

Disinfection of Hot Tubs Contaminated with *Legionella*

cdc.gov/legionella

Hot tubs* contaminated with *Legionella* bacteria can cause outbreaks of disease. *Legionella* can cause [Legionnaires' disease](#), a serious type of lung infection, and a milder infection called Pontiac fever. It is critical to collect water samples **then** disinfect hot tubs linked to cases of Legionnaires' disease or Pontiac fever.

CDC-recommended best practices

No scientific studies have determined the best way to disinfect a hot tub contaminated with *Legionella*. **CDC recommends following these steps** based on currently available scientific information:



This photograph shows *Legionella* spp. colonies grown in culture and illuminated using ultraviolet light.

- 1. Close the hot tub immediately.**
 - Shut down the hydrotherapy jets and circulation pumps, but **do not** drain the water.
- 2. Contact your state or local public health agency.**
 - The health department will determine if you need to conduct laboratory testing.
- 3. Collect water samples if directed by the health department.**
 - If so, always collaborate with your state or local public health agency and a laboratory with *Legionella* testing expertise. View a [CDC list of laboratories that test for Legionella](#).
 - Have samples taken from the tub, hydrotherapy jets, drain, and filters or filter media before proceeding to step 4. Find [additional information and tools from CDC on water sampling](#).
 - You do not have to wait for laboratory results before disinfecting the hot tub. However, do not re-open the hot tub for use until all test results are negative for *Legionella*.
- 4. Drain all water from the hot tub.**
 - Dispose of the water to waste or as directed by the local regulatory authority.
- 5. Vigorously scrub all hot tub surfaces, skimming devices, and circulation components.**
 - Use water with free chlorine at a minimum concentration of 5 parts per million (ppm) to remove any biofilm (slime). After scrubbing, rinse the tub with clean water and flush to waste.
- 6. Replace filters (for cartridge or diatomaceous earth filters) or filter media (for sand filters).**
 - Bag these and dispose as normal solid waste.
- 7. Make any needed repairs.**
 - Inspect the hot tub thoroughly for any broken or poorly functioning components such as valves, sensors, tubing, or disinfectant feeders.
- 8. Refill and hyperchlorinate using 20 ppm free chlorine.**
 - Keep the hydrotherapy jets off and let the hyperchlorinated water circulate for 1 hour in all of the components of the hot tub including the compensation/surge tank, filter housing, and piping.
 - Turn on the hydrotherapy jets to circulate the hyperchlorinated water for 9 additional hours. Maintain 20 ppm of free chlorine in the system for the **entire 10 hours**.

9. Flush the entire system.

- This removes the hyperchlorinated water from all equipment.

10. Take new samples to confirm the elimination of *Legionella*.

- At least 24 hours after the device has been restored to normal operating conditions, have samples taken from:
 - » Tub
 - » Hydrotherapy jets
 - » Drain
 - » Filters or filter media
 - » Any part of the hot tub that originally tested positive for *Legionella*



11. Keep the hot tub closed until testing confirms the elimination of *Legionella*.

- If laboratory testing is positive for *Legionella*, repeat steps 4 through 10 until all testing is negative.
- If laboratory testing is negative for *Legionella*, proceed to step 12.

12. Ensure water quality prior to reopening the hot tub for use.

- Ensure that halogen (chlorine or bromine) and pH levels meet local and state standards.

13. Maintain water quality according to local and state standards.

- See “Prevention through regular operation and maintenance” section below for additional information.
- Continued *Legionella* testing may be considered on a case-by-case basis.
- If the hot tub is associated with an outbreak, the following continued laboratory testing schedule may be considered:
 - » Conduct culture-based testing every 2 weeks for 3 months, then every month for 3 months.
 - » If testing finds *Legionella* at any time during this 6-month period, disinfect again and start the testing schedule over.
 - » For hot tubs that continue to grow *Legionella*, consider hiring a consultant with expertise in *Legionella* remediation.



This image is of a typical pool/spa water chemistry test kit for measuring chlorine, bromine, and pH.

Note: There are no data to suggest that personal protective equipment is required for disinfecting a hot tub, but N95 respirator masks may be worn during the disinfection process. Respirators must be used in accordance with a comprehensive respiratory protection program, which includes fit testing, training, and medical clearance (see [Occupational Safety and Health Administration standard 29 CFR 1910.134](#)). Visit the [National Institute for Occupational Safety and Health N95 respirator web page](#).

Prevention through regular operation and maintenance

[Proper operation and maintenance of hot tubs](#) can help prevent the growth of *Legionella* and protect people’s health. View [CDC’s Model Aquatic Health Code](#) for guidance on making water activities healthier and safer. Water management programs take a preventive approach by reducing the risk of *Legionella* growing and spreading in building water systems. See CDC’s toolkit on [how to develop a Legionella water management program](#).

References:

1. ANSI/ASHRAE. [Legionellosis: Risk management for building water systems](#). Atlanta, GA: ASHRAE; 2015.
2. ASHRAE. [Minimizing the risk of legionellosis associated with building water systems](#). Atlanta, GA: ASHRAE; 2000.
3. CDC. [Developing a water management program to reduce Legionella growth and spread in buildings: A practical guide to implementing industry standards](#). Atlanta, GA: 2017.

* The phrase “hot tubs” in this document includes hot tubs, whirlpool spas, and hydrotherapy spas.