

PUBLIC POOL MANUAL FOR OPERATORS



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Your Health Connection

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Introduction

Pools have been implicated in fatal or near-fatal injuries and waterborne illnesses, including skin infections and respiratory disease.

This manual was developed for public pool operators as a reference to assist them in operating and maintaining their pool safely and in compliance with *Ontario Regulation 565/90 Public Pools* under the *Health Protection and Promotion Act, RSO 1990*.

It is important to note that this manual does not discuss all requirements in the Public Pools regulation and following this manual does not exempt operators or owners from any regulatory responsibilities.

Ontario Regulation 565/90 Public Pools can be found on-line at <http://www.e-laws.gov.on.ca>. Our website www.simcoemuskokahealth.org also has links to this site and has forms and posters that you can download.

Please note that changes or alterations to your pool or operational equipment may require a permit from your municipal building department. Call your building inspector before you make changes.

If you need technical advice on the operation and maintenance of your pool please consult a pool specialist.

Role of the Public Health Inspector

Improperly maintained pools can allow the spread of disease-causing organisms among users. The goal of the public health inspector is to reduce or eliminate the incidence of these illnesses. Compliance with the regulation and good practice is a major tool in helping reach this goal.

More than 200 pools operate throughout Simcoe Muskoka. Public health inspectors inspect these facilities regularly, conduct outbreak investigations and investigate bather complaints. Your inspector can help you operate and maintain your pool in a safe and sanitary manner.

The *Health Protection and Promotion Act* provides the authority under which enforcement measures can be taken if conditions are found that are or may be hazardous to users. Enforcement measures may include closure of the pool until hazards are eliminated.

Role of the Operator

Owners and operators are legally responsible for ensuring that pools are operated and maintained in accordance with provincial requirements. Not doing so exposes bathers to unnecessary risk of waterborne illness or life threatening injury.

Operators can consult with their inspector at any time. Pool operators may close a pool whenever hazardous conditions are found and need not wait for an inspector.

Public Health Concerns

Many outbreaks involving thousands of people have been reported where the source of 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 so common, most people don't seek medical attention for it and incidents often go unreported.

Cryptosporidium has been associated with outbreaks at public pools. This parasite is highly resistant to chlorine and can survive many days at normal operational concentrations. In healthy 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 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
<i>E.coli</i> 0157:H7	Less than 1 minute
Hepatitis A virus	16 minutes
<i>Giardia</i> parasite	45 minutes
<i>Cryptosporidium</i> parasite	6.7days

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 tests as per regulation
- Document incident on the Pool Maintenance Record

Diarrhea

- Evacuate and close the pool
- Shut off recirculation system and chemical feed system
- Remove as much waste as possible 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.
- Re-start recirculation system and chemical feeder.
- Re-open the pool when all pool chemistry tests as 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' concerns.

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 or vomitus.

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

Pool Classes

OR 565/90 categorizes public pools as Class A or B. Since the requirements differ, it is important to know which class your pool fits to ensure you are meeting the regulatory standards. The following will help to determine which class of pool you are operating. **The full text, including exemptions, is found in sec. 2 and 3 of *OR 565/90*.**

Class A


- General public is admitted
- Operated in conjunction with or as part of a program of a YMCA or similar institution or an educational, instructional, physical fitness or athletic institution supported in whole or in part by public funds or public subscription
- Operated on the premises of a recreational camp, for use by campers and their visitors and by staff

Class B

Operated on the premises of

- an apartment building with more than 5 units or a community of 5 or more dwellings
- a mobile home park
- a nurses' residence
- a hotel
- a campground
- a club
- a condominium or co-operative with 5 or more dwellings
- a day nursery or day camp
- an establishment or institution for the care or treatment of persons who are ill, infirm or aged or for persons in custodial care.

Safety Equipment

Reaching pole	<ul style="list-style-type: none"> • 3.65 metres long, electrically insulated and on deck
Two Buoyant Throwing Aids	<ul style="list-style-type: none"> • Rope to be 6 mm in diameter • Rope length to be 3 metres + half the width of the pool • On deck and located on both sides of the pool
Spine Board	<ul style="list-style-type: none"> • To be in good condition
Emergency Telephone	<ul style="list-style-type: none"> • Class A pools - on deck • Class B pools - within 30 metres of the pool • To be fully operational and tested daily
First Aid Kit 	<p>See list of contents later in this manual</p>
Ground Fault Detector	<ul style="list-style-type: none"> • Required if pool has underwater lights or electrical outlets within 3 metres of the pool surface and must be tested daily

Required Signs

1. General Pool Rules
2. Shower Sign
3. Emergency Telephone
4. No Diving
5. Deck markings
6. Black disc
7. Unsupervised Sign

1. General Pool Rules

A minimum of two signs is required on the deck or at the pool indicating the following:

- No person infected with a communicable disease or having open sores on his/her body shall enter the pool
- No person shall bring a glass container onto the deck or into the pool
- No person shall pollute the water in the pool in any manner, and spitting, spouting of water and blowing the nose in the pool or on the deck are prohibited
- No person shall engage in boisterous play in or about the pool
- The maximum number of bathers permitted on the deck and in the pool at any time is _____. (*Always 10 if the pool is greater than 93 square metres and is unsupervised*)
- The emergency telephone is located _____

2. Shower Sign

The following notice is to be posted at the entrance of every shower area and at every entrance to the pool deck:

NOTICE

Every bather shall take a shower, using warm water and soap, and thoroughly rinse off all soap before entering or reentering the deck.

3. Emergency Telephone

A notice must be posted above the phone that states the following:

If the phone is connected to a reception desk or is directly connected to emergency services, indicate this on the sign.

<p style="text-align: center;">EMERGENCY TELEPHONE</p> <p>DIAL 911 for emergency resuscitation, medical and fire services</p> <p>Name of the Spa: _____</p> <p>Address of Spa: _____</p> <p>Location of Spa: _____</p> <p>In-house Emergency Number: _____</p>
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4. No Diving

If the pool water depth is **less than 2.5 metres**, one of the following signs must be posted with lettering that is at least 15 cm high. The following words can be posted on the wall or marked onto the deck:

CAUTION – AVOID DEEP DIVES
OR
SHALLOW WATER – NO DIVING

If at any point the water depth is **1.35 metres or less** between 7.5 and 9 metres away from a diving area, and the pool is equipped with a diving board that is 60 cm in height or less above the water, provide the following notice clearly marked in dark letters at least 15 cm high on a light background:

DANGER – AVOID DEEP OR LONG DIVES

5. Deck Markings

“**DEEP AREA**” and “**SHALLOW AREA**” in figures at least 10 cm high on the deck in the appropriate places, and markings indicating the breaks between gentle and steep bottom slopes.

6. Black Disc

- A black disc 150 mm in diameter on a white background must be affixed to the bottom of the pool at its deepest point.
- The white background at its narrowest point should be no less than the diameter of the black disc (150 mm).
- Must be clearly visible from any point on the deck 9 metres away from the disc.

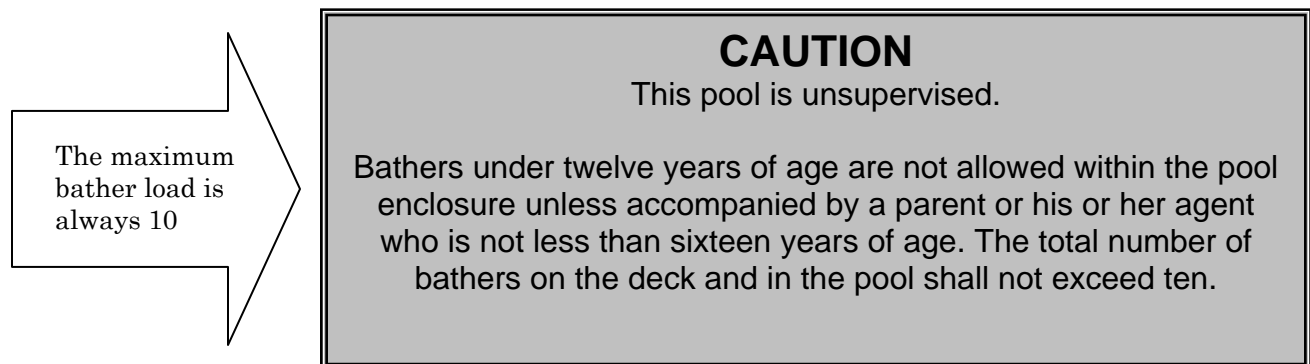
Note: The pool must be closed when the black disc is not clearly visible.

7. Unsupervised Sign

CLASS A pools must always have lifeguards on duty. “Unsupervised” signs are not required.

CLASS B pools may or may not have lifeguards on duty.

Only Class B pools that are **greater than 93 square metres** can operate without safety supervision (excluding pools operated in conjunction with day camps or day cares) provided that the following notice is posted within the pool enclosure, printed in letters at least 2.5 cm high:

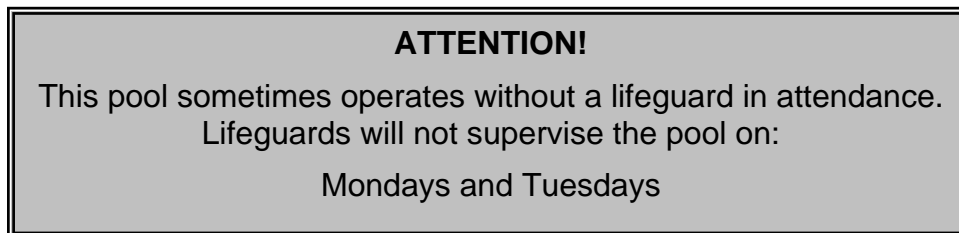


For Class B pools that are **less than 93 square metres**, the sign must read:



For Class B Pools that have **Occasional Safety Supervision**:

If a Class B pool operates with and without safety supervision at different times, a sign may be posted that states when the lifeguards are on duty. The sign below is an example:



It is recommended, however, that the “Unsupervised” sign always be posted at pools where supervision is occasional.

Lifeguards

You will first need to know:

- the total water surface area of your pool
- the allowable bather load

before using the chart below which indicates the minimum number of lifeguards and assistant lifeguards for a public pool with a water surface area of **500 square metres or less**.

Where there are lifeguards and assistant lifeguards on duty		Where there are <u>only</u> lifeguards on duty	
Number of bathers on the deck and in the pool	Minimum number of lifeguards and assistant lifeguards on duty	Number of bathers on the deck and in the pool	Minimum number of lifeguards on duty
0-30	1	0-30	1
31 – 100	2	31 – 125	2
101 – 200	3	126 – 250	3
201 – 300	4	251 – 400	4
300 or more	One additional lifeguard or assistant lifeguard for each additional 100 bathers or fraction thereof	400 or more	One additional lifeguard for each additional 150 bathers or fraction thereof

Testing and Inspections

Tests and inspections	When
Water clarity (Black disc clearly visible from 9 metres *)	Every 2 hours and ½ hour before pool opens ***
Free available chlorine (FAC)	
Bromine	
pH	
Total chlorine (<i>Free Available Chlorine + Combined chlorine</i>)	Daily
Combined chlorine (<i>Total Chlorine—Free Available Chlorine</i>) *	
Number of bathers	
Make-up water meter reading	
Skimmer lids & drain covers inspected	
Safety Equipment and First Aid Kit*	
Ground fault detector	Daily – before opening
Emergency Phone	
Cyanuric Acid (outdoor pools)	Weekly
Total alkalinity*	
Water cover outlets**	Once every 30 days

* *recommended*

** *must also be signed by the person conducting the test*

*** *Note: Where the addition of chemicals required to maintain the pH value and the disinfectant residual of the pool water is controlled by automatic sensing devices and the pH value and the disinfectant residual are automatically determined and displayed or continuously recorded, the operator must at least once every day test disinfectant and pH levels manually.*

Record these tests and inspections in a Pool Maintenance Record Book

Testing Method

Always follow the manufacturer's instructions.

- Take the water sample away from any jets.
- Submerge the comparator tub at least 18 inches below the water surface.
- Add reagent with the reagent bottle completely upside down and vertical (straight up and down); this affects the size of the drops.
- Count the drops as you add them to the comparator tube making sure that you add the exact amount required.

Test kits

There are many types of test kits commercially available from pool and spa supply companies.

Some kits will measure FAC/bromine residual and pH and nothing else. For a public pool a fully equipped test kit is required. The kit must contain the reagents to test for free available and combined chlorine or bromine levels, total alkalinity, pH, and if the pool is using stabilized chlorine, to measure cyanuric acid levels.

Reagents should be replaced as per manufacturer's recommendation because they lose strength over time. Storing them in direct sunlight or in filter equipment rooms where the conditions are warm and humid can ruin the reagents. Storing them at very cold temperatures (outdoor shed in winter) may destroy the reagents too. Mixing reagents from other kits may mean inaccurate results.

Required pool chemical levels

Test	Required Level
Free available chlorine (Unstabilized pool)	0.5 mg/L
Free available chlorine (Stabilized pool)	1.0 mg/L
Bromine	2.0 mg/L
pH	7.2 – 7.8
Cyanuric acid (Stabilized pool)	1 - 60 mg/L
Total alkalinity	Minimum 80 mg/L

Records must be:

- kept for a minimum of one year
- signed by the operator
- available for inspection by a public health inspector

Important Math Calculations

Calculating area of the pool

The total area of the pool water surface is calculated by measuring the shallow and deep areas of the pool separately and then adding the two results together.

- The shallow area is part of the pool that is 1.35 metres (4.5 feet) or less in depth.
- The deep area is part of the pool that is greater than 1.35 metres (4.5 feet) in depth.

Length of shallow end _____ Width of shallow end _____
Area of shallow end: Length \times Width = _____ m²

Length of deep end _____ Width of deep end _____
Area of deep end: Length \times Width = _____ m²

Turnover Rate

Turnover rate is the number of times the total volume of water is filtered, disinfected and returned to the pool each day.

Turnover period is the time needed for the total volume of water to be filtered, disinfected and returned to the pool once.

Determine the volume in metres³

Volume m³ = Area m² \times Depth in metres (for both shallow and deep ends)

Shallow End (_____ m² \times _____ m) + Deep End (_____ m² \times _____ m)

(_____ m³) + (_____ m³)

Volume \equiv _____ m³

Convert from m³ to litres:

1 m³ = 1000 L

Volume = _____ m³ \times 1000 = _____ litres

EXISTING POOLS (constructed before 1997)		
	Turnover rate	Turnover period
Class A pools constructed after 1974	4 times the total volume of the pool each day	Once every 6 hours
Class A pools constructed prior to 1974 and Class B pools	3 times the total volume of the pool each day	Once every 8 hours
NEWER POOLS (constructed after 1997)		
	Turnover rate	Turnover period
Class A pools	6 times the total water volume of the pool	Once every 4 hours
Class B pools	4 times the total water volume of the pool	Once every 6 hours

Calculated Flow Rate

$$\begin{aligned}
 \text{Flow rate} &= \frac{\text{Pool water volume in litres}}{\text{Turnover period (in hours)} \times 60 \text{ min./hr.}} \\
 &= \frac{\text{litres}}{\text{hours} \times 60 \text{ min./hr.}} \\
 &= \text{_____ L/min. (or lpm)}
 \end{aligned}$$

Actual Flow Rate (read from flow meter)

Flow meter reading _____ L/min.

- If the actual flow rate is the same as or higher than the calculated rate, then the water is being filtered and disinfected frequently enough.
- If the actual flow rate is less than the calculated rate, then the water is not being filtered and disinfected frequently enough and a repair may be required. Consult a pool expert.

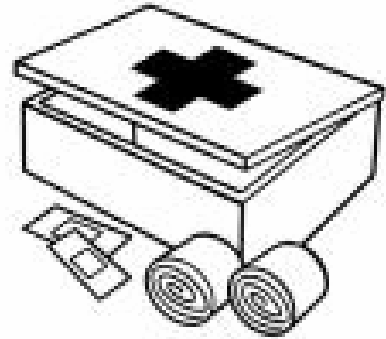
Make-up Water

- Estimate the **number of bathers** in the pool each day
- Add **20 litres** of water **per bather** to the pool
- Read the **water meter** to determine the amount of water added to the pool
- **Record bather load** and amount of **make-up water added** in the Pool Maintenance Record book

If 40 bathers use the pool in one day, then 800 litres (40 bathers x 20 litres/per bather) of water must be added to the pool that day.

First Aid Kit Contents Checklist

- A current copy of the St. John Ambulance or Red Cross First Aid Manual
- 12 safety pins
- 24 adhesive dressings, individually wrapped
- 12 sterile gauze pads each 7.5 cm square
- 4 rolls of gauze bandages 5 cm in width
- 4 rolls of gauze bandages 10 cm in width
- 4 sterile surgical pads, individually wrapped
- 6 triangular bandages
- 2 rolls of splint padding
- 1 roll-up splint
- 1 pair of scissors
- 2 pairs of non-permeable gloves
- 1 resuscitation pocket mask



Close the pool when:

- The black disc on the white background is not clearly visible
- Fecal accidents
- Emergency phone is not working
- Ground fault detector is not working or indicates a fault
- Insufficient quantity of disinfectant (FAC or Bromine)
- Main drain cover is missing or not secured to the bottom of the pool
- Circulation/filtration system not working

Chemical Safety

- Train staff in proper handling and storage of chemicals and about potential hazards in the pool environment.
- Store pool chemicals in a cool, dry and well-ventilated space.
- Keep corrosive materials such as acids and combustibles (i.e., such as paper and rags) away from other chemicals.
- Keep all chemicals away from hot surfaces or flame.
- Have personal protective equipment available (gloves, respirators, apron).
- Material safety data sheets should be made available to employees for every chemical in 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 should have its own scoop. Use scoops provided by the manufacturer.
- Keep containers closed when chemicals are not in use.
- Never re-use empty chlorine containers for storage of other chemicals and never mix old chemicals with your fresh supply.

**NEVER ADD WATER TO THE CHEMICALS,
ALWAYS ADD THE CHEMICAL TO THE WATER**

Pool Parts

Make-up water meter	<ul style="list-style-type: none"> • measures the amount of fresh water added to a pool • fresh water slows cyanuric acid build-up and dilutes swimmer pollutants • 20L of fresh water per bather must be added to the pool daily
Filter	<ul style="list-style-type: none"> • removes dirt, debris and undissolved solids from the pool water • filter is usually cleaned by backwashing
Flow meter	<ul style="list-style-type: none"> • shows the rate at which water is circulating in the system
Skimmers	<ul style="list-style-type: none"> • located under the pool deck • collects and traps objects which float on the surface of the water • each skimmer contains a basket, floating weir and equalizer line • at least 15 per cent of the total pool water volume is capable of being withdrawn from the gutter or skimmer lines daily and discharged to waste drains
Equalizer line	<ul style="list-style-type: none"> • is not permitted • ensures that water is always in the lines so that the recirculation pump is pumping water and not air • one end of the line must be plugged
Main drain	<ul style="list-style-type: none"> • located at the deepest end of pool • cover must be flush and secure to pool bottom • must be inspected monthly and recorded
Pressure gauges	<ul style="list-style-type: none"> • two gauges are located at the top of the filter tank one measures the pressure of water flowing into the tank, the other measures pressure of water flowing out (after the filter) • when too much dirt collects on the filter medium the pressure after the filter drops; the difference is visible on the gauges (when the difference is significant, backwashing or filter replacement is required)
Recirculation pump	<ul style="list-style-type: none"> • pulls water from the pool and pushes it through the filter or it pulls the water through the filter and pushes it back to the pool • must be capable of pumping enough water through the system to provide the required number of turnovers each day

