

Requirements for Underground Petroleum Storage Tank Systems at “Class B” Locations

The problem of inadequate underground petroleum storage facilities prompted past changes to The Hazardous Substances and Waste Dangerous Goods Regulations. These changes incorporated a deadline extension for the upgrading of all new and existing underground petroleum storage tank systems located at Class "B" sites. Sites of moderate environmental sensitivity are considered Class "B" locations.

Operators of such underground storage systems are required to upgrade their facilities by December 31, 1997, or until the tank in question is known to be 17 years old, whichever comes last.

What is Site Classification?

To make construction requirements under the regulations more fairly reflect each individual situation, a system of site classification has been devised. Saskatchewan Environment staff look at a number of factors, including depth to ground water, soil texture and profiles, distance to wells, surface water and residences. Contact the department to find out the classification of your particular site.

Before You Begin

Before you begin any construction or upgrading, you must get approval from the department.

What are the Requirements?

By December 31, 1997 or a tank system age of 17 years, underground petroleum storage tank systems at Class "B" locations must meet the following standards:

Tank Construction

Single-wall tanks which meet the following specifications are acceptable:

- ULC/CAN4-S603 Steel Underground Tanks
- ULC/CAN4-S615 Fibreglass Reinforced Plastic Underground Tanks

All underground tanks are to be cathodically protected, by either sacrificial anodes or impressed current systems. (see below for more details on these)

Tank Location

Tanks shall be located at least 1 metre from a building or street line, 1.5 metres from other property lines or 600 mm from adjacent tanks.

Piping

Single-wall piping which meets the following specifications is acceptable.

- API-5L or CAN/CSAZ245.1-M, Steel Line Pipe
- ASTM A53, Steel, Black and Hot Dipped, Zinc-Coated Welded and Seamless
- ULC-C107, Fibreglass Reinforced Plastic Pipe
- ULC-C107.4-1993, Ducted Flexible Piping



All steel underground piping requires cathodic protection.

Leak Detection

Monitor wells, one more than the number of tanks, installed within the tank bed backfill are required (see Figure F on reverse). Monitor wells may have to be equipped with hydrocarbon vapor detectors and audible alarms at some locations.

Note: Owners of metered steel underground tank systems are required to perform on-going leak detection by means of Statistical Inventory Reconciliation beginning no later than December 31, 1995, unless both the tanks and piping have been cathodically protected. Monitor wells must be installed by December 31, 1995 for unprotected underground steel stand-by and heating oil tanks so that leak detection monitoring can be performed on an annual basis. A separate information guide is available on Statistical Inventory Reconciliation.

Other Requirements

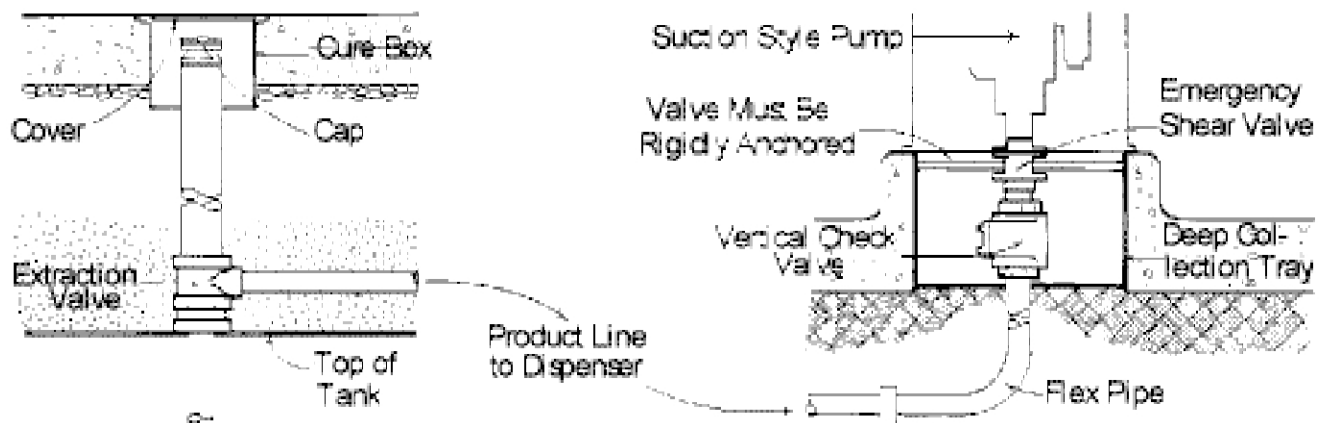
Tanks filled with hoses equipped with tight-fit couplings need a transfer spill prevention system (Figure E) or an overflow protection system (Figure D) by December 31, 1997.

Tanks filled with hoses with working automatic shut off nozzles need a transfer spill prevention system (Figure E) by December 31, 1997. As well, all systems require:

- a drip collection tray under each dispenser (Figure B) by December 31, 1997
- an in-line vertical check valve immediately beneath each product pump on suction pump systems (Figure B)
- Corrosion monitoring terminals for underground steel tanks and piping by December 31, 1997 or 17 years
- Prior to use, the system must be tested for leaks and as-built drawings must be submitted to the department.

Any contaminated soil discovered during upgrading must be removed and dealt with according to departmental guidelines.

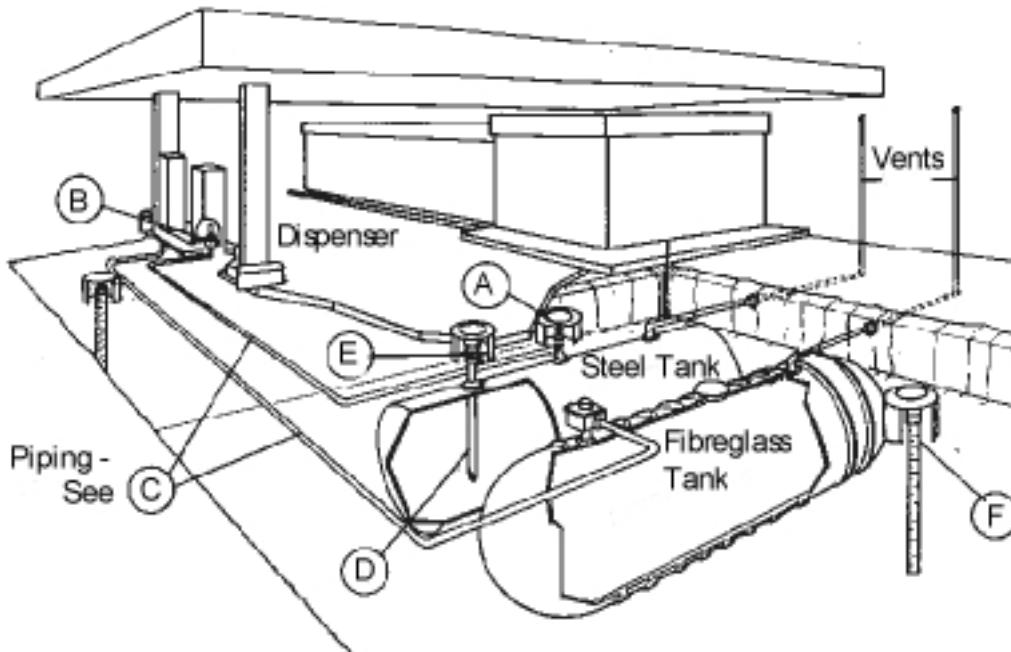
Overview of Storage Tank Systems at Class "B" Locations



A Extractor Valve at Suction Line

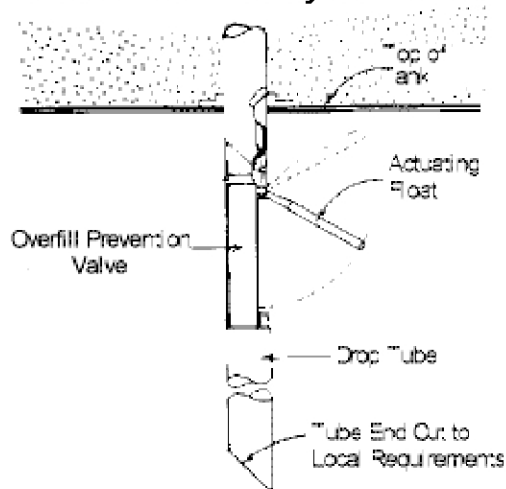
B Vertical Check Valve & Shear Valve at Pump

C Piping Systems

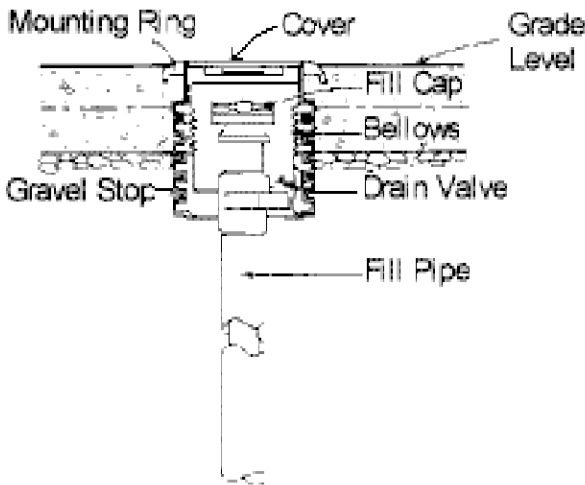


- Materials for piping systems containing flammable or combustible liquids shall be suitable for the maximum anticipated working pressures and operating temperatures and for the chemical properties of the contained liquid.
- All exposed and underground piping, couplings, flanges, and bolts for flammable liquids or combustible liquids shall be protected where necessary against external corrosion.
- Welded joints in piping systems are preferred over threaded or flanged joints.
- In the design of flammable or combustible liquid piping systems, provision shall be made for thermal expansion and contraction.
- Flexible hose connectors conforming to CAN/ULC-S633-M "Flexible Underground Hose Connectors for Flammable and Combustible Liquids" may be used where necessary in systems carrying flammable or combustible liquids to prevent excessive stresses resulting from vibration, settling or temperature changes. A swing joint system for making connections is acceptable, but a union system is not.

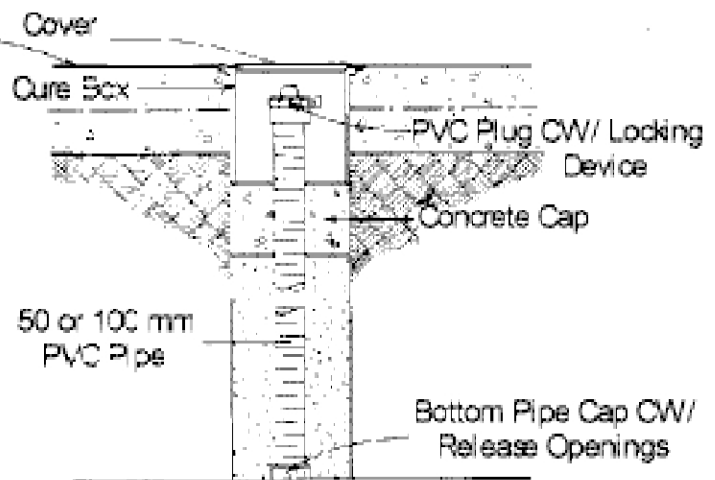
D Overfill Protection System-Floater Valve



E Transfer Spill Prevention System



F Monitor Well



General Note: Cathodic Protection

- Corrosion can rarely be stopped, but Cathodic Protection will allow corrosion to be effectively removed from the pipeline. This is accomplished by installing anodic materials in the soil, and connecting them to the pipeline in such a manner as to create an electrochemical cell with the pipeline the cathode - hence the name "Cathodic Protection"
- The minimum criteria for achievement of complete cathodic protection of any buried steel structure is the achievement of a minimum 0.85 volt potential of the structure with respect to a copper-copper sulphate halfcell. This means that if the structure being measured indicates a voltage of -0.95 volts, it is protected, but if it indicated a voltage of -0.75 volts, complete protection is not achieved.
- There are essentially two types of Cathodic Protection Systems:
 - (1) Sacrificial System - advantage is taken of the voltage difference between metals. The limiting factor in utilizing a sacrificial system is that a relatively small current can be produced per anode. Depending upon this current, the anode eventually is consumed, and must be replaced.
 - (2) Impressed current system - the basic difference between the sacrificial and the impressed current systems is that a power source is placed between the structure and the anodes.