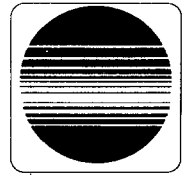


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Fuel Storage On The Farm

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A 300-gallon gasoline tank not properly protected may be losing as much as 10 gallons of gasoline per month. With today's high fuel prices, reducing this loss can produce a substantial savings. When analyzing a farm operation to locate places where fuel is wasted, do not overlook the fuel storage facility.

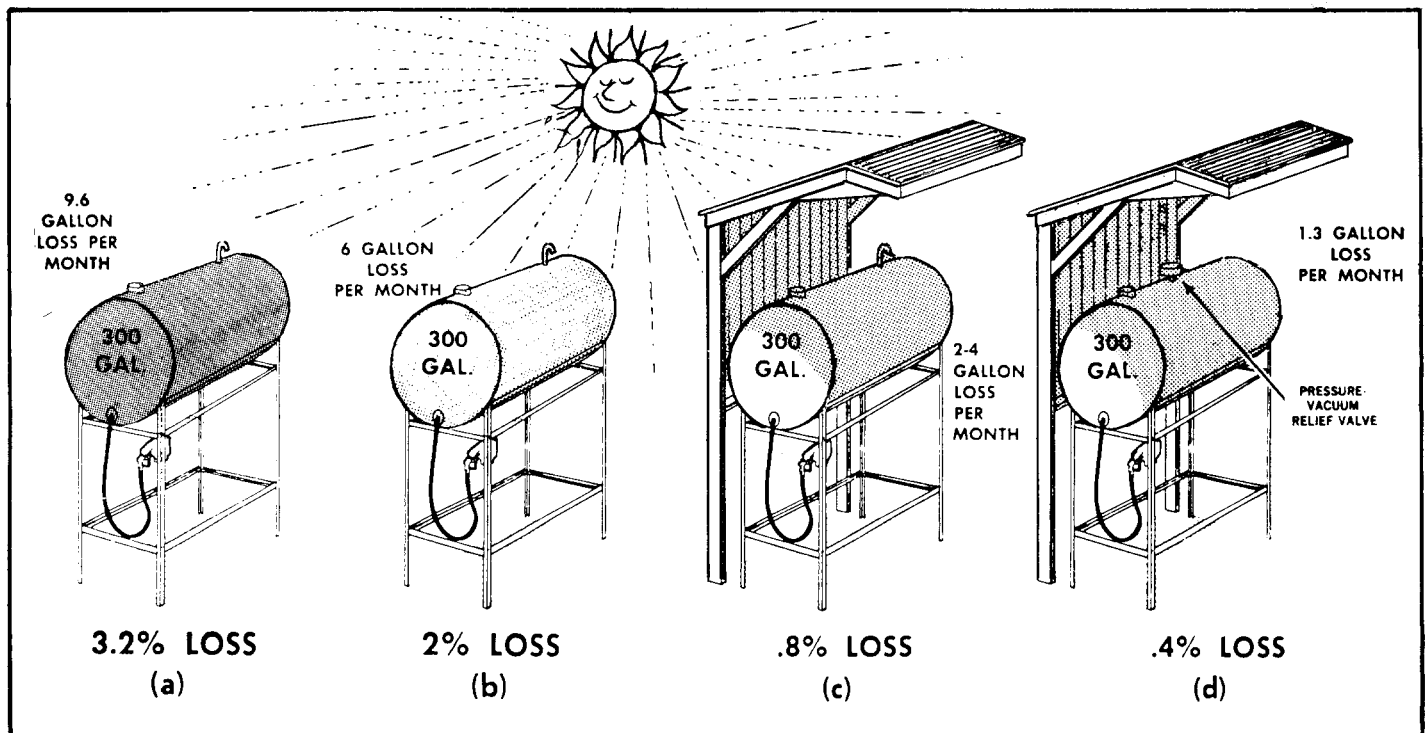


Figure 1 - Shows how color, shade, and a pressure-vacuum cap affects evaporation loss.

- Red or rusty colored tanks are used on many farms today. When exposed to the sun's heat, evaporation loss can be substantial.
- Evaporation loss can be cut by one-third by painting the tank with white or aluminum paint.
- Shade makes a substantial difference in the amount of evaporation loss. When a fuel tank is completely shaded, color has little effect on fuel losses.
- Evaporation losses can be further reduced by use of a pressure-vacuum relief filler cap. The tank must be air tight for the cap to work. Cost can usually be recovered during the first year. The caps should be available from most farm supply and hardware stores.

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GASOLINE STORAGE LOSSES

The main factors which contribute to gasoline storage losses are fuel leaks and evaporation.

Check for fuel leaks by examining all connections between the outlet as well as the hose itself. Also check the ground beneath the hose. If any connections are moist or caked with dust or if the ground shows indications of fuel leakage, both fuel and money are being wasted and safety is being compromised.

Evaporation loss from above-ground tanks is important because of fuel loss, both quantity and quality. Fuel storage tanks need to "breathe" in and out as temperature changes cause fuel to expand and contract. This "breathing" is necessary to equalize atmospheric pressure with that in the tank. But the less the tank "breathes" the less gasoline lost and the less impurities (mostly water) enter the tank.

Evaporation losses are greatly affected by tank color, location and type of filler cap. Losses can be substantial if the tank is exposed to direct sunlight and if vapors are free to pass through an open vent. A study by agricultural engineers in Ontario, Canada, indicated that the lowest loss to be expected over the four summer months in southern Ontario from a dark colored, open vent storage without shade cover is 14 percent of the stored quantity. Figure 1 indicates summer evaporation loss from a 300-gallon tank. This loss took place in four weeks with usage of 75 gallons per week based on studies conducted in Missouri. Evaporation is especially rapid at temperatures over 90 degrees F.

Evaporation loss from underground tanks is minor because temperature of the stored fuel remains low, and relatively constant throughout the year.

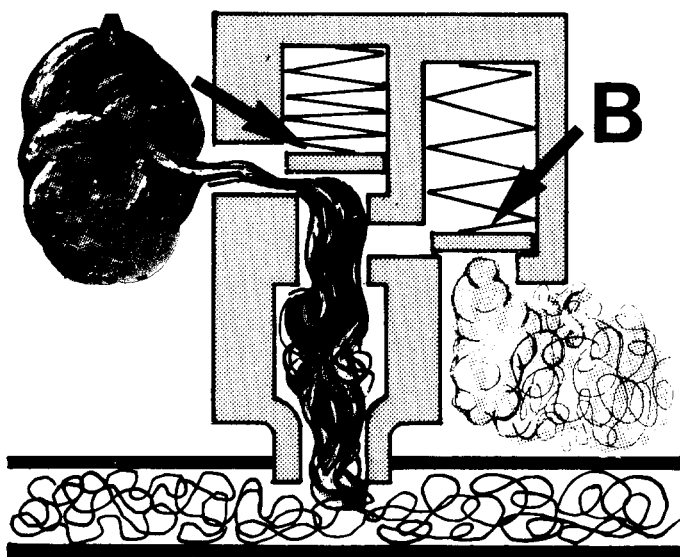


Figure 2 - A pressure-vacuum relief valve decreases fuel evaporation losses. The spring-loaded valve restricts the air movement in and out of the tank. A rise in tank pressure raises the spring-loaded disc-valve (A) allowing air to escape. When storage tanks cool or when fuel is withdrawn, the inlet valve (B) raises and allows outside air to enter.

GASOLINE QUALITY

Quantity losses are only one aspect to consider when looking at evaporation. Gasoline quality also decreases along with a loss of gallons. Fuel suppliers provide different gasoline blends depending on the season of the year. Winter grade gasoline vaporizes more readily. This aids in starting and more rapid warm up during cold weather. The more volatile or "lighter" components are also easier to evaporate during fuel storage. Because of this, winter time evaporation losses may be about the same as those in summer. Evaporation of the lighter components may change winter grade gasoline to the equivalent of summer grade. This change will make an engine start harder in cold weather.

Gasoline quality may deteriorate when fuel is stored for periods beyond 30 days. There is an increase in the gum content with long term storage. Fuels are treated with additives to prevent gum formation. These additives only do their job for a limited time. Gum formation is less of a problem with underground tanks since fuel remains cool and less chemical activity occurs.

DIESEL FUEL STORAGE

Evaporation during storage is usually not rapid enough with diesel fuel to be of major concern. What evaporation does occur has little effect on fuel quality. The important fact in maintaining quality is to keep it free of dirt and water and avoid gum deposits.

The fuel injection system on a diesel engine is fitted with parts that are manufactured with very close tolerances. Very fine dirt particles can soon cause wear and result in expensive repairs. Water causes corrosion and reduces lubrication which can ruin the precision parts of the fuel pump and injectors. Manufacturers of diesel engines emphasize the importance of quality fuel free of dirt and water.

Dirt particles may come from several different sources. Some may be present in the fuel when it is delivered by the supplier, but they are far more likely to come from carelessness or improper storage and handling facilities on the farm.

Water and sediment will settle out of diesel fuel and accumulate at the bottom of the tank. Where a fuel pump is used, keep the suction pipe 3 to 4 inches from the bottom, out of water and sediment. It may be advisable to remove water and sediment periodically and flush tanks with clean fuel. To do this a valve at the bottom of a tank and a hand pump could be used. Collect contaminated fuel and use for cleaning parts, engines, and other shop uses. Install a fuel filter on storage tanks as additional protection against dirt and moisture.

To minimize gum and varnish-forming tendencies in an above-ground tank, keep it shaded from direct sunlight in the same manner as for gasoline storages. This will also help keep moisture from condensing in the tank. Diesel fuel contains gum inhibitors which retard the formation of gum and varnish. However, storing diesel fuel for periods beyond six months highly increases the chance of gum and varnish formation and decreases fuel quality.