

Alberta Health

Pool Standards

July 2014 (Amended January 2018)

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Part 1 Purpose and Application

Introduction

The *Pool Standards, July 2014* are established under the authority of the *Public Health Act*, RSA 2000, c P-37 (Act) and the *Public Swimming Pools Regulation (Regulation)* (AR 204/2014). They have been developed in consultation with the pool industry, pool operators and public health officials from Alberta Health Services. The *Pool Standards, July 2014 (Amended January 2018)* replace the *Pool Standards, July 2014 (Amended 2017)*.

Purpose

The primary objective of the *Pool Standards* is to set specific technical standards pertaining to water quality and facility operations required in the *Regulation*.

The *Pool Standards* set requirements for operator education, recirculation, water chemistry and microbiology, water quality monitoring, anti-entrapment, policies and plans related to pool safety and supervision, public education, water quality incident response and general sanitation.

The *Pool Standards* also include a protocol for management of contaminated public swimming pool water and the calculations for maximum bather load and flow rates through anti-entrapment suction outlets.

The *Regulation* and the *Pool Standards* together govern the operation and maintenance of pools to ensure safe water quality and a safe and sanitary swimming environment for Albertans. The *Regulation* and the *Pool Standards* do not govern the operation and maintenance of floatation tanks.

Application

The *Pool Standards* apply to all pools as defined in the *Regulation*.

Pursuant to Section 3 of the *Regulation*, the *Pool Standards* do not apply to:

- a structure containing water constructed for the sole use by owners of a single family dwelling and their families and guests;
- a natural pool; or
- a pool of water that is drained, cleaned and filled after each use by each individual.

Part 2 Definitions

The following terms are defined in the *Regulation* and are repeated here for ease of reference:

- a) bed and breakfast means a bed and breakfast as defined in the *Food Regulation* (AR 31/2006);
- b) executive officer means an executive officer as defined in the *Public Health Act*;
- c) natural pool means an artificially created ecosystem which reproduces the conditions of a natural body of water where water is purified by biological and physical treatment;
- d) owner means the owner of a pool;
- e) owner's agent means the person designated under section 5 as an owner's agent;
- f) patron means an individual who enters the public swimming pool premises and might or might not enter or use the public swimming pool;
- g) pool means a public swimming pool and the public swimming pool's premises;
- h) pool operator means an individual who operates and maintains a pool on a day-to-day basis and meets the qualifications set out in the *Pool Standards* in order to do so;
- i) *Pool Standards* means the *Pool Standards, July 2014 (Amended January 2018)* declared in force by section 2;
- j) public swimming pool means a structure that contains water that is used for recreational, therapeutic or other similar purposes and includes a swimming pool, wading pool, water spray park, whirlpool and any fountain or other artificially created pool of water;
- k) public swimming pool premises means the buildings and equipment used in connection with a public swimming pool;
- l) suction outlet means a fitting or fitting assembly and related components, including a cover or grate and sump, that provide a localized low pressure area for the transfer of water from a public swimming pool;
- m) swimming pool means a structure that contains water that is deeper than 60 centimetres at its deepest point.

- n) wading pool means a structure containing water the depth of which is 60 centimetres or less throughout the structure;
- o) water spray park means a structure on which water is sprayed or released but does not accumulate;
- p) whirlpool means a structure containing water at a temperature above 30°C and that:
- (i) is not drained, cleaned and refilled before use by each individual, and
 - (ii) utilizes hydro-jet circulation or air induction bubbles or both.

For the purposes of the *Pool Standards*, the following terms are defined:

- anti-entrapment device means any device used for the purpose of preventing body entrapment, hair entrapment or entanglement, limb entrapment, mechanical entrapment, evisceration incidents and death including but not limited to: certified ANSI/APSP-16 2011 suction outlets, a Safety Vacuum Release System (SVRS), a suction-limiting vent system or an automatic pump shut off system.
- bather means a patron who enters or uses the public swimming pool.
- blockable suction outlet means a suction outlet that has a perforated (open) area that can be shadowed by the area of the 18 x 23 inches (45.7 x 58.4 centimeters) body blocking element described in ANSI/APSP – 16 2011.
- maximum flow rate means the highest possible water flow through a fully submerged suction system (excluding the skimmer or gutter system) with the system's pump(s) operating at full speed with clean pump basket(s) and clean filter(s).
- secondary disinfection means a disinfection process or system designed to achieve minimum 3-log (99.9 percent) reduction in the number of infective cryptosporidium oocysts.

Part 3 Operation and Maintenance of Pools

1.0 Pool Operator

For the purposes of section 6 of the *Regulation*, the following pool operator training and certification qualifications apply.

1.1 Certificate

The pool operator must

- a) be certified by an organization that is on the List of Approved Pool Operator Education Organizations approved by the Minister, and
- b) upon request, provide proof of successful completion of the course in the form of a certificate issued by the approved organization.

1.2 Qualifications obtained prior to November 30, 2014

A pool operator is considered certified if, prior to November 30, 2014, the pool operator

- a) has successfully completed a pool operator course through the Alberta Association of Recreation Facility Personnel, the National Swimming Pool Foundation, or a regional health authority in Alberta, and
- b) is operating a pool or teaching a pool course.

1.3 Additional Training

An executive officer may require a pool operator to obtain additional training in water treatment, disinfection, facility operation and safety where required.

2.0 Pool Maintenance

For the purposes of section 11 of the *Regulation*, the following pool maintenance standards apply.

2.1 Shower water temperature range

Subject to section 2.8, every shower must provide water at a temperature of not less than 35 degrees Celsius and not greater than 45 degrees Celsius.

2.2 Public swimming pool maximum water temperature

2.2.1 The water in a public swimming pool, when in use, must not be greater than 40 degrees Celsius.

2.2.2 A whirlpool must be fitted with a temperature regulator that is in good working order.

2.3 Dry sauna and steam sauna maximum temperature

2.3.1 The ambient air temperature in a dry sauna must not be greater than 85 degrees Celsius.

2.3.2 The ambient air temperature in a steam sauna must not be greater than 60 degrees Celsius.

2.3.3 The ambient air temperature in a dry sauna or a steam sauna must be measured and recorded at least once every 24 hours, when in use.

2.4 Ventilation

The ventilation in a public swimming pool premises must be able to maintain safe air quality and must protect against the buildup of chlorine gas or disinfection by-products.

2.5 Monitoring Length of Stay

2.5.1 To assist patrons in monitoring their length of stay in a whirlpool, a clock must be clearly visible from the whirlpool.

2.5.2 Reasonable provisions shall be available to assist patrons in monitoring their length of stay in a dry sauna or steam sauna. These could include, but are not limited to, supervision, clocks or timing devices that use sound or light.

2.6 Soap in washrooms and showers

Subject to section 2.8, an adequate supply of soap must be provided in suitable dispensers in all washrooms and showers.

2.7 Designated food handling and consumption area

Any food handling and consumption must occur in a clearly designated area which is set aside for that purpose.

2.8 Exemption for soap and shower temperature

Sections 2.1 and 2.6 do not apply to showers used only for cooling or rinsing purposes.

3.0 Filtration, Circulation and Disinfection

For the purposes of sections 10, 12 and 13 of the *Regulation*, the following filtration, circulation, disinfection and operational standards apply.

3.1 Recirculation

3.1.1 A recirculation rate shall be maintained so that an amount of water equivalent to 100 percent of the water volume passes through treatment and is recirculated within:

- i. 4 hours, for a swimming pool constructed after November 2006,
- ii. 6 hours, for a swimming pool constructed before November 2006,

- iii. 8 hours, for a swimming pool constructed before November 2006, where it can be demonstrated that the water quality can be maintained in accordance with the *Pool Standards*.
- iv. 1.5 hours for a water slide receiving pool used solely for that purpose.
- v. 2 hours for a stand-alone wading pool or recirculating water spray park.
- vi. 15 minutes for a whirlpool with a volume of less than four cubic metres.
- vii. 20 minutes for a whirlpool with a volume of four or more cubic metres.

3.1.2 Notwithstanding section 3.1.1, a water slide receiving pool or whirlpool constructed prior to November 30, 2006, may exceed the required recirculation rates if chlorine, pH, clarity, oxidation reduction potential (ORP) and bacteriological requirements are maintained in accordance with Sections 4.0, 6.0 and 8.0 of the *Pool Standards*.

3.1.3 If a wading pool, water slide receiving pool or recirculating water spray park is connected to a swimming pool, the turnover time for the swimming pool shall apply to the wading pool, water slide receiving pool or water spray park.

3.2 Collection of water from public swimming pool surface

When a public swimming pool is in use, it must be operated to maximize the flow of the water through the skimming devices.

3.3 Maximum rate of filtration

3.3.1 The maximum rate of filtration for a high rate sand filter must not be:

- a) greater than 10 litres per second per square meter (15 US gallons per minute per square foot) for swimming pools, water slide receiving pools, wading pools or recirculating water spray parks, and
- b) greater than 8.5 litres per second per square meter (12.5 US gallons per minute per square foot) for a whirlpool.

3.3.2 Notwithstanding subsection 3.3.1, pools constructed prior to November 30, 2006, that use high rate sand filters may operate at a higher filtration rate where

- a) the rate is prescribed by the manufacturer's specifications, and
- b) where the chlorine, pH, clarity, ORP and bacteriological requirements can be maintained in accordance with Sections 4.0, 6.0 and 8.0 of the *Pool Standards*.

3.3.3 The rate of filtration for other types of filters must comply with the manufacturer's specifications.

3.4 Treatment for recirculating water spray parks

Any stand-alone recirculating water spray park constructed after November 30, 2014 shall provide 100 per cent filtered water with 2.0 milligrams per litre free chlorine residual at the point of contact with the bather.

4.0 Chlorine, pH and Other Chemical Parameters

For the purposes of sections 13 and 14 of the *Regulation*, the following chlorine, pH and other chemical parameter standards apply.

4.1 Free chlorine residual

The minimum free chlorine residual in a public swimming pool must be maintained as follows:

- 4.1.1 1.0 milligram per litre in a public swimming pool with an operating water temperature of not greater than 30 degrees Celsius.
- 4.1.2 2.0 milligrams per litre in a public swimming pool with an operating water temperature of greater than 30 degrees Celsius.
- 4.1.3 2.0 milligrams per litre in a recirculating, stand-alone water spray park or stand-alone wading pool regardless of the operating water temperature.

4.2 Oxidation reduction potential (ORP)

Notwithstanding standard 4.1, a public swimming pool, except for a recirculating water spray park, may operate with a free chlorine residual of no less than:

- a) 0.5 milligrams per litre if able to consistently maintain an ORP value of no less than 700 millivolt (mV), and
- b) 0.3 milligrams per litre if able to consistently maintain an ORP value of no less than 770 mV, a pH of no more than 7.3 and when supplemental disinfection is used.

4.3 Combined chlorine residual

The combined chlorine residual in a public swimming pool must be maintained at the lowest level possible to maximize bather comfort.

4.4 pH range

The pH of the water in a public swimming pool must be maintained at no less than 6.8 and no greater than 7.6.

4.5 Total alkalinity

4.5.1 The total alkalinity of the public swimming pool water must be maintained at no less than 60 milligrams per litre and no greater than 180 milligrams per litre, or at levels where chlorine and pH requirements can be maintained in accordance with Section 4.0 of the *Pool Standards*.

4.5.2 Total alkalinity must be measured and recorded at least once per week.

4.6 Cyanuric acid

Where cyanuric acid is used in an outdoor public swimming pool, the concentration:

- a) must not be greater than 50 milligrams per litre, and
- b) must be measured and recorded at least once a week.

4.7 Non-chlorinated oxidizing products

Non-chlorinated oxidizing products used in a public swimming pool must be used in accordance with the manufacturer's instructions.

5.0 Testing, Monitoring and Recordkeeping

For the purposes of section 15 and 17 of the *Regulation*, the following monitoring and recordkeeping standards apply.

5.1 Operating records

Operating records must be maintained to provide information regarding:

- a) time of and observations and readings for pH, and the free, total and combined chlorine residual;
- b) time and results of total alkalinity tests;
- c) automated controller set points and readings for ORP, chlorine and pH;
- d) temperature of the public swimming pool water;
- e) clarity of the water;
- f) results of microbiological analyses as provided by the regional health authority;
- g) any other water quality tests;
- h) quantities and dates of all chemicals used;
- i) equipment maintenance, including pump modifications which potentially affect flow rate;
- j) ambient air temperature in a dry sauna or steam sauna;

- k) make and model, purchase and expiry date of suction outlet covers, and manufacturers' recommended flow rate;
- l) incident records with respect to patron injury; and
- m) contamination events including the date of the event and the response.

5.2 Manual tests

- 5.2.1 The free chlorine, combined chlorine and pH must be tested manually at least once per day:
- 5.2.2 The automated readings and associated setpoints shall be monitored and recorded at least once per day.
- 5.2.3 Dip and read strips must not be used to measure chlorine, pH or alkalinity.

5.3 Automated controller results

Automated controller readings must be consistent with any manual tests.

6.0 Microbiological Requirements

For the purposes of section 18 of the *Regulation*, the following microbiological requirements apply.

6.1 Heterotrophic plate count / Total coliforms

The quality of water in a public swimming pool must be maintained so that the water does not:

- a) have a heterotrophic plate count greater than 100 colony forming units per milliliter in a 100 millilitre sample, or
- b) show the presence of total coliforms in a 100 millilitre sample.

6.2 *Pseudomonas aeruginosa*

In addition to 6.1, the quality of water in a public swimming pool operating at greater than 30 degrees Celsius must be maintained so that samples of the water do not show the presence of *Pseudomonas aeruginosa*.

7.0 Microbiological Sampling

For the purposes of section 19 of the *Regulation*, the following microbiological sampling requirements apply.

7.1 Water sampling procedure

- 7.1.1 A water sample for heterotrophic plate count and total coliforms must be taken weekly from a public swimming pool.

7.1.2 A water sample for *Pseudomonas aeruginosa* must be taken weekly for public swimming pools operating at 30 degrees Celsius or greater.

7.1.3 Samples required under Section 7.1.1 and 7.1.2 must be taken:

- a) from a point near an outlet or from any other location that is necessary to give an accurate representation of the water quality in the public swimming pool, and
- b) between 200 to 400 millimeters below the surface of the water.

7.2 Collection of water samples

Public swimming pool water samples for microbiological testing must be collected in sample bottles supplied by the Provincial Laboratory of Public Health (ProvLab).

8.0 Water Quality and Water Clarity

For the purposes of sections 10 and 20 of the *Regulation*, the following public swimming pool water quality and clarity standards apply.

8.1 Bather load

- 8.1.1 When in use, the maximum design bather load of the public swimming pool must not be exceeded.
- 8.1.2 Where the maximum design bather load for a public swimming pool is not available, the owner or owners' agent, if any, must calculate and apply a maximum bather load value in accordance with Schedule B.
- 8.1.3 Notwithstanding 8.1.1 and 8.1.2, the public swimming pool may be operated to exceed the maximum design bather load or the calculated maximum bather load if chlorine, pH, clarity, ORP and bacteriological requirements are met.

8.2 Clarity problems

Where water clarity problems persist, the executive officer may require monitoring of the clarity until the turbidity is no greater than 0.5 Nephelometric Turbidity Units (NTU).

9.0 Anti-Entrapment Devices

For the purposes of section 23 of the *Regulation*, the following standards apply.

ANSI/APSP-16 2011 means the Standard 16 *American National Standard for Suction Fittings for Use in Swimming Pools, Wading Pools, Spas and Hot Tubs* published by the American National Standards Institute/Association of Pool and Spa Professionals.

ASTM F2387 means the *Standard Specification for Manufactured Safety Vacuum Release Systems (SVRS) for Swimming Pools, Spas and Hot Tubs* published by the American Society for Testing and Materials.

ASME/ANSI A112.19.17 (previously known as ASME/ANSI A112.19.17-2010) means the *Manufactured Safety Vacuum Release Systems (SVRS) for Residential and Commercial Swimming Pool, Spa, Hot Tub, and Wading Pool Suction Systems* published by the American Society of Mechanical Engineers/American National Standards Institute.

9.1 Anti-entrapment Plan

Every owner or owner's agent, if any, must assess anti-entrapment risks, develop and implement an appropriate anti-entrapment plan to meet the requirements of this section.

9.2 Installation of anti-entrapment devices

An anti-entrapment device must be installed in accordance with the manufacturer's specifications and be maintained in good working order when the public swimming pool is in use.

9.3 Main submerged suction outlet

9.3.1 On or after November 30, 2019, a submerged suction outlet, including a gravity fed outlet, in a public swimming pool, must be:

- a. compliant with the ANSI/APSP-16 2011 performance standards, or
- b. custom fabricated and certified by a professional engineer, in accordance with ANSI/APSP-16 2011, and installed and maintained according to the engineer's instructions.

9.3.2 The flow rating of the submerged suction outlet must be higher than or equal to the maximum flow rate divided across multiple interconnected outlets in accordance with Schedule C.

9.3.3 Pursuant to Section 9.3.2, where an operator is unable to calculate the maximum flow rate, the maximum flow rate must be determined by a professional engineer.

9.4 Single or interconnected submerged suction outlet

On or after November 30, 2019, an existing public swimming pool that has

- i) a blockable single submerged suction outlet, or
- ii) interconnected submerged suction outlets with a distance of less than 66 cm (26 inches) from the outside edge of one cover to the inside edge of the second cover on the same plane.

must employ at least one of the following systems:

- a) a multiple suction outlet system with at least two fully submerged suction outlets per pump no less than 66 cm (26 inches) from the outside edge of one cover to the inside edge of the second cover,
- b) a safety vacuum release system (commonly referred to as SVRS) that relieves suction when a blockage is detected and that is installed to meet the performance standards of the ASTM F2387 or ASME/ANSI A112.19.17,
- c) a properly designed and tested suction-limiting vent system which meets ASME-A112.19.17,
- d) an automatic pump shut-off system which meets ASME-A112.19.17,
- e) permanent disablement of the submerged suction outlet either by reversing the flow through the outlet or completely sealing the existing outlet if the skimmers are capable of providing for 100 percent flow through,
- f) a gravity fed system, or equivalent system, approved by a professional engineer, or
- g) interconnected submerged suction outlets on different planes, not installed in a seating area.

9.5 Other submerged suction outlets

Notwithstanding sections 9.3 and 9.4, every equalizer line outlet or submerged suction outlet used for vacuuming must

- a. have a cover to prevent the risk of entrapment, or
- b. be permanently disabled.

9.6 Damaged submerged suction outlets

9.6.1 The covers of each submerged suction outlet, including equalizer and vacuum outlets, shall be routinely inspected prior to opening each day and throughout the day when the public swimming pool is in use.

9.6.2 If upon visual inspection the cover of a submerged suction outlet is cracked, broken, improperly secured or missing, the pump shall be immediately shut down and the public swimming pool closed, and only reopened when the cover is repaired or replaced.

9.6.3 Notwithstanding 9.6.2, an executive officer, where satisfied that measures undertaken by the operator will sufficiently protect bathers from entrapment, may allow a swimming pool to remain open to the public until repair or replacement of the cover can be conducted.

9.6.4 An anti-entrapment system installed in accordance with Section 9.4 must be routinely inspected in accordance with manufacturers' instructions. A pool shall be closed immediately if the anti-entrapment system is not operating in accordance with the manufacturer's instructions.

Part 4 Written Policies and Plans

For the purposes of section 24 of the *Regulation*, the following standards for written policies and plans apply.

10.0 Pool Safety and Supervision

10.1 Pool Safety and Supervision Plan

A Pool Safety and Supervision Plan shall be developed based on current best practices, and must include:

- a) a pool admission standard based on the bather's age, swimming competency and adult oversight if the bather is a minor or when there is a question of swimmer competency;
- b) rules for bather use and supervision of pool mats, inflatable toys and life jackets;
- c) a list of all of the facility-appropriate lifesaving equipment to be provided on-site;
- d) a list of the required emergency equipment and procedures including telephone access and emergency telephone numbers;
- e) a facility safety check procedure;
- f) supervision protocols including lifeguard scanning and supervision protocols for each public swimming pool when in use, including those not offering lifeguarding;
- g) Information and procedures for use of a public swimming pool where no lifeguard is on duty;
- h) a procedure to monitor patrons using special areas such as the dry sauna and steam sauna;
- i) procedures to respond to medical emergencies such as entrapped patrons, overheated dry sauna or steam sauna users;
- j) measures to ensure the safety of patrons using a dry sauna or steam sauna in order to protect against burns and overheating which may include, but are not limited to:
 - thermostatic control of air temperature,
 - a working thermometer in each unit,
 - doors that open outwards with little resistance,
 - a signaling device or process for emergencies;
- k) information on the safe handling and storage of pool treatment chemicals and other related chemicals; and
- l) any other measure that may be applicable to the pool.

11.0 Patron Education and Notification

For the purposes of Section 24 of the *Regulation*, the following education and signage standards apply.

11.1 Education of patrons

11.1.1 The patron education policy and plan shall include a strategy to provide information to:

- a) those bathers who should wear protective, water-resistant swimwear including
 - i) children, 35 months and under, and
 - ii) anyone who is or may be incontinent.
- b) those patrons who should consult with a physician prior to using the whirlpool, dry sauna and steam sauna, including
 - i) pregnant women,
 - ii) individuals with medical conditions including but not limited to heart disease, hypertension, seizures, diabetes or obesity,
 - iii) individuals greater than 65 years of age; and
 - iv) individuals with a medical condition requiring the ongoing care of a physician.
- c) those patrons with diarrhea or a history of diarrhea over the previous two weeks who should not use the public swimming pool.

11.2 Signs posting rules and safety information

Except for stand-alone water spray parks, an owner or owner's agent, if any, must post one or more signs that convey the following rules and safety information for the use of the pool in a size, type and location that may be easily seen by all patrons.

Rules for use of the pool

- 11.2.1 Bathers must take a shower using soap prior to entering the public swimming pool.
- 11.2.2 Patrons must wash their hands using soap after using the washroom or changing diapers.
- 11.2.3 Glass is not allowed on the pool deck or in other barefoot areas.
- 11.2.4 Street footwear must not be worn in wet traffic areas.
- 11.2.5 Patrons who are intoxicated will not be allowed to use the pool.

Pool safety information

- 11.2.6 The maximum bather load for the public swimming pool.
- 11.2.7 The public swimming pool depths and identification of those areas of the public swimming pool where diving is not allowed.
- 11.2.8 The permitted temperature range of the whirlpool, dry sauna or steam sauna.
- 11.2.9 Location of the fire alarm, telephone or other emergency devices, where applicable.
- 11.2.10 Where there is no lifeguard on duty, signage stating
- No lifeguard is on duty,
 - Children under 13 years of age should be supervised, and
 - Patrons should not swim alone.
- 11.2.11 Any other information that the owner or owner's agent determines is necessary to maintain the health and safety of the patrons using the pool facility.

12.0 Water Quality Incident Response Plan

For purposes of section 24 of the *Regulation*, the following water quality response standards apply.

12.1 Water Quality Incident Response Plan

A Water Quality Incident Response Plan that is appropriate to the type of public swimming pool must include the following:

- a) the steps to be taken when any of the following occur:
 - i) standards for microbiology, ORP, free chlorine, cyanuric acid, pH and clarity in the public swimming pool are not being met,
 - ii) blood, food or chemicals foul the water, or
 - iii) fecal material or vomit foul the water, and
- b) the name of the appropriate contact person and emergency contact numbers.

12.2 Requirements

A Water Quality Incident Response Plan must adhere to the requirements in Schedule A: "Contamination Management for Public Swimming Pools".

13.0 General Sanitation Plan

For purposes of section 24 of the *Regulation*, the following standards for the general sanitation plan apply.

13.1 General Sanitation Plan

A General Sanitation Plan for a public swimming pool premises must list the chemicals used for cleaning and disinfection, and specify a routine schedule for adequate cleaning, and where necessary disinfecting, of:

- a) walls, floors, and decks;
- b) washrooms and change rooms;
- c) showers;
- d) dry saunas and steam saunas; and
- e) any other area or equipment in contact with patrons of the pool.

Part 5 Schedules

Schedule A

Contamination Management for Public Swimming Pools

Every owner or owner's agent is required to develop, maintain, and implement a written policy that outlines a response plan for managing blood, vomit, and fecal contamination in public swimming pools. This schedule was first developed in 2006, and has been modified to reflect the United States Centers for Disease Control and Prevention *Recommendations for Aquatic Operators of Treated Venues* March 2012.

1. In the event of blood, vomit, or fecal contamination, the pool operator shall immediately close the public swimming pool until remediation procedures are complete. This also includes any affected water features and public swimming pools that share the same recirculation system.
2. To avoid cross contamination, a bather must take a shower, using soap, prior to re-entering any public swimming pool.
3. Contaminating material must be removed (e.g. using a net, scoop, or bucket) and disposed of in a sanitary manner.
4. The net, scoop or container used to remove the fecal or vomit contamination must be thoroughly cleaned and disinfected.
5. Aquatic vacuum cleaners must not be used for removal of contaminants from the water or adjacent surfaces unless vacuumed waste is discharged to a sanitary sewer and the vacuum equipment can be adequately cleaned and disinfected.
6. A contamination response log must be maintained and must include at a minimum:
 - the date and time of the event,
 - type of incident,
 - the concentration of chlorine, pH and ORP at the time of the incident,
 - the procedures followed, and
 - the name of the person(s) conducting the procedures.

Public Swimming Pool Water Contamination Response

For purposes of this section, CT means concentration in milligrams per litre multiplied by time in minutes. $CT = C \text{ (mg/L)} \times T \text{ (min)}$

1. A public swimming pool that has been contaminated by blood, vomit or feces shall be treated as follows:
 - a) Check to ensure that the pH of the water is 7.5 or lower and adjust if necessary;
 - b) Verify and maintain water temperature at 25 degrees Celsius or higher;
 - c) Operate the filtration/recirculation system while the water reaches and maintains the proper free chlorine concentration during the remediation process; and
 - d) Test the chlorine residual at multiple sampling points to ensure the proper free chlorine concentration is achieved throughout the water for the entire disinfection time.
2. In addition to the above measures, the specific treatment of the water depends upon the type of contamination. The water should be treated as follows:

Blood-contaminated water

If the public swimming pool is operating at required chlorine residual and pH, it may remain open. If the free chlorine residual is below the required minimum residual level, the operator shall immediately close the public swimming pool until the free chlorine is verified to be at or above the required minimum.

Vomit-contaminated water

Raise the free chlorine residual to 2.0 mg/L (if less than 2.0 mg/L), and maintain for at least 25 minutes, or meet an equivalent CT value as shown in the table below.

Formed-fecal contaminated water

Raise the free chlorine residual to 2.0 mg/L and maintain for at least 25 minutes, or meet an equivalent CT value as shown in the table below.

CT for Response to Formed-Fecal Incident

Chlorine Concentration (mg/L)	Disinfection Time	Equivalent CT Values
1.0	50 minutes	50
2.0	25 minutes	50
3.0	17 minutes	50

The above table is based on the minimum CT of 45, maximum pH of 7.5, minimum temperature of 25 degrees Celsius and 99.9% inactivation of *Giardia* cysts by chlorine taken from *United States Centers for Disease Control. Responding to Fecal Accidents in Disinfected Swimming Pool Venues. MMWR 2001;50(20):416-7.*

Diarrhea contaminated water

For purposes of this section, diarrhea means stool that is too liquid to form a constant shape and stool that due to its consistency, cannot be captured in a standard net.

- a) Raise the free chlorine residual to 20.0 milligrams per litre, and maintain for at least 12.75 hours or
- b) Meet an equivalent CT value as shown in the table below.

CT for Response to Diarrhea Incident

Chlorine Concentration (mg/L)	Disinfection Time	Equivalent CT
1.0	15,300 minutes (255 hours)	15,300
10.0	1,530 minutes (25.5 hours)	15,300
20.0	765 minutes (12.75 hours)	15,300

The above table is based on a minimum CT of 15,300*, maximum pH of 7.5, minimum temperature of 25 degrees Celsius and 99.9% inactivation of *Cryptosporidium* cysts taken from Shields, JM et al (2008) Inactivation of *Cryptosporidium parvum* under chlorinated recreational water conditions, published by Journal of Water and Health. 06.4:513-520.

- c) In water containing chlorine stabilizer, lower the cyanuric acid concentration to 15 milligrams per litre or less, and raise the free chlorine to either 20 milligrams per litre for at least 28 hours, to 30 milligrams per litre for at least 18 hours, or to 40 milligrams per litre for at least 8.5 hours.
3. The owner or owner's agent, if any, of a public swimming pool may use a combination of chlorine and other secondary disinfection treatments to respond to a contamination event. Pursuant to section 8(1) of the Regulation, the regional health authority must review and approve any secondary disinfection prior to its use in order to ensure that an equivalent CT value will be achieved.

Schedule B

Calculation for the Maximum Bather Load

Maximum bather load is the maximum number of bathers allowed in any 24 hour period based on the capacity of the filtration system. It is determined based on two cubic meters of treated water for every bather in each 24 hour period, and the turnover period.

To determine the volume of treated water produced by the public swimming pool treatment system:

1. Determine the amount of treated water per minute:

$$\frac{\text{Volume of Public swimming pool (cubic metres)}}{\text{Turnover period (minutes)}} = \text{Volume of treated water per minute}$$

2. Determine amount of treated water per hour:

$$\frac{\text{Volume of treated water per minute}}{\text{X 60 minutes}} = \text{Volume of treated water per hour}$$

3. Determine the amount of treated water for each day

$$\frac{\text{Volume of treated water per hour}}{\text{X 24 hours}} = \text{Volume of treated water per day (24 hours)}$$

To determine maximum bather load:

Two cubic meters treated water is required for every bather in each 24 hours:

4. Number of bathers over a 24 hour period =

$$\frac{\text{Volume of treated water per day (24 hours)}}{\text{Two cubic metres per 24 hours}}$$

Note: This is equivalent to the total number of bathers allowed when the public swimming pool is in use.

5. If the public swimming pool operates for less than 24 hours then, the number of bathers per hour =

$$\frac{\text{Number of bathers per 24 hours}}{\text{Number of hours of operation}}$$

Schedule C

Flow Capacity Requirements for Submerged Suction Outlets

For the purposes of Section 9.3.2, this table outlines the percent of the maximum flow rate that each submerged suction outlet must be capable of accommodating. For systems with multiple interconnected outlets per pump, this is based on the assumption that one of the outlets is blocked. For example, if a pool had 4 interconnected outlets, the system must be engineered so that each of the remaining outlets is capable of handling 33% of the maximum flow rate if one is blocked.

	2 outlets in total	3 outlets in total	4 outlets in total	5 outlets in total	6 outlets in total	>6 outlets in total
Percent of maximum flow rate through each outlet.	100%	50%	33%	25%	20%	100% / [# of interconnected outlets -1]