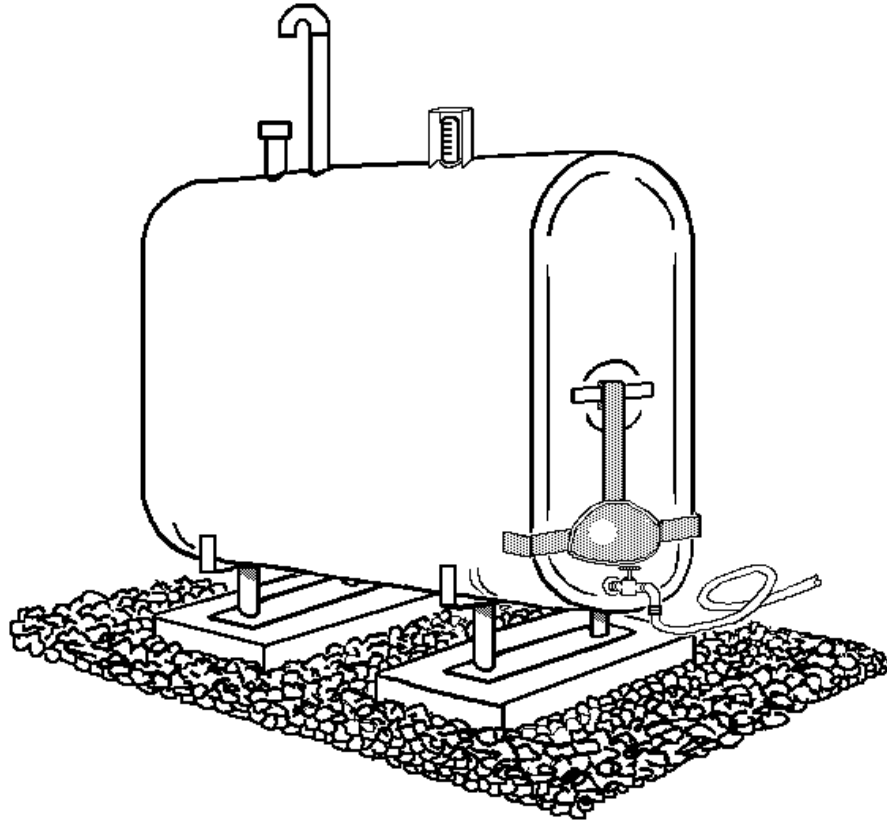


**SYSTEM INSTALLATION
AND INSPECTION MANUAL
HEATING OIL STORAGE TANK SYSTEMS**



GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
DEPARTMENT OF ENVIRONMENT

POLLUTION PREVENTION DIVISION
PETROLEUM STORAGE AND MANAGEMENT SECTION

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AND INSPECTION MANUAL
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INTRODUCTION

This manual has been prepared in an effort to clarify existing requirements and further define additional requirements. The implementation of the requirements of this manual is being done to safeguard the quality of the environment in which all such heating oil storage tank systems must exist. This manual will provide guidance to a person installing or altering a heating oil storage tank system. Adherence to these, and other, requirements is a necessity to both protect the environment from preventable heating oil leaks and to obtain and maintain the registration of a system. Although anyone is permitted to conduct installation and alteration activities, including those described in this manual, it should be understood that a subsequent inspection of the work, by a licensed inspector, will be required.

1) Requirements for Installation of Heating Oil Storage Tank Systems

1.1) Aboveground:

1.1.1) A steel aboveground heating oil storage tank shall be installed:

- a) bearing a metal label in accordance with Section 6 of CAN/ULC-S602-1992, "Standard for Aboveground Steel Tanks for Fuel Oil and Lubricating Oil" as amended; or
- b) bearing a metal label in accordance with Section 3 or 4, as applicable, of CAN/ULC-S643-1990, "Standard for Aboveground Shop Fabricated Steel Utility Tanks," as amended.

1.1.2) The nominal steel sheet used in the fabrication of these tanks shall be at least 14 gauge thick. Steel tanks made from thicker materials, 12 gauge, are available and their use is strongly encouraged.

1.1.3) A non-metallic aboveground heating oil storage tank shall be installed bearing a label in accordance with Section 5 of ULC/ORD-C80.1-2000 "Aboveground Non-Metallic Tanks for Fuel Oil," as amended.

1.1.4) Where the ground has been disturbed recently, or is otherwise at risk for settling, an aboveground heating oil storage tank shall be installed on a prepared bedding, designed to bear the gross weight of the tank filled with product. The tank's support legs or tank cradle must be installed on a solid base such as a concrete floor, a concrete pad or reinforced patio blocks (see Figure 1).

The patio blocks shall be at least 600 mm X 300 mm X 50 mm and be reinforced such that the blocks may crack but not break apart. A cracked reinforced patio block shall be replaced as soon as possible. A cracked reinforced patio block shall not be permitted to remain in place under a new or replacement tank. Where the tank legs are more than 200 mm (8 in.) high, tank leg support brackets shall be used however their use is recommended in all situations.

1.1.5) An outside aboveground heating oil storage tank system:

- a) shall not block doorways or windows, including basement windows;
- b) shall not have the tank placed in intimate contact with a wall or any other structure since leaves and other organic matter can accumulate and cause external corrosion of the tank. A minimum clearance of 50 mm (2 in.) is required;
- c) shall, for an end outlet tank, be provided with protection for the product supply valve by using a tank outlet protector;
- d) shall have the product lines protected from damage by running them along the edge of the wall and/or by placing a suitable impact resistant cover over them;
- e) shall, for a supply line from an end outlet tank, incorporate provisions for expansion, contraction, jarring, vibration, settling, frost heaving and other movement of the line. Suitable arrangements include, but are not limited to, the use of a horizontal loop or an 'S' shape in the line between the tank and the wall;
- f) should be located at least 1.5 m (5 feet) from a property line;
- g) should be protected from vehicular impact where the tank is located in or near a driveway or car-port;
- h) should not be located directly under the eave of a house where it may be subject to falling icicles or snow or increased external pitting from dripping water; and
- i) should be located a minimum of 30 m (100 ft.) from a well. Where this is not practical, a secondarily contained system should be considered.

1.1.6) An inside aboveground heating oil storage tank system:

- a) shall not exceed 230 L (50 gallon) capacity where the tank is located above the lowest storey, cellar or basement;
- b) shall not block doorways, windows or hallways;
- c) shall be located at least 1.5 m (5 feet) from any fuel-fired appliance, unless it is completely shielded from the appliance by a wall of non-combustible construction;
- d) shall, for an end outlet tank, be provided with protection for the product supply valve;
- e) shall have the product lines protected from damage by running them along the edge of the wall and/or by placing a suitable impact resistant cover over them;
- f) should not have the tank placed in intimate contact with a wall. A minimum clearance of 50 mm (2 in.) is recommended; and
- g) should be protected from vehicular impact if located in a garage.

- 1.1.7) A tank outlet protector:
- a) shall be of durable construction;
 - b) shall attach/fasten to the tank with, if necessary, materials meeting (a);
 - c) shall be readily removable to allow easy access for valve maintenance or repair;
 - d) shall as viewed from above, completely cover an end outlet valve;
 - e) should be of non-combustible material; and
 - f) should not provide a step or surface to stand on.

1.2) Underground:

- 1.2.1) A steel underground heating oil storage tank shall be installed bearing a metal label in accordance with Section 4 of CAN/ULC-S603-1992, "Standard for Steel Underground Tanks for Flammable and Combustible Liquids" and shall be cathodically protected in accordance with CAN/ULC-S603.1-1992 "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids" as amended.
- 1.2.2) A fibreglass underground heating oil storage tank shall be installed bearing a metal label in accordance with Section 6 of ULC-S615-1998, "Standard for Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids" as amended.
- 1.2.3) Only double walled, or otherwise secondarily contained, underground tanks shall be installed. The interstice of such tank installations shall be constantly monitored for the presence of hydrocarbons or water which may indicate a leak. The monitoring device shall be installed in such a manner that it visually or audibly alerts the tank owner of the presence of a leak.
- 1.2.4) An underground heating oil storage tank system shall be located in conformance with the following:
- a) the tank shall be at least
 - (i) 1.5 m (5 ft.) from a property line; and
 - (ii) 1 m (39 in.) from a building;
 - b) the product lines shall be secondarily contained in accordance with the requirements of:
 - (i) ULC/ORD-C107.19-1992, "Secondary Containment of Underground Piping for Flammable and Combustible Liquids"; or
 - (ii) ULC/ORD-C107.4-1992, "Ducted Flexible Underground Piping Systems for Flammable and Combustible Liquids".

2) Fill and Vent Piping for Heating Oil Storage Tank Systems

- 2.1) The fill and vent pipe material shall be of either steel or galvanized construction.
- 2.2) A fill pipe shall not be less than 50 mm (2 in.) nominal inside diameter.
- 2.3) Cross-connected tanks provided with a single fill pipe, shall have the fill pipe connected to the first tank (see Figure 2).
- 2.4) The size of the cross-connected fill pipe shall not be less than the size of the fill pipe (see Figure 2).
- 2.5) The fill pipe of an outdoor tank shall be 50 mm (2 in) or higher.
- 2.6) The inlet to the fill pipe of a tank shall be at least 300 mm (12 in) above the elbow, in the event that an elbow is used in the fill pipe.
- 2.7) The inlet to the fill pipe shall be located outside buildings, not be less than 610 mm (2 ft.) from any building opening such as a doorway, window or intake duct and be provided with a metal cover.
- 2.8) Threaded joints in fill and vent piping shall be made fuel oil-tight using joint compound or tape conforming to CAN/ULC-S642-M, "Compounds and Tapes for Threaded Pipe Joints."
- 2.9) Vent pipes shall not be less than:
 - a) 32 mm (1¼ in.) nominal inside diameter; or
 - b) 38 mm (1½ in.) nominal inside diameter where two or more tanks share a cross-connected vent pipe.
- 2.10) A cross-connected vent pipe shall be connected to the tops of both tanks (see Figure 2).
- 2.11) The vent pipe shall:
 - a) be installed to drain toward the tank;
 - b) not extend into the tank more than 25 mm (1-in.); and
 - c) be connected to a vent alarm.
- 2.12) The vent pipe outlet shall, in the case of an indoor tank, terminate to open air outside at an elevation of at least 2 m (79 in.).

- 2.13) The vent pipe outlet of any tank shall terminate at an elevation which is at least 150 mm (6 inches) above the inlet to the fill pipe and not less than 610 mm (2 ft.) from any opening such as a doorway, window or intake duct and be provided with a weatherproof vent cap.

3) Product Piping for Heating Oil Storage Tank Systems

- 3.1) The product pipe material shall be new and shall be either wrought iron, steel, or brass pipe: or brass, copper, or steel tubing. Copper tubing shall be a minimum of type 'L'.
- 3.2) Nipples used to attach the product delivery valve to a tank shall be a minimum of schedule 40 black iron and shall be a maximum of 75 mm (3 inches) in length.
- 3.3) Valves used to control the delivery of product from a tank shall be of brass construction with a minimum rating of 850 kPa (125 PSI) and shall be either a gate or ball type, certified for use with oil, and be located as close as practicable to the tank shell.
- 3.4) Threaded joints in the product piping shall be made fuel oil-tight using joint compound or tape conforming to CAN/ULC-S642-M, "Compounds and Tapes for Threaded Pipe Joints."
- 3.5) All connections in copper piping and tubing shall be made fuel oil-tight using a flared joint.
- 3.6) Product filters, where used, shall:
- a) be installed inside a building; and
 - b) have sufficient clearance to allow for maintenance, replacement or repair.
- 3.7) Burying a product line in concrete is not recommended. If unavoidable, the product line must be placed in a continuous run of non-corrodible petroleum resistant tubing when buried under, or otherwise placed in direct contact with, a concrete floor. The flexible petroleum resistant tubing must protrude at least 5 cm (2 in.) above the concrete floor.
- 3.8) Product lines shall not be less than 10 mm (3/8-in.) outside diameter. If located outside, 13 mm (1/2 in.) minimum outside diameter is recommended to reduce the potential for freezing.

4) Registration of Existing Heating Oil Storage Tank Systems

- 4.1) The registration of an existing tank system requires that an inspection, by a licensed inspector, be conducted and any deficiencies found are to be corrected for the storage tank system to be registered.

- 4.2) Deficiencies, for the purpose of registration, are technical issues which vary from the usual requirements of the regulations, CSA-B139 and this Manual.
- 4.3) All deficiencies shall be corrected before registration is permitted. There are some issues which can be looked at differently for existing tanks and these items may remain uncorrected if their correction is not feasible. Such items include the requirements of 1.1.5(b), 1.2.4(a), 3.2, 3.3 and 3.7.

5) Registration and Alteration of Heating Oil Storage Tank Systems

- 5.1) Sections 5 and 6 of the regulations require that new, altered and existing systems must be registered. Registration may mean different things depending upon the situation such as:
 - a) For a new or replacement system, registration can occur once the system has been inspected by a licensed inspector and found to comply with the regulations and the requirements of CSA-B139, the tank manufacturer's instructions and this manual. Any deficiencies found as a result of this inspection will have to be corrected before the registration can be completed.
 - b) For an existing system that is being registered, registration can occur once the system has been inspected by a licensed inspector and found to comply with the regulations and the requirements of CSA-B139, the tank manufacturer's instructions and this manual. Any deficiencies found as a result of this inspection will usually have to be corrected before the registration can be completed. It should be noted that an existing system that has a storage tank whose age is already at or beyond the age limit stated in Section 15 will not be registered. Such a storage tank can be removed and/or replaced at any time but must be removed and/or replaced by March 31, 2007.
 - c) For a system that has already been registered and which has subsequently been altered, an actual registration will not occur however that part of the system that was altered will have to be inspected by a licensed inspector to determine whether the system still complies with the regulations and the requirements of CSA-B139, the tank manufacturer's instructions and this manual. Any deficiencies found as a result of this inspection will have to be corrected for the system to maintain its registration.
 - d) For an existing system that has not yet been registered, if such a system is altered then it will have to be registered. Registration can occur once the system has been inspected by a licensed inspector and found to comply with the regulations and the requirements of CSA-B139, the tank manufacturer's instructions and this manual. Any deficiencies found as a result of this inspection will usually have to be corrected before the registration can be completed.

- 5.2) To clarify the issue of timing, with respect to the four situations described in 5.1, one should note that:
- a) For the situation described in 5.1(a) although no time frame is specified within which the registration must occur, the registration of the system must normally be completed before any heating oil can be put into the heating oil storage tank system.
 - b) For the situation described in 5.1(b) the registration of the system must be completed on or before March 31, 2007. If any deficiencies are present which have to be addressed and the correction of such deficiencies involves an alteration of the system, as described in 5.3(a), then all deficiencies must be corrected and the system must be registered at that time. Again, this must be completed on or before March 31, 2007 however if the deficiency is of a substantive nature then it should be corrected in short order.
 - c) For the situation described in 5.1(c) that part of the system that has been altered must be inspected by a licensed inspector within 30 days of the alteration having taken place. If any deficiencies are present their correction shall be completed and the system reinspected by a licensed inspector within 30 days of the inspector's first deficiency report being presented to the system owner. If deficiencies are still found during this second inspection the system's registration shall be temporarily revoked, the registration tag shall be removed and the system shall be emptied and not refilled until such time as the system has been inspected and found to comply with the regulations and the requirements of CSA-B139, the tank manufacturer's instructions and this manual, and has its registration reinstated and its registration tag reapplied to the vent.
 - d) For the situation described in 5.1(d) the registration of the system must normally be completed before any heating oil can again be put into the heating oil storage tank system.

It should be noted that an existing system that has a storage tank whose age is already at or beyond the age limit stated in Section 15 will not be registered. In such a situation, the storage tank shall be replaced.

The entire system must be inspected by a licensed inspector within 30 days of the alteration and/or storage tank replacement having taken place. If any deficiencies are present their correction shall be completed and the system reinspected by a licensed inspector within 30 days of the inspector's first deficiency report being presented to the system owner. If deficiencies are still found during this second inspection the system shall be emptied and shall not be refilled until such time as the system has been inspected and found to comply with the regulations and the requirements of CSA-B139, the tank manufacturer's instructions and this manual, and has been registered. Again, the registration of the system must normally be completed before it can be filled (in the case of a replacement tank) or refilled (in the case of an existing tank).

- 5.3) For the purpose of dealing with potential problems which arise in 5.2(a),(c) and (d) and in accordance with Subsection 17(2) of the regulations, the administrator may vary the time period to meet the registration requirement. Such a variance could allow the system to be filled prior to it being registered which would still be required within a period of time specified by the administrator.

- 5.4) Since the word “alter” has a very inclusive definition it would be helpful to tank owners and inspectors to note a number of activities which, for the purpose of the regulation, would or would not be considered as “alterations”. An “alteration” is usually, although not always, characterized by the fact that the activity can be conducted at a scheduled, normal work day, time. Activities which are not considered “alterations” are usually, although not always, characterized by the fact that the activity is more often of an “emergency”, nights and weekends, nature requiring immediate fixing. The activities contained in the following lists are provided as examples. They do not exclude other activities which may or may not be considered “alterations”. The Administrator should be contacted to determine if other specific activities would be considered “alterations”.
- a) The following activities would be regarded as “alterations” and would require registration and/or inspection by a licensed inspector:
 - (i) relocation of a tank;
 - (ii) upgrading of piping (vent, fill or product);
 - (iii) relocation of product piping;
 - (iv) upgrading, relocation or addition of a valve;
 - (v) upgrading or replacement of secondary containment; or
 - (vi) addition of a filter assembly.
 - b) The following activities would not be regarded as “alterations” and would not require registration:
 - (i) removal of a heating oil storage tank system;
 - (ii) replacement of vent, fill or product piping (same size, length, diameter and material);
 - (iii) replacement of a valve;
 - (iv) replacement of a filter assembly or parts thereof;
 - (v) replacement of a gauge or vent alarm;
 - (vi) addition of a gauge or tank valve protector; or
 - (vii) any disconnection and reconnection of product piping to the burner assembly for the purpose of burner assembly repair or maintenance.

6) Storage Tank Removal and Replacement

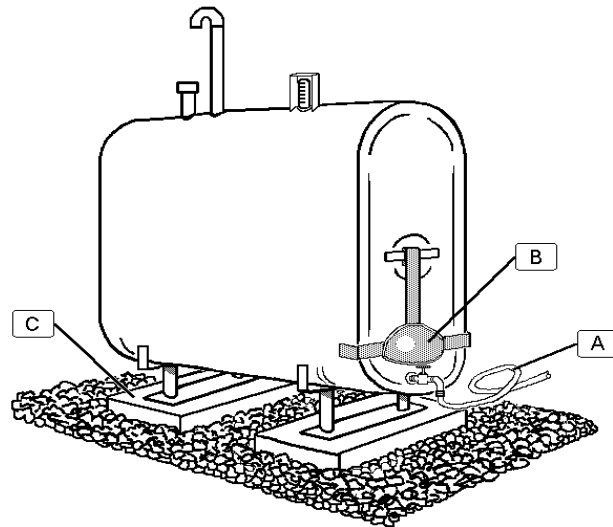
- 6.1) When a storage tank is being removed from service most of the fuel may be pumped out and placed in another fuel storage tank for later use. The fuel shall be pumped out to a level no lower than 200mm (8in) from the bottom of the tank. This should be done carefully to ensure that no contaminants from the sludge at the bottom of the tank are drawn into the suction line. The fuel then remaining in the tank shall be pumped off for appropriate disposal. If safe to do so, the tank shall then be cut in half and the residual sludge in the bottom of the tank shall be thoroughly removed for appropriate disposal. Finally, the tank itself shall be removed for appropriate disposal (usually recycling).

7) **Updates & Contacts:**

- 7.1) This manual was first produced on April 16, 2002. Given the nature of the information in the document and the fact that it may be appropriate, from time to time, to provide additional information or guidance on practical, technical or regulatory issues, any person using this document should check to see that they are referring to the latest version. That can be done by calling our 1-800 number. The manual is also available on the Government Website - http://www.gov.nf.ca/env/Env/PollPrev/petroleum_storage/siim.pdf - in the Department of Environment section.

For this information or for any other questions you may have concerning the Heating Oil Storage Tank System Regulations you can call the toll-free number, 1-800-563-6181 or locally call 729-0948 or 2556.

Figure 1. Aboveground Installation



- Notes:**
- A - Horizontal Loop**
 - B - Tank Outlet Protector**
 - C - Reinforced Patio Block**
(600 mm x 300 mm x 50 mm)

Figure 2: Cross-Connected Tanks

