

Number 88
June 2001

Pollution Prevention

Raising Awareness About Mercury

Mercury Manometers

Mercury metal and mercury-containing manometers are a health, environmental and liability issue for many dairy farms and farms with milk storage or retired milking areas. Dairy farms with modern equipment may still have outdated equipment on site in a storage area or an old milking parlor. These areas may contain mercury without the owner's knowledge, and should be investigated. Dairy farm owners should seriously consider replacing mercury manometers, and remove retired mercury-containing devices and mercury metal.



What is a dairy manometer?

Milking systems have vacuum lines that remove and transport milk from cows' udders to a bulk tank. As part of this system, vacuum gauges, or manometers, measure pressure in the vacuum line. Maintaining the

pressure setting for the milking system is very important to both the dairy farm and the health and production of the dairy cattle. Less vacuum leads to longer milking time and greater energy consumption. Too high a vacuum can lead to mastitis among the dairy cattle. A mastitis infection can lead to production and economic loss, since infected milk should not be shipped. It is important that the manometer is accurate and dependable. Manometers should be regularly maintained and calibrated.

Mercury Manometers

There are different types of vacuum gauges or manometers. The mercury manometer is one type used in milking systems. Mercury manometers frequently have a U-shaped glass or plastic tube containing about 12 ounces of elemental mercury, the silver liquid in the gauge. The mercury level rises or falls in response to vacuum changes in the milking system. The vacuum is read from the side of the mercury-containing tube. Non-mercury gauges display the vacuum on a dial or a digital display.

Mercury is an element that occurs naturally in the earth's surface. It is used in many household products. Mercury conducts electricity, expands uniformly with temperature and easily forms bonds with other metals. At room temperature, mercury is a liquid. Mercury does not degrade, and is not destroyed by combustion. It cycles between soils, the atmosphere and surface waters. Its toxicity can endanger living organisms, and produce adverse health effects. Organic mercury can accumulate in tissue and increase its toxicity as it moves up the food chain. Mercury use and pollution should be prevented wherever possible.

Why is mercury a concern for dairy farms?

The mercury in these manometers can become contaminated with water, milk, dirt and cleaning chemicals. Also, the mercury-containing tube can become discolored and cloudy. These problems make manometers difficult to read accurately. Maintenance may be required. During servicing, manometers are emptied and filled with new mercury, and elemental mercury remains as a waste, which must be properly handled. There is also potential to spill mercury during service. Dairy farms that maintain their own manometers may accumulate mercury at their facility, and have even greater risk.



Spilled mercury can evaporate at room temperature and easily be inhaled by humans and animals. Mercury vapors are colorless, odorless and tasteless. Short term exposure to a concentration of mercury or mercury vapors can lead to nausea, shortness of breath, bronchitis, migraine headaches, and fatigue. Long term exposure to mercury can result in damage to the nervous system, kidneys and liver; symptoms include shakiness, tremors, numbness in the fingers and toes, loss of muscle control, memory loss and kidney disease.

Raising Awareness About Mercury

Mercury Manometers

Children, developing fetuses and women of childbearing age are most at risk for mercury poisoning. Therefore, mercury should be handled carefully.

Liability for environmental effects, the health of workers and the welfare of animals are important issues when using mercury containing manometers. There are also regulatory and economic issues with the collection, storage and disposal of used mercury. If a spill does occur, cleaning up can be challenging. It may require a professional clean-up service, which can be expensive. Dairy farms can reduce their costs and liability associated with mercury by replacing mercury-containing manometers with mercury-free alternatives. For information on how to store and ship mercury-containing wastes, contact the Division of Hazardous Waste at your Ohio EPA district office.

Environmental Impact

Once mercury enters the environment, it may enter the food chain through a water system. In the environment mercury can be converted into methylmercury, a form of mercury that builds up in

wildlife tissue, especially in fish. Methylmercury can move up the food chain and create a risk for



human consumption of fish.

There is a statewide fish advisory for mercury that affects children under the age of six, pregnant women and women of childbearing age. The fish advisory recommends that these targeted groups limit the amount of fish they eat from Ohio waters. For more information on the mercury fish advisory, check out Ohio EPA's Division of Surface Water Web page at

www.epa.state.oh.us/dsw/fishadvisory/index.html.

It does not take a lot of mercury to have negative consequences. Researchers estimate that if one gram of mercury, 1/70 of a teaspoon, enters a 20-acre lake every year from the atmosphere, that amount is enough to raise the mercury levels in fish. An average mercury manometer has over 340 grams of mercury. Methylmercury builds up in the fish and could be a concern for humans. Methylmercury in large fish can be hundreds or thousands of times greater than in the surrounding water.

What can dairy farms do if they have a mercury manometer?

If a dairy farm uses mercury manometers, it should follow maintenance guidelines. Replace old mercury manometers with gauges that do not contain mercury, including bourbon (spring) gauges and electronic or digital manometers.

Bourbon gauges and digital manometers can make it easier to run at a constant, efficient pressure level, reducing milking time and subsequently reducing energy consumption. These alternatives also do not have the health, storage or liability issues of maintaining and disposing a mercury-containing manometer, or the risk of a mercury spill.

When you replace an old mercury-containing manometer, check with the vendors to see if they will accept the old manometer when they install the new mercury-free gauge, or contact a mercury collection program. If a retired mercury-containing manometer or replacement mercury is stored at the dairy farm, you should send it to a mercury collection program. Mercury recycling companies are listed on Ohio

EPA's Web page under the Office of Pollution Prevention at

www.epa.state.oh.us/opp/recyc/mercrc.html. You may also contact the Bowling Green State University Mercury Collection Program at www.bgsu.edu/offices/envhs/mercury.htm. They will pick up your mercury or retired mercury containing manometer free of charge. Bowling Green State University can make pick-ups throughout Ohio.

Bowling Green State University Mercury Collection Program
Bowling Green, OH. 43403
(419) 372-2173
Fax: (419) 372-2194

The Office of Pollution Prevention was created to encourage multi-media pollution prevention activities in Ohio to reduce risk to public health, safety, welfare and the environment. Pollution prevention stresses source reduction and, as a second choice, environmentally sound recycling while avoiding cross media transfers. The office develops information related to pollution prevention, increases awareness of pollution prevention opportunities, and can offer technical assistance to business, government, and the public.