

AGRI-FACTS

Practical Information for Alberta's Agriculture Industry

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Automatic Livestock Waterers

A reliable, constant supply of good quality water is an essential part of any livestock enterprise. Automatic waterers have almost totally replaced the old water trough and tank for year-round stock watering because of their convenience and efficiency.

Automatic livestock waterers consist of an insulated base and a heated bowl that automatically fills with water from a pressure line. The level of the water in the bowl is controlled by a float-operated valve. The water temperature in the bowl is regulated by a thermostat set at 4 to 6°C. There are three types of waterers; electrically heated, gas heated and energy free. The most common automatic livestock waterers are electrically heated,

although natural gas and propane heated models are available. Energy free stock waterers have also come onto the market over the last few years.

The location of the automatic livestock waterer is important for successful operation. Wind and snow protection reduces energy costs, prevents freeze-up and makes it easier for the animals to use. The ground surface must be graded so that it drains away from the waterer. A concrete pad surrounded by gravel will assist drainage and prevent a mud hole from forming. Location on a fence line can provide service to more than one pen.

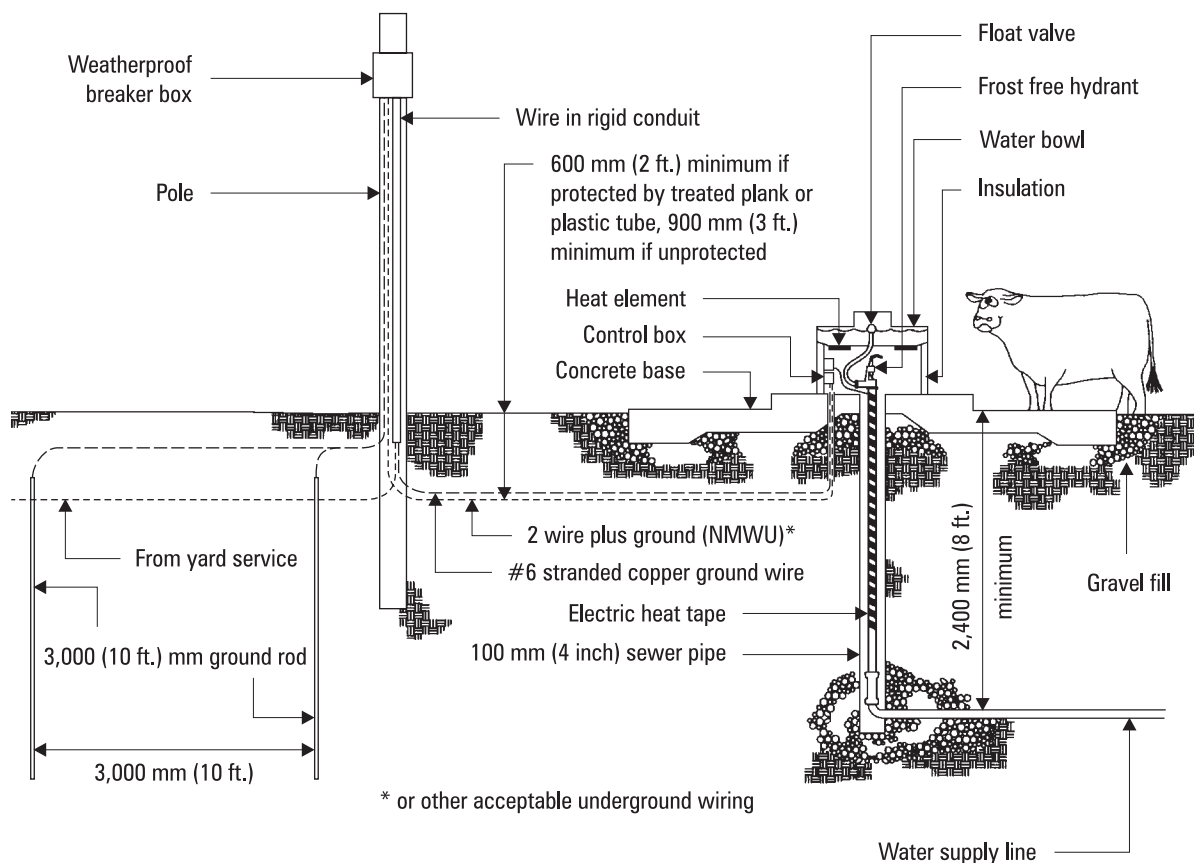


Figure 1. Automatic livestock waterer

Selection

The following points can be considered when selecting an automatic livestock waterer:

1. Is it easily cleaned?
2. Is the thermostat adjustable?
3. Is the heating element replaceable?
4. Are parts locally available?
5. Is the waterer the correct size?
6. Is it well insulated and weather stripped?
7. It must be CSA or CGA approved.
8. Hinged covers over the bowl can mean energy savings.
9. A heating element immersed in the water or attached directly to the bottom of the bowl will transfer heat from the element to the water more efficiently. The elements on most waterers also warm the entire space enclosed by the base. The trade off on this, however, is an increased chance of freeze-up due to failure of heat tape or poor weather stripping on the base.
10. New models of energy efficient waterers are appearing on the market every year. These waterers usually have extra thick insulation and insulating caps which float on the water; this prevents heat loss from the water surface.

11. Thermal cover kits, to improve efficiency, are available for some stock waterers.
12. Almost all stock waterers will malfunction and freeze up at some time. The inner components of a waterer must be accessible, even when surrounded with ice and snow.

Energy free waterers

Several types of energy free stock waterers are available. These waterers rely on super insulation, insulated covers and large volumes of water to prevent freeze-up. Some models are working very well in Alberta. These waterers will work best when plenty of water is used daily. A minimum of 10 head of cattle or horses are required during cold weather. During cold weather energyless waterers must be checked at least twice daily: once in the morning, to make sure the insulated covers are not frozen shut, and once at night to make sure the floats aren't held open by ice build up. Ice build-up is significant as cattle dribble water when they lift their heads after drinking.

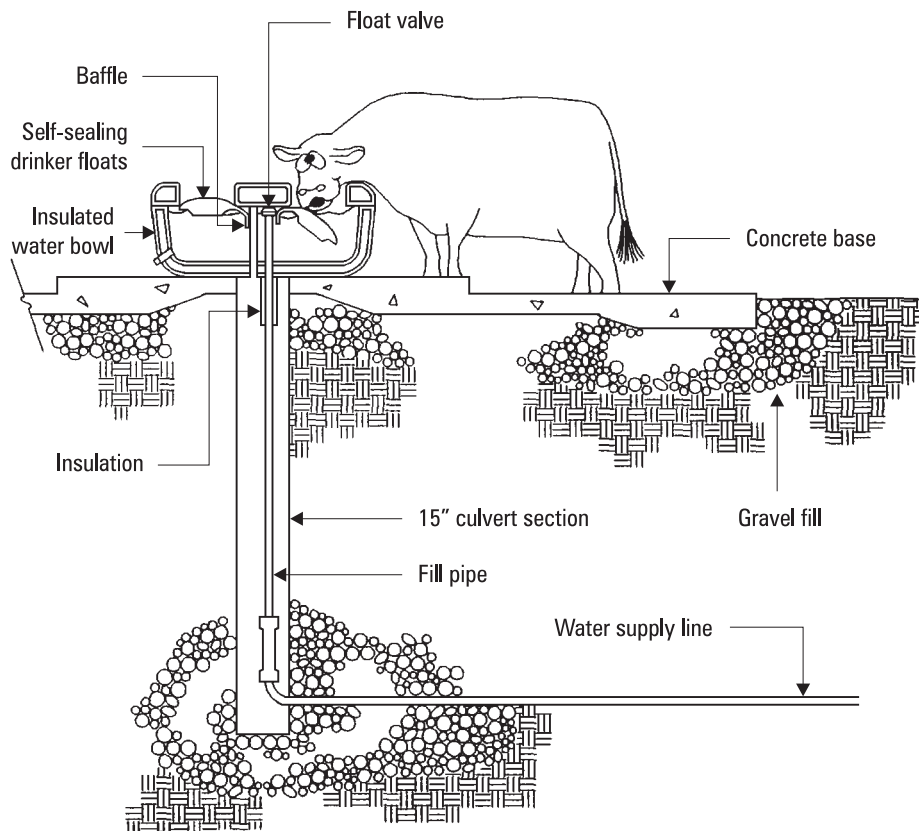


Figure 2. Energy free waterer

Temperatures in, and around, an energyless waterer were measured in Alberta during the winter of 1987-88. During the coldest night recorded, the minimum outside temperature was -27.5°C. Water coming into the waterer was +5°C. Overnight the temperature of the water in the waterer dropped to +1°C. Some younger and smaller animals did have trouble adjusting to this waterer.

This waterer went through a three-day cold snap in February, 1989 with no major problems. Temperatures dropped to the -40°C range.

Proper installation and management is critical in the successful operation of energyless waterers.

Electrically heated types

Installation

Note: Electrical permits are required for all new electrical installations and all extensions to existing installations. A number of animal electrocutions have resulted from ineffective grounding and improper installation of automatic livestock waterers.

Insurance policies may not cover electrocuted animals if the installation did not have an electrical permit. Stray or tingle voltage in waterers can also cause a slight shock to animals. This can cause animals to refuse to drink from a waterer completely or only drink as a last resort. Permit applications and farmstead wiring regulations are available from Alberta Labour, Electrical Protection Branch.

The following points should be considered when installing an electrically heated automatic livestock waterer:

1. Overhead or underground wiring to the waterer should be of adequate size and be on its own 15 amp breaker. Overhead wiring is subject to minimum clearances over buildings and from ground level. (Consult with an electrician or provincial electrical inspector.) Underground wiring should be plastic covered NMWU10 and be buried a minimum of 600 mm (two feet) or a minimum 900 mm (three feet) under driveways, etc.
2. Where the wiring can be touched (or damaged) by humans or animals, it must be protected by rigid conduit.
3. The waterer must be grounded back to the breaker box using no. 6 stranded copper. Where the waterer has a hinged bowl, the ground wire should be installed on the bowl itself. Electrical regulations require two 10-foot-long ground rods at least three metres (10 feet) apart.

4. A heating tape should be installed in the riser pipe to prevent freezing. The thermostat on the heating tape should be at ground level.
5. A backflow prevention valve is necessary between the waterer and pressure tank. This will prevent backsiphonage of water should the foot valve in the pump fail.
6. Provision should be made to drain the riser pipe or water supply line, so the waterer can be shut off in the winter without freezing. A self draining wheel hydrant makes an excellent combination riser pipe and shutoff valve. Every waterer should have its own shutoff valve and, where practical, its own supply line from the central water supply system.
7. A light socket in the waterer base with a 40 to 60 watt light bulb will help reduce condensation inside the waterer and provide a handy light source for maintenance of the waterer.
8. The waterer should be installed on a solid base to prevent movement and subsequent damage to wiring and water lines. A reinforced concrete pad is recommended. A 16 ft x 16 ft x 6 in. thick pad with 10 m rebar 12 in. on centre both ways is suggested. A 450 mm wide by 150 mm high (18 in. x 6 in.) step around the waterer will help prevent manure contamination of the water and corrosion of the waterer frame.
9. The base of the waterer must be caulked or weather stripped to the concrete pad to keep wind penetration to a minimum.

Maintenance

Clean and flush the bowl once-a-week. Keep manure and mud away from the base of the waterer. This will extend the life of the waterer by preventing corrosion. The waterer should be checked before turning the power on for the winter. The check should include:

- wiring, both power supply and grounding circuit for damage
- water line connections for leaks
- element(s) and thermostat for correct operation
- float and valve for sticking
- base for secure connection to the pad

Cost of operation

A typical automatic livestock waterer will have a 600 to 1,000 watt heating element(s). On the coldest days, the elements will be on for about 12 hours, consuming from seven to 12 kilowatt hours of electricity. Additional operating costs include the power to supply the pump and the heat tape on the riser pipe.

New energy efficient types of waterers can likely cut energy costs 20 per cent to 80 per cent, depending on design.

Heat tapes

Electric heat tapes are an almost essential option on electric stock waterers. A thermostatically controlled heat tape should be installed around the riser pipe with about three turns of heat tape per foot of pipe. The spacing between the spiral turns must not be less than 12 mm (1/2 inch). Heat tape must never cross itself, contact the soil, or be exposed to sunlight.

All heat tapes will eventually fail. Since replacement of the heat tape is inevitable, it's important it can be easily replaced. One way to facilitate this is to use a section of plastic pipe, at least one size larger than the riser pipe, as a sleeve. Slit the entire sleeve pipe lengthwise, coil the heat tape around the slit pipe sleeve and slip the assembly over the riser. When the heat tape has to be replaced you simply have to pull up both the sleeve and heat tape.

Thawing frozen automatic waterers

Automatic waterers will freeze in the winter if the power, heating element or heat tape fails. Waterers that freeze early in the winter can usually be thawed by simply turning the thermostat to a high setting and plugging in the heat tape. If this doesn't do the job, temporarily install an in-car warmer in the waterer base. Pipe heating devices such as the Richie "Pipe-N-Hot" can also be used to thaw the riser pipe. Some farmers have successfully thawed riser pipes by attaching a rubber hose to the exhaust pipe of a vehicle and running this hose down the casing that surrounds the riser pipe. The heat of the exhaust will thaw the line.

For further information, contact the Alberta Agriculture, Food and Rural Development Agricultural Water Specialist or the Agricultural Engineering Branch at the following locations.

Lethbridge	(403) 381-5846
Red Deer	(403) 340-5324
Grande Prairie	(780) 538-5606
Edmonton	(780) 427-2963