# Milkhouse Wastewater Management

## Introduction

Milkhouse wastewater (water used to clean milking equipment and cows) can contaminate both groundwater and surface water if the disposal system is inadequately performing or poorly managed.

**Milkhouse wastewater can contain:**

- Residual milk (i.e. milk that remains in the pipeline and milking units)
- Wash water for cleaning (pipelines, milking units, and the milk house floor).
- Cleaning chemicals, detergents, and acid rinse
- Manure and other organic matter
- Bedding material
- Nutrients especially nitrogen and phosphorus
- Bacteria
- Soil particles

Milk runoff is especially detrimental to streams due to its high biological oxygen demand. If allowed into water bodies, milk, manure, and detergents can cause an ecological imbalance, which will result in algae blooms, fish die-offs, abundant foam, and strong odors.

**A minimum of two months of daily flow data will provide adequate information for estimating a design of wastewater flows.**

The amount of milkhouse wastewater varies from farm to farm as well as with the number of animals. An estimate of wastewater produced is necessary for designing an efficient milkhouse wastewater treatment system. Typically, the majority of water used in the milkhouse will pass through a water softener, making this the best location to install a flow meter. A minimum of two months of daily flow data will provide adequate information for estimating a design of wastewater flows. Continued flow monitoring should remain a part of the system operation and maintenance plan. With no flow meter data, a good estimate of wastewater is 5 gal/cow/day. This estimate is for milkhouse wastewater only and does not include any parlor washing or other wastewater.

## Options for Handling Milkhouse Wastewater

*(Check with local agencies to ensure legality of the any milkhouse wastewater system)*

- Collect in combination with solid manure
- Store in a liquid manure storage unit (settling tanks-to separate dense fibers)
- Bark beds
- Grass filter strip
- Constructed Wetlands
- Treatment followed by soil infiltration (septic system and bark beds)
- Temporary storage followed by land application through spray irrigation

**The primary tank should have a capacity of at least 1,000 gallons.**

### Settling Tanks

Settling tanks are used to separate solids and light fibers from the wastewater. This type of system is particularly useful if one is planning to use wastewater for irrigation. It is also a good precaution to take because solids will eventually clump and clog pipes and leach fields, blocking entry to a holding tank or septic tank and causing backup. Tanks that have compartments or multiple tanks in a series perform best because they are able to

separate floating debris from the wastewater more effectively and the second tank acts as storage of the waste water for later use.

### Bark Beds

This system is quite similar to a septic system in that wastewater is collected and piped to a tank before being sent to a leach field. The leach field area should be located in a place with zero slope, non-compacted soil, and minimum of 2 feet from a water table. The bark bed is enclosed in several foot-thick layers consisting of wood and bark which gives it a unique ability to function all year round due to the insulation of the leach field pipes by the bark preventing them from freezing. This system also allows the wastewater to evaporate during the summer months. The bark aids in reducing decomposition odors and moderates the level of nutrients being absorbed by the soil. Due to the decomposition of the organic materials, additional layers will be needed every 2 to 3 years.

### Grass Filter Strips

Milkhouse wastewater can be directed to a properly sized grass area for filtering. Grass filter strips can absorb nutrients efficiently while preventing organic particles from being transported into water bodies. Filter strips can only function effectively if temperatures allow plants to grow actively. During the cold months, when grasses are not growing actively or are covered with snow and ice, nutrients in wastewater cannot be absorbed by plant roots. Therefore, the system will not work efficiently. For maximum filtering capacity, wastewater should be applied in rotations to prevent nutrients from runoff, over-application, or leaching into groundwater. Grass strips should be grazed or mowed on a regular schedule to function properly and maintain productivity.

### Constructed Wetlands

Constructed wetlands can generally handle loads of nutrients than compared to aerobic lagoons and therefore need less land. Settling tanks are still recommended to remove solids prior to wetland application. These systems treat wastewater aerobically in surface waters and anaerobically in the sediment layer. They do not produce much odor and can provide a scenic resource and area for wildlife habitat. These systems *do* require careful operation and maintenance for optimum treatment and performance.

### Treatment Followed by Soil Infiltration

#### Septic System

Milkhouse wastewater may be pumped or drained from a settling tank to a septic system (leach field) similar to a household septic system. Soils with extremely low or extremely high permeability must be avoided to minimize groundwater contamination. Septic systems have limited will not last forever and should be replaced when they plug up.

**Bark Beds:** (see above article)

### Temporary Storage Followed by Land Application

Milkhouse wastewater can be pre-treated in a primary septic tank and then used for irrigating croplands and pastures. A minimum of 3-day Hydraulic Retention Time (HRT) is required to remove large particles and some of the fats and oils. The primary tank should have a capacity of at least 1,000 gallons. Effluent (liquid waste) from the primary retention tank flows into a dozing tank with a minimum of 1,000 gallons which is used when irrigation must be suspended for crop harvesting or grazing. Irrigation systems are used to distribute treated milkhouse wastewater on pasture or cropland, and consist of a pump, piping, and irrigation heads.

### Resources


Schmidt, D. R., K. A. Janni, and S. H. Christopherson. 2007. "Milk House Wastewater Treatment Demonstration Project Overview." 1205. University of Minnesota Cooperative Extension Service. http://www.extension.umn.edu/distribution/livestocksystems/M1205.htmll

Snieckus, Robert E. Ed. 2002. Dairy Environmental Handbook; Best Management Practices for Dairy Producers . National Milk Producers Federation. Arlington,VA. 175p. http://www.nmpf.org/publications/dairy_handbook

*Assessing the Risk of Groundwater Contamination from Milkhouse Wastewater Treatment*. Worksheet #10. Vermont Farm**A*Syst*. United States Environmental Protection Agency. http://efotg.sc.egov.usda.gov/references/public/VT/Worksheet10-Milkhouse_Wastewater_Treatment.pdf


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Factsheets in this series were prepared by, Masoud Hashemi, Stephen Herbert, Carrie Chickering-Sears, Sarah Weis, Carlos Gradil, Steve Purdy, Mark Huyler, and Randy Prostak, in collaboration with Jacqui Carlevale.



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