

# New Hampshire Department of Environmental Services

## Best Management Practices for the Installation and Upgrading of On-Premise-Use Heating Oil Tanks

### Why Are Best Management Practices Important?

The State provides cleanup cost funding to heating oil tank owners who do not have private insurance coverage. The primary condition for receiving state cleanup cost funding, and avoiding significant financial liability, is that heating oil tank owners ensure their oil tank systems are properly installed, operated and maintained to prevent spills. Thus, the Department of Environmental Services has established best management practices (BMPs) for the installation and upgrading of on-premise-use heating oil tanks. "On-Premise-Use" (OPUFs) heating oil tanks are those storing heating oil for heating buildings on the property, and not for purposes of sale. The majority of tanks discussed in the BMPs are the familiar 275-gallon tanks that serve private residences.

### BMPs Apply To Non-Regulated Heating Oil Tanks

The national standard for heating oil systems is National Fire Protection Association (NFPA) Chapter 31, "Installation of Oil-Burning Equipment" (2006 edition). This standard is adopted within the State Fire Code (SFC) by the Department of Safety, under Administrative Rule Saf-C 6012. All heating oil tank installations in New Hampshire must meet NFPA 31 and SFC requirements. The DES BMPs augment NFPA 31 and the SFC with additional recommendations that are specific to preventing oil spills or leaks.

Heating oil tanks covered by the BMPs are those for which state cleanup funding may be available, as defined in RSA 146-E: 2, III. They include both aboveground and underground tanks that are *not* subject to DES regulations, i.e., either Administrative Rule Env-Wm 1402 "*Control of Aboveground Petroleum Storage Facilities*" or Env-Wm 1401 "*Underground Storage Facilities*." Regardless of system location or configuration, these BMPs cover the complete tank and piping installation of OPUFs from the fill pipe to the connection with the furnace, boiler or other oil burning heating device.

## **1.0 TANK FABRICATION STANDARDS AND INSTALLATION REQUIREMENTS**

### 1.1 STANDARDS FOR TANK DESIGN AND FABRICATION

Heating oil storage tanks must conform to the minimum design and fabrication standards of NFPA 31, Chapter 7.2.9, as follows:

- (a) Underwriters Laboratories, Inc. UL 142, *Standards for Steel Aboveground tanks for Flammable and Combustible Liquids*; UL 58, *Standard for Steel Underground Tanks for Flammable and Combustible Liquids*; UL 80, *Standard for Steel Inside Tanks for Oil Burner Fuel*; UL 1316, *Standard for Glass-Fiber Reinforced Plastic Underground Storage Tanks for Petroleum Products*.
- (b) American Petroleum Institute, Standard API 650, *Specifications for Welded Steel Tanks for Oil Storage*.
- (c) American Society for Testing and Materials, ASTM D 4021, *Standard Specification for Glass-Fiber Reinforced Polyester Underground Petroleum Storage Tanks*.

### 1.2 GENERAL HANDLING, STORAGE AND INSTALLATION PROCEDURES

- (a) Tanks and all oil heat equipment should be installed in accordance with the manufacturer's requirements and instructions. Tanks should be transported and handled in a way to minimize the possibility of damage. Minor damage such as scratches should be repaired according to manufacturer's instructions before the tank is installed. If damage is such that it affects the integrity of the tank, it should not be installed.

- (b) Tanks in storage before being installed should have all openings plugged. Additionally, whenever possible tanks should be stored indoors or in a weatherproof enclosure. It is critical that all water, ice and other contaminants be removed from the tank before it is installed.

## 2.0 OUTDOOR TANKS

Tanks should be installed indoors whenever possible. For tanks located outdoors, special considerations are required to prevent spills or leaks due to freezing and thawing of the soil, and damage from snow and ice.

### 2.1 LEGS AND FOUNDATIONS

- (a) Regardless of tank configuration, tanks should be mounted on steel pipe legs not exceeding 12 inches in height and fitted with threaded floor flanges at the base of each leg. Other non-threaded "feet" can be used provided they are of similar metals and are designed so that they will remain centered under the tank legs.
- (b) The flanged legs should be set on a minimum 3½ inch thick reinforced concrete pad. Reinforcement should be re-bar, mesh, or metal screening. Pads can be either pre-cast or poured in place. The length and width of the pad should be equal to or larger than the dimensions of the tank and positioned so that the entire tank sits above the pad. Prior to pad installation, all topsoil and organic material should be removed and the pad set on a bed of compacted well-drained gravel, crushed stone, coarse sand or other acceptable sub-grade.
- (c) Leg brackets that are welded to the bottom of a tank by the manufacturer should not be used as legs and not rest directly on the concrete pad. Some tanks, such as UL 142 tanks, are designed and manufactured to be supported by skids, cradles, saddles, or other similar supports. These supports should be placed on an acceptable concrete pad as described above. In all cases, there should be a minimum of 4 inches of clearance from the bottom (belly) of the tank to the top surface of the concrete pad.

### 2.2 OUTDOOR TANK LOCATION

Outdoor tanks and piping should be located to prevent damage from falling snow or ice. To meet this requirement, the system should be:

- (a) Located at the gable end of a building, or
- (b) Fully covered by a sturdy, well constructed roof that meets or exceeds building code requirements for snow load, or
- (c) Located so that the tank and any unsupported piping are not placed within 18 inches of the drip line of the eaves.
- (d) Other considerations to minimize the risk of physical damage to the tank and associated components should be taken into account when locating an outdoor tank. These may include vehicular traffic, overhanging tree limbs, foot traffic areas, and snow storage areas from plowing and roof shoveling.

### 2.3 OUTDOOR TANK INSTALLATION

- (a) It is strongly recommended that outdoor tanks be installed with a top-draw supply line system. Such a configuration can reduce the risk of a complete loss of oil in the event of a failure anywhere from the supply line connection at the tank to the oil burner.
- (b) Filters should not be located where they can freeze, or be struck by falling snow, ice or other objects. If an outdoor filter must be used, the filter and tank connections should be protected by a rigid, permanent cover that is attached to the pad, legs, and/or tank, or the filter and

connections should be turned such that it is fully protected under the tank. In all installations, filters should be accessible for periodic maintenance.

- (c) Annual service maintenance should be conducted by a professional service technician to remove any accumulated water and debris.
- (d) The tank should be pitched toward the bottom outlet with a slope of not less than ¼ inch per foot. If a top-draw system is used, the bottom tank plug should be fitted with a drain valve for water removal, and be designed so the handle can be locked or removed.
- (e) The use of light colored outdoor tanks should be considered to minimize condensation and reduce the risk of interior corrosion.

### **3.0 INDOOR TANKS**

- (a) Indoor tanks should be located on a concrete floor or a concrete pad as described in Section 2.1 above.
- (b) Section 2.1 describing tank legs and flanged feet, and Section 2.3(d) regarding tank pitch also applies to indoor tanks.

### **4.0 OIL SUPPLY AND RETURN PIPING**

- (a) Corrosion resistant supply (and return) piping such as PVC, polyethylene, or equivalent coated copper should be used for all indoor and outdoor installations. The entire length of the supply (and return) pipes(s) or lines should be continuous from the tank to the furnace whenever possible. State fire code Administrative Rule Saf-C 6012.02, requires that oil supply and return lines be continuous with no splices when installed in buildings under concrete, sub-floors, or earth surfaces.
- (b) NFPA 31, Chapter 8.2.9 (2006 edition), requires that piping be substantially supported and protected against physical damage. A rigid conduit or other acceptable protection should be used in areas exposed to foot traffic, ice and snow accumulation/removal, etc.
- (c) At least one horizontal coil of line should be provided at both the tank and furnace ends to provide for movement and to facilitate future service as necessary.
- (d) NFPA 31, Chapter 8.2.8.4 (2006 edition), prohibits the use of compression fittings. To minimize cracking and subsequent water infiltration, frost-proof nuts should be used in all outdoor applications.

### **5.0 FILL & VENT PIPING, GAUGES, ALARMS, AND CAPS**

NFPA 31 contains detailed and specific fill and venting requirements for many different circumstances and configurations. While general requirements are provided below, please reference the NFPA standard or contact your local fire department for specifics as needed.

- (a) Pursuant to NFPA 31, Chapter 8.3 (2006 edition), the fill pipe shall terminate outside the building not less than 24 inches from any building opening and be configured in a manner that minimizes spills when the fill hose is disconnected. It shall be equipped with a tight metal cover designed to discourage tampering and be identified as a fuel-oil-fill cover.
- (b) Pursuant to NFPA 31, Chapter 8.7 (2006 edition), tanks shall be equipped with proper atmospheric venting. Indoor tanks shall be equipped with vent pipes that terminate outside the building not less than 24 inches from any building opening. Inside and outside tanks with a capacity of 660-gallons or less shall have a vent with a minimum inside diameter of 1¼ inches.

To prevent over pressurization of the tank, the vent pipe shall have a diameter equal to or greater than that of the fill pipe.

- (c) Pursuant to NFPA 31, Chapter 8.8 (2006 edition), all tanks shall be equipped with a method of determining the oil level in the tank. At a minimum, an audible vent whistle alarm shall be present on all tanks to determine tank filling status during a delivery. Aboveground tanks shall also be equipped with a pop-up style sight gauge or an equivalent gauge which indicates the liquid level in the tank at all times.
- (d) Risers (4 to 6 inches) should be used on fill and vent lines on outdoor tanks to extend these appurtenances above typical snow accumulation on top of a tank.

## **6.0 UNDERGROUND TANKS**

It is strongly advised that new tank systems not be installed underground. For existing systems, underground tanks and associated piping that are not secondarily contained as detailed in DES regulations Administrative Rule Env-Wm 1401 *Underground Storage Facilities*, are of significant concern and are recommended to be taken out of service as soon as practical.

## **7.0 ABANDONMENT OF TANKS AND RELATED EQUIPMENT**

NFPA 31 Chapter 7.13 (2006 edition) requires that oil storage tanks permanently removed from service meet the following criteria:

- (a) Be emptied of all contents;
- (b) Be cleaned and rendered free of combustible vapors;
- (c) Be removed from the premises or property; and
- (d) Be properly disposed in accordance with all applicable local, state, and federal rules and regulations.

Additionally, any oil, sludge, scale, water, etc., in the tank shall be disposed of properly. Contact DES to obtain the requirements and available options for the proper disposal of tanks, associated piping, and waste contents.

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