

DC FIRE & EMERGENCY MEDICAL SERVICES DEPARTMENT



FIRE PREVENTION DIVISION

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ABOVEGROUND FUEL STORAGE TANK

INSTALLATION AND MAINTENANCE REGULATIONS

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BACKGROUND

One of the main goals of the DC Fire and Emergency Medical Services Department is to protect the lives and property of the citizens and visitors of the District of Columbia. We are constantly taking new strives to ensure this priority remains first in every task that we set out to perform.

The chief of the DC Fire and Emergency Medical Services Department is the official who is designated the authority having jurisdiction (AHJ) to oversee all aboveground fuel storage tank systems in the District of Columbia. He delegates his authority to the Fire Marshal, who servers as Deputy Fire Chief of the DC Fire and Emergency Medical Services Department's Fire Prevention Division, and who is directly responsible for overseeing the installation process of these vessels and their components. This responsibility includes ensuring that owners of such vessels are maintaining them in an ongoing and safe operating capacity with proper maintenance practices.

The information contained in this manual has been compiled to better assist companies or individuals wishing to install or maintain an aboveground storage tank system within the District of Columbia. It is designed to be a reference guide and should be used to answer basic questions pertaining to the city's requirements for aboveground storage tanks.

Questions in relation to this document should be referred to the Office of the Fire Marshal, the DC Fire and Emergency Medical Services Department's Fire Prevention Division, Hazardous Materials Inspection Branch, located at 441 4th Street NW Suite 370, Wash, DC 20001. The phone number is (202) 727-1600.

Important Definitions

Authority Having Jurisdiction (AHJ)- the organization, office, or individual responsible for approving equipment, materials, or procedures.

Approved- acceptable to the authority having jurisdiction

Aboveground Tank- a tank that is installed above grade, at grade, or below grade without backfill.

Atmospheric Tank- a storage tank that has been designed to operate at pressures from atmospheric through 1.0 psig, measured at the top of the tank.

Fire Resistant Tank- a listed aboveground tank that provides fire resistive protection from exposure to a high intensity liquid pool of fire.

Low-Pressure Tank- a storage tank designed to with stand an internal pressure above 1.0 psig, but not more than 15 psig, measured at the top of the tank.

Protected Aboveground Tank- an aboveground tank that is listed in accordance with UL 2085 that consists of a primary tank provided with protection from physical damage and fire resistive protection from exposure to a high intensity liquid pool of fire.

Secondary Containment- a tank that has an inner and outer wall with an interstitial space between the walls and that has a means for monitoring the interstitial space for a leak.

Storage Tank- any vessel having a liquid capacity that exceeds 60 gallons, is intended for fixed installation, and is not used for processing.

Storage Tank Building- a roofed structure that contains storage tanks and that limits the dissipation of heat or the dispersion of flammable vapors or restricts fire-fighting access and control.

Vapor Recovery System- a system that is designed to capture and retain, without processing, vapors displaced during transfer or filling operations. Examples are balanced-pressure vapor displacement systems and vacuum-assist systems without vapor processing.

Vault- an enclosure consisting of four walls, a floor, and a top for the purpose of containing a liquid storage tank and not intended to be occupied by personnel other than for inspection, repair, or maintenance of the vault, the storage tank, or other related equipment.

Section 1: General Requirements

- 1.1 Approval must be granted by the DC Fire and EMS Department's Fire Prevention Division, Office of the Fire Marshal prior to the installation, modifications, or use of any aboveground fuel storage tank or system shall commence.
- 1.2 To properly obtain required approval, facility owners who contemplate aboveground storage tank projects shall provide a written scope of the proposed work, together with concise specifications and construction plans. These documents shall adequately describe the property and indicate the size and location of the system's components.
- 1.3 All AST materials and equipment shall be clearly specified, together with appropriate dimensions and construction details.
- 1.4 The installation of aboveground fuel storage tanks systems is a highly complex field and requires a wide range of construction knowledge and experience. Any person or persons performing such installations shall be licensed and qualified.

Section 2: General Design Standards for Aboveground Tanks

- 2.1 Aboveground fuel storage tanks within the District of Columbia shall be permitted to be of any shape, size, or type, consistent with sound engineering design.
- 2.2 Aboveground fuel storage tanks within the District of Columbia shall be designed and built in accordance with recognized engineering standards for the material of construction being used.
- 2.3 Aboveground fuel storage tanks that meet any of the following standards can be installed in the District of Columbia:
 - ❑ UL 80, Standard for Steel Inside Tanks for Oil Burner Fuel.
 - ❑ UL 142, Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids.
 - ❑ UL 2080, Standard for Fire Resistant Tanks for Flammable and Combustible Liquids.
 - ❑ UL 2085, Standard for Insulated Aboveground Tanks for Flammable and Combustible liquids.
 - ❑ API Specification 12B, Bolted Tanks for Storage of Production Liquids.
 - ❑ API Specification 12D, Field Welded Tanks for Storage of Production Liquids.
 - ❑ API Specification 12F, Shop welded Tanks for Storage of Production Liquids.
 - ❑ API Specification 650, Welded Steel Tanks for Oil Storage.

- 2.4 Aboveground fuel storage tanks within the District of Columbia shall be of steel type or of other approved noncombustible materials with the following limitation:
 - The materials of construction for tanks and their appurtenances shall be compatible with the liquid or product to be stored.
- 2.5 Metal aboveground fuel storage tanks in the District of Columbia shall be welded, bolted, or constructed using a combination of these methods.

Section 3: Site Selection for the Installation

- 3.1 In the District of Columbia, the location of aboveground fuel storage tanks with respect to property lines, public ways, and important buildings in the same area are very important and carefully observed by the DC Fire Marshal’s Office.
- 3.2 Aboveground storage tanks storing Class I, Class II, or Class IIIA Flammable and Combustible (stable) liquids and operating at pressures not in excess of 2.5 psig, shall be place on property lots located within the District of Columbia in the manner as stated in the following table:

Minimum Distance Placement Table

<u>Capacity (gal) buildings</u>	<u>Distance From Property Line</u>	<u>Distance from Public Way and</u>
275 or less	5 feet	5 feet
276 to 750	10 feet	5 feet
751 to 12,000	15 feet	5 feet
12,000 to 30,000	20 feet	5 feet

- 3.3 Individuals wishing to install aboveground storage tanks greater than the highest capacity listed above within the District of Columbia shall contact the DC Fire Marshal’s Office (The Authority Having Jurisdiction “AHJ”) for further assistance.
- 3.4 The shell-to-shell spacing between multiple above ground tanks shall be a minimum of 3 feet, but can be increased at the discretion of the DC Fire Marshal’s Office (The Authority Having Jurisdiction “AHJ”).
- 3.5 The foundation for the aboveground fuel storage tank shall be designed to support the tank plus 100% of its contents when full.
- 3.6 The aboveground fuel storage tank design shall take into consideration the type of support that is being used and the point load associated with that support.

- 3.7 Saddle supports for horizontal tanks may be constructed of steel or concrete, and must be installed on a firm stable foundation. If saddle support is made of steel and greater than 12 inches in height, a minimum two-hour fire protection rating shall be required.
- 3.8 The foundation upon which the aboveground fuel storage tank will rest upon shall be constructed of concrete, asphalt, gravel, or other stable, noncohesive materials, and must include provisions in its design to prevent leakage movement.
- 3.9 Aboveground fuel storage tank foundation designs shall include provisions for draining surface water away from the tank.
- 3.10 Aboveground fuel storage tanks shall not be located on foundations directly above underground utilities or directly beneath overhead power lines.

Section 4: Piping System Installation

General Requirements:

- 4.1 In the District of Columbia, the design, fabrication, assembly, test, and inspection of piping systems shall be suitable for the expected working pressures and structural stresses during service use.

Aboveground piping shall be threaded, flanged, or welded schedule 40 steel pipe with compatible nodular iron or steel fittings. Low melting-point materials, such as fiberglass and aluminum shall not be used on aboveground piping systems installations.
- 4.2 Piping affiliated with aboveground storage tanks where subject to external corrosion shall be fabricated from non-corrosive materials, coated, or provided with corrosion protection. Dissimilar metallic parts that promote galvanic action shall not be joined.
- 4.3 Piping systems of aboveground storage tanks shall contain a sufficient number of manual control valves and check valves to operate the system properly and to protect the immediate environment under normal and emergency conditions.
- 4.4 Piping systems of aboveground storage tanks in connection with pumps shall contain a sufficient number of control valves and check valves to control the flow of liquids properly in normal operation and in the event of physical damage or fire exposure.

- 4.5 Piping systems affiliated with aboveground storage tanks shall be located in a way that it will be protected from physical damage and excessive stresses arising from settlement, vibration, expansion, contraction, or exposure to fire.
- 4.6 The piping supports shall be protected against exposure to fire by one of the following methods:
- Draining liquid away from the piping system at a minimum slope of not less than 1% percent.
 - Provide protection with a fire-resistive rating of not less than two (2) hours.
 - Other approved methods formally approved by the DC Fire Marshal's Office (The Authority Having Jurisdiction "AHJ")
- 4.7 No portion of an aboveground storage tank piping system shall be pass through any building's airshaft, intake or discharge, at any given time during installation and after completion of said installation.
- 4.8 Aboveground storage tank piping systems shall be maintained liquid tight and shall be color-coded and clearly marked identifying the product housed (See section 8.3).

Pipe Joints:

- 4.9 The pipe joints of piping systems shall be liquid tight. Also, they shall be welded, flanged or threaded. Threaded or flanged joints shall fit tightly by using approved methods and materials for the type of joint.
- 4.10 Joints in aboveground storage tank piping systems shall be welded when they are to be located in concealed spaces with in buildings.
- 4.11 Piping shall be secured near the joint in a way to prevent damage to the fitting.

Fill Lines:

- 4.12 Pipe openings for aboveground storage tanks shall be from the top of the tank only.
- 4.13 Fill piping for aboveground storage tanks shall be provided with a means for making a direct connection to the delivery vehicle's dispensing hose, so that the delivery of fuel is not exposed to the direct air during filling operations.

- 4.14 Aboveground storage tank fill pipes shall be provided with check valves or block valves for automatic protection against backflow where the piping is arranged in such a way that backflow from the system is possible.
- 4.15 Where any portion of an aboveground storage tank's fill pipe exterior to the tank extends below the level of the top of the tank, a check valve shall be installed in the fill pipe not more than 12" from the fill hose connection.
- 4.16 The piping system of an aboveground storage tank shall be provided with an approved siphon prevention system to prevent the flow of liquid by siphon action.
- 4.17 Aboveground storage tank fill pipe connections shall be provided with a spill container having a capacity of not less than 5 gallons.
- 4.18 Aboveground storage tanks with a top fill pipe connection shall have spill containers that are noncombustible and they shall be affixed and equipped with a manual drain valve that drains directly into the primary tank.
- 4.19 Aboveground storage tanks with a remote fill pipe connection shall have a portable container of not less than 5 gallons in place of a fixed container.
- 4.20 Fill lines on aboveground storage tanks containing Class I, II, and IIIA flammable and combustible liquids, shall be located outside of buildings at a location free from sources of ignition and be a minimum of 5 feet from any building opening or property lot line and protected from damage.
- 4.21 Means shall be provided to prevent overfilling by sounding an alarm when the liquid level in the tank reaches 90 percent of capacity and by automatically stopping the delivery of liquid to the tank when the liquid level in the tank reaches 95 percent of capacity. This section shall not restrict or interfere with the proper functioning of the normal or emergency vent.
- 4.22 All fill lines on aboveground storage tanks shall be fitted with a liquid-tight cap, which shall be properly identified and closed when not in use.

Vent Lines:

- 4.23 Vent lines from aboveground storage tanks shall not be used for purposes other than venting.
- 4.24 All aboveground storage tanks vent piping shall be installed such that they drain towards the tanks without sags or traps in which liquid can collect.

- 4.25 Vent pipe outlets from aboveground storage tanks shall be located such that the vapors are released at a safe point outside of buildings and not less 12 feet above the adjacent ground level.
- 4.26 Vent pipes shall be located such that flammable vapors will not be trapped by eaves or other obstructions and shall be a minimum of 5 feet from any building opening or lot lines of properties.
- 4.27 Vent pipes shall be installed so that they drain towards the tank without sags or traps in which liquid can collect.
- 4.28 Vent pipes shall be fitted with a protective cap (mushroom style or equivalent) at the point of termination, which will prevent water and debris from entering the line and tank.
- 4.29 Stationary aboveground storage tanks shall be equipped with additional emergency venting that will release excessive internal pressure caused by exposure to fires.
- 4.30 Emergency vent lines on aboveground storage tanks containing Class I, II, and IIIA flammable and combustible liquids shall not discharge inside buildings.

Section 5: Spill Control and Secondary Containment

Dike Impounding:

- 5.1 Every aboveground storage tank in within the District of Columbia that contains a Class I, II, or IIIA liquid shall be provided with means to prevent an accidental releases of liquid from endangering buildings and adjoining property or from reaching waterways.
- 5.2 Dikes shall be designed to contain product spills and releases from the tank or tanks, piping, and associated equipment. Dikes shall contain accidental spills and prevent them from entering the ground. Uncontained spills may be ignited and cause the spread of fire or contaminate the environment.
- 5.3 Dikes shall be designed so that a slop of not less than 1 percent away from the tank or tanks is provided for at least 50 feet or to the dike base, which ever is less.
- 5.4 The capacity of the dike shall not be less than the greatest amount of liquid that can be released from the largest tank in the dike area and capable of containing 110 percent of its capacity.

- 5.5 The outside base of the dike at the ground level shall be no closer than 10 feet to any property line that is or can be built upon.
- 5.6 Wall of the dike shall be of earth, steel, concrete, or solid masonry designed to be liquid tight and to withstand a full hydrostatic static head test.
- 5.7 Earthen dike walls 3 feet or more in height shall have a flat section at the top not less than 2 feet wide. The slope of an earthen wall shall be consistent with the angle of repose of the materials of the material of which the wall is constructed. Steel dikes may be an integral part of the tank.
- 5.8 Dike walls shall have a maximum interior height of no more than 6 feet.
- 5.9 Dike walls and bottom area shall consist of specially formulated and well-compacted clay, solid pavement, coatings, or impervious membrane liners. Concrete with an additive to make impervious may be used.
- 5.10 All materials shall be specifically designed and tested to ensure compliance with environmental standards.
- 5.11 Dike coatings and liners shall be installed in accordance with the manufacture's specifications as approved by the inspecting official.
- 5.12 Piping and conduit shall pass over the top of the dike. If this is not practical, where penetration of the dike wall or floor is absolutely unavoidable, the penetration shall be sleeved and made liquid tight.
- 5.13 Inspection access shall be provided all tanks, valves, and piping within the dike area at a minimum clearance of 3 feet around the entire interior perimeter. Permanently affixed, approved stairs and handrails shall be installed on said dikes if the code official deems their need and uses for inspection purposes.
- 5.14 The interior of dikes shall drain to a collection sump, where storm water or other contained liquids can be siphoned or pumped over the dike wall and discarded in an approved environmentally safe manner. The surface area within the dike shall be graded away from the tank at a minimum slope of one inch per eight linear feet (one percent 1%).
- 5.15 If this is not practical, drain control points of a dike shall be located outside of the dike area and be protected from physical damage and be readily accessible under fire conditions. All drainage runoff from the dike shall not be allowed to contaminate natural watercourses, public sewers, and or utilities.

Secondary Containment Aboveground Tanks:

- 5.16 When a listed above ground secondary containment-type tank is used to provide spill control, the tank shall not be required to meet the requirements specified in sections 5.1 through 5.15, if all of the following conditions are met:
- a) The capacity of the tank shall not exceed 12,000 gallons
 - b) All piping connections to the tank shall be made above the normal maximum liquid level.
 - c) Means shall be provided to prevent the release of liquid from the tank by siphon flow.
 - d) Means shall be provided for determining the level of liquid in the tank. This means shall also be accessible to the delivery operator.
 - e) Means shall be provided to prevent overfilling by sounding an alarm when the liquid level in the tank reaches 90 percent of capacity and by automatically stopping the delivery of liquid to the tank when the liquid level in the tank reaches 95 percent of capacity. This section shall not restrict or interfere with the proper functioning of the normal or emergency vent.
 - f) Spacing between the tanks shall not be less than 3 feet.
 - g) The tank shall be capable of resisting the damage from the impact of a motor vehicle or suitable collision barriers shall be provided.
 - h) Where the interstitial space is enclosed, it shall be provided with emergency venting.
 - i) Means shall be provided to establish the integrity of the secondary containment (Testing).

Section 6: Release Detection

- 6.1 In the District of Columbia, tank systems shall be designed, constructed, and operated to provide protection for the general public and the environment against failure and/or releases. The following shall be acceptable methods of leak detection practices for aboveground storage tanks as listed in Sections 6.2 and 6.3:
- 6.2 Release detection using secondary containment methods:

- Double wall tanks utilizing sensing probes or devices in the interstitial space that are easily accessible for testing and maintenance.
 - Impervious dikes
- 6.3 Release detection using volumetric methods: Installed and calibrated mechanical and electronic gauging equipment according to manufacture's specification. A manufacture-certified technician should install volumetric equipment.
 - Automatic tank gauging
 - Statistical inventory reconciliation and inventory reconciliation
 - Tightness testing

Section 7: Testing and Inspection Requirements for aboveground Tanks

Tanks:

- 7.1 All aboveground fuel storage tanks shall be inspected when they are first delivered on the site and before they are installed to verify that they are not visibly damaged and that their coatings are in tact.
- 7.2 All aboveground fuel storage tanks shall have an air-and-soap test performed over their entire surface prior to the introduction of liquid into the system. This is done to ensure that no leaks are present.
- 7.3 There shall be a minimum of two pressure gauges used during tank testing with a maximum limit of 10 to 15 psig to reduce the risk of over-pressurizing the tank due to gage failure.
- 7.4 A pressure relief device shall also be used to prevent over-pressurizing during testing. The device shall have the capability of relieving the entire output of air source at 0.5 psig greater than the recommended test pressures.
- 7.5 The maximum recommended test pressure shall be 2.5 psig for testing vertical tanks and 3 to 5 psig for horizontal tanks.

The following procedure shall be used as an example only:

- Install both pressure gages on the pressure-relief device.
- Apply the air pressure to prescribed test pressure.
- Discontinue the air source.
- Prepare soap and water solutions, use alternative solution if below freezing temperatures are present.

- Apply solution uniformly over the tank with a mop, portable sprayer etc, while paying special attention seams and threaded joints.
 - The presences of bubbles indicated a leak, not a change in gage pressure.
- 7.6 Procedures for testing double-walled tanks will vary. The manufacturer's recommended testing practices and procedures shall be followed.
- 7.7 The Interstice space shall never be pressurized directly from an air source. Interstice space directly pressurized from an air source can be over pressurized in as little as 2 seconds.

Piping:

- 7.8 All piping shall be tested before being covered, enclosed, or placed in use. Testing shall be done hydrostatically to 150 percent of the maximum anticipated pressure of the system or pneumatically to 110 percent of the maximum anticipated pressure of the system.
- 7.9 In no case shall the test pressure be less than 5 psig measured at the highest point of the system, the test pressure shall be maintained for a minimum of 10 minutes.
- 7.10 The interstitial space of secondary containment piping shall be tested hydrostatically or with air a 5 psig, or in accordance with the manufacturer's specifications.

Section 8: Identification and Security

- 8.1 All aboveground storage tanks that are permanently installed or mounted and used for the storage of Class I, II, and IIIA flammable and combustible liquids, shall be labeled and placarded identifying the material therein.
- 8.2 Unsupervised, isolated aboveground storage tanks shall be secured and marked in such a manner as to identify the fire hazards of the tank and the tank's contents to the general public. The area in which the tank located shall be protected from tampering or trespassing.
- 8.3 All aboveground storage tank piping supply and return risers carrying flammable and combustible liquids shall be color coded and clearly marked identifying the contents of the tank served by the riser.
- The color green shall be used for diesel/ fuel oil piping.
 - The color red shall be used for all Class I flammable liquid piping.

- 8.4 Guard post shall be provided to protect all aboveground storage tanks against physical damage from motor vehicles and other apparatus. Guard post shall be constructed in the following manner:
- ❑ Said post shall be constructed of steel not less than 4 inches in diameter and concrete filled.
 - ❑ Space not more than 4 feet between posts on center.
 - ❑ Set not less than 3 feet (36") deep in a concrete footing of not less than a 15- inch diameter.
 - ❑ Set with the top of the post not less than 3 feet (36") above ground.
 - ❑ Located not less than 3 feet (36") from the tank and/or tanks.
- 8.5 Aboveground storage tanks shall be protected by other physical barriers, if the guard post method is not desirable. Said barriers shall be a minimum of 3 feet (36") in height and shall be able to resist a force of 12,000 pounds applied 36 inches above the adjacent ground surface.

Section 9: Aboveground Tanks Inside of Building

- 9.1 The provisions of this section shall be additional requirements that must be adhered to, in addition to the preceding requirements contained in this document that shall also be satisfied.
- 9.2 Aboveground tanks that store Class I, II, and IIIA flammable and combustible liquids are allowed to be located in buildings. Such tanks shall be located inside of special enclosures, in a liquid storage room, or shall be listed and labeled as a protected aboveground tank.
- 9.3 Aboveground tanks storing Class I, II, and IIIA flammable and combustible liquids used inside of buildings shall not exceed 6,000 gallons in individual capacity or 18,000 gallons in aggregate capacity.
- 9.4 Aboveground storage tanks exceeding the limitations stated in section 9.3 shall be installed in buildings or storage spaces satisfying the following H2 Hazardous requirements:
- ❑ The aboveground tank or tanks shall be installed behind 4 hour rated enclosures.
 - ❑ The aboveground tank and area must be equipped throughout with a compatible automatic fire suppression system.
 - ❑ The aboveground tank shall be housed in a liquid tight area, with the exception given only to listed secondary containment tanks.
 - ❑ The aboveground tank storage room shall be equipped with an approved supervised leakage alarm and detection system that sounds

an audible signal 15 dBA above the ambient sound level at every point of entry where the tank is located.

- The storage area door shall have approved signage on every door that states the following: “WARNING, WHEN ALARM SOUNDS, THE ENVIRONMENT WITHIN THE ROOM MAY BE HAZARDOUS”.
- The area shall contain approved vents that vent to the outside, where Class I, II, and IIIA liquids are being stored, the venting shall be mechanical.
- Where Class I liquids are stored, the venting shall be of an approved explosion proof type.
- All lighting fixtures in the tank room shall be of an approved explosion proof type where Class I liquids are stored.

9.5 The tank or tanks shall be surrounded by a clear width space of not less than 3 feet to allow for service and inspection.

Section 10: Aboveground Tank Storage in Above and Below Grade Vaults

- 10.1 Aboveground tanks used for the storage of Class I, II, and IIIA liquids are allowed to be installed in approved vaults located above or below grade.
- 10.2 Aboveground tanks storing Class I and II flammable and combustible liquids in vaults shall be limited to a maximum individual capacity of 15,000 gallons and an aggregate capacity of 48,000 gallons.
- 10.3 Tanks shall be listed for aboveground use, and each tank shall be in its own vault. Adjacent vaults are permitted to share a common wall. The common wall shall be liquid and vapor tight, and shall be designed to withstand the load imposed when the vault on either side is filled with water.
- 10.4 The vault shall completely enclose each tank and there shall be no openings in the vault enclosures except those necessary for access to inspect, fill, empty, and vent the tank.
- 10.5 Connections shall be provided on each vault to dilute, disperse, and remove vapors prior to personnel entering the vault.
- 10.6 The walls and floor of the vault shall be constructed of reinforced concrete at minimum of 6 inches thick.
- 10.7 The top of an at-grade or below-grade vault shall be designed to relieve safely or contain the force of an explosion occurring inside the vault.

- 10.8 The top of an above-grade vault shall be constructed of noncombustible material and shall be designed to be weaker than the walls of the vault. This is to ensure that the thrust of an explosion occurring inside the vault is directed upward before significantly high pressure can develop within the vault.
- 10.9 The walls and floors of a vault installed below grade shall be designed to withstand anticipated soil and hydrostatic loading.
- 10.10 Vaults shall be made liquid tight and there shall be no backfill around the tank or within the vault.
- 10.11 Vault floors shall drain to a sump.
- 10.12 Vaults shall be provided with an approved personnel access way 30 inches minimum in width, and a permanently affixed ladder.
- 10.13 The travel distance from any point inside a vault to an access way shall not exceed 20 feet.
- 10.14 There shall be sufficient clearance between the tank and the vault to allow for visual inspection and maintenance of the tank and its appurtenances. A minimum of 3 feet is expectable.
- 10.15 Vaults and their tanks shall be suitable anchored to withstand up lifting by ground water or flooding.
- 10.16 Vaults shall be equipped with an approved vapor recovery and liquid detection system equipped with on-site audible and visual warning devices with battery backup.
- 10.17 Vapor detection systems shall sound an alarm when the system detects vapors that reach or exceed 25 percent of the lower explosive limit (LEL) of the liquid stored.
- 10.18 Vapor detectors shall be located no higher than 12 inches above the lowest point in the vault.
- 10.19 Vaults shall be equipped with a leak detection system capable of detecting liquids, including water, and activating an alarm. The leak detector shall be installed in accordance with manufacture's specifications.
- 10.20 Vaults containing tanks storing Class I liquids shall be equipped with a mechanical exhaust ventilation system which can run constantly or that will operate upon activation of the vapor or liquid detection system.

- 10.21 Emergency vents shall be vapor tight and shall be permitted to discharge inside the vault. Long-bolt manhole covers shall not be permitted for this purpose.
- 10.22 If located aboveground, vaults shall be protected from the impact of motor vehicles and other apparatus in accordance with Section 8.4.
- 10.23 Vaults shall be provided with an approved, suitable means to admit a fire suppression agent.
- 10.24 Tanks located in vaults shall have a means provided to prevent overfilling by sounding an alarm when the liquid level in the tank reaches 90 percent of capacity and by automatically stopping the delivery of liquid to the tank when the liquid level in the tank reaches 95 percent of capacity. This section shall not restrict or interfere with the proper functioning of the normal or emergency vent.

Section 11: Special Operations and Temporary Aboveground Tanks

Temporary Aboveground Storage Tanks on Construction Sites:

- 11.1 The capacity of a temporary aboveground storage tank containing Class I and II Flammable and Combustible liquids shall not exceed 10,000 gallons and shall be of the single-compartment design.
- 11.2 Aboveground tanks containing Class I and II Flammable and Combustible liquids shall be kept a minimum of 50 feet from the building or structure under construction and other combustible storage.
- 11.3 The aboveground storage tank fill opening shall be equipped with a locking closure device. Fill openings shall be separate from the vent openings.
- 11.4 Tanks shall be provided with a method of normal emergency venting. Emergency vents shall be arranged to discharge in a manner, which prevents localized overheating or flame impingement on any part of the tank in the event that vapors from such vents are ignited. The venting shall also be in accordance with Sections 4.23 through 4.30 of this regulation.
- 11.5 The aboveground tank shall be provided with top openings only and shall be mounted in one of the following methods:

- On well-constructed metal legs connected to shoes or runners designed so that the tank is stabilized and the entire tank and its supports can be moved as a unit.
 - For stationary tanks, on a stable base or timbers or blocks approximately 6 inches in height which prevents the tank from contacting the ground.
- 11.6 Aboveground storage tanks with top openings shall be equipped with a tightly and permanently attached, approved pumping device having an approved hose of sufficient length for filling vehicles, equipment, or containers to be served from the tank. The pump or the hose shall be equipped with a padlock to its hanger to prevent tampering.
- 11.7 Aboveground storage tanks with top openings shall have an effective anti-siphoning device included in the pump discharge unless a self-closing nozzle is provided. Siphons or internal pressure discharge devices shall not be used.
- 11.8 Outdoor aboveground storage tank areas shall be provided with drainage control and diking in accordance with Section 5.
- 11.9 Temporary aboveground storage tanks that are used for the storage of flammable and combustible liquids shall be conspicuously marked with the name of the product, which they contain, and the words: FLAMMABLE-KEEP FIRE AND FLAME AWAY. Tanks shall bear the additional marking: KEEP 50 FEET FROM BUILDINGS.
- 11.10 Portable fire extinguishers shall be provided near the location of the temporary aboveground storage tank area with a minimum rating of 20-B:C.

Section 12: Closure and Removal Procedures

- 12.1 Leaking storage tanks shall be promptly emptied, repaired and returned to service, abandoned in place, or removed. In order to further safeguard the public and environment, any owner or operator of any aboveground fuel storage tank shall strictly adhere to the following requirements as listed in Sections 12.2 through 12.4:

Temporary Measures:

- 12.2 Aboveground tanks temporarily out of service shall have all connecting lines isolated from the tank and secure from tampering, with the only exception being given to in-place fire protection system lines.

12.3 Aboveground storage tanks out of service for a period of 90 days shall meet the following:

- ❑ All flammable or combustible liquid products must be removed from the tank.
- ❑ All piping, including fill line, gauge opening, vapor return and pump connection shall be capped or plugged and secured from tampering.
- ❑ All vent lines shall remain open and be maintained

Permanent Measures:

12.4 Aboveground storage tanks out of service for a period of 1 year shall be removed and properly disposed of. Removal requirements shall be as follows:

- ❑ Approval shall be required from the fire official.
- ❑ All flammable and combustible products shall be removed from the tank and connecting piping.
- ❑ Piping shall be disconnected.
- ❑ All piping shall be removed from the building and/ or ground.
- ❑ Tank openings shall be capped or plugged, leaving a 0.125-inch to 0.25 inch diameter opening for pressure equalization.
- ❑ The tank shall be purged of all vapors and inserted prior to removal
- ❑ Finally, an approved licensed contractor shall dispose of the tank.

Section 13: Documentation and Notification

13.1 Accurate inventory records or a leak detection program shall be maintained on all Class I, II, and IIIA flammable and combustible liquid storage tanks for indication of possible leakage from the tanks or associated piping. Said records shall be provided upon request of the fire official.

13.2 A consistent or accidental loss of liquid, or other indication of a leak from a tank system, shall be reported immediately to the fire department or fire official (The authority having jurisdiction).

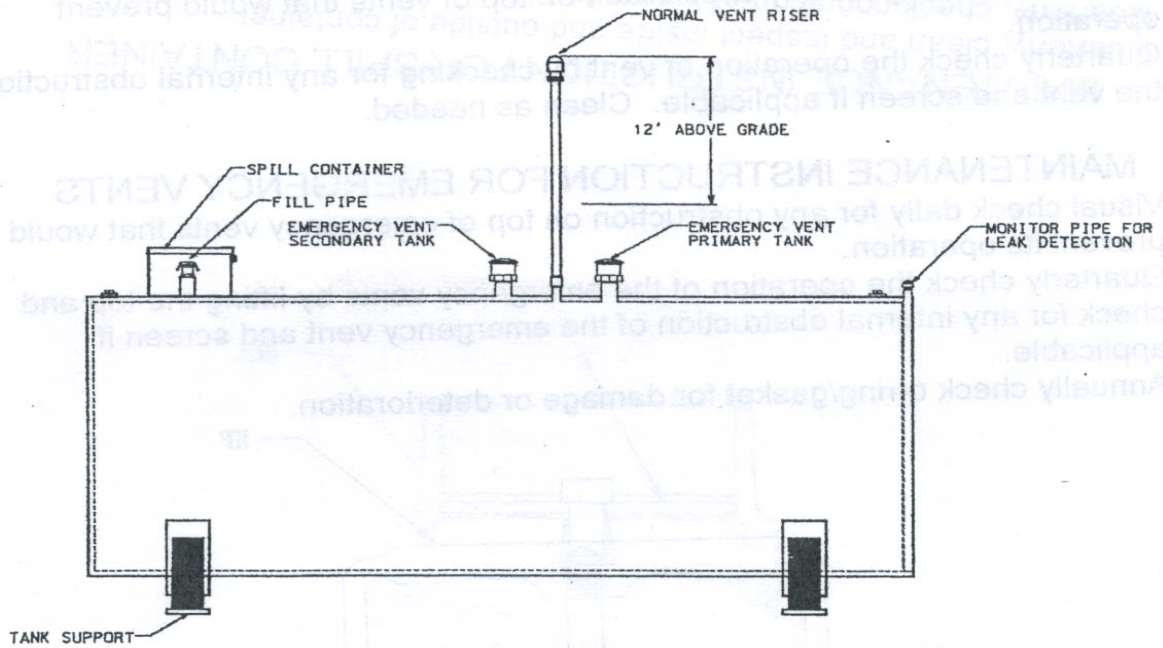
13.3 In the event of a spill, leak or discharge from an aboveground storage tank system, the owner or operator of such tank system shall complete a site assessment if the fire official determines that a potential fire or explosion hazard exists. Such site assessments shall be conducted to ascertain potential fire hazards and shall be completed and submitted to the fire department within a time period established by the fire code official not to exceed 60-days. The following information shall be included:

- ❑ Name of the facility.

- ❑ Name(s) of the owner or operator of the facility.
- ❑ Location of facility.
- ❑ Date and year of initial facility operation.
- ❑ Maximum storage or handling capacity of the facility and normal daily throughput in relation to the aboveground storage tank(s).
- ❑ Description of the facility, including maps, flow diagrams, and topographical maps.
- ❑ The cause(s) of such spill(s), including a failure analysis of the system or subsystem in which the failure occurred.
- ❑ Corrective actions and/or countermeasures taken, including a complete description of equipment repairs or replacements.

Appendices

BASIC ABOVEGROUND STORAGE TANK



Spill Container: This tank accessory is designed to catch any spills during tank filling operations. It typically has a lockable, hinged lid and allows fluid to drain into the tank.

Tank Vent: This tank accessory allows air to enter the tank when fluid is being withdrawn and also exhaust air when the tank is being filled. This component prevents damage to the tank due to too much pressure. The vent is usually installed on a pipe 12 feet above the ground.

Emergency Vent: Found in both the primary and secondary tank, these accessories prevent damage to the tank by allowing excess pressure to be vented. They are designed to release excess pressure in the event of an emergency, such as fire.

Monitor Pipe for Leak Detection: This pipe is installed in the air space (interstice) between the primary and the secondary tank of a double wall tank. It is typically used with leak detection equipment to detect leaks in either the primary or secondary tank.

Tank Support: These structures are used to elevate the tank off the ground. They are usually 12 inches in height, but can be higher if they are fire rated with a minimum 2-hour rating.

PERIODIC SELF INSPECTION & MAINTENANCE PRACTICES FOR TANK OWNERS

What should I check monthly?

Check the primary tank for the presence of water at the lowest possible point(s) inside the tank. Check the secondary tank or secondary containment if so equipped. Remove any water found, because the bacteria found in water can cause corrosion to the tank.

Check the interstitial space of a double wall tank for the presents of fuel.

Check the leak detection system for proper operation and replace or correct malfunctioning components as necessary.

Check ground well if the tank is so equipped. Remove a tank from service that has a known leak in either the primary or secondary tank or containment.

Check all pipe connection to the tank for evidence of leakage. Replace gaskets in flanged connections as necessary with new gaskets compatible with the stored product. Tighten threaded connections if necessary.

What should I check quarterly?

Perform a walk-around inspection to identify and repair areas of damage to the tank or its coating. Clean the exterior if necessary and have any deficiencies that are found repaired. The integrity of the coating must be maintained. Periodic repainting may be required.

Check and clean normal operating vents and emergency vents on the primary tank (and secondary tanks if applicable) and spill containers.

What should I check annually?

Check o-ring/ gasket of emergency vents for damage or deterioration.

Check tank supports to determine if there is damage or deterioration. Look for signs of damage from vehicles, misuse, and corrosion. Have any serious damage repaired immediately.

Check the tank foundation for signs of settlement, cracking, pitting, and Spaulding. Any visible damage shall be repaired. Observe the condition of the anchor bolts to determine if there has been distortion of the bolts or cracking around the bolts. Replace the bolts if they have deteriorated.



ABOVEGROUND STORAGE TANK OWNER SELF INSPECTION AND MAINTENANCE CHECKLIST

Owner/ Operator's Name: _____

Property Address: _____

Tank Location on the Property: _____

Date of Tank Installation: _____

FREQUENCY	ITEMS TO CHECK	DATE CHECK	COMMENTS
MONTHLY	Water present in tank		
	Tank Interstitial Space		
	Leak Detection Equipment if Applicable		
	Ground Wells if Applicable		
	Piping connections to Tank for Leaks		
QUARTERLY	Tank's Outer Coating and Surface for		
	Normal Operating Vent		
	Emergency Operating Vent		
	Spill Containers		
ANNUALLY	Site Drainage		
	O-Rings of Emergency Vents for Damage		
	Tank Supports		
	Tank Surrounding Foundation		
	Cathodic Protection System if Applicable		

Additional Comments: _____

REPORT A LEAKING STORAGE TANK ON (202) 727-1600