

Decontamination of Spas and Wading (Kiddie) Pools

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Brought to you by the APSP Recreational Water Quality Committee

I. INTRODUCTION

The purpose of the fact sheet is to provide a generic overview of procedures to be used for the decontamination or annual maintenance of spas, hot tubs, swim spas and wading (kiddie) pools. If used for decontamination, the user/operator should check existing local or state regulatory agency guidelines. The following recommendations do not replace existing state or local guidelines. In the absence of regulatory agency guidelines, please refer to CDC Healthy Swimming recommendations.

II. SUMMARY OF DECONTAMINATION CHARACTERISTICS

1. Decontaminate water, filter, plumbing
2. Drain, sanitize vessel, filter, plumbing then continue with water and /or filter media replacement and or treatment
3. Complete required documentation in cases involving an Accidental Fecal Release (AFR) accident or suspected bacterial outbreak or when decontamination is part of a general water replacement routine
4. Appropriate Personal Protective Equipment (PPE) should be worn by operators during the decontamination process. See Precautions section for more information.

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III. DECONTAMINATION STEPS

Typical indications of contamination requiring remediation include slime formation, cloudy water, musty odors, vomit or fecal contamination. These conditions can result in threats to bather health which can include rashes, flu-like symptoms, diarrhea or respiratory distress and may have originated from contact or swallowing contaminated water during use. Many of these symptoms may take several days to develop.

If the user/operator suspects contamination, the procedure in this Information Bulletin can be used as a precaution. If the water is contaminated then the plumbing system and filter is likely to be harboring bacteria, viral particles and/or parasitic pathogens and should be addressed. Therefore, the replacement of water alone is not sufficient. The vessel shell and its filtration/circulation systems should be thoroughly decontaminated as well.

A. *Decontamination*

1. Filters

Cartridge Filters: First, remove the filter cartridge and either clean or replace it. To clean a cartridge, first use a filter cleaner per label directions. After thoroughly rinsing the cartridge, completely submerge the cartridge in a 1:10 solution of sodium hypochlorite (liquid bleach) to water for one to four hours. Next, inspect and clean the filter-housing interior and all surfaces where possible using a 1:10 solution of sodium hypochlorite (liquid bleach) to water.

Diatomaceous Earth (DE) Filters: First, backwash filters removing all DE housing and grids. Dispose of DE according to local regulatory guidelines. If guidelines do not exist, use CDC standards for disposal. Wash the remaining DE from housing and all filter grids. Where possible, remove and submerge filter grids in a 1:10 solution of sodium hypochlorite (liquid bleach): water for one to four hours. Inspect and clean the filter-housing interior using a 1:10 solution of sodium hypochlorite (liquid bleach): water. Install filter grids after spa decontamination is complete.

Sand Filters: Backwash the filter thoroughly according to local regulatory guidelines. Remove and dispose of the sand filter media.¹ Check the filter laterals and diffuser to determine any damage. Replace as required.

2. For spas, raise the water level to ½ inch above the high water mark.
3. **For diarrheal discharge or suspected bacterial outbreak** (e.g. *Legionella*, *Pseudomonas*): Maintain 20 ppm free available chlorine and 7.5 pH.²
4. **For formed stool:** Maintain 10 ppm free available chlorine and 7.5 pH.
5. Circulate the water under condition (3) for 12.75 hours and for spas, ensure the jets are on maximum.
6. *For spas:* While the water is circulating under condition (3), turn the aerator (blower) on for 30 seconds every 5 minutes for at least one hour. Spas with air injector (venturi) systems may require the pump alternating operation from on to off every 5 minutes to ensure the disinfection of the air lines.
7. Circulate the water under condition (4) for 4.5 – 5 minutes and for spas, ensure the jets are on maximum.
8. Stop the circulation in spas by turning the jets and aerator off.
9. Check local regulatory guidelines before draining, then drain vessel and rinse the sides during the process.
10. Clean the shell with a surface cleaner, and rinse off surfaces to remove cleaner.
11. Remove any excess water and cleaner.

	Mass Required to Yield 20 ppm Chlorine
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¹ When following the Decontamination Procedure as part of normal spa maintenance, sand replacement may not be necessary. Draw down the water to the sand surface and inspect for cracks, mounds or signs of channeling. Any of these features can signal a need to change the sand.

² For spas treated with a polyhexamethylene biguanide (Biguanide, PHMB) as a sanitizer remember that PHMB is not compatible with products like chlorine-releasing chemicals so, consult with the manufacturer to use compatible problem-solving chemicals if PHMB is used.

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Chlorine Source	Mass Required to Yield 20 ppm Chlorine	
	1000 gallons	5000 gallons
Calcium Hypochlorite (65% min.)	4.0 oz	20.0 oz
Lithium Hypochlorite (35%)	8.0 oz	40.0 oz
Sodium Dichloroisocyanurate (56%)	4.0 oz	20.0 oz
Sodium Hypochlorite (10%)	20.0 fl. oz.	140 fl.oz /1.0 gal

Chlorine Source	Mass Required to Yield 10 ppm Chlorine	
	1000 gallons	5000 gallons
Calcium Hypochlorite (65% min.)	2.0 oz	10.0 oz
Lithium Hypochlorite (35%)	4.0 oz	20.0 oz
Sodium Dichloroisocyanurate (56%)	2.0 oz	10.0 oz
Sodium Hypochlorite (10%)	10.0 fl. oz.	70 fl.oz /0.5 gal

B. Water Replacement and Treatment

12. Refill the vessel with water
13. Replace the filter with a cleaned, sanitized, or new filter cartridge, fresh sand, or DE
14. Balance water and sanitize as required by state, local guidelines. In the absence of, use ANSI/APSP or CDC Healthy Swimming recommendations.
15. Complete required by state, local documentation. In the absence of, use CDC recommendations in cases involving an Accidental Fecal Release (AFR) accident.

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IV. PRECAUTIONS

To minimize exposure to potentially harmful pathogens and disinfection by-products during the decontamination procedure, operators in the spa area should use the following Personal Protective Equipment (PPE):

1. Appropriate air purifying respirator
2. Goggles/eye protection
3. Gloves
4. Any other PPE required by the MSDS's of products being used in the decontamination procedure

V. REFERENCES

1. Centers for Disease Control and Prevention, Division of Parasitic Diseases, Healthy Swimming website, <http://www.cdc.gov/healthyswimming/>
2. Centers for Disease Control and Prevention, "Fecal Accident Response Recommendations for Pool Staff", <http://www.cdc.gov/healthyswimming/fecalacc.html>.
3. Centers for Disease Control and Prevention, "Vomit and Blood Contamination of Pool Water", <http://www.cdc.gov/healthyswimming/bloodandvomit.htm>
4. Environmental Protection Agency, "Disinfection Profiling and Benchmarking Guidance Manual" from <http://www.epa.gov/safewater/mdbp/mdbp.html>
5. *Pool & Spa Operator Handbook*, Spa & Therapy Operations, NSPF 2009. Pgs 161-174.
6. American National Standards Institute, ANSI /APSP-11, 2009.