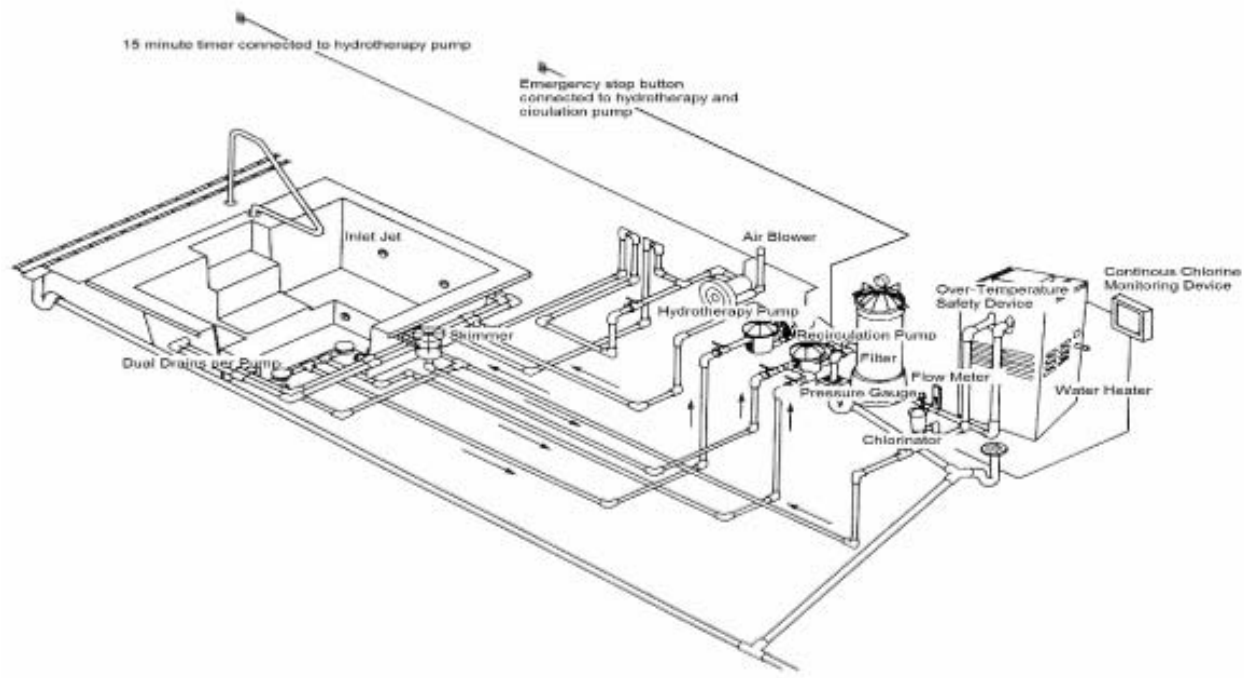
Diapers and Swim Pants
Swim diapers are unlikely to prevent diarrheal fluids from leaking into a pool. Even though diapers or swim pants may hold in some feces, they are not leak proof and pool water may still be contaminated.

There are ways that operators can assist parents while protecting other users.

- Install diaper change stations equipped with soap and running water
- Instruct staff to discourage parents from changing diapers on public tables or chairs. Post signs reminding parents to wash their child especially the "rear end" with soap and water before swimming
- Create special rules for large groups of children and have staff educate the children before they enter the pool.
  Such rules should include:
    - No entry into the pool if you have diarrhea
    - Use the bathroom first and then shower before entering the pool
    - Don't swallow or spit pool water
    - Encourage bathroom breaks

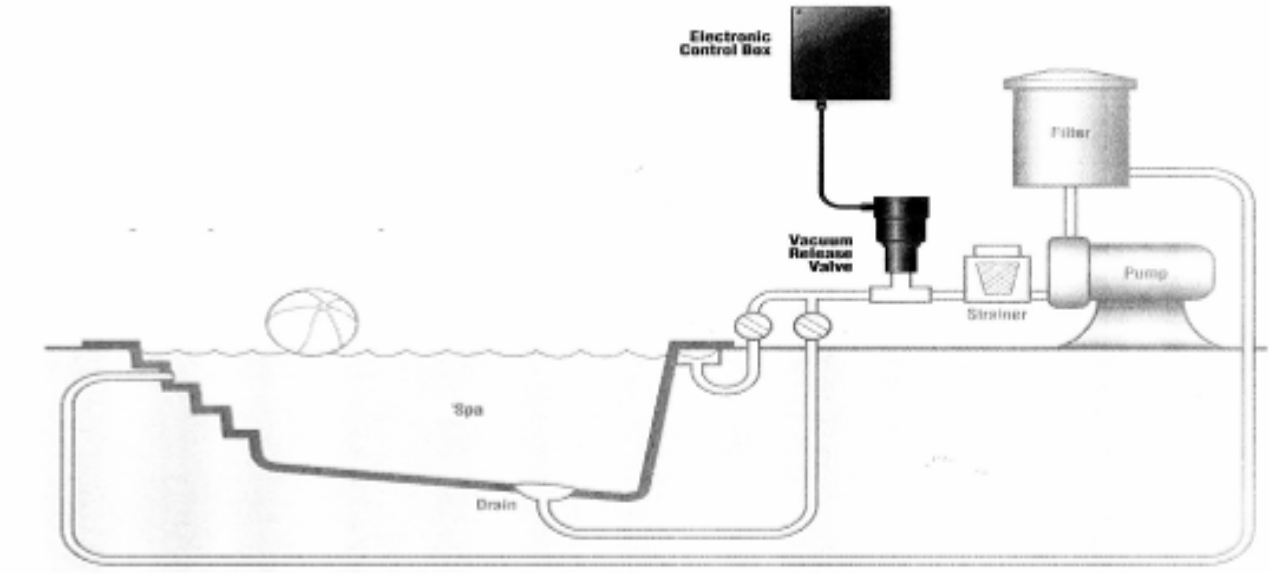
A Detailed View of a Typical Spa Setup

View A

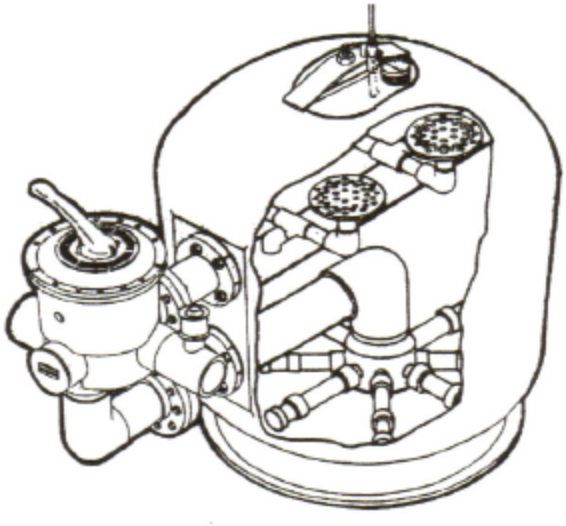


A Detailed View of a Typical Spa Setup

View B



FILTRATION



Filtration is the mechanical process of removing insoluble matter from the spa water. The filter consists of a tank containing fine grain material such as sand or diatomaceous earth through which dirty water is forced. The used spa water is passed through the filter media and the filtered water is returned to the spa becoming clearer with each passing.

Filter Head Operation

A filter may have different settings such as filtration, re-circulation, backwashing and draining. Each procedure may require slightly different or additional steps

4 major settings on a filter could include:

1. Filter
    - Normal operation
    - Directs water down through the filter medium

2. Re-circulate
    - Allows sand and water to settle
    - Directs water back to spa by passing the filter

3. Backwash
    - To clean the filter medium
    - Directs water up through the filter medium and to waste (opposite flow to “Filter” setting)

4. Drain

- Directs water directly to waste by by-passing the filter

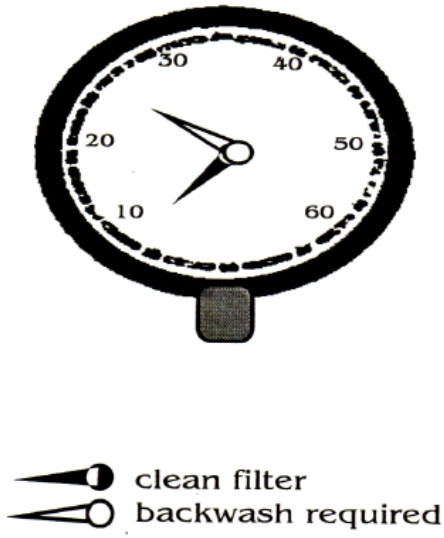
GAUGES

One or two pressure gauges are usually located on the filter head. These gauge(s) are used to determine how clogged the filter has become. These pressure gauge(s) can be used to assess whether the spa filter is clean or needs to be backwashed.

Single Gauge

Single Pressure Gauge System

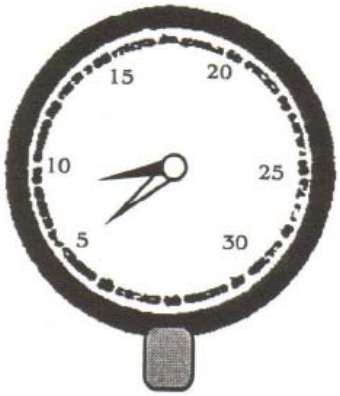
Pressure System



The single pressure gauge measures the back pressure the filter medium places on the water being pumped through the filter. A clean filter will have a low reading. As it collects dirt and begins to clog, the pressure level will begin to increase. The filter requires backwashing when the pressure gauge indicates an increase of 8-10lbs/in^2 or the manufacturers' recommendation.

TWO PRESSURE GAUGE SYSTEM

Influent (Incoming) Gauge



Effluent (Outgoing) Gauge

The two pressure gauge system has an influent (incoming) gauge that measures the back pressure caused by the filter medium (as does the single gauge system) as well as an effluent (outgoing) gauge that measures the pressure in the water leaving the filter. The gauges are usually located on the filter head.

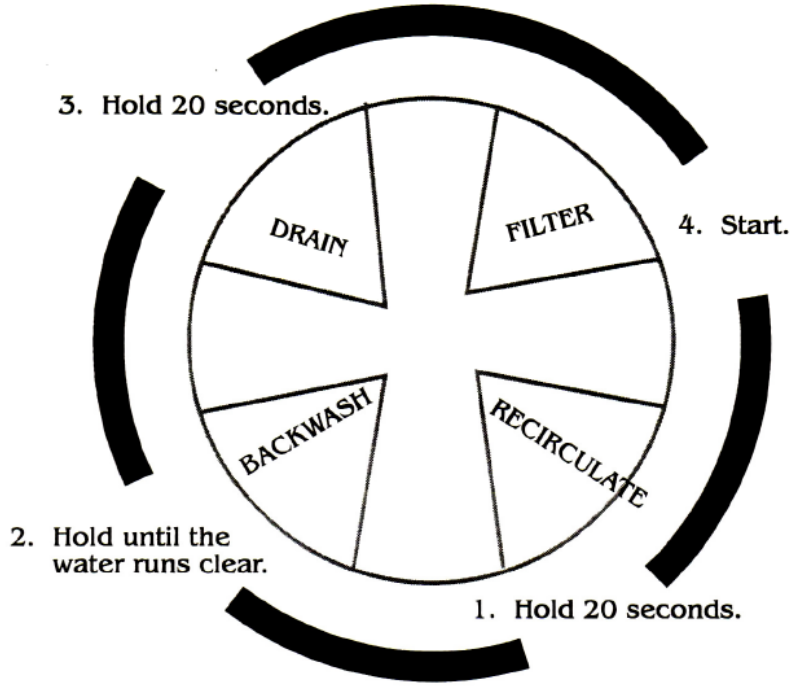
With a clean filter the two gauges will have similar readings. As the filter gathers dirt and becomes clogged, one pressure gauge will show a decrease in pressure gauge will show a decrease in pressure and the other an increase. When there is a difference of 15 lbs/in^2 or manufacturers recommended pressure differential backwashing is required.

WHY FOLLOW THE GAUGES?

When the filter is clogged the amount of water flowing through it decreases to the point that it is inefficient.

Checking the gauges and following procedures will ensure the efficient operation of the filter.

GENERAL BACKWASH PROCEDURE



How to backwash

Note: Prior to changing valve position turn the pump(s) off

1. Turn setting from “FILTER” to “RECIRCULATE” for 20 seconds. This allows the water in the filter to settle.

2. Turn setting to “BACKWASH” and start the pump. Leave it there until the water running to waste is clear.

3. Turn setting to “DRAIN” for 20 seconds. This allows the sand and the water to settle.

4. Turn setting to “FILTER” and start the pump. This returns filter to normal operation.

Example of Acceptable Suction Covers

FIGURE 3a. One type of Anti-Vortex Drain Cover. ***Notice the top of the cover is domed.***

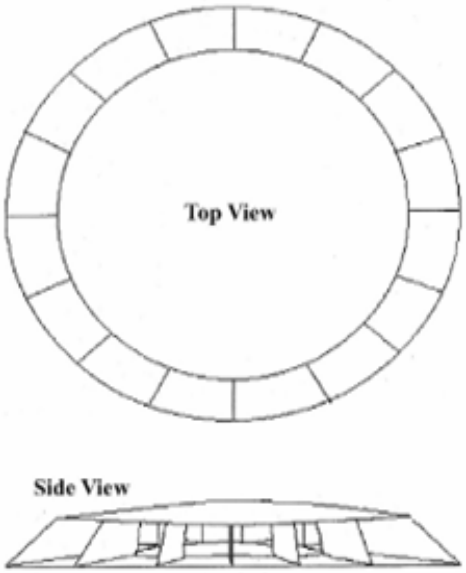


FIGURE 3b. Another type of design for Anti-Vortex Cover. ***Note again the domed top of the cover.***

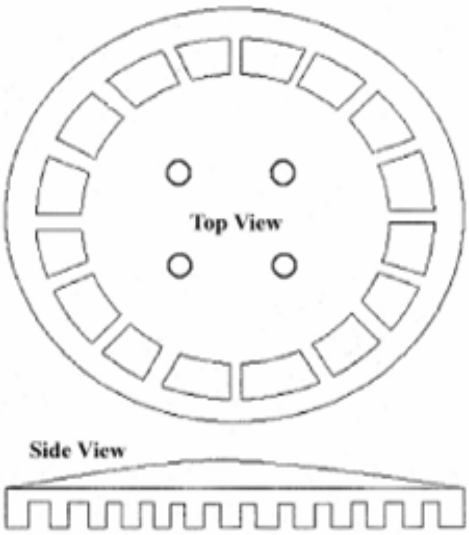
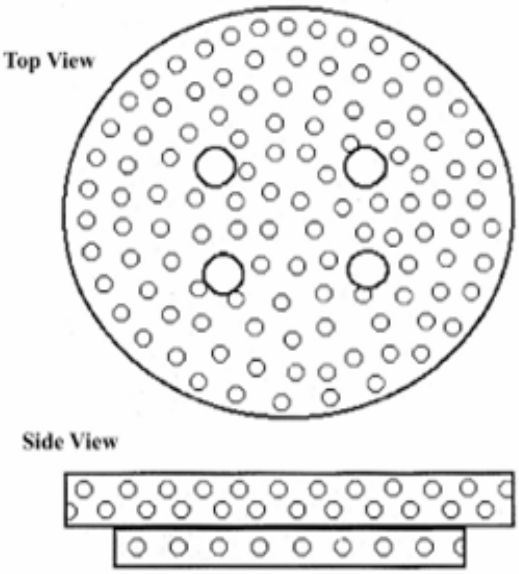


FIGURE 3c. Top and Side View of Suction Drain Cover. ***The top of the cover may or may not be domed.***



Appendix 12

Handling Chemicals Safely

- Store spa chemicals in a cool, dry and ventilated area.
- Keep corrosive materials away from other chemicals.
- Keep all chemicals away from hot surfaces and flames.
- Have personal protective equipment available as required.
- Material Safety Data Sheets must be made available to employees for every chemical use.
- Do not eat, drink or smoke in the chemical storage area.
- Ensure the chemical storage room is inaccessible to unauthorized persons.
- Handle chemicals with clean and dry scoops only. Each chemical must have its own scoop. Use scoops provided by the manufacturer if available.
- Keep containers closed when chemicals are not in use.
- Label all containers with the chemical name.
- Never reuse empty chemical containers for the storage of other chemicals.
- Never mix contaminated chemicals with your fresh supply.
- When missing chemicals, add them slowly. Never add water to the chemicals, always add the chemical to the water.
- Always wash hands thoroughly after handling chemicals.

APPENDIX 13

CHEMICALS AND EFFECTS ON SPA WATER

Type of Chemical	Effect on the Spa Water
Sodium Carbonate	• increases alkalinity • increases pH
Sodium Bicarbonate	• increases alkalinity • increases pH
Acid	• decreases alkalinity • decreases pH

EFFECTS OF TOTAL ALKALINITY

Problem	Solution
LOW • pH bounce • Staining • Increased corrosion	• Add sodium bicarbonate to raise total alkalinity
HIGH • High acid demand • pH usually high • Bicarbonate scale •	• Add muriatic acid or pH decreaser to lower total alkalinity with the pump turned off

WATER BALANCE

Water balance is the correction of five factors to appropriate levels so that the water is not corrosive or scaling. Two of the factors, temperature and total dissolved solids, are of minor significance, but pH, total alkalinity and hardness are of greater significance to balance spa water.

Under normal operating conditions, the parameters or factors to maintain balanced water should be in the following ranges:

Water Balance Factors	Ideal Levels
pH	**7.2 – 7.8**
Total Alkalinity	**80 – 120 ppm**
Calcium Hardness	**200 – 400 ppm**
Temperature	**Maximum 40°C (104°F)**
Total Dissolved Solids Other than electrolytic chlorine generators also known as salt generators	**Less than 2000 ppm**

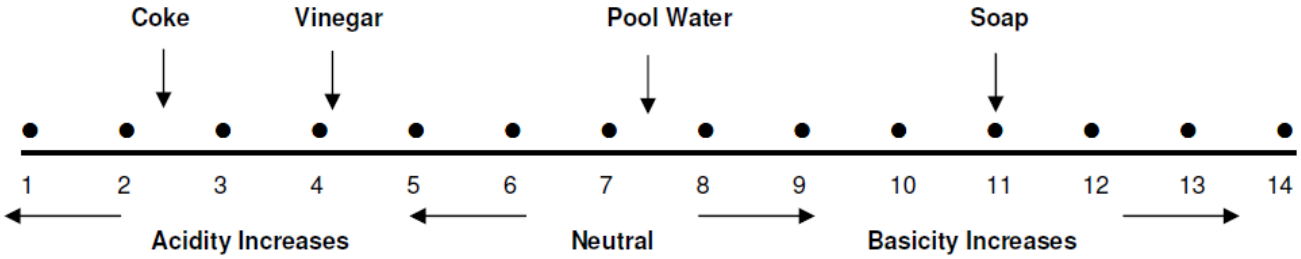
If one or all of the ranges is exceeded, the probability of scale formation will be greatly increased. If one or all of the ranges is low, corrosion of grout and piping etc. may occur.

pH

- pH is the measure of the hydrogen ion concentration. It is a measure of acidity or basicity. The scale ranges from 0 (the most acidic) to 14 (the most basic) with 7 being the neutral point.

- pH (potenz hydrogen) stands for hydrogen power. The required pH range for spa water is 7.2 to 7.8.

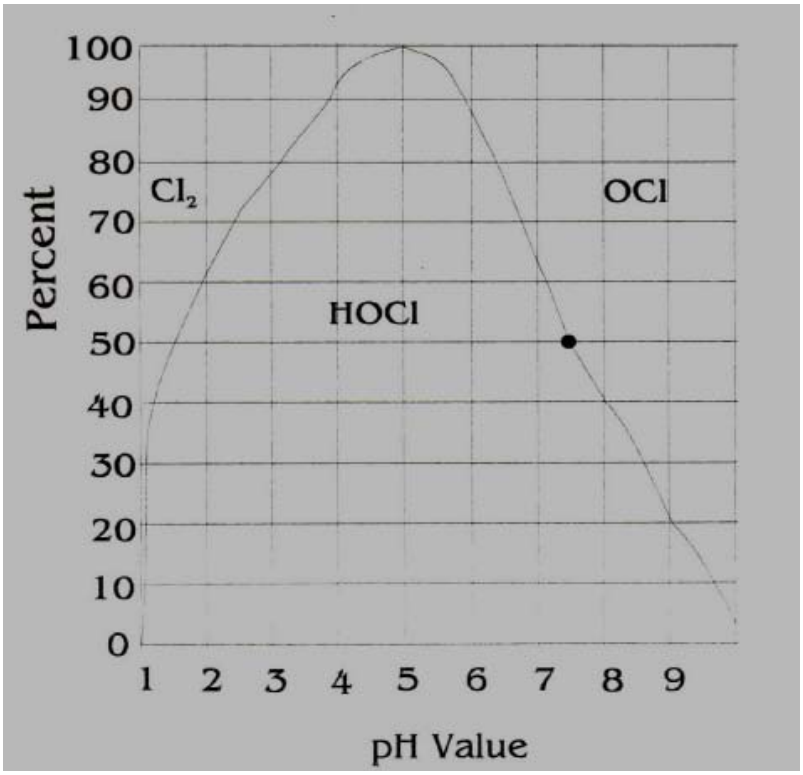
Chemical	Limits	Frequency of Test
pH	7.2 – 7.8	½ hour before opening and every 2 hours while pool is open



EFFECTS OF pH

Problem	Solution
LOW • free chlorine active • eye irritation • overactive chlorine • corrosion • pool liner wrinkles	**TO RAISE THE pH** • add soda ash (sodium carbonate) or, • add pH up.
HIGH • chlorine effectiveness decreases • eye irritation • chlorine inefficiency • short filter runs • scaling	**TO LOWER THE pH** • add muriatic acid or, • add carbon dioxide or, • add pH down
Note: When mixing chemicals, add them slowly. Never add water to the chemicals, always add the chemicals to the water.	

EFFECTS OF pH on HYPOCHLOROUS ACID



- At a pH of 7.5, 50% of the Free Available Chlorine is in the Hypochlorous acid (HOCl) state and 50% is in the hypochlorite ion (OCl^-) state.
- As pH increases above this value, the effectiveness of the chlorine decreases.
- As the pH decreases below this value, the effectiveness of the chlorine increases.

TOTAL ALKALINITY (TA)

Total alkalinity is the ability of a body of water to resist changes in pH. It is the measure of dissolved bicarbonate in spa water.

Chemical	Limit	Frequency of Test
Total Alkalinity	Minimum 80 mg/l	Daily

The total alkalinity should be measured and adjusted when:

- pH of the spa water is consistently high and difficult to maintain from 7.2 – 7.8 and/or
- water is cloudy and/or
- there is excessive corrosion or staining

CALCIUM HARDNESS

- Calcium hardness is the term used to describe the ability of water to form suds. It is a measure of dissolved calcium and or magnesium in spa water.

- If the calcium hardness is low, water is corrosive. If the calcium hardness is high, scaling occurs.

EFFECTS OF CALCIUM HARDNESS

PROBLEM	SOLUTION
LOW • Increases corrosion • Etches plaster • Shorter plaster life • Shorter vinyl life • Rough plaster, hard to clean • Creates pores for algae roots	**Under 100 ppm critical** • Use calcium chloride to raise calcium hardness • Apply directly to spa water, never through the skimmer • Add 1/3 total treatment no sooner than every six hours
HIGH • Cloudy water • Scale on all surfaces • Discoloration • Rough surface, hard to clean • Causes heater scale • Piping scale reduces recirculation	**OVER APPROXIMATELY 450 ppm** • Dilution of spa water

TYPES OF CHLORINE RESIDUALS

Free Available Chlorine:

The amount of uncombined chlorine in the water available to sanitize, oxidize organic contaminants and to kill bacteria.

Total Chlorine:

The sum of the combined chlorine and the free available chlorine.

Combined Chlorine:

Free available chlorine which has combined with wastes to produce chloramines. Combined chlorine has little disinfecting power and causes chlorine odour in a spa. It is also responsible for eye irritation.

Chlorination

Chlorination is the addition of chlorine to spa water. Chlorine is added to sanitize and destroy harmful bacteria and to oxidize or burn out organic contaminants. When chlorine is added to spa water, it produces hypochlorous acid and hypolorite ion.

Cl	+	H2O	→	HOCl	+	OCl^-
Chlorine	+	Water	→	Hypochlorous acid	+	Hypochlorite ion

Both these products are measured as Free Available Chlorine, however, hypochlorous acid is much more efficient as a sanitizer.

Gas Chlorine

Pale greenish-yellow poisonous gas of marked odour, irritating to the eyes and throat.

Active Strength 100%
Available chlorine content 100%

Advantages	Disadvantages
• Least expensive of chlorine sanitizer	• Expensive feed equipment required • Dangerous to handle • Lowers pH dramatically • Chlorine residual of water dissipates rapidly in sunlight

Electronic Chlorine Generators / Salt Generators

A process in which salt is added into the spa water. As the dissolved salt passes through the electronic cell(s), gas, chlorine, caustic soda and hydrogen gas are created. Gas chlorine is rapidly absorbed into the water, thus resulting in chlorination of spa water.

Salt levels 2500 – 3500 ppm

Advantages	Disadvantages
• Relative pH neutral	• Must maintain salt level

Sodium Hypochlorite

Liquid form

Strength 10% - 15%
pH 13
Large acid demand

Advantages	Disadvantages
• Low cost • Readily available • Useful for sanitation of other surfaces	• Loses effectiveness during storage • Large storage area

Calcium Hypochlorite

White granules with a strong chlorine odour. Sometimes called High Test Hypochlorite (HTH).

Active Strength 70%
Available chlorine content 70%
pH 11

Advantages	Disadvantages
• Easily handled • No significant storage	• Can cause turbidity, scale, or clogged filters if pH and total alkalinity are high

SUPERCHLORINATION

Super-chlorination is the addition of high doses (10-20 mg/l) of chlorine to remove organic contaminants and improve water quality. The continual addition of chlorine, dirt and micro-organisms eventually causing a build-up of combined chlorine compounds. Combined chlorine causes eye irritation and chlorine odour.

To rid the spa water of these, add large doses of chlorine, raising the free available chlorine level to approximately 10-20 mg/l. This dosage oxidizes the combined chlorine forming nitrogen gas and kills algae. Depending on bather load, the recommended frequency of super-chlorination is every 1-2 weeks.

Stabilization

Stabilization is the addition of cyanuric acid to spa water to help minimize chlorine loss due to destruction of chlorine molecule by sunlight. Stabilized chlorine contains both stabilizer and chlorine in its composition.

Chemical	Limit	Frequency of Test
Cyanuric Acid	Maximum 150 mg/l	Daily

Cyanuric acid is a weak organic acid which binds the chlorine residual of the spa water and greatly reduces chlorine loss by the sun's ultraviolet rays. Chlorine residuals that have been stabilized will last 3 to 4 times longer. The cyanurates slightly reduce the disinfection power of the chlorine, thus higher levels of chlorine must be maintained usually greater than 1.0 mg/l.

Stabilizer does not dissipate or wear-out, therefore, high levels of cyanurates can only be reduced by adding fresh water. This must be done if levels are greater than 60 mg/l. Stabilizer is most effective in the range of 25-50 mg/l.

Cyanurate stabilizer must not be added to a public spa if the spa and its deck are totally or partially covered by a roof.

BROMINATION

Bromination is the addition of bromine to the spa water to prevent the growth of disease causing organisms.

When bromine is dissolved in water it produces Hypobromous acid, an extremely powerful disinfectant. Compared to Hypochlorous acid, Hypobromous acid shows certain advantages i.e. increasing bacterial kill efficiencies relative to chlorine at pH values above 7.5.

Bromine sanitizer is essentially independent of the pH, however, its use reduces the pH of spa water and subsequently reduces the total alkalinity. There is no known bromine stabilizer.

Chemical	Limit	Frequency of Test
Bromine	Minimum 2.0 mg/l	½ hour before opening and every hour while spa is open

Effects of Bromination

Problem	Solution
• Destroys Total Alkalinity (TA) therefore, water could be corrosive. Causes bicarbonate to leave the water as carbon dioxide, therefore, lowers TA • Reduces pH	• Use Sodium Bicarbonate to increase TA
• Causes pH reaction with reagent changing the colour to look as though the pH is higher	• TA not to exceed 100 ppm

APPENDIX 21

FREQUENCY OF WATER TESTS

CHEMICALS	LIMITS	FREQUENCY OF TESTS
Free Available Chlorine (FAC) Unstabilized Stabilized	 Minimum 5 mg/l Minimum 5 mg/l	½ hour before opening and every hour while spa is open
Bromine	Minimum 5 mg/l	
pH	7.2 – 7.8	
Total Chlorine	Recommended not to exceed the sum of FAC reading plus 0.5 mg/l	Daily
Cyanuric Acid	Maximum 150 mg/l	Daily
Total Alkalinity	Minimum 80 mg/l	Daily

Spa Daily Inspection and Records

Emergency Phone (before opening)	Satisfactory or Unsatisfactory	am/pm	Month/Day/Year	Signature
Ground Fault Interrupter	Satisfactory or Unsatisfactory	am/pm	Month/Day/Year	Signature
O.R.P. :½ hour before open + 1x during the day	1st reading	2nd reading	Month/Day/Year	Signature
Spa tank drained	Yes	No	Month/Day/Year	
Spa tank refilled	Yes	No	Month/Day/Year	
Number of bathers	# of bather		Month/Day/Year	
Water meter reading	Ist reading am/pm	2nd reading am/pm	Water added	
Chemicals added manually	Type & amount		Month/Day/Year	
Emergencies, Rescues, breakdown of equipment			Month/Day/Year	Signature

Spa Hourly Water Tests

			1AM	2AM	3AM	44M	5AM	6AM	7AM	8AM	9AM	10AM	11AM	12AM
Free Available Chlorine	½ hr. before opening	m/L												
Total Br. /CL Residual		m/L												
pH														
Temperature		°C												
Alkalinity														
Water clarity														
Operator's initial														

			1PM	2PM	3PM	4PM	5PM	6PM	7PM	8PM	9PM	10PM	11PM	12PM
Free Available Chlorine	½ hr. before opening	m/L												
Total Br./CL. Residual		m/L												
pH														
Temperature		°C												
Alkalinity														
Water clarity														
Operator's initial														

APPENDIX 23

Name of Spa:	Address:	Date:

Spa Monthly Test

Section 22 (1)(a)(b), 22(2)(a)(b)

Month	Inspection of gravity and suction outlet covers, etc.	Emergency stop button	Vacuum release mechanism
January	Month/Day /Year Signature	Month/Day /Year Signature	Month/Day /Year Signature
February	Month/Day /Year Signature	Month/Day /Year Signature	Month/Day /Year Signature
March	Month/Day /Year Signature	Month/Day /Year Signature	Month/Day /Year Signature
April	Month/Day /Year Signature	Month/Day /Year Signature	Month/Day /Year Signature
May	Month/Day /Year Signature	Month/Day /Year Signature	Month/Day /Year Signature
June	Month/Day /Year Signature	Month/Day /Year Signature	Month/Day /Year Signature
July	Month/Day /Year Signature	Month/Day /Year Signature	Month/Day /Year Signature
August	Month/Day /Year Signature	Month/Day /Year Signature	Month/Day /Year Signature
September	Month/Day /Year Signature	Month/Day /Year Signature	Month/Day /Year Signature
October	Month/Day /Year Signature	Month/Day /Year Signature	Month/Day /Year Signature
November	Month/Day /Year Signature	Month/Day /Year Signature	Month/Day /Year Signature
December	Month/Day /Year Signature	Month/Day /Year Signature	Month/Day /Year Signature

APPENDIX 24

Name of Spa:	Address:	Date:

Weekly Test for Cyanuric Acid

Section 22 (1) (c)

(Note: for spas that use cyanurate stabilization)

Reading	Date Signature	Reading	Date Signature
mg/L	Month/Day /Year Signature	mg/L	Month/Day /Year Signature
mg/L	Month/Day /Year Signature	mg/L	Month/Day /Year Signature
mg/L	Month/Day /Year Signature	mg/L	Month/Day /Year Signature
mg/L	Month/Day /Year Signature	mg/L	Month/Day /Year Signature
mg/L	Month/Day /Year Signature	mg/L	Month/Day /Year Signature
mg/L	Month/Day /Year Signature	mg/L	Month/Day /Year Signature
mg/L	Month/Day /Year Signature	mg/L	Month/Day /Year Signature
mg/L	Month/Day /Year Signature	mg/L	Month/Day /Year Signature
mg/L	Month/Day /Year Signature	mg/L	Month/Day /Year Signature
mg/L	Month/Day /Year Signature	mg/L	Month/Day /Year Signature

Name of Spa:	Address:	Date:

Spa Monthly Test
for additional Vacuum Release Mechanism

Month	Vacuum Release Mechanism Location: ______	Vacuum Release Mechanism Location: ______	Vacuum Release Mechanism Location: ______
MONTH/ DAY/ YEAR	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature
MONTH/ DAY/ YEAR	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature
MONTH/ DAY/ YEAR	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature
MONTH/ DAY/ YEAR	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature
MONTH/ DAY/ YEAR	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature
MONTH/ DAY/ YEAR	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature
MONTH/ DAY/ YEAR	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature
MONTH/ DAY/ YEAR	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature
MONTH/ DAY/ YEAR	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature
MONTH/ DAY/ YEAR	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature
MONTH/ DAY/ YEAR	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature
MONTH/ DAY/ YEAR	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature	SATISFACTORY/UNSATISFACTORY Signature

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