Recommendations for Floatation Tanks, 2019

Ministry of Health
August 2019

Ontario

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Introduction

A floatation tank is a light- and sound-proof or reduced chamber or environment in which a person floats in a shallow depth of salt water solution. Floatation tanks may also be known as a float tub, float tank, sensory deprivation tank, or an isolation tank.

The floatation tank solution is typically between 12 and 18 inches deep and consists of a solution of Epsom salt near its saturation point. The high salinity allows users to float face-up on the water's surface with minimal effort. People often use floatation tanks for meditation, therapeutic, stress reduction, and overall relaxation purposes.

Floating can be in an open or enclosed space, though traditionally the term "floatation tank" refers to a cocoon-like device with a lid or door. The term also refers to systems that are rooms or walk-in cabins. Typically, only one person will float at one time, but partner floatation does occur.

Currently, there is no regulatory framework for floatation tanks in Ontario. Floatation tanks cannot be defined as either a "public spa" or a "public wading pool" under Ontario's *Public Pools Regulation*, as the regulations only apply to public pools with a depth of more than 0.75 meters (29.5 inches) and spas with hydro jet circulation, air induction bubbles, current flow, or a combination of them over the majority of the of the spa area.

Purpose

The Role of Public Health

The Recommendations for Floatation Tanks document is intended to offer guidance to Medical Officers of Health (MOH) and Public Health Inspectors (PHI). MOHs and PHIs may inspect each floatation facility and tank on a case-by-case basis.

Floatation tanks and premises may be inspected at the discretion of the public health unit and when the demand for inspection arises (e.g. complaint-based inspection).

The Role of Floatation Tank Operators

The Recommendations for Floatation Tanks document is intended to assist operators in taking the necessary measures to prevent health hazards that may endanger or transmit infections to clients and/or themselves by offering practical information and recommendations for floatation tank operation.

Floatation tank operators are responsible for ensuring they are in compliance with any applicable municipal by-laws and other regulatory requirements. They must also obtain business licenses and approval(s) to operate from the appropriate licensing bodies.

Floatation tank operators are encouraged to consult with their local public health unit and PHIs to work together toward shared safe environments.

Background

In recent years, the recreational use of floatation tanks has grown in popularity as a form of stress reduction.

Floatation tank solution contains an extremely high concentration of Epsom salt; between 25 and 35% (weight/volume), which is near the saturation limit of magnesium sulfate ($MgSO_4$) (30% at 20°C). The floatation tank solution is typically maintained at body-temperature (34°C to 37°C) and is 1.2-1.3 times denser than pool water due to the salinity.

There is no sodium chloride (NaCl) involved in float tank solutions, and as such, there is no hypochlorous acid or hypochlorite ion created. Inactivation or growth inhibition of microbes is a result of the osmotic pressure differential from the high salt concentrations causing water to leave the cell and not from disinfection by the dissolved salt. Manganese or magnesium oxide (brownish colour) is the byproduct of magnesium sulphate oxidation. It typically manifests itself as a brown substance along the wall of the floatation tank. While it is not dangerous, good sanitation and salt balance should prevent this from being an issue.

Very few microorganisms grow in high salt concentrations. However, some pathogenic bacteria (i.e., halophiles) and viruses can survive and grow in high salt concentrations and pose health risks to people using the float tanks (e.g., *Pseudomonas* spp., which can lead to skin rashes or eye infections). The addition of disinfectant methods to the float tank solution greatly reduces the risk of accumulating pathogenic microorganisms in the float tank solution.

Floating is done in a manner where ingestion of the floatation tank solution is extremely unlikely. Laying face-up in the solution results in minimal contact of solution with the mouth, eyes, nose, and ears, provided that the client is wearing earplugs. Skin exposure is of primary concern. To mitigate the entry of potential pathogens into the body via the skin, the client should be free of cuts and lesions, and should shower before and after floating. Minor cuts can be covered with a protective layer of petroleum jelly or the client may choose not to float until the wound has healed. Showering beforehand reduces the contaminant load brought into the solution and showering afterwards removes residual salt and reduces the chance that contaminants from the solution remain on the body.

Recommendations

Construction and design

1. Premises

a. Floors should be easily cleanable, made of impermeable material and have non-slip surfaces.
b. Showers should be conveniently located and accessible to the floatation tanks.
c. Soap should be provided by the premises to assist in the cleansing of the client's body while showering before and after floating.
d. Washroom(s) with a toilet, hand washing sink, hot and cold running water, liquid hand soap in a dispenser, and a method of hand drying that uses single-service products or a hot air dryer should be convenient and accessible in the premises.
e. Lighting and ventilation should be sufficient to enable the sanitary operation and maintenance of the premises and the safe use of the equipment.
f. Linens should be laundered between client uses.
g. Entry into and exit from the tank should be easy for clients. Clearance beside each float tank is recommended to allow for the application of first aid, should it be required.
h. Doors to each float room should have the ability to be unlocked from the outside in case of an emergency.
i. If the float tank is equipped with stairs to facilitate entry into and out of the tank, these should be marked to minimize the potential for slips, trips, and falls.
j. Clients should be made aware of the health and safety risks through both written signage and/or client forms and client orientation.

2. Floatation tank

a. All equipment used or proposed for use in floatation tank facilities should be of a proven design and construction and certified, listed, and labelled to a specific standard for the specified use by an accredited certification organization (e.g., Canadian Standards Association, Standards Council of Canada).
b. Any pillows or other items provided for use in the floatation tanks should be comprised of material that can be cleaned and disinfected.
c. Inlets and outlets of the tank should be at opposite end of the tank to promote the maximum flow of float tank water and eliminate dead spots.

d. There should be suitable ventilation to ensure acceptable air quality for client health and safety, especially if tank lids are closed during float sessions.
e. The facility should have the means to fully drain each tank.
f. It is recommended that all suction outlets should be skimmer style to encourage removal of surface contaminants. If outlets are under the surface water, manual skimming of the surface is recommended between float session and/or manual mixing of the floatation tank solution during the circulation phase.
g. A ground fault circuit interrupter (GFCI) should be installed if the tank contains under-water lighting and/or speakers.

Operation and maintenance

3. Client health

Operators should have adequate training to recognize, prevent, and respond to a health hazard that may arise.

a. Clients should take a cleansing shower prior to and after each float session. For this reason, the operator should provide shower facilities and soap.
b. Clients should not enter the float tank if they are infected with a communicable disease or have open sores on their body.
c. If petroleum jelly is used to cover minor cuts, it should be stored, handled, and dispensed in a manner which prevents contamination.
d. Expectant mothers should consult with their physician prior to floating.
e. Single-use, disposable ear plugs should be made available to each client.
f. A method to perform an eye wash is recommended for clients who may accidentally get salt water in their eyes.
g. Clients should not float while under the influence of drugs or alcohol

4. Routine cleaning and disinfection

Appropriate cleaning and disinfection, along with cleaning schedules ensure the health and safety of clients.

a. All areas of the facility should be kept in a clean and sanitary condition.
b. After each float session, the operator should:
    i. Conduct a visual inspection of the tank and clean and disinfect as required; and,
    ii. Remove visible contaminates (e.g. hair, scum, debris).

c. When the tank is emptied, and floatation tank solution is changed, operators should thoroughly clean and disinfect the tank, outlet covers, and other circulatory fixtures.

5. Circulation and filtration

Operators should be trained in tank maintenance, including circulation, filtration, water chemistry, and proper cleaning and disinfection.

Filtration is an essential part of the circulation system as it removes dirt, oils, and bacteria from the water that assists in maintaining desirable and safe water quality.

a. The recirculation system should be provided with a filter capable of removing insoluble contaminants. Cartridge-style filters are strongly recommended.
b. When tanks are not in use, floatation tank solution should be continually circulated and filtered.
c. Filters should be backwashed, cleaned and otherwise replaced according to the manufacturer's instructions for use (MIFU). Most disposable cartridges or bags offer 1-10-micron filtration.
d. Flow meters are preferred so that turnover rates and filter runs can be evaluated.
e. Generally, three turnovers of floatation tank solution should occur between float sessions. In the absence of a flow meter the operator must ensure they know the specified turnover rate as per the MIFU and determine the time required to achieve 3 turnovers of floatation tank solution.

6. Water maintenance

Maintaining tank water parameters within the acceptable ranges will help promote adequate disinfection and good water clarity, which are essential to the health and safety of clients. Balanced water chemistry also helps reduce corrosion and scaling of the tank.

Disinfection of float tank solution

a. Each facility should have a disinfectant strategy to handle the expected growth of microorganisms. A summary of appropriate disinfection strategies can be found in Appendix A of this document.
b. Operators should use a measured amount of oxidizer in their basin to address organic impurities in the floatation tank solution.
    i. Hydrogen peroxide is a commonly used oxidizer, but it is not effective alone as a disinfectant. Hydrogen peroxide, if used, should be maintained between 40 – 100ppm (min. – max.).

   ii. Ozone is another powerful oxidizer but may also be a respiratory irritant. If ozone is used, airborne levels should be measured both inside and outside the tank and kept below 0.1ppm (based on an 8-hour average).

c. Systems may employ the use of ultraviolet (UV) light as a supplemental form of disinfectant or water treatment. UV light does have a deleterious effect on microorganisms; however, the use of UV alone as a facility's disinfection strategy is not recommended. If UV is used, UV bulbs should be cleaned/replaced as per MIFU.
d. The combination of hydrogen peroxide and UV creates the formation of a powerful hydroxyl radical that may be sufficient to inactivate microorganisms. If a facility wishes to try this strategy, it is recommended that peroxide levels be kept above 30ppm and that the functionality of the UV lamp can be verified.
e. Chlorine and bromine may be used as disinfectants; however, the risks of airborne chemical exposure to the floater when using these alternatives should be considered. When using these disinfectants, lower concentrations such as 0.5 – 1.0ppm are recommended.
f. Cyanuric acid is not necessary in a floatation tank environment. Cyanuric acid is used to reduce the loss of free chlorine caused by the sun's UV rays. Since floatation tanks are not exposed to direct sunlight, there is no benefit to adding cyanuric acid (or products containing cyanuric acid) to tank water
g. If chemicals are added to the floatation tank it should be done at the start of the circulation phase to promote mixing and reduce the likelihood of contact with the client.
h. Facilities are encouraged to perform routine monitoring of the disinfectant residual in order to ensure that an appropriate level of residual is maintained to prohibit pathogen growth.

Water clarity and change

The water in a floatation tank should be completely clear. Water that is cloudy or discolored is an indication of potential issues (e.g. excess microbial growth, imbalance in water chemistry). Clarity can be measured by eye with the aid of a bright flashlight.

i. Clarity should be evaluated after each float session and recorded at least daily.
j. If the quality of the solution ever deteriorates, the entire solution should be drained, and the tank cleaned and disinfected, and refilled
k. Floatation tank solution should be drained, and the tank cleaned and disinfected, and refilled every 6 to 12 months at minimum, depending on usage, MIFU and quality indicators such as clarity and odour.

Specific gravity and salt

Specific gravity (salinity) is the ratio of the density of salt water to pure water. If the specific gravity is too high, the water passes its saturation point and is unable to absorb any more salt. Crystals will start to form, which can clog the filtration system and cause the pump to seize. If the specific gravity is too low, users will not be as buoyant in the water.

l. Operators should have a means of measuring the specific gravity onsite. Typically, a hydrometer is used for these purposes.
m. Specific gravity of the float tank solution should be kept at the levels recommended by the MIFU. In the absence of these recommendations, a specific gravity value of 1.25 - 1.3 g/ mL is recommended.
n. Only USP (pharmaceutical or food) grade Epsom salts should be used. Technical grade salts are commonly meant for agricultural or industrial use and may contain impurities, such as iron, manganese, and other metals, which may be absorbed through the skin and/or cause damage to the pump.

Temperature

The temperature of both the floatation tank solution and its room should be maintained to inhibit sweating, prevent condensation, and mitigate slipping hazards.

o. The temperature of the floatation tank solution should be maintained between 33.3 – 35.6°C/ 92 - 96°F or as per the MIFU.

pH

p. For bather comfort, the pH of the floatation tank solution should be maintained just around neutral at 6.8 – 7.6.

7. Record keeping

Maintaining records are essential for operators to show due diligence in maintaining their operation. Operators should keep all records on site for a minimum of one year.

a. A written comprehensive maintenance plan should be available and should include: details and frequency of the operator’s planned routine facility and equipment inspection, maintenance, and replacement of recirculation and water treatment components.
b. The following should be recorded daily – an example daily log is provided in Appendix B:
    i. Number of floats/clients per day

ii. Description of tank solution clarity
iii. Temperature of tank solution
iv. Tank solution pH
v. Disinfectant / oxidizer levels and records of amounts of chemicals added
vi. Water depth
vii. Specific gravity
viii. Flow meter and/or filter gauge readings and visual assurance of circulation
ix. Any emergencies, incidents (e.g. fecal, vomit, blood), or breakdown of equipment

8. Policies and procedures

Documenting policies and procedures are essential for operators to show due diligence in maintaining their operation. It is important that policies and procedures are developed and reviewed by operators on an on-going basis. Staff members should have access to the policies and procedures and should be familiar with their use. Policies and procedures are not limited to those listed in this section.

a. The facility must change float tank solution water immediately and clean and disinfect the tank after a fecal incident. Recommended written instructions on how to drain and disinfect a basin are provided in the Appendix C of this document.
b. The facility should have a safety and supervision plan/emergency response that addresses floaters in distress.
c. The facility should have a written list of: cleaning and disinfection procedures, frequencies, and products.
d. It is recommended that a first-aid trained staff member be present in the facility at all times.
e. The facility should have a policy on the age of floaters and on determining each individual’s suitability to float alone.

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Appendix A – Summary of disinfection strategies for floatation tanks

Disinfection strategy	Advantages	Disadvantages	Suitability for disinfection
Ultraviolet (UV) light	• No chemical exposure to clients • UV is effective at killing microorganisms	• Effectiveness is dependent on the circulation system design and clear water (i.e. UV transmittance) • Lamp intensity, transmittance, and exposure time may not be able to be monitored	Unsuitable
Hydrogen peroxide	• Powerful oxidizer by burning off organic material and improving clarity	• Poor disinfectant in aquatic environments	Unsuitable
Ozone	• Powerful oxidizer	• Indoor ozone may be a respiratory irritant • Residuals cannot be measured	Suitable
UV light with hydrogen peroxide	• Hydrogen peroxide works with UV to create hydroxyl radicals which creates a disinfectant	• Hydroxyl radicals cannot be measured	Suitable
Chlorine or bromine	• Effective disinfectant in the correct pH range • Residuals can be measured	• Chemical levels cannot be effectively and responsibly monitored and managed via test kits • Effectiveness requires further chemical additions to balance pH and alkalinity (both hard to accurately measure in a float tank) • Disinfection byproducts may have respiratory health concerns because of the enclosed space	Suitable

Appendix B – Example of a floatation tank daily log

Parameters		Recommended ranges, if no MIFU are provided
Water temperature		33.3°C – 35.6°C
Disinfectant	Hydrogen peroxide	40ppm – 100ppm
	Ozone (airborne – both inside and outside the tank)	< 0.1ppm
	Chlorine or bromine	0.5ppm – 1.0ppm
pH		6.8 – 7.6
Specific gravity		1.25 – 1.3g/mL

Tank	Date	Time	Temp. (°C)	Disinfectant level measured	Amount of disinfectant added	pH	Water depth	Clarity (clear, cloudy)	Specific gravity	Circulation (flow rate/ movement)	# of floats/ clients
1											
2											
3											
4											
5											

Appendix C – Recommended response for handling fecal incidents

Operators should take the following steps when responding to fecal incidents:

1. Stop circulation if the system is engaged.
2. Remove all large contaminant particles using a sieve or mesh wand. This equipment must then be cleaning and disinfected with a low-level disinfectant, at a minimum.
3. Remove the filter.
4. Drain the tank.
5. Clean and disinfect the tank
6. Fill the tank and circulate a disinfectant solution through the system allowing and adequate contact time (e.g. 1:9 bleach solutions for 10 minutes). The room should be ventilated for this process.
7. Drain the disinfectant solution and rinse the basin with fresh potable water.
8. Create a fresh float tank solution.

Publication No. 978-1-4868-3667-3 PDF Queen's Printer of Ontario

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