

Energy Free Water Fountains

From 1990 to 1993 PAMI compared three energy free livestock water fountains and four electrically heated ones. Here's what we found.

Do Energy Free Fountains Work?

Energy free fountains come in a variety of styles and offer different combinations of features. In PAMI tests, only one fountain didn't measure up in a Canadian prairie winter. Average temperature during the test period of 22 weeks was 12°F (-11°C), with average temperatures as low as -15°F (-26°C) over a 4 week period.

Energy free water fountains do work in cold prairie winters, but certain critical conditions must be met. Here's a checklist:

They must be properly designed.
Find out where the fountain was manufactured. Some are designed for milder winters, but can't be relied on during sustained periods of cold.

They must be properly installed.
Close attention to proper installation will help ensure trouble free operation. See the diagram below and Installation Tips.

They must be properly maintained.
You'll want to do daily checks on the fountain, especially in extreme cold. Animals are sloppy drinkers, so run off from their mouths tends to freeze up the drinker lids. Routinely chipping this ice away helps ensure an uninterrupted water supply to your animals. See the Maintenance Schedule.

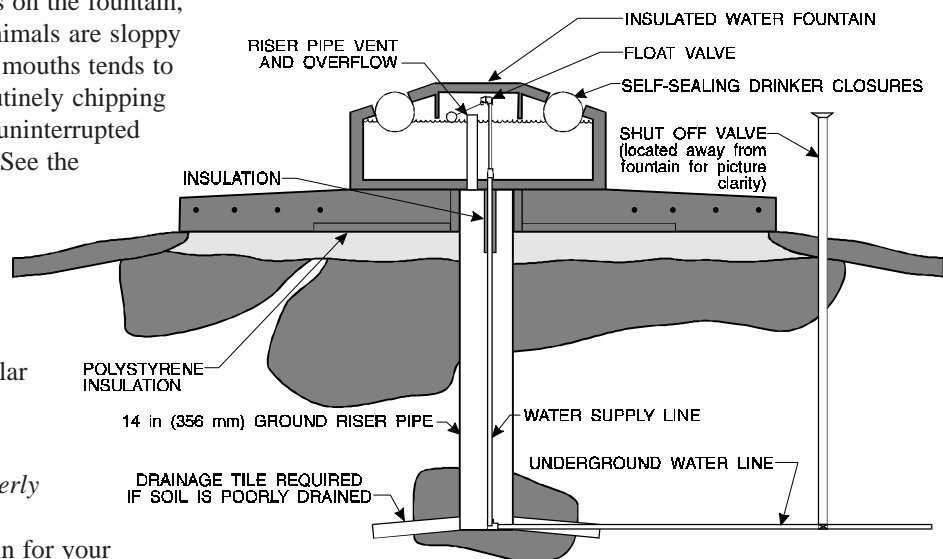
They must be properly adjusted.
Follow the manufacturer's instructions to properly adjust the water level in your particular fountain.

The fountain must be properly sized.
A properly sized water fountain for your

herd is important. Too few animals drinking from a fountain that is too large can lead to freeze up. See the energy free fountain sizing guide.

The fountain must be used regularly.
If livestock are removed, the water supply must be shut off, and the valve and water bowl drained to prevent freeze up.

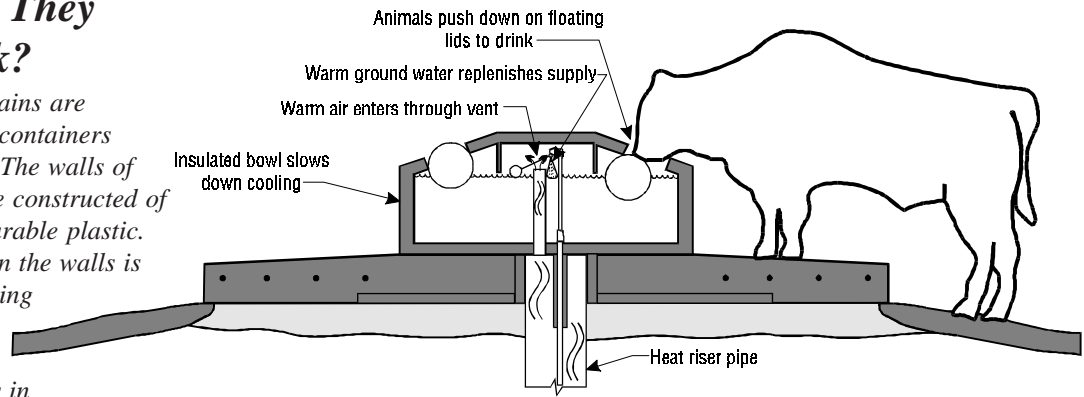
The ground water temperature must be warm enough.
In PAMI tests, the ground water came from a well and the temperature remained constant at around 45°F (7°C). Dugout water or other sources of surface water would likely be colder, and may be risky.



Typical installation of Energy Free Fountain

How Do They Work?

Energy free fountains are closed, insulated containers filled with water. The walls of the containers are constructed of double walled, durable plastic. The space between the walls is filled with insulating material. These water fountains act like a thermos in that they slow down the cooling of water.



Energy free fountains use available heat (called geo-thermal heat) from the ground, below the frost line. Ground water enters the fountain through a float valve assembly at ground temperature, usually about 45°F (7°C). Ground water acts as the fountain's heat source. The water slowly cools, but as an animal drinks from the fountain, warmer ground water replenishes the fountain. This continual exchange of warm water for cold provides heat to offset the effects of cooling.

Are Energy Free Fountains Cheaper to Operate?

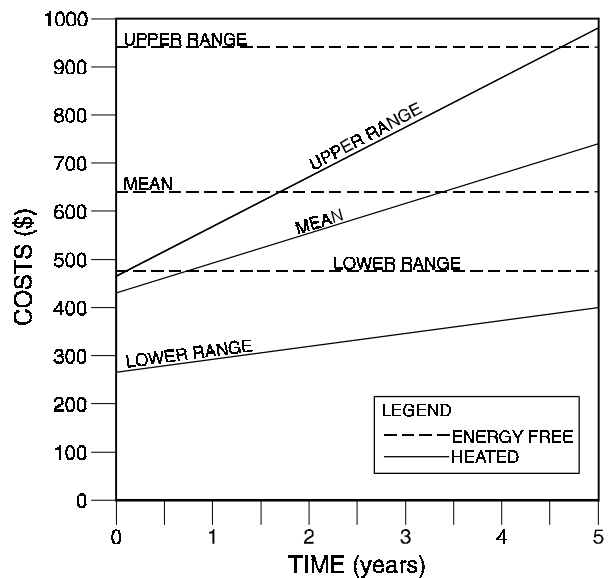
While energy free fountains may save you money on power, they tend to cost more than heated fountains to buy.

The purchase prices of the energy free fountains tested by PAMI ranged from \$475.00 to \$930.00, while heated fountains ranged from \$280.00 to \$475.00

Energy savings ranged from \$24.00 per year when compared to the most efficient heated fountain, to \$100.00 per year compared to the most power hungry fountain. These savings are based on energy costs of 5.5 cents per kilowatt hour. If you live in a region with higher energy costs, the savings would be greater.

The energy graph at right gives a projection of costs for energy free fountains versus heated fountains for a five year period, including the initial purchase price. This graph assumes energy rates of 5.5 cents per kilowatt hour, excluding the cost of heat tape on the heated fountains. Based on these costs and assuming a heat tape is on for half of a six month season, energy costs for heat tape would add about \$9.00 for an average winter.

Energy free fountains may be cheaper to install since you don't need to trench in power lines.



Cost/Time Graph for Energy Free versus Heated Water Fountains

Can I Replace my Heated Fountain with an Energy Free Unit?

You can, but you'll still need to wrap the water supply line with heat tape, and maintain the ice build up on a daily basis.

Most heated installations have smaller heat riser pipes and less insulation, hence the heat tape requirement.

If you don't have insulation between the ground and concrete base, faster cooling may occur.

Fountain Fact

Energy free fountains have less algae build up and supply cooler water than heated fountains during the summer.

Will Animals Learn to Drink From Energy Free Fountains?

PAMI's tests were conducted using young bulls. Approximately 150 animals used the energy free fountains. (See the fountain sizing guide.) Animals need to learn that pushing down on the floating lids or lifting hinged lids (depending on design) gives access to water.

Only one animal had difficulty learning how to access the floating drinker lids.

This animal was moved to another pen where it encountered no difficulty drinking from a heated fountain, but you may not have this luxury. Giving this bull a little assistance probably would have solved the problem.

PAMI did not test the fountains with other types of livestock.

Energy Free Fountain Sizing Guide (based on manufacturer's recommendations)

Fountain Capacity	Beef	Dairy	Hogs	Sheep	Horses
10 gal (45 L)	100	40	100	100	40
12 gal (55 L)	125	50	135	200	50
35 gal (160 L)*	250	90	150+	225+	90

* Fountains in this size range should allow access by up to 4 animals at a time.

Fountain Fact

Cool down tests on one energy free fountain showed that it could go unaccessed for about 20 hours at -4°F (-20°C) before freeze up was imminent.

Installation Tips:

1. Ground riser pipes should be at least 14 inches (360 mm) in diameter. One manufacturer recommended an 8 inch (200 mm) riser. This was too small, and the unit froze up twice.

2. Some tests have shown a benefit to insulating the top 3-4 ft (1m) of riser pipe. If you do, it must be insulated with a material that does not absorb moisture.

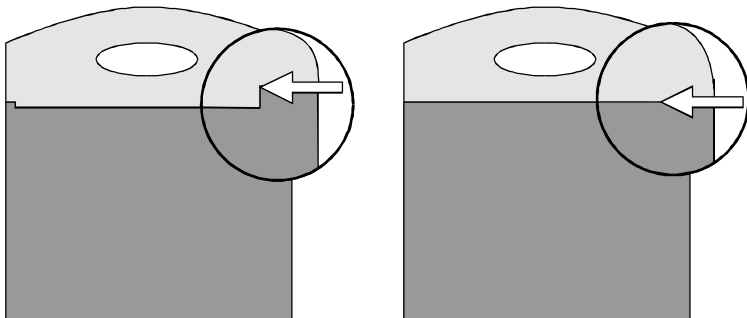
3. Make sure the water supply line does not touch the sides of the riser pipe.

4. Insulation between the concrete pad and the ground will help slow down cooling. Make sure the base is level so that float valves and floating lids function properly.

5. Install drainage tile that slopes away from the bottom of the riser pipe if your soil is poorly drained. This will ensure adequate drainage of water that may collect from the fountain overflow pipe.

An Energy Free Fountain Maintenance Schedule

Daily	Weekly	Monthly
Clear ice build up from drinker lids	Clear ice build up around base.	Inspect unit for damage caused by animals
Ensure lids are moving freely.	Check water levels	
	Check float for proper operation	
	Clean out debris	



Keeping Out The Cold

Most energy free fountains separate into two pieces- top and bottom half. The type of joint between the two pieces can dramatically affect cooling characteristics. Look for a lapp joint, shown at left. A butt joint can let in too much cold air.

Energy Free Maintenance Tip

In case of a power failure, keep livestock away from the fountain so they can't empty it. If this has already happened, some hot water will help thaw the ice and the float valve.

NEVER USE AN OPEN FLAME TO THAW ICE.

Fountain Fact

Keeping your energy free fountain water bowl clean and free of debris will help ensure proper operation and a healthy water supply. Also, debris caught in float valves can cause valve leakage resulting in wasted water.

In Depth Information

Detailed information on the PAMI Water Fountain Studies can be obtained (at cost) in the following reports:

DP0990- Field Study of Electrically Heated and Energy Free Automated Livestock Water Fountains

DP2791- Effects of Three Ground Riser Pipe Designs on the Performance and Operation of Energy Free Water Fountains -1

RP0292- Effects of Three Ground Riser Pipe Designs on the Performance and Operation of Energy Free Water Fountains -2

Call 1-800-567-PAMI and ask for the reports by number and name.

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