CARR CONCRETE

THE FREEZE-PROOF WATERER

WHAT CAN IT DO?

In addition to providing a year-round water source, the freeze-proof waterer is a simple, common sense approach to providing your livestock with a constant source of ice-free water during the winter months. If properly installed and the by-pass valve regulated correctly, this stock tank will provide an ice-free drinking area for your livestock to -20 F. Water is the least expensive feed for all livestock, and having free access to water at all times will increase production. If your wintertime water supply is interrupted by freezing, this tank will pay for itself with increased milk production or rate of gain--not to mention the labor savings of chopping ice or hauling water. The freeze-proof requires no electricity or other outside source of energy: IT OPERATES SOLELY FROM THE HEAT OF THE EARTH AND THE PRESSURE FROM YOUR WATER SUPPLY.

HOW DOES IT WORK?

Although originally developed to operate from farm ponds, the freeze-proof works equally well on any pressure water system and can also be used as a spring fed waterer. It is a rectangular tank with a cover over about 2/3 of the top. The covered portion of the tank is buried below the frost line by setting the tank into a bank or pond dam, or by simply covering the tank with earth. See Figures 1 & 2. A baffle secured to the lid keeps earth from falling into the remaining open 1/3 of the tank (drinking area.)

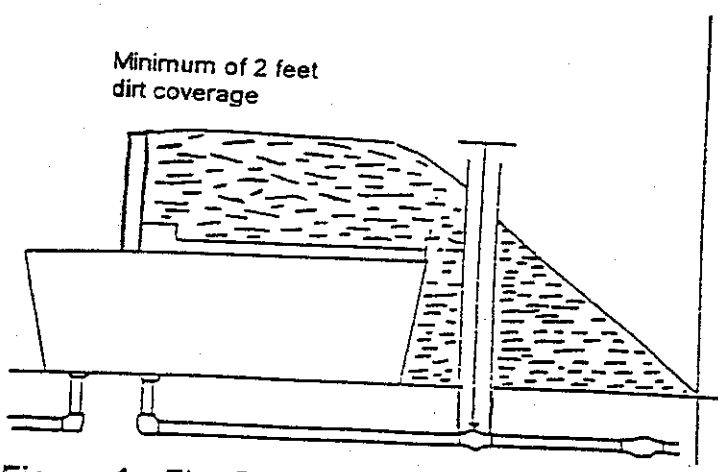

Figure 1. *Flat Surface Installation*

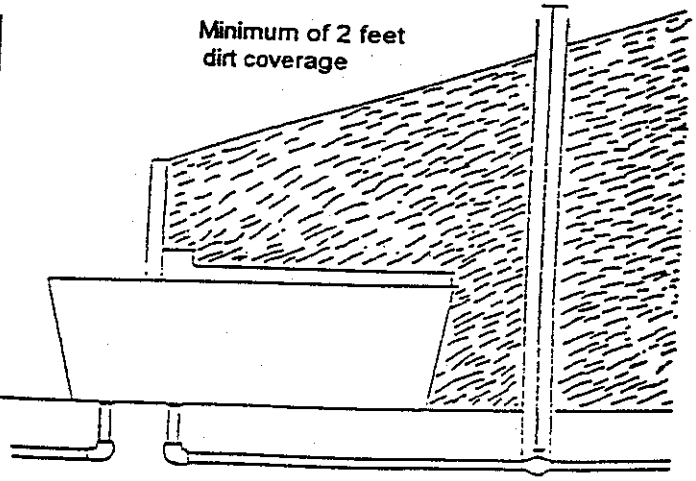

Figure 2. *Bank or Pond Dam Installation*

The earth below the frost line remains several degrees above freezing. Concrete is a good heat conductor and therefore; as the water in the tank cools below the temperature of the surrounding earth, heat is readily transferred from the earth through the tank walls to the water. The water in the buried portion of the tank will be kept from freezing just as your buried water lines are kept from freezing. The exposed portion of the tank (the 1/3 open drinking area) cannot absorb heat from the earth and will freeze if the water in the tank is not circulated. To keep this drinking area from freezing, it is necessary to circulate a small amount of water to mix the warmer water in the buried portion of the tank with the cold water in the front drinking area.

In order to circulate water in the tank, the freeze-proof has two valves. The 3/4 inch refill valve is float controlled and opens only when the water level is lowered as animals drink. The by-pass valve, which is manually controlled, is opened in the winter months to permit a small stream of water to flow continuously from a pin hole in the end of the copper tube. When flowing from such a small opening, only a very small amount of water is needed to gently circulate the water, bringing the warmer water from the buried portion of the tank to the drinking area. Approximately 6 gallons of water per hour is necessary to keep the tank open to -20 F.

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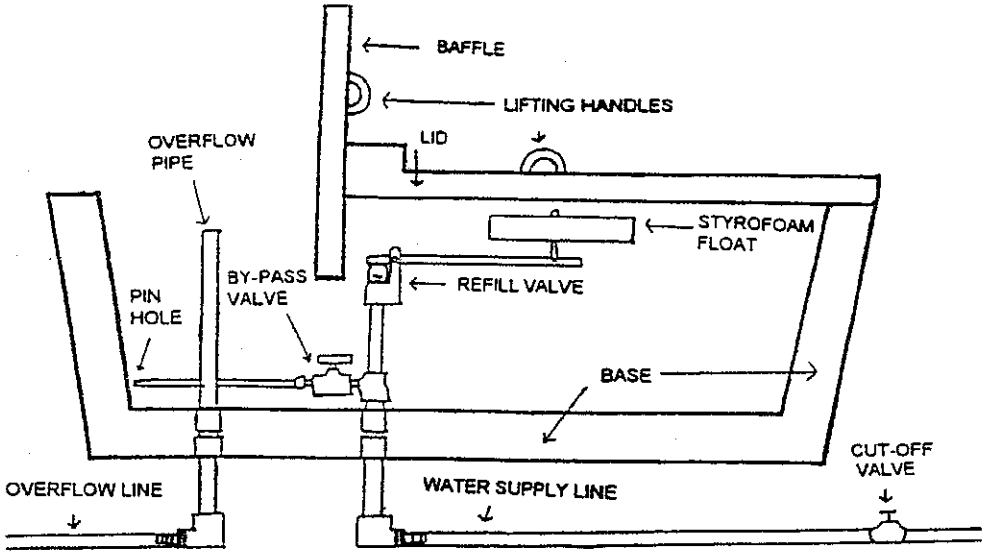

Figure 3. *Freeze-proof waterer diagram*

ADVANTAGES OVER POND WATERING

Use of a freeze-proof waterer allows the pond to be fenced. This means that:

1. Pond life will be longer, since cattle are not able to trample down the sides and dam.
2. You prevent contamination of the pond water with cattle insecticides and manure.
3. You reduce the chance of foot rot and other contagious diseases.
4. You prevent livestock loss caused by breaking through thin ice and drowning.

In addition, use of a freeze-proof in any of its applications gives your animals access to water at all times and eliminates the breaking of ice and hauling of water in the winter time.

SPECIFICATIONS

Weight	2,200 pounds
Height	24 inches
Length	6'-0"
Width	30 inches
Tapered sidewall thickness	4 inches
Bottom thickness	4 inches
Steel reinforcing	85 feet of ½ inch steel reinforcing rod
Drain & outlet	1½ inch standard pipe
Baffle & lid	Can be removed for installation (Lifting hooks provided)
Hauling & installation	Can be hauled on 3/4 ton pickup & installed with most front end loaders.

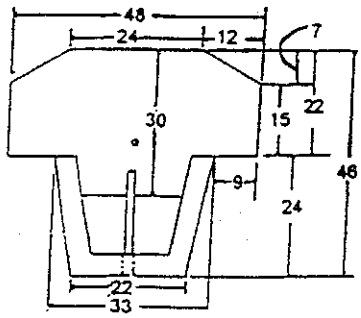

Figure 4. *End View Dimensions (All measurements in inches)*

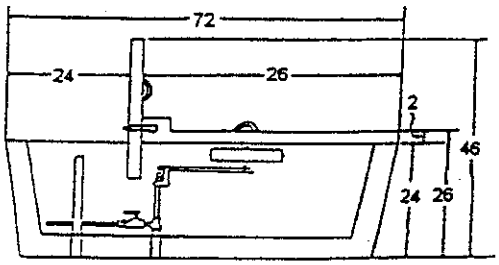

Figure 5. *Side View Dimensions (All measurements in inches)*

INSTALLATION PROCEDURES

1. The freeze-proof waterer needs a clean source of water. If the water source is a farm pond, it is necessary to filter the water to keep the circulating valve from plugging. Although there are several ways to build a filter, we have found the use of a floating filter to be the most trouble free.

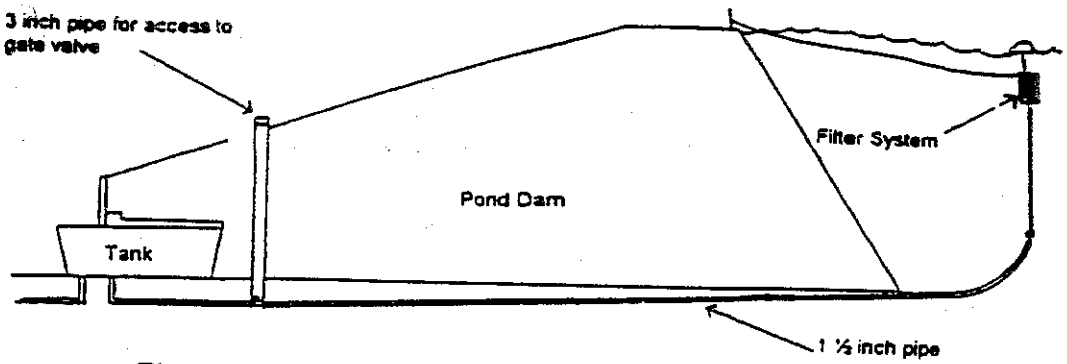

Figure 6. *Typical Pond Dam Installation*

2. When selecting a site, a bank or pond dam makes an excellent choice. If this is not feasible, the tank can be set on level ground and earth mounded over it. When a pond is the source of water, try to get a ten (10) foot drop between the water levels in the pond and the tank. This will assure enough water pressure to both operate the freeze-proof feature and also provide rapid refilling of the tank when animals drink.
3. Excavate into the bank and level the area where the tank will rest. The front bottom of the tank can rest on the ground or be partially underground, as you prefer.
4. Dig trenches for supply and overflow lines all the way under the tank location. These lines must be buried below the frost level, so it is best to come in at an angle from behind the baffle where earth coverage is the deepest. If lines must be run out the front of the tank, the nipples extending down from the bottom of the tank can be lengthened enough to ensure proper line depth.
5. Remove baffle and lid from tank and set base in place. Make sure the tank is level and couplings in the bottom of the tank are located over a trench.
6. Assemble the nipple. (A), the 90° ell (B), and the plastic to metal adapter (C). Reaching under the tank through the trench, screw the assemblies into the couplings in the bottom of the tank. The plastic lines will be below frost level as they come out from under the tank.

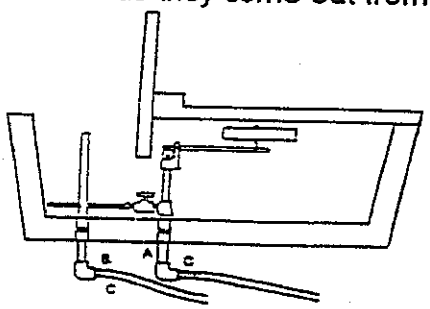

Figure 7. *Pipe Connections*

7. Although not necessary for operation of the tank, it is advisable to provide a cut-off valve on the water supply line so water can be shut off for periodic cleaning or repairs.
8. After connections are made, fill tank with water and set float so the water level is about 1 inch below the top of the overflow pipe. The water level is set by adjusting the position of the Styrofoam float on the eye bolt. Check to see if the eye bolt will hit the lid when it is on. If it will, cut off the eye bolt to ensure 3/4 to 1 inch clearance.
9. Place lid on tank. Place baffle in place and secure to lid with ½ inch bolt.
10. Build retaining wall to keep earth from spilling out under the baffle. Treated posts and 2 inch lumber do a good job. Be sure the retaining wall is set to the rear of the baffle so that the baffle can be removed to allow easy access to the tank for cleaning or repair. Normally, after the earth has set up for a few months, the baffle can be removed: However, if the soil used for top fill is loose, you may want to run the boards across the back of the baffle. Retaining wall is 12 feet long and 4 feet high.

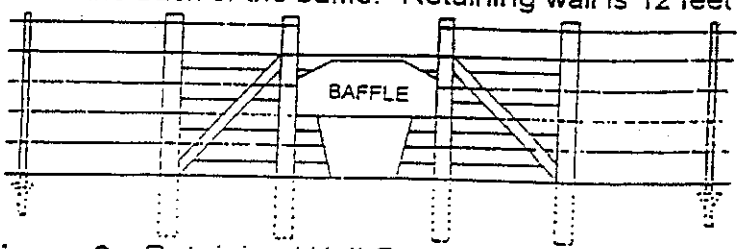

Figure 8. *Retaining Wall For Freeze-Proof Waterer*

11. Fill over the tank to a depth that puts the tank below your frost level. This can be determined by the depth of water lines that are normally buried in your area. There should always be a minimum of 24 inches in any area.
12. Run the overflow line to a ditch or over a bank and make sure discharge has 12-18 inches of airspace or drop to the ground. This prevents ice from building up under the discharge and plugging the overflow pipe. If you do not have a suitable place to run the overflow, you can build a pit and fill it with large loose gravel and run the overflow into it. Be sure the overflow discharges below the frost line.
13. A fence should be built around the waterer to keep cattle from trampling earth off the tank. When installed in a pond dam, the retaining wall can become a part of the fence surrounding the pond.

OPERATING INSTRUCTIONS

1. The by-pass valve must be opened during freezing weather. Open the valve until you see the water begin to move in the tank. If your water source is limited, you should regulate flow by allowing the tank to fill completely until it begins to overflow. You can then measure the discharge and adjust the by-pass to a flow of about 6 gallons per hour (a gallon container should fill up every 10 minutes.)
2. The freeze-proof feature of the tank operates satisfactorily at 2 to 65 pounds of water pressure: However, the greater the pressure, the faster the refill time after animals drink. If your pressure is over 65 psi, it may be necessary to install a pressure reduction valve to prevent chatter of the float controlled refill valve (which can waste water.)
3. Best results are achieved after the earth has settled and compacted around the tank. Do not use sand or frozen earth to fill over the tank. It is best if installations are made in the summer to ensure good compaction of the earth before freezing weather.
4. Each year, before cold weather turn off the water supply, remove the overflow pipe, and clean the tank and valves. Remove the copper tubing and clean, making sure the pin hole in the end is open. Replace the drain pipe and turn on the water. Be sure the float returns to an upright position as tank refills. If the ground is settled or if boards were installed behind the baffle, one may remove the baffle for easy access.

MODIFICATIONS FOR PRESSURE SYSTEMS

The standard freeze-proof is set up for a farm pond water source. If you are on a pressure system where water is limited or expensive, you can minimize the water usage in two ways.

1. The pin hole opening in the copper circulation tube can be reduced in size from 1/8 inch to 1/16 inch. This will give more water movement with less flow volume.
2. Set the water level in the tank 2-3 inches below the top of the overflow pipe. This will permit the circulating valve to operate for several hours before the tank overflows.
   NOTE: Do not set the water level below the bottom edge of the baffle.

MODIFICATION FOR USE ON SPRING

Although basically designed to work on a constant pressure system, the freeze-proof waterer can be fed from springs. One way is to use a reservoir between spring and tank, letting gravity provide the constant pressure needed to use the regular mode. If this is not feasible, the alternative is to use our spring fed model.

Since you cannot restrict the flow of water from a spring without the possibility of ruining the spring development, the spring fed model has no valves. The full flow from the spring flows through the tank at all times. It is impossible for us to determine at what temperature freezing will occur since all springs differ in flow rates. In most cases, if the spring flow is sufficient to circulate the water in the tank, it will perform comparable to the pressure fed model. Some advantage can be achieved by reducing the size of the inlet pipe to give more water movement with the same flow volume. This inlet can be restricted since you can let the inlet line become partially filled with water to build up pressure and therefore flow into the tank with more force. If this procedure is used, it would be wise to put an overflow on the spring catch basin since the restricted line may not be able to carry the full spring flow during peak flow times.