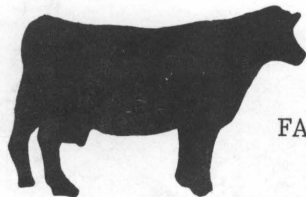


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# dairy guidelines

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## FARM SEMEN STORAGE TANKS: THEIR CARE AND MAINTENANCE

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Each year there is an increase in the number of Virginia dairy farmers who are breeding their cows artificially. As a result, the number of on-the-farm semen tanks has increased. Consequently, there is a greater likelihood of an individual having problems with a semen tank. With proper care, maintenance, and use, the chance of problems can be reduced.

A good appreciation of the functional aspects of a semen storage tank will help in understanding recommendations for its use. Semen storage tanks are composed of an inner liner and an outer tank. These join at the neck opening, providing the main support of the inner liner. The semen tank is insulated by filling the space between the liner and outer tank with fiberglass wool and drawing a vacuum on this space through a fitting on the shoulder of the tank. The vacuum is the most important insulation because it dramatically reduces the rate of liquid nitrogen evaporation. The principle is the same as a thermos bottle.

When charged with liquid nitrogen, the temperature inside the body of the tank is  $-320^{\circ}$  F. This temperature is ideal for long-term semen storage. However, temperatures increase in the neck region. These elevated temperatures in the neck, especially above the frost line, are detrimental to frozen semen (see diagram on page 3).

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Based on these characteristics, the following recommendations are made for proper care, maintenance, and use of tanks.

1. Remove the tank from the shipping carton and place it on a wooden pallet at a location where it will be observed several times a day. The wooden pallet will keep it dry and reduce corrosion on its bottom. A preferable location for the tank is the room where semen is prepared for insemination. Always be watchful for a lid that is left off and for frost or sweat on the tank. Give particular attention to the neck and vacuum fitting. Frost indicates that the vacuum insulation has been lost and liquid nitrogen has been or is evaporating rapidly. If this should happen, use a wooden yardstick to measure the amount of liquid nitrogen in the tank. If the tank still contains liquid nitrogen, the semen must be transferred to a good tank. Should the tank be empty of liquid nitrogen, the frost will thaw to produce sweat. When this occurs, it is doubtful that the semen is viable. Tanks which contain a Virginia Semen Testing Program test cane can be checked to determine the amount of damage that has occurred.

2. Check the level of liquid nitrogen in the semen storage tank once a week. Use a wooden yardstick as a dip stick: insert it to the bottom of the tank, wait 5 to 10 seconds, remove it and wave it in the air to allow frost to form. The frost indicates the depth of liquid nitrogen. Record this level each week between nitrogen refills. (See chart on page 4.)

A record of the liquid nitrogen level each week will show the rate of normal evaporation. The loss varies with season and amount of tank use. Monitoring loss between nitrogen refills will help detect high nitrogen loss rates which would indicate tank problems that could put the semen in jeopardy. Never let the liquid nitrogen level drop below 1 inch.

3. If you move your tank, do so carefully. Rough handling can damage the tank, especially in the neck where the inner liner and outer tank join. A very small crack will cause loss of the vacuum and allow the liquid nitrogen to evaporate in a very short time.
4. Exposing semen doses, especially straws, to elevated temperatures in the neck for other than short periods of time (few seconds) is detrimental to sperm viability. This can especially be a problem above the frost line in the neck. A good inventory identifying which canisters contain which bulls reduces the amount of "fishing around" for a bull and the unnecessary exposure of semen to these elevated temperatures.

5. When possible, single deck storage of semen on the bottom of the cane may be beneficial. When double decking, straws on the top of the cane are exposed to the higher temperatures found in the neck of the tank more frequently during cane handling. The plastic straw container (goblet) at the bottom of the cane is often full of liquid nitrogen when the cane is pulled up. This helps protect the semen from these temperatures.
6. Place a lock on your semen tank lid. This prevents unnecessary opening of the tank. It also reminds you to replace the lid after a dose is removed.

Liquid nitrogen semen tank problems are often disastrous though not that common. They can, to a good extent, be avoided with careful use and maintenance of the tank.

**IMPORTANT**  
HOLDING SEMEN IN  
THIS DANGER ZONE  
FOR ONLY A FEW  
SECONDS CAN  
DECREASE FERTILITY

