



FARM STORAGE AND HANDLING OF PETROLEUM PRODUCTS

This factsheet outlines environmental and fire-safe practices for the handling and storage of petroleum products (excluding liquid propane), as well as the handling of used oil, oil filters and containers. Methods are identified to reduce evaporative fuel losses from storage tanks.

INTRODUCTION

Diesel, gasoline and lubricating and hydraulic oils are used extensively on farms today. Handling and storage presents a financial (increasing cost), environmental (small amounts cause adverse effect) and a fire safety concerns (very flammable) to a farm.

CONCERNS AND LEGISLATION

On-farm receiving, storage and dispensing sites for petroleum products are potential sources of pollution and are fire safety concerns. For instance, one litre of petroleum can contaminate one million litres of water; a leak of one drop in two minutes is 130 litre a year. The main concerns and legislation are:

Siting Concerns. The *Canadian Farm Building Code* (where proclaimed by local government) requires a 12 m separation from any building and property line (underground tanks 1.5 m separation).

Ground Water Concerns. The *Health Act* requires “probable sources of contamination” to be 30.5 m from ground water wells.

Pollution Concerns. The *Environmental Management Act* regulates pollution concerns:

- spills and leaks that impact the environment
- used oil, oil filter and container disposal is regulated

The federal *Fisheries Act* has a section regarding pollution:

- section 36(3) prohibits the deposit of deleterious substances into watercourses (“deleterious” would include petroleum products)

Fire Safety Concerns. The *BC Fire Code* (Part 4) regulates storage tanks containing flammable or combustible liquids. **Note that “farms” are exempt** from Part 4, making the requirements voluntary or “Beneficial Management Practices” (BMP’s).

SMALL FUEL TANKS

Fuel tanks less than 230 litres (50 Imperial gal) must meet transportation regulations, ULC (Underwriters Laboratories of Canada) or CSA (Canadian Standards Association) standards. This size of tank should:

- be stored at least 3 m from any building
- or, be stored in a building used exclusively for fuel storage that is at least 3 m from other buildings
- and, be conspicuously marked with the name of the product contained and the words “**Flammable—Keep Fire and Flame Away**”

LARGE FUEL TANKS

Fuel tanks 230 - 4450 litres (50 – 1,000 Imperial gal) should be stored outside of buildings, either above or below ground, and should:

- be constructed in accordance with accepted engineering practices
- have separate fill and vent openings
- if elevated, have an adequate support of steel, wood or earth bank
- be marked with the product name and the words “**Flammable—Keep Fire and Flame Away,**” plus “**Keep 12 Metres from Buildings**”

UNDERGROUND FUEL TANKS

The following should be used on underground fuel storage tanks exceeding 250-litre (55 I.gal) capacity:

- secondary containment of all tanks and piping (e.g., double wall)
- corrosion protection of all steel tanks and piping
- leak detection
- an overfill protection device for the tank
- a spill containment device at the fill nozzle

ABOVEGROUND FUEL TANKS

These fuel storage tanks must be located:

- 30.5 m from ground water wells (*Health Act*)
- 12 m from any building (where *Canadian Farm Building Code* is proclaimed by local government)

These fuel storage tanks should:

- be at least 12 m from a property line or public road
- be at least 12 m (40 ft) from any building (this distance must be available between any vehicle, equipment or container being filled and any building) - “buildings” refers to any combustible structures, hay stack, etc
- be at least 15 m (50 ft) from any watercourse
- be at least 30 m (100 ft) from any source of water used for domestic purposes
- be located away from other storages containing chemical and fertilizer products to minimize hazards due to fire, mixing, or contamination of substances
- have clear and easy access to minimize the potential for accidental collisions
- have protection from unauthorized access by using fences, locked gates, valves, fill and vent caps
- prevent spilled liquid from entering buildings or waterways by using grading or curbing and drainage (noncombustible sills, curbs, or dikes of sufficient height to contain spills – the stored volume plus 10 percent). Note: an alternative is a double-walled tank



Photo courtesy of Highland Tank

Double-Walled Fuel Tanks. These fuel storage tanks must be located similar to other above ground tanks. Although more expensive, double wall tanks offer spill containment and reduced fuel loss from evaporation.

MOBILE FUEL TANKS

For jerry cans, drums and truck-box fuel tanks:

- keep upright and secure during transport
- avoid dispensing from horizontal drums
- have secondary containment for truck boxes
- have a fuel spill clean up kit

INDOOR FUEL TANKS

Fuel tanks used for dispensing fuel located within a building should meet *Fire Code* requirements (see *Fire Code* for other details or local Fire Commissioner Office):

- if vapours are released into the room
 - have continuous mechanical ventilation of at least 18 m³/hr per square metre of room area, but not less than 250 m³/hr
 - have automatic interlocks so activity generating vapours cannot be performed when the ventilation system is not in operation
 - have audible alarm upon shutdown of the ventilation system
- bond and ground tank, piping and discharge equipment

SAFETY RECOMMENDATIONS

Storage Site. In addition to safe siting, leakage protection, etc, ensure the site has:

- a rust-protected steel tank
- a hand or electric pump that removes fuel through the top of the tank – gravity fed delivery has the most risk of spills, etc
- a anti-siphon valve between pump and tank to prevent tank from draining if the line is broken
- a self-closing, automatic shut off, nozzle
- a “**No Smoking—Ignition Off**” sign at the site
- a dry chemical ABC fire extinguisher at the site of at least 20 pounds that is maintained regularly
- a bonding line to ground the tank and vehicle being filled
- no storage of combustible items near tanks
- no long grass, weeds, etc, near the area at the tanks

Refueling. Follow these practices when refueling:

- remain in attendance at the fueling site
- shut off engines and other ignition sources while refueling
- shut off or do not use cell phones when refueling (static electricity concern)
- do not smoke within 7.5 m (25 ft) while refueling

Theft. Consider the following to reduce fuel theft:

- locate at the back of the yard but keep it visible
- light the area
- use a locking device on the tank and nozzle
- if using an electric pump, turn off power to pump

Refer to **Figure 1**, next page, for an example of well-planned farm fuel storage.

LEAKS AND SPILLS

Consider the following points regarding leaks & spills:

- monitor tank & surrounding area for leaks weekly
- keep an ongoing fuel inventory sheet using a fuel meter or by dipping the tank
- immediately clean up any spills that may occur
- report spills greater than 100 litres to **1-800-663-3456** (*Spill Reporting Reg.*)
- also call local police if the spill is on a highway
- contain small spills and allow soil microbes to break down the petroleum

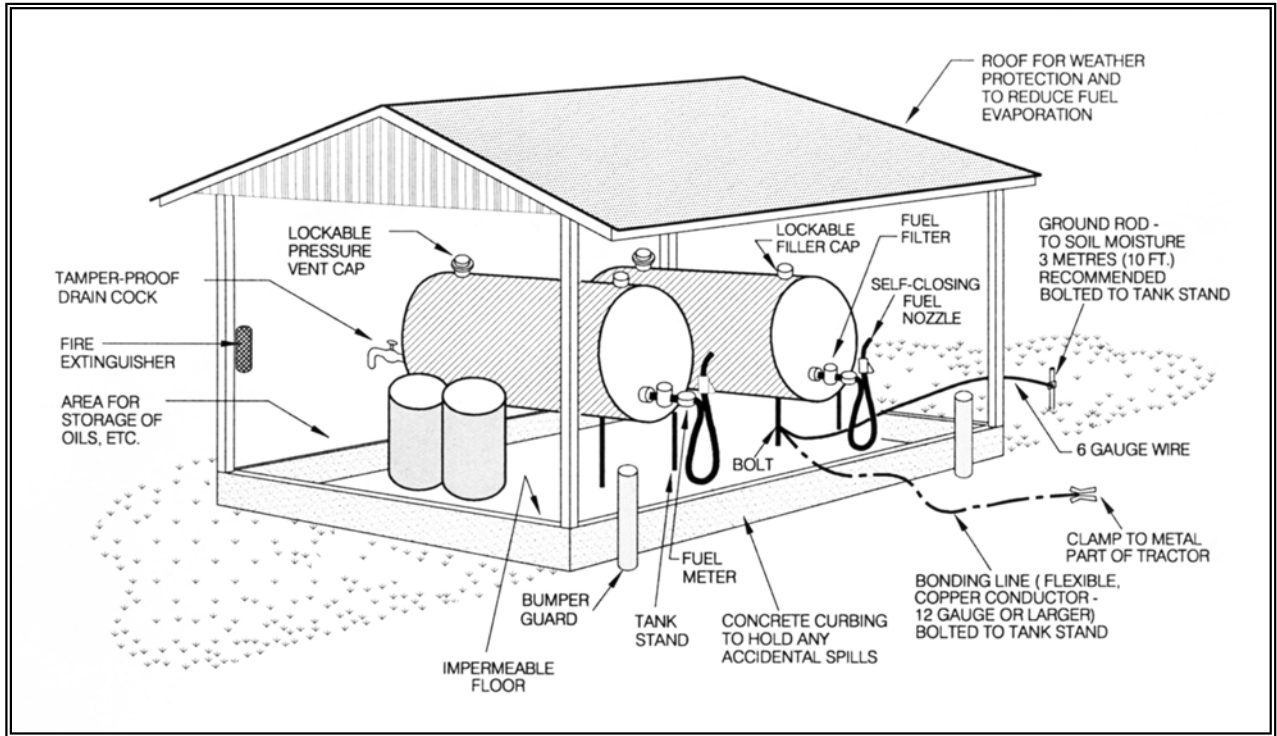


Figure 1 A Well Planned Farm Fuel Storage Site

SYSTEM MAINTENANCE

Considering the following maintenance points:

- install the tank so it is sloped slightly away from the fuel outlet and to a (tamper-proof) drain at the rear of the tank for removal of water & sediment
- flush the tank annually to remove sediment and water (dispose of material in acceptable manner)
- use a tank fuel filter to prevent tank contamination from entering equipment
- allow 24 hours after a tank fill up or fuel move to let tank sediment resettle before refueling, and/or install a good quality fuel filter
- use a fuel meter in combination with a fuel log to establish fuel consumption rates of various tractors and farm operations
- keep the use of mobile fuel tanks to a minimum

CONTINGENCY PLAN

Develop a contingency plan (written and readily available at the oil and fuel storage site) that provides a timely and effective response to emergencies involving the release of petroleum products into the environment from:

- accidental spills, such as when transporting, storing, applying or dispensing
- release due to building fires or natural events, such as forest fires, floods, or earthquakes, or due to vandalism

FUEL STORAGE LOSSES

An often overlooked aspect of fuel storage is fuel loss due to evaporation. Fuel evaporation during storage is an environmental concern and a farm financial loss. Losses due to evaporation depend on the:

- type of fuel
- type of storage
- fuel storage temperature
- duration of storage

Evaporation losses, which increase with higher temperatures, are much greater for gasoline than for diesel fuel (gasoline is more volatile). Gasoline evaporation losses are significant even during winter because of the additives in winter fuel.

Evaporation from aboveground tanks is due to heating of the tank by the sun which causes the fuel to volatilize and vent to the atmosphere. Underground tanks have low evaporation losses but are generally not used on farms due to the installation costs, especially with the environmental protection required. Double-walled tanks are becoming available that have built-in leakage containment and reduced evaporative losses.

Fuels may be stored for up to a year and still be usable. However, such long duration storage is not usually recommended as a reduction in fuel quality can be expected. Also, the chance of fuel contamination from moisture condensing within the tank increases with time.

Table 1, below, shows summer evaporation losses reported from a 1200-litre (265 Imperial gal) aboveground gasoline storage tank, as well as losses from underground and doubled-walled tanks for comparison. Four methods to reduce fuel evaporation losses are apparent:

Table 1 EVAPORATION LOSSES FROM 1200 LITRE (265 Imperial gal) ABOVEGROUND GASOLINE STORAGE TANK ¹

Tank Conditions		Evaporation Lost per Summer Month	Percent of Full Tank Lost
Dark tank	in sun	38 Litres	3.2 %
White tank	in sun	23 Litres	1.9 %
Dark tank	in sun with pressure vent cap	21 Litres	1.8 %
White tank	in sun with pressure vent cap	9 Litres	0.8 %
Dark tank	in shade	9 Litres	0.8 %
² White tank	in shade with pressure vent cap	5 Litres	0.4 %
<i>for comparison purposes:</i>			
<i>underground tank</i>		<i>less than 4 Litres</i>	<i>0.3 %</i>
³ <i>double-walled aboveground tank</i>		<i>losses similar to underground tank</i>	

¹ reported from University of Nebraska, 1981

² economical and environmental choice

³ double-walled tanks also have built-in spill containment



Step 1. Paint the Tank. The use of reflective paint (silver or white) will reduce losses by up to 40 percent over a dark tank. A good coat of paint will also reduce rusting of the tank



Step 2. Use a Pressure Vent Cap. Direct venting of the tank fumes are restricted until a slight pressure has built up in the tank, reduces losses a further 50 %. A painted and pressure-vented tank has 75 % less evaporation losses than a dark tank. These two improvements should be considered standard for all farm fuel tanks, especially gasoline storage tanks.



Step 3. Shade the Tank. A painted and pressure-vented tank in the shade further reduces losses by over 40 %. A simple roof over the tank will provide complete shading, as well as reduce weathering of hoses and valves, provide storage for lubricants and solvents and provide cover from the weather while refueling.

Or,Use a Double-walled Tank. While more expensive than other tanks, when replacing a tank, consider a double-walled tank for spill containment and reduced evaporation losses.

USED OIL, FILTERS, AND CONTAINERS

Used oil, oil filter and container disposal is an environmental concern regulated by regulations under the *Environmental Management Act*. These items are considered “special wastes” under the *Hazardous Waste Regulation*. This regulation prohibits the disposal of special wastes into landfills or municipal sewers. Spreading used oil onto land as dust control is not an appropriate disposal method. Recycling is the preferred option for both used oil and oil filters.

The *Post-Consumer Residual Stewardship Program Regulation* requires sellers of lubricating oil to accept the return of waste lubricating oil at no charge (lubricating oils include typical farm oils). The used oils must be kept free of water and solvents and should be put into clean containers. A simple way to ensure this is to return the used oils in the plastic pails they were received in, also ensuring that the pails are recycled.

Recycling is available for waste oil, oil filters and containers by phoning **BC Used Oil Recycling Line** (1-866-322-8662), or go to their web site to locate the closest facilities:

www.usedoilrecycling.com

FOR FURTHER INFORMATION CONTACT

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