



On-site wastewater treatment systems

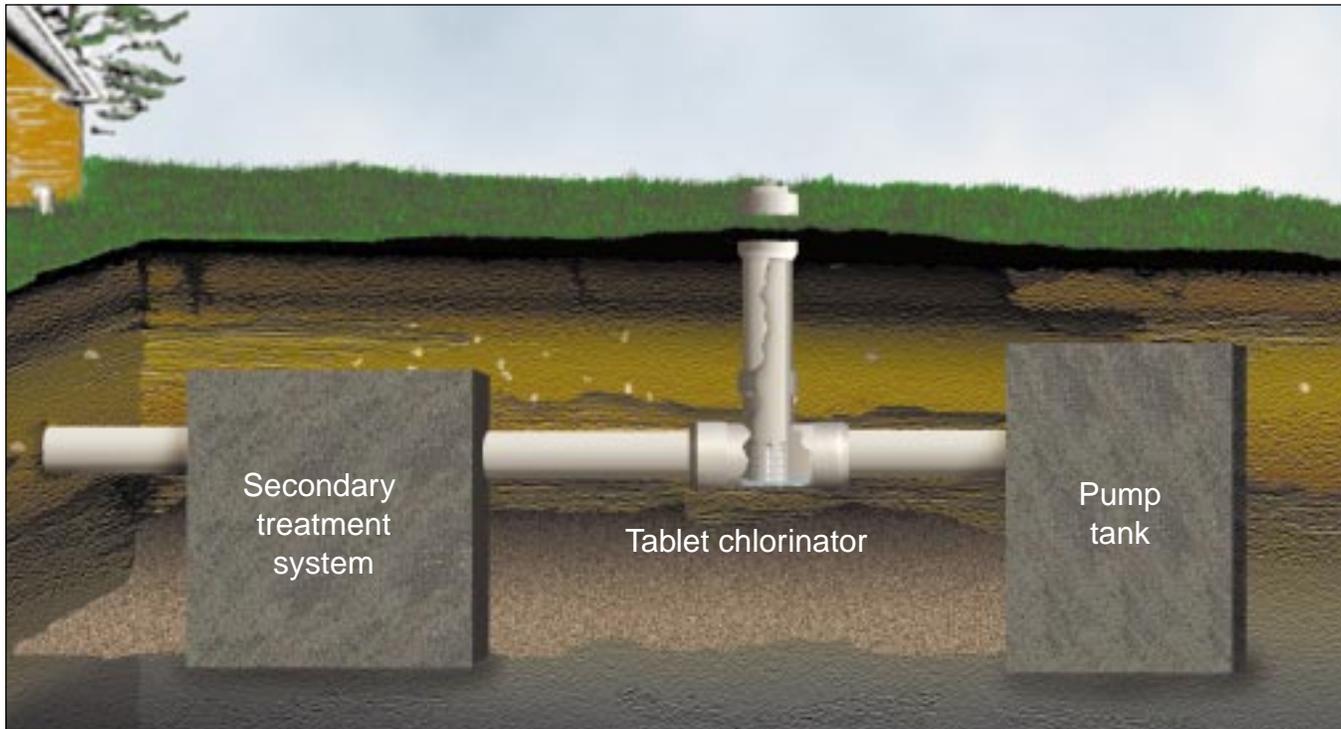


Figure 1: The most common form of disinfection for on-site systems is tablet chlorination.

Tablet chlorination

Richard Weaver and Bruce Lesikar

Professor in Soil and Environmental Microbiology, Extension Agricultural Engineering Specialist
The Texas A&M University System

Wastewater that is sprayed onto lawns must first be disinfected to prevent odors and remove disease-causing microorganisms. Wastewater can be disinfected with chlorine, ozone and ultraviolet light. For on-site wastewater treatment systems, the most common form of disinfection is tablet chlorination.

Tablet chlorinators generally have four components:

- ✓ Chlorine tablets.
- ✓ A tube that holds the tablets.
- ✓ A contact device, which puts the chlorine tablets into contact with the wastewater.

- ✓ A storage reservoir, usually a pump tank, where the wastewater is stored before it is distributed.

Before being chlorinated, wastewater from a home is treated by a secondary treatment device, usually in an aerobic treatment unit or sand filter. The wastewater moves from the

treatment device through a pipe to the contact device.

The contact device usually contains a basin, where the tube containing a stack of chlorine tablets is placed. The bottom tablet in the tube is in contact with the wastewater flowing through the basin. As that tablet dissolves and/or erodes, the tablet above it falls by gravity to replace it.

A tablet can dissolve quickly or slowly, depending on the amount of wastewater coming into contact with

Use only chlorine tablets that are approved for wastewater

it and the length of time it is in contact. A balance must be struck regarding the contact time in the chlorinator basin: Too much contact time causes the wastewater to be over-chlorinated and the tablets to be consumed rapidly; too little contact time, and the wastewater is not chlorinated enough.

Use only chlorine tablets that are approved for use in wastewater. They are made of calcium hypochlorite, a common household bleach. These tablets dissolve in the wastewater, releasing the hypochlorite, which then becomes hypochlorous acid, the primary disinfectant.

Do not use swimming pool chlorine tablets. They are often made from trichloroisocyanuric acid, which is not approved for use in wastewater treatment systems. These tablets make the chlorine available too slowly for it to be effective. If wetted repeatedly, they also can produce nitrogen chloride, which can explode.

Do not combine tablets of trichloroisocyanuric acid with calcium hypochlorite, because the combination will form the explosive compound nitrogen chloride. Read the list of active ingredients on the tablet label to make sure you are using calcium hypochlorite.

Because chlorine tablets are caustic, handle them with care. Wear gloves to protect your skin from direct contact with the tablets. Moist tablets are the most caustic; handle them with special care.

Also, because chlorine gas collects in the tablet container, open the container in a well-ventilated area. Chlorine gas can escape from the tablets and container, reducing the effectiveness of the tablets and possibly corroding metal products stored near the container.

After being chlorinated, the wastewater enters the pump tank, where the disinfection process is completed. At this point the wastewater is called reclaimed water. Texas regulations require that reclaimed water contain at least 0.2 milligrams of chlorine per liter of wastewater or have no more than 200 fecal coliforms (bacteria from human wastes) per 100 milliliters of wastewater.

An easy way to determine the chlorine concentration in your reclaimed water is by using chlorine test kits. They are available in stores that sell swimming pool supplies.

The most satisfactory kits require that you mix a small amount of reclaimed water in a solution and compare the mixture's color with those shown in the kit. The kits using paper strips may be less satisfactory because they do not determine the actual concentration of chlorine in the water.

Usually, if a test detects any chlorine, the wastewater will contain less than 200 fecal coliforms per 100 milliliters. But this does not guarantee that it is free of disease-causing organisms. To reduce the risk of having any disease-causing organisms, the wastewater should have at least 0.2 milligrams of chlorine per liter.

How to keep it working

You can either buy a chlorinator commercially or have one built by an installer. Please follow the manufacturer's recommendations for maintaining the system. Other guidelines:

- ✓ Make sure the chlorinator contains chlorine tablets at all times. Inspect it weekly to ensure that tablets are present and in

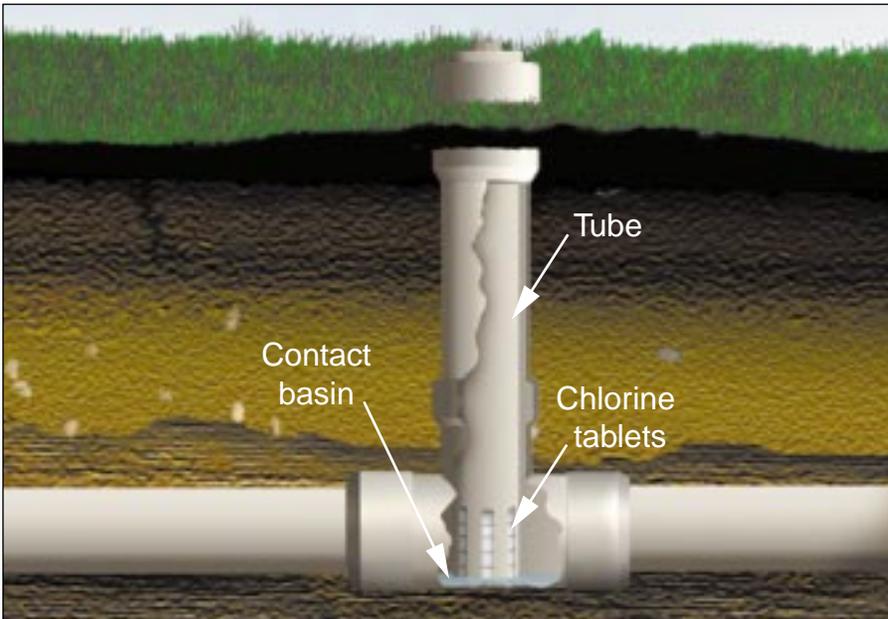


Figure 2: Wastewater disinfection begins in the contact basin.

contact with the wastewater. Add chlorine tablets as necessary. Just as cars do not operate without gasoline, tablet chlorinators do not operate without chlorine tablets.

- ✓ If you use a spray distribution system, Texas regulations require that you keep a maintenance contract in effect with a licensed maintenance provider. Most such contracts stipulate that the homeowner replace the chlorine tablets.
- ✓ Tablets can become compacted in the tube. To reduce the chances of compaction, place two to five tablets in the tube at a time.
- ✓ If the tablets do become compacted in the tube, or if a portion of the bottom tablet has not dissolved and is holding up the

rest of the stack, remove the tube and wash out the blockage with a stream of water from a garden hose.

- ✓ Use only tablets that have been certified for use in domestic wastewater systems. State regulations do not allow tablets for swimming pools and other applications to be used to treat wastewater.
- ✓ Use a chlorine test kit to determine the chlorine concentration in the pump tank.
- ✓ If you smell septic odors when the reclaimed water is being sprayed, check to make sure that the chlorinator contains chlorine tablets. If it does, contact your maintenance provider to check the system.

Tablet chlorinators do not operate without chlorine tablets

The On-Site Wastewater Treatment Systems series of publications is a result of collaborative efforts of various agencies, organizations and funding sources. We would like to acknowledge the following collaborators:

Texas State Soil and Water Conservation Board	USEPA 319(h) Program
Texas On-Site Wastewater Treatment Research Council	Texas Agricultural Extension Service
Texas Natural Resource Conservation Commission	Texas Agricultural Experiment Station
USDA Water Quality Demonstration Projects	Texas On-Site Wastewater Association
Consortium of Institutes for Decentralized Wastewater Treatment	USDA Natural Resources Conservation Service

Produced by Agricultural Communications, The Texas A&M University System

All publications in the On-site Wastewater Treatment Systems series can be downloaded free from the World Wide Web at:

<http://texaserc.tamu.edu>

Educational programs of the Texas Agricultural Extension Service are open to all people without regard to race, color, sex, disability, religion, age or national origin.

Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Chester P. Fehlis, Deputy Director, The Texas Agricultural Extension Service, The Texas A&M University System.
5,000 copies, Reprint

For Sale Only \$1
