

POOL BULLETIN

Contamination Accidents in Public Swimming Pools and Spas

Accidents in public pools or spas that involve fecal material, dead animals and other biological contaminants can lead to the transmission of serious, even life threatening illness. In the event of an accident, precautionary measures should be taken immediately to help reduce the risk to recreational facility users. These measures are described below.

For normal pool or spa operation, always keep pool water balanced, maintain proper pH and disinfectant levels. The free chlorine residual should be maintained at or above 1.0 parts per million (ppm) or 1.5 ppm where cyanuric acid stabilizer is being used. The pH must be maintained between 7.2 and 8.0 at all times the recreational facility is open for use. The facility must not be open unless the filtration and automatic disinfection equipment are operating and in good working condition. If proper recirculation or disinfection cannot be maintained, close the pool or spa.

NOTE: When working with pool chemicals, always read and follow the instructions and cautions listed on the container label.

IN THE EVENT OF CONTAMINATION WITH FECES, VOMITUS, OR A DEAD ANIMAL, INITIATE THE FOLLOWING PROCEDURE IN A POOL OR SPA:

1. Close the pool and instruct all users to immediately exit the water.
2. Avoid direct contact with the contaminating material when removing it. Waste materials must be directed to a sanitary sewer, not a storm sewer, and not through the filtration system. Vacuum equipment, nets and leaf rakes and similar equipment used in the cleanup should be disinfected immediately after use.
3. Disinfect the pool by achieving a chlorine contact time (CCT) value of at least 9,600. The CCT value is the concentration of free residual chlorine in parts per million multiplied by the time in minutes. For example, a 20 ppm concentration of chlorine maintained in a pool for 8 hours will result in a CCT value of 9,600 (60 minutes/hour x 8 hours x 20 ppm). Any combination of concentration and time resulting in a CCT value of 9,600 or greater is satisfactory.
4. If the pool is a low volume pool, such as a spa pool or wading pool, the pool should be drained. Brush the bottom and sides of the pool with a 20:1 solution of pool chlorine - sodium hypochlorite (20 parts water to 1 part of 12 – 15% strength sodium hypochlorite), refill the pool and balance the pH and free residual chlorine in the water.
5. Adjust the pH to an ideal of between 7.2 and 7.6. Maintain the pH and chlorine residual throughout the treatment period.
6. Run the filtration system a minimum of 3 to 4 turnovers, (e.g. this may keep the pool closed for 24 hours or more). Filters should not be backwashed prior to filtration turnover unless the flow rate is below 70% of the clean flow rate.
7. When a CCT value of 9,600 is reached, thoroughly backwash the filter to a sanitary sewer, not a storm sewer.
8. Disinfect the filter tank and filter media with a 20:1 solution of sodium hypochlorite (20 parts water to 1 part 12 – 15% sodium hypochlorite).
9. Start the filtration system and adjust the levels of the pH and residual chlorine in the water. When the chlorine residual returns to 5 ppm or below, the pool may be reopened. Adding sodium thiosulfate, available from the pool supply, can neutralize high chlorine residuals more rapidly.
10. When incidents of contamination occur, document what actions were taken to correct the situation in the daily log.

Contamination Accidents in Public Swimming Pools and Spas

How much chlorine should I add to the pool or spa water?

Use the formula below to determine how much sodium hypochlorite to add to the pool volume to achieve the concentration of chlorine (ppm) that is chosen from the chart below. Add enough chlorine to achieve the concentration of chlorine level chosen. Verify the chlorine concentration in the water by measuring it with the free residual chlorine test using an approved pool test kit.

How long is the high chlorine level required to remain in the pool or spa water?

Maintain the chosen concentration of chlorine in the water for the corresponding length of time as indicated in the chart below. The concentration of chlorine in the water must be maintained at the elevated level for the entire time period in order to achieve the chlorine contact time of 9600, (see the chart). Test the water frequently during the time period in order to make sure that the chlorine level has not dropped below the required concentration. Add additional chlorine to the water as needed, to maintain the chosen chlorine concentration.

$$\begin{array}{rclcl} \text{Concentration} & \text{multiplied by} & \text{Time} & & = \text{Chlorine Contact Time} \\ C & \times & T & = & CCT \\ \text{For example: } 20 & \times & 480 & = & 9600 \end{array}$$

C CONCENTRATION OF CHLORINE (SODIUM HYPOCHLORITE) IN WATER (ppm)	T LENGTH OF TIME OF CHLORINE IN WATER (minutes)	CCT CHLORINE CONTACT TIME REQUIRED VALUE OF 9600 (CCT)
20	480 min. (8hours)	9600
30	320 min.	9600
40	240 min.	9600
50	192 min.	9600
60	160 min.	9600

Formula to determine amount of sodium hypochlorite to add to pool to achieve the concentration desired:

$$\frac{\text{Concentration of chlorine desired in ppm. (from chart above)}}{1} \times 13 \frac{\text{fluid ounces}}{\text{gallon}} \times \frac{\text{Total pool volume in gallons}}{10,000 \text{ gallons}}$$

Example: You want 20 ppm chlorine in the pool for 480 minutes and the pool volume is 20,000 gallons.

Therefore according to the formula: $\frac{20 \text{ ppm}}{1} \times 13 \times \frac{20,000 \text{ gallons}}{10,000 \text{ gallons}} = 520$ fluid ounces of sodium hypochlorite must be added to the pool to achieve the desired concentration of 20 ppm.

Contact Environmental Health Services for further information at:

225 Camino del Remedio
Santa Barbara, CA. 93110
(805) 681-4900

or

2125 S. Centerpointe Parkway, #333
Santa Maria, CA. 93455
(805) 346-8460

POOL SAFETY ACTION SHEET

Contamination Accidents in Public Swimming Pools and Spas

Remember: Read and follow label instructions and cautions on chemical containers.

In the event of a fecal, vomitus or dead animal accident:

1. Close the pool or spa and evacuate all persons from the pool. The pool or spa must remain closed for up to 24 hours* to allow for complete disinfection of the water and filtration system.
2. Remove and dispose of offending material, in a sanitary manner.
3. For wading pools, drain all of the water and scrub the shell with 1 part of pool chlorine (12% - 15% sodium hypochlorite) to 20 parts of water. Refill the wading pool with water. Disinfect the water and filtration system using a residual chlorine concentration of 20 ppm minimum. Proceed with procedures #5 through #9.
4. Disinfect the pool or spa water using a residual chlorine concentration of 20 ppm minimum. Maintain this 20 ppm concentration for a minimum of 8 hours.
5. Maintain the pH of the pool at 7.2 - 7.6 throughout the treatment period.
6. Run the filtration system for 3 to 4 complete water volume turnovers.
7. After completing 3 to 4 water turnovers through the filtration system, disinfect the filter tank and filter media using 1 part of pool chlorine (12% - 15% sodium hypochlorite) to 20 parts of water.
8. Restart the filtration system.
9. When the water pH measures 7.2 - 8.0 and the residual chlorine level measures 5 ppm or less, the pool, wading pool, or spa may be safely re-opened for recreational users.

For more in-depth instructions on chlorine concentration and contact time, please refer to the Pool Bulletin entitled: "Contamination Accidents in Public Swimming Pools and Spas".

*Pools, spas, and wading pools that maintain 20 ppm or greater of sodium hypochlorite in the water and complete a minimum filtration turnover of 3 - 4 volumes of water, may re-open for recreational use after 8 hours providing all procedures #1 through #9 are completed in an approved manner.

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