

527 CMR: BOARD OF FIRE PREVENTION REGULATIONS

527 CMR 9.00: TANKS AND CONTAINERS

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9.01: Purpose and Scope

(1) 527 CMR 9.00 shall apply to the design, construction, installation, testing, and maintenance of tanks and containers. The intent is to protect the public safety and welfare from the dangers of fire and/or explosion due to tank or container leakage of flammable and combustible liquids.

(2) Aboveground tanks of more than 10,000 gallons capacity for the storage of any fluid other than water shall be regulated by 527 CMR 9.00 and by 502 CMR 5.00: *Permit Requirements And Annual Inspection Of Aboveground Storage Tanks Or Containers Of More Than Ten Thousand Gallons' Capacity* for the purpose of protecting the public safety and welfare from the dangers of tank failure, rupture, or leakage. In the event of a conflict between 527 CMR 9.00 or any other requirement in 527 CMR or 502 CMR 5.00 or 780 CMR (The State Building Code), the more stringent of the aforementioned regulations shall apply.

(3) 527 CMR 9.00 shall apply to the design, construction, installation, testing and maintenance of tanks storing hazardous substances.

(4) Nothing in 527 CMR 9.00 shall be construed to abrogate the provisions of 780 CMR, The State Building Code, which may contain additional requirements for the design, construction, and installation of aboveground storage tanks.

9.02: Definitions

For the purposes of 527 CMR 9.00, the following terms shall have the meanings assigned to them:

Abandoned, in the case of underground storage tanks, shall mean out of service for a continuous period in excess of six months and for a period in excess of 24 months in the case of any aboveground tank of 10,000 gallons capacity or less; and in the case of aboveground storage of any fluid other than water, where a permit is required from the Marshal under provisions of M.G.L. c. 148, § 37, it shall mean out of service for a continuous period in excess of 60 months and it has been deemed to be unsafe and a threat to the public safety by the Head of the Fire Department and by the Department of Fire Services.

Aboveground Storage Tank. A horizontal or vertical tank, that is listed and intended for fixed installation, without back fill above or below grade, and is used within the scope of its approval or listing.

EXCEPTION 1: Aboveground Storage Tanks regulated by 527 CMR 9.04: *Vaults*, and 502 CMR 5.00: *Permit Requirements And Annual Inspection Of Aboveground Storage Tanks Or Containers Of More Than Ten Thousand Gallons' Capacity* need not meet double-walled tank requirements.

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EXCEPTION 2: Aboveground pressure vessels constructed in accordance with the requirements of the ASME, *Unfired Pressure Vessels Code* and regulated by M.G.L. c. 146 and 527 CMR 9.07(G) shall be exempt from the requirements for vaults or double-walled tanks.

Approved, approved by the State Fire Marshal.

Automatic Line Leak Detector, a device designed to detect product or pressure losses in a pressurized product line of a remote pumping system.

Board, the Board of Fire Prevention Regulations.

Cathodic Protection System, a technique which inhibits the corrosion of a tank or its components either through sacrificial or galvanic anodes or impressed current.

Class A Operator, means the individual or individuals designated by the owner or operator to have primary statutory and regulatory responsibility for the operation and maintenance of the underground storage tank system. The Class A Operator may hold more than one class of operator position.

Class B Operator, means the individual or individuals designated by the owner or operator to implement applicable regulatory requirements and implement the daily aspects of the operation, maintenance, and recordkeeping for the underground storage tank system. The Class B Operator may hold more than one class of operator position.

Class C Operator, means the individual or individuals designated by the owner or operator to have primary responsibility for responding to alarms, emergencies presented by spills or releases, and other problems associated with the operation of the underground storage tank system. The Class C Operator may hold more than one class of operator position.

Combustible Liquid, Any liquid having a flash point at or above 100°F shall be known as a Class II or Class III Liquid. Combustible liquids shall be divided into the foll

Class II: Liquids having flash points at or above 100°F. and below 140°F.

Class IIIA: Liquids having a flash point at or above 140°F. and below 200°F.

Class IIIB: Liquids having a flash point at or above 200°F.

Components, piping, pumps, and other related storing, conveyancing, and dispensing elements which, together with one or more tanks and any cathodic protection or monitoring system, constitute a storage facility.

Consumptive Use, fuel oil used exclusively for area heating and/or the heating of domestic water on the premises where stored.

Corrosion Expert, a person who, by reason of thorough knowledge of the physical sciences and the principles of engineering and mathematics acquired by a professional education and related practical experience, is qualified to engage in the practice of corrosion control on buried or submerged metal piping systems and metal tanks. Such person shall be accredited or certified as being qualified by the National Association of Corrosion Engineers (NACE) as a Cathodic Protection Specialist or Corrosion Specialist or be a Massachusetts registered professional corrosion engineer. The corrosion expert shall follow applicable NACE criteria.

DEP, The Massachusetts Department of Environmental Protection.

Department, the Department of Fire Services.

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Double-walled Tank, a container with two complete shells which provide both primary and secondary containment. The container shall have a continuous 360° interstitial space between the primary and secondary shell. The interstitial space shall be designed with an approved interstitial space monitor to continuously monitor this space. All double-walled tanks shall be UL-listed.

Engineer, a Massachusetts registered professional engineer.

European Suction System, an underground suction piping system which is sloped back to the tank so that the contents of the piping will drain back into the tank if the suction is released, and only one check valve is used which is located directly under the dispenser.

Existing Facility, a facility whose construction, installation, or operation began prior to the effective date of the revised edition of 527 CMR 9.00 printed and effective December 31, 1986.

Fire Resistant Tank. A tank assembly that consists of a listed aboveground storage tank and construction that provides fire resistive protection from exposure to a high intensity liquid pool fire. (See 527 CMR 9.04.)

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Flammable Liquid, Any liquid having a flash point below 100°F and having a vapor pressure not exceeding 40 psia at 100°F Flammable liquids shall be known as Class I liquids and shall be divided into the following classifications:

Class IA: Liquids having flash points below 73°F and having a boiling point below 100°F.

Class IB: Liquids having flash points below 73°F and having a boiling point at or above 100°F.

Class IC: Liquids having flash points at or above 73°F and below 100°F.

Fuel Oil, any hydrocarbon oil as specified by ASTM Standard D396-90, Specification for Fuel Oil.

Hazardous Substances, are regulated substances as defined in section 101(14) of the Federal Comprehensive Environmental Response, Compensation and Liability Act of 1980 and 40 CFR Part 302. (This term does not include any substance regulated as a hazardous waste under Subtitle C of the Federal Resource Conservation and Recovery Act and 40 CFR Part 261).

Head of the Fire Department, the fire chief or other top ranking official of the local fire department, or a designee of the Head of the Fire Department.

Interim Wellhead Protection Area (IWPA) for public water systems using wells or well fields that lack a Department of Environmental Protection (Massachusetts DEP) approved Zone II, the DEP will apply an interim wellhead protection area. This IWPA shall be ½-mile radius measured from the well or well field for sources whose approved pumping rate is 100,000 gallons per day or greater. For wells or well fields that yield less than 100,000 gallons per day, the IWPA radius is proportional to the approved pumping rate which may be calculated according to the following equation: IWPA radius in feet = [32 x pumping rate in gallons per minute] + 400.

A default IWPA radius shall be applied to transient non-community (TNC) and non-transient non-community (NTNC) wells for which radii could not be calculated using the above equation because there is no metered rate of withdrawal or no approved pumping rate or to wells for which there are no DWS-determined radii using other appropriate methods. The default IWPA radius shall be 500 feet for TNC wells and 750 feet for NTNC wells.

Leakage or Leak, any uncontrolled movement of product from an above ground storage tank and/or associated piping, either observed or detected, or from an underground storage tank system when using a tightness test method, measurable by a final or precision test which can accurately detect a leak of 0.10 gallons per hour with the probability of detection of 0.95, and the probability of false alarm of 0.05; or when using a continuous monitoring system which can accurately detect a leak of 0.20 gallons per hour with the probability of detection of 0.95 and the probability of false alarm of 0.05.

Listed, equipment or materials included in a list published by an organization acceptable to the Marshal, and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials and whose listing states either that equipment or materials meet appropriate standards or have been tested and found suitable for use in a specific manner.

Marshal, the State Fire Marshal or a designee of the State Fire Marshal.

Monitoring System. A full-time system installed for the purpose of early detection of leaks, such as observation wells, visual or audible alarms, statistical inventory reconciliation (SIR) process conducted in connection with an in-tank monitoring system, or their equivalent. Minimum standards of monitoring systems shall detect a leak at a minimum rate of 0.20 gallons per hour or more with the probability of detection of 0.95, and the probability of false alarm of 0.05.

NFPA 30, National Fire Protection Association Standard 30 entitled: Flammable and Combustible Liquids Code, 2003 Edition.

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Nationally Recognized Testing Laboratory (NRTL). An organization which tests for safety and lists, labels or accepts equipment or materials and which meets the criteria in 527 CMR 49.00 (Appendix C).

Observation Well, a dug or drilled cased well which can be used for detecting the presence of flammable or combustible liquids, which is drilled to a depth intercepting the water table and screened as to intercept said water table, and which is installed and maintained in an approved manner.

Operator, the lessee of a storage facility, or the person or persons responsible for the daily operation of a storage facility.

Out of Service, not in use in that no filling or withdrawal is occurring.

Owner, the person or persons or government entity having legal ownership of a storage facility.

Person, any agency or political subdivision of the Federal Government or the Commonwealth of Massachusetts; any state, public or private corporation or authority, individual, trust, firm, joint stock company, partnership, association, consortium, joint venture, or other commercial entity; and any officer, employee or agent of said person, and any group of said persons.

Pipeline, any trunk pipeline within the Commonwealth for the transportation of flammable or combustible liquids.

p.s.i., pounds per square inch gauge.

Qualified Person, a representative certified by the manufacturer of the product being installed or tested.

Remote Pumping System, a pressurized product line system in which flammable and combustible liquids are supplied to a point away from the tank by means of a pumping unit.

Replacement and Substantial Modification, both mean the construction of any additions to an existing storage facility, the removing of any part of an existing storage facility (*e.g.*, a tank, or piping) and the installing of a new part, or any restoration, refurbishment, or renovation which significantly impairs or affects the physical integrity of the storage facility or its monitoring system.

Secondary Containment or Equivalent Protection, techniques that may include impervious liners, double-walled tanks, or equivalent methods approved by the Marshal.

Sole Source Aquifer, an aquifer designated by the U.S. Environmental Protection Agency as the sole or principal source of drinking water for an area as defined in 310 CMR 40.0006.

Statistical Inventory Reconciliation (SIR), a process of evaluating the various sources of errors present in daily inventory records and capable of detecting a leak or discharge from the tank system, including associated piping of 0.20 gallons per hour with the probability of detection of 0.95 and probability of false alarm of 0.05 as determined by an independent testing laboratory using the U.S. Environmental Protection Agency's standardized test procedures or equivalent.

Storage Facility, one or more tanks at a particular site, together with all components thereof, used or designed to be used for the storage of any product within the scope of 527 CMR 9.01.

Tank, any structure either underground or aboveground used or designed to be used for the storage of any product within the scope of 527 CMR 9.00; as well as any aboveground structure in excess of 10,000 gallons capacity used or designed to be used for the storage of any fluid except water.

Third-party Inspection, any inspection conducted by or under the direct supervision of a Third-party Inspector, in accordance with 527 CMR 9.07(P).

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Third-party Inspector, a person who has completed training required by the Marshal and who is a Massachusetts Registered Professional Engineer, a Massachusetts Licensed Site Professional, or a person holding an underground storage tank inspector certification issued by an independent organization such as: the International Code Council, National Fire Protection Association or the American Petroleum Institute, or a person holding an underground storage tank inspector certification issued by an agency of another state with underground storage tank regulations similar to 527 CMR 9.00 and approved by the Marshal, or a person who through training and experience, is otherwise acceptable to and approved by the Marshal. A third-party inspector shall not be an owner or operator of the underground storage tank, an employee of the owner/operator of the underground storage tank, or a person having daily on-site responsibility of the underground storage tank.

UL-listed, included in a current list or report of approved equipment, materials, or methods published by Underwriters Laboratories, Inc.

Underground Storage Tank System, shall mean an underground storage tank, connected underground piping, underground ancillary equipment and containment system, if any.

Underground Storage, Underground Storage Tank, UST, where 10% or more of the tank volume and piping is buried below the ground surface but which shall not include storage in a freestanding container within a building or underground storage tanks described in 527 CMR 9.07(N)(2), (3), (8), (11), (12), (13), (14), (16) and (17).

Waste Oil, used and/or reprocessed, but not subsequently re-refined, oil which has served its original intended purpose. Waste oil includes, but is not limited to, used and/or reprocessed fuel oil, engine oil, gear oil, cutting oil, and transmission fluid and dielectric fluid.

Water Supply, any raw or finished source that is presently used, reserved for future use, or under investigation for future use by a public water supply as defined in 310 CMR 22.02, or used as a source of private drinking water by one or more persons. This shall include all land and/or waters used as a tributary to a public water system except those listed under 310 CMR 22.22.

Zone A,

- (a) the land area between the surface water source and the upper boundary of a bank;
- (b) the land area within a 400 foot lateral distance from the upper boundary of a bank of a Class A surface water source, as defined in 314 CMR 4.05(3)(a) and;
- (c) the land area within a 200 foot lateral distance from the upper boundary of the bank of a tributary or associated surface water body.

Zone B, the land area within ½-mile of the upper boundary of the bank of a Class A surface water source, as defined in 314 CMR 4.05(3)(a), or the edge of watershed, whichever is less. However, Zone B shall always include the land area within 400 foot lateral distance from the upper boundary of the bank of the Class A surface water source.

Zone I, the protective radius required around a public water well or well field. For public water system wells with approved yields of 100,000 gallons per day or greater, the protective radius is 400 feet. Tubular well fields require a 250 foot protective radius. Protective radii for all other public water system wells are determined by the following equation: Zone I radius in feet = $(150 \times \log \text{ of pumping rate in gallons per day}) - 350$. This equation is equivalent to the chart in the Division's Water Supply Guidelines.

A default Zone I radius shall be applied to transient non-community (TNC) and non-transient non-community (NTNC) wells for which radii could not be calculated using the above equation because there is no metered rate of withdrawal or no approved pumping rate or to wells for which there are no DWS-determined radii using other appropriate methods. The default Zone I radius shall be 100 feet for TNC wells and 250 feet for NTNC wells.

9.02: continued

Zone II, that area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation). It is bounded by the groundwater divides which result from pumping the well and by the contact of the aquifer with less permeable materials such as till or bedrock. In some cases, streams or lakes may act as recharge boundaries. In all cases, Zone II shall extend upgradient to its point of intersection with prevailing hydrogeologic boundaries (a groundwater flow divide, a contact with till or bedrock, or a recharge boundary).

9.03: Aboveground Storage Tanks Greater Than 10,000 Gallons Capacity or Tanks Storing Combustible Liquids

(A) The design, construction and installation of aboveground storage tanks storing combustible liquids or aboveground storage tanks greater than 10,000 gallons gross capacity used for the storage of flammable and/or combustible liquids shall be in accordance with 502 CMR 5.00; 527 CMR 9.00 and NFPA 30 *Flammable and Combustible Liquids Code* – 2003. Tanks greater than 10,000 gallons gross capacity storing non-flammable hazardous substances shall be constructed and conform to 502 CMR 5.00 and good engineering practice. The foundation and structural supports shall be designed in accordance with 780 CMR, The State Building Code.

(B) In accordance with M.G.L. c.148, § 37, no person shall construct, maintain or use any aboveground storage tank of more than 10,000 gallons capacity, for the storage of any fluid other than water, without first securing a permit therefore from the Marshal. The aboveground storage tank shall be constructed, installed and maintained in accordance with 527 CMR 9.00 and 502 CMR 5.00.

(C) Applicability.

(1) When the general provisions of 527 CMR 9.00 differ from NFPA 30 for aboveground storage tanks greater than 10,000 gallons capacity, NFPA 30 shall apply.

Exceptions:

(a) Section 4.3.3.3(a) of NFPA 30-2003 does not apply.

(b) Pre-fabricated tank with a pre-fabricated dike. Where all of the following are provided: 110% containment

(c) Pre-fabricated tank with a pre-fabricated dike and rain-shield. Where all of the following are provided:

(i) 110% containment

(ii) Provisions that an overflow of the tank will go directly into the dike.

The tank shall meet the requirements of NFPA 30-2003: 4.3.2.3.3.

(2) NFPA 30 shall not apply to tanks of 10,000 gallons capacity or less storing combustible liquids, which are specifically regulated by other rules and regulations of the Board of Fire Prevention Regulations.

(D) Aboveground Piping. (Reference 527 CMR 4.00 and 527 CMR 15.00 where applicable) Piping on aboveground storage tanks shall meet the provisions of NFPA 30, Chapter 3. Where the provisions of 527 CMR 4.00 and 15.00 differ from NFPA 30 Chapter 3, 527 CMR shall apply.

(E) Location of Aboveground Tanks. The distance requirements in NFPA 30 and 527 CMR 9.00 shall not apply to replacements of existing tanks unless the Head of the Fire Department determines that their continued use shall constitute a fire hazard.

(F) Outside Fuel Oil Storage Tanks.

(1) Storage tanks larger than 660 gallons capacity used in connection with oil burning appliances (reference 527 CMR 4.00) and emergency power generators shall meet the construction provisions of Standard UL-142 and shall be located in accordance with Table 3:

9.03: continued

TABLE 3

Capacity of tank, gallons	Minimum distance in feet from property line that is or can be built upon	Minimum distance in feet from nearest side of any public way or from nearest important building on the same property
660 or less	10	0
661 to 12,000	15	5
12,001 to 30,000	20	5
30,001 to 50,000	30	10

(2) Tanks shall be mounted on a continuous concrete slab capable of withstanding the expected load and extending eight inches beyond the perimeter of the tank or tanks. Tanks shall be securely supported by rigid non-combustible supports to prevent settling, sliding or lifting.

(3) When tanks are installed in areas subject to vehicular impact, physical barriers shall be provided. Physical barriers shall consist of lally columns, substantial pipes, bollards or similar barriers.

(4) The Head of the Fire Department may require secondary containment or dikes around storage tanks if in his opinion failure of the tank could cause irreparable harm to public health, safety and/or welfare, and/or to the environment.

(5) In areas subject to flooding or high water each tank shall be suitably anchored to withstand uplifting, including when the tank is empty.

(6) If during transportation or installation the original protective coating of the tank has been damaged, these areas shall be recovered.

(G) Transportation by Pipeline.

(1) No pipeline constructed after the effective date of 527 CMR 9.00 shall be used for the transportation of any flammable or combustible liquid unless prior to such construction the plans and specifications hereinafter required in 527 CMR 9.03(G) shall have been approved. Application for approval to construct a pipeline shall be made to the Marshal and shall be accompanied by suitable drawings, in duplicate, of the entire proposed pipeline clearly showing details of the origin and the terminals. The location of the proposed pipeline shall be shown on a map, which shall also indicate adjacent highways throughout the entire route of the proposed pipeline. Highway and river crossings must be clearly detailed on suitable drawings. The application must also be accompanied by a duplicate set of specifications showing the type of construction and the materials used. Emergency repairs may be made to an existing pipeline without complying with the provisions of 527 CMR 9.03(G).

The approval of the Marshal shall be indicated by his signature on each set of plans and specifications, one to be retained by him and one to be returned to the applicant which shall serve as a permit to transport flammable or combustible liquids, by such pipeline.

(2) Pipe valves and fittings shall be made of material suitable for use with the products conveyed and constructed of adequate strength to safely withstand the stresses to which they will be subjected in service.

Pipelines shall be designed and constructed in accordance with recognized engineering practice.

NOTE: The current code for Pressure Piping (ASA B31.1) of the American Standards Association is considered as recognized engineering practice.

(3) Pipelines shall be suitably protected against mechanical injury either by burying at least 30 inches underground, by covering with at least 30 inches of fill, or by other approved method.

(a) Pipelines in streets and highways shall, as far as practicable, be installed below all other existing pipelines or other conduits.

(b) Pipelines shall not be installed less than ten feet from any building, other than a building which is part of the pipeline system.

9.03: continued

(c) Emergency shutoff valves shall be located in pipeline at points where, because of physical or topographic conditions, valves are necessary to prevent drainage of oil from lines while being repaired.

9.04: Aboveground Storage Tanks Equal to or Less than 10,000 Gallons Capacity For Storing Class I Liquids

(A) The design, construction and installation of above ground storage tanks 10,000 gallon capacity or less storing Class I liquids shall comply with NFPA 30-2003.

(B) The storage of Class I liquids at motor fuel dispensing facilities shall comply with NFPA 30A-2003

(C) The Head of the Fire Department may further limit the quantity of flammable liquids, that may be stored aboveground, where conditions are such to warrant restricting the amount of such liquids. The Head of the Fire Department may further prescribe the manner in which flammable liquids may be stored aboveground in accordance with 527 CMR 9.04.

(D) The Head of the Fire Department may accept the installation practices of NFPA 395 at farms and other isolated locations.

9.05: Underground Storage Tanks

(A) Design and Construction of New or Replacement Underground Tanks.

(1) All new and replacement tanks must be equipped with a metallic or nonmetallic striker plate attached to the bottom of the tank at each opening. Such striker plate shall be at least 12" x 12" in area and at least ¼" thick.

(2) Underground tanks shall be designed and built in accordance with approved engineering standards for the materials of construction being used, and in accordance with 527 CMR 9.07(A).

(3) All tanks shall be designed and constructed to minimize the risk of corrosion and leakage. Fuel oil tanks of 1,100 gallons or less capacity utilized exclusively for consumptive use on the premises shall be constructed in accordance with 527 CMR 9.05(A)(4). The following construction shall be utilized for all other tanks installed after January 1, 1989. (In the period from May 1, 1988, to January 1, 1989, all underground tanks shall conform to 527 CMR 9.05(A)(4).

(a) Listed double-walled steel tanks with cathodic protection, having electrical isolation and equipped with a test box to allow measurement of electrical potential and current flow, listed double-walled fiberglass tanks, listed double-walled composite tanks having electrical isolation, a double-walled composite tank manufactured in accordance with ACT-100/89 having electrical isolation, or a listed double-walled jacketed steel tank having electrical isolation. These tanks shall be equipped with an approved standpipe, vacuum, or electronic monitoring system or an approved equivalent for the purpose of continuous monitoring the interstitial space. The material used in the construction of the UST vessel and associated piping shall be compatible with the product being stored in the UST.

(b) Any other "state-of-the-art" type of tank construction with an approved continuous interstitial space monitor and providing equal or better protection against leakage than the above-mentioned tanks and approved by the Marshal.

(4) All tanks shall be designed and constructed to minimize the risk of corrosion and leakage. The following construction shall be utilized exclusively for consumptive use on the premises:

(a) Listed double-walled fiberglass reinforced plastic (FRP) tanks, using materials compatible with the product to be stored therein. These tanks shall be equipped with a standpipe, vacuum, or electronic monitoring system, or an approved equivalent provided for the purpose of continuous monitoring the interstitial space.

9.05: continued

(b) Listed double-walled steel tanks with cathodic protection or bonded fiberglass coating, having electrical isolation, or listed double-walled fiberglass tanks. These tanks shall be equipped with a standpipe, vacuum, or electronic monitoring system, or an approved equivalent provided for the purpose of constantly monitoring the interstitial space.

(c) Any other "state-of-the-art" type of tank construction providing equal or better protection against leakage than the above-mentioned tanks and approved by the Marshal.

(5) Horizontal steel tanks located underground shall not exceed the maximum capacities, diameters, or lengths for the corresponding gauges of metal outlined in the following table and shall be equipped with cathodic protection:

TABLE 4 - UNDERGROUND HORIZONTAL TANKS

Capacity Over	Not Over	Maximum Diameter	Maximum Length	Thickness of Shell	Thickness of Heads
10 gals.	270 gals.	42"	6'	10 USS gauge	14 USS gauge
270 gals.	560 gals.	48"	11'	10 USS gauge	12 USS gauge
560 gals.	1,100 gals.	64"	14'	10 USS gauge	10 USS gauge
1,100 gals.	4,000 gals.	84"	24'	3/16"	3/16"
4,000 gals.	12,000 gals.	126"	32'	1/4"	1/4"
12,000 gals.	20,000 gals.	132"	42'	5/16"	5/16"
20,000 gals.	35,000 gals.	132"	50'	3/8"	3/8"

(6) Vertical steel tanks located underground shall not exceed the maximum capacities, diameters, or heights for the corresponding gauges of metal outlined in the following table and shall be equipped with cathodic protection:

TABLE 5 - UNDERGROUND VERTICAL TANKS

Capacity Over	Not Over	Maximum Diameter	Maximum Height	Unbraced Flat Tops	Thickness
10 gals.	60 gals.	24"	4'	24"	10 USS gauge
60 gals.	270 gals.	36"	6'	36"	10 USS gauge
270 gals.	560 gals.	54"	10'	43"	10 USS gauge
560 gals.	1,100 gals.	68"	12'	54"	10 USS gauge
1,100 gals.	4,000 gals.	105"	18'	72"	3/16"
4,000 gals.	12,000 gals.	132"	24'	96"	1/4"
12,000 gals.	20,000 gals.	132"	30'	120"	5/16"
20,000 gals.	25,000 gals.	132"	35'	132"	3/8"

(7) All new and replacement tank installations shall be equipped with a spill containment manhole with a minimum capacity of three gallons, capable of returning product to the tank.

(8) All new and replacement tank installations shall be equipped with an overflow prevention device. The device shall be designed so as not to preclude the ability to perform a tightness test on the tank and piping. The following options are acceptable:

(a) A device which shall automatically shut flow into the tank when the tank is no more than 95% full.

(b) A device which shall alert the individual delivering product when the tank is no more than 90% full by restricting the flow into the tank or triggering a high-level alarm.

(c) A device which shall alert the individual delivering product to the tank by restricting the flow into the tank 30 minutes prior to overfilling.

(B) Underground Piping.

(1) All new and replacement piping shall be installed with secondary containment which may include impervious liners, double-walled piping, or equivalent methods approved by the Marshal. All new or replacement piping shall be continuously monitored for product loss. If a suction system is used with a check valve under the dispensing pump and the piping is pitched to the tank, secondary containment of new or replacement piping shall not be required except as provided in 527 CMR 9.05(D)(6).

9.05: continued

- (2) All new or replacement piping shall be constructed of noncorrodible materials such as fiberglass reinforced plastic (FRP) or its equivalent, or shall be protected against corrosion by the use of a steel system cathodically protected by impressed current or sacrificial anodes or by some other type of equivalent protection.
- (3) Product lines shall be installed in a trench between the tank area and the pump island. Similarly, underground vent lines shall be installed in a trench.
- (4) Before underground piping is installed, the trench shall receive a minimum six-inch-deep bed of well-compacted noncorrosive material such as clean washed sand or gravel. All trenches shall be wide enough to permit at least six inches of noncorrosive backfill material around all lines.
- (5) All pipes connected to such tanks shall lead from the tops of tanks, and the tops of all tanks shall be below the level of the lowest horizontal pipe used in the connection therein except where the design specifically prevents a possible siphoning condition and has been approved by the Head of the Fire Department.
- (6) All pipes used for the conveyance of flammable liquid shall decline to tanks without traps or pockets, and shall be protected against injury. Intermediate sumps to allow piping decline to tanks shall not be considered a trap or pocket provided the sump is monitored for leak detection. Piping drops from submerged pumps to allow piping decline to the tank shall not be considered a trap.
- (7) Underground copper piping or tubing shall not be used on new or replacement piping installations unless the copper piping or tubing is adequately protected against physical damage and protected from corrosion. Copper piping or tubing shall only be allowed for use as a product line when installed in an installation covered by 527 CMR 4.00.
- (8) At marine fueling facilities where tanks are at an elevation which produces a gravity head on the dispensing unit, the tank outlet shall be equipped with a device, such as a solenoid valve, positioned adjacent to, and downstream from, the outlet, so installed and adjusted that liquid cannot flow by gravity from the tank in case of piping or hose failure when the dispenser is not in use.
- (9) A double elbow swing joint or flexible connector shall be installed at all locations where piping changes direction from horizontal to vertical or from vertical to horizontal.
- (10) Flexible connectors constructed and listed for underground applications shall be permitted to be used without backfill in below grade tank sumps.
- (11) All new or substantially modified product dispensers shall be equipped with a dispenser sump. All dispenser sumps shall be continuously monitored for product loss.
Exception: This requirement shall not apply to the replacement or repair of the product dispenser alone due to damage or malfunction, but shall apply to any replacement of both the dispenser and the equipment used to connect the dispenser to an underground storage tank.
- (12) All new or replacement tanks utilizing a submersible pump shall be equipped with a sump. All sumps shall be continuously monitored for product loss.

(C) Underground Tank Installation.

- (1) No new or replacement tank or piping shall be installed, whether as part of a new or existing storage facility, unless the owner has given notice of its installation to the head of the fire department; and no new or replacement tank or piping shall be buried or concealed until it has been inspected for damage and external defects, and has been approved by the Head of the Fire Department or his designee. A tightness test on all new or replacement tanks and piping shall be done after the installing, backfilling, and surfacing to grade have been completed, this test shall be of both the tank and the piping.
- (2) No new or replacement tank, piping or dispenser shall be installed except by a contractor who has been certified in writing by the manufacturer or a petroleum equipment association as qualified for the purpose. The contractor shall, prior to any installation, submit to the Head of the Fire Department a copy of such certificate.
- (3) The installation of a new or replacement tank, including anchoring of the tank, shall be carried out in accordance with the manufacturer's recommendation, accepted engineering practices, and the provisions of 527 CMR 9.05(C), provided that the backfill material for FRP (fiberglass reinforced plastic) tanks shall be pea gravel or crushed stone and the backfill material for all other tanks shall be either pea gravel or clean noncorrosive sand free of cinders, stones, and any other foreign material with the material under the tank to be compacted and the balance to be placed in uniform lifts and to be thoroughly compacted.

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- (4) Any damage to the exterior of a tank or its coating shall be repaired before the tank is covered.
- (5) Every new or replacement tank and its piping shall be tested separately, at the owner's expense, prior to its being buried. The tank shall be tested by air pressure not less than three lbs. and not more than five lbs. per square inch. The piping shall be tested hydrostatically (or by air pressure) to 150% of the maximum anticipated pressure of the system but not less than 50 lbs. per square inch gauge at the highest point of the system. After the tank and piping have been fully buried, all subsequent testing of the underground tanks shall be done in accordance with the provisions of NFPA 329 or other test of equivalent or superior accuracy. The owner shall furnish the Head of the Fire Department with a certified copy of all testing required by 527 CMR 9.05(F) which the fire department shall keep with the records of the storage facility.
- (6) Steel tanks completely underground shall be covered with a minimum of two feet of earth or shall be covered with not less than one foot of earth, on top of which shall be placed a slab of reinforced concrete not less than four inches thick. When tanks are or are likely to be subjected to traffic, they shall be protected against damage from vehicles passing over them by at least three feet of earth cover, or 18 inches of well-tamped earth plus six inches of reinforced concrete or eight inches of asphaltic concrete. When asphaltic or reinforced concrete paving is used as part of the protection, it shall extend at least one foot horizontally beyond the outline of the tank in all directions.
- (7) An underground storage tank used for the storage of a Class I flammable liquid, if within ten feet of a building having a cellar or basement shall be placed below the level of the floor of such cellar or basement.

(D) Leak Detection Equipment, Testing and/or Inventory Requirements for Underground Tanks.

- (1) Consumptive use fuel oil tanks and hazardous waste tanks shall be exempt from 527 CMR 9.05(D)(2), 9.05(E)(1), and 9.05(F). Tanks used solely for emergency power generators and tanks used for a combination of consumptive use fuel oil and emergency power generators shall be exempt from 527 CMR 9.05(D)(2) and 9.05(E)(1). (Reference: 527 CMR 5.00, and 310 CMR 30.00 "Hazardous Waste Regulations"). Waste oil tanks shall be exempt from 527 CMR 9.05(D)(1) and (2); 9.05(E)(1).
- (2) All other tanks shall satisfy one of the four following options:
- (a) The installation and maintenance of an approved in-tank monitoring system installed and maintained by a qualified person.
1. The operator shall prepare, reconcile, and maintain daily inventory control records for each tank and for every combination of interconnected tanks. This inventory shall be taken by the use of the in-tank monitor for the purpose of prevention and early detection of leaks. (Reference: 527 CMR 9.05(E))
 2. At the close of each calendar month, the operator shall use the in-tank monitor over a continuous period of six hours, during which no product is delivered to or taken from the tank, to determine any loss of product. A loss of 0.20 gallons per hour or more over a six-hour period with the probability of detection of 0.95 and a probability of false alarm of 0.05 shall constitute a leak.
 3. Upon a failed result the owner/operator shall immediately notify the Head of the Fire Department. The owner/operator shall have the tank and piping tested in accordance with 527 CMR 9.05(F)(8), (9) and (12), or conduct an investigation which shall determine to the Head of the Fire Department's satisfaction that factors other than a leak caused the fail report.
 4. If the procedure in 527 CMR 9.05(D)(2)(a)3. is followed and the tank is considered tight, then the requirements for tank tightness testing in 527 CMR 9.05(F) shall be considered as being complete.
- (b) The installation of an approved double-walled tank, an interstitial space monitoring system, and liquid removal port.
1. This installation shall be exempt from the requirements of tank tightness testing in 527 CMR 9.05(F) provided that the continuous monitor is installed and maintained by a qualified person.
 2. If the monitor activates, whether a trouble or an alarm mode, the owner/operator shall immediately notify the local fire department.

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(c) The installation and maintenance of an approved in-tank monitoring system installed and maintained by a qualified person with inventory data analysis conducted by an independently managed third party certified statistical inventory reconciliation (SIR) process.

1. If the SIR analysis is conclusive and identifies a statistically significant loss of any product, the result is fail. Upon a failed result the owner/operator and the SIR vendor shall immediately notify the Head of the Fire Department. The owner/operator shall have the tank and piping tested in accordance with 527 CMR 9.05(F)(8), (9) and (12), or conduct an investigation which shall determine to the Head of the Fire Department's satisfaction that factors other than a leak caused the fail report.
2. If the SIR analysis is inconclusive, the owner/operator and the SIR vendor shall immediately notify the Head of the Fire Department and conduct an investigation following the SIR vendor's loss investigation procedures. If the result is inconclusive for two consecutive months, the owner/operator shall have the tank and piping tested in accordance with 527 CMR 9.05(F)(8), (9) and (12).
3. If the result is conclusive and not a fail, the result is pass and the tank system, including associated piping, is considered tight, and the requirements for tank tightness testing in 527 CMR 9.05(F) shall be considered as being complete.
4. For the purpose of 527 CMR 9.05(D)(2)(d), the tank gauge, installed in the tank, used to generate data for SIR analysis shall have a resolution of 1/10 of an inch or better.

(d) The installation and maintenance of a Continuous In-tank Leak Detection System installed and operated in accordance with the manufacturers instructions and capable of detecting a leak or discharge of 0.20 gallons per hour with the probability of detection of 0.95 and a probability of false alarm of 0.05 as determined by an independent testing laboratory using the U.S. Environmental Protection Agency Standard Test Procedures for Evaluating Leak Detection Methods (EPA/530/UST-90/004 through 010) or other equivalent test procedures.

1. The operator shall maintain an "Equipment Check Guidelines for Inspectors" prepared by the manufacturer. This summary should guide inspectors on proper field procedures to follow when inspecting equipment for proper operation, for attempting to access the stored history (for alarms or failed tests) and to determine compliance with 527 CMR 9.05(D)(e). The guidelines shall be maintained on the site and be made readily available upon inspection.
2. If the Continuous In-Tank Leak Detection System analysis is conclusive and identifies a statistically significant loss of any product, the result is fail. Upon a failed result the owner/operator shall immediately notify the Head of the Fire Department. The owner/operator shall have the tank and piping tested in accordance with 527 CMR 9.05(F)(7), (8) and (11), or conduct an investigation which shall determine to the Head of the Fire Department's satisfaction that factors other than a leak caused the fail report.
3. If the Continuous In-Tank Leak Detection System analysis is inconclusive, the owner/operator shall immediately conduct an investigation following the system vendor's loss investigation procedures. If the system analysis is inconclusive due to high tank activity the tank(s) affected shall be taken out of service to allow the Continuous In-Tank Leak Detection System the minimum sufficient quality test time in accordance with the manufacturers recommendations. If the analysis result is then still inconclusive, the owner/operator shall have the tank and piping tested in accordance with 527 CMR 9.05(F)(7), (8) and (11), or conduct an investigation which shall determine to the Head of the Fire Department's satisfaction that factors other than a leak caused the inconclusive report.
4. If the result is conclusive and not a fail, the result is pass and the tank is considered tight, and the requirements for tank tightness testing in 527 CMR 9.05(F) shall be considered as being complete.

(3) All leak detection equipment shall be installed, calibrated, operated and maintained in accordance with the manufacturer's instructions, including routine maintenance and service checks for operability and running condition.

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(4) At least once each calendar month, the operator shall take a measurement to determine if any water has entered the underground storage tank. This measurement shall be recorded and any excess of water shall be removed and disposed in the manner required by the Department of Environmental Protection (DEP). (Reference: 527 CMR 9.05(E))

(5) The operator shall maintain monthly product inventory records in accordance with 527 CMR 9.05(E)(1).

(6) Double-walled tanks with an approved interstitial space monitoring system as well as piping with secondary containment shall be required for new or replacement tanks and piping. All new or replacement piping and dispenser sumps shall be continuously monitored for product loss. All new and replacement dispensers shall be equipped with a dispenser sump.

Exception: This requirement shall not apply to the replacement or repair of the product dispenser alone due to damage or malfunction, but shall apply to any replacement of both the dispenser and the equipment used to connect the dispenser to an underground storage tank.

(7) The owner and/or operator of every storage facility shall keep all records of cathodic protection monitoring, leak detection monitoring, inventory records, calibration maintenance and repair of leak detection equipment, schedules of required calibration and maintenance provided by the leak detection equipment manufacturer and any other records required by 527 CMR 9.00 for the remaining operating life of the facility. These records shall be made readily available upon request of the Marshal and/or the Head of the Fire Department.

(E) Inventory Methods for Underground Tanks

(1) The operator of every new and existing storage facility shall prepare, reconcile and maintain daily inventory records for each tank and for each combination of interconnected tanks with a common level of product (hereinafter, a combination), for the purpose of prevention and early detection of leaks. The preparation, reconciliation, and maintenance of such records shall be done in accordance with the provisions of 527 CMR 5.06(3) as amended, with the following additions and modification:

(a) At the close of each calendar month, the operator shall determine, for that month and for each tank or combination, the number of days in which any amount of product was dispensed and the number of days in which a loss of product was recorded. These records shall include the inspection details on monitoring wells and leak detection systems.

(b) An abnormal loss of product for any tank or combination shall mean a loss not explainable by spillage, temperature variations or other causes, in excess of 0.5% of the volume of product dispensed over a period of a calendar month.

(c) In the event of any abnormal loss of product, the following steps shall be taken, with the investigation not to stop until the discrepancy has been found, the tank has been tested, repaired or replaced, or the entire procedure has been completed:

1. Inventory input and output records shall be checked by the owner of the tank for arithmetical error.

2. Inventory shall be checked by the owner of the tank for error in measurement.

3. If the abnormal loss is not reconcilable by steps 1. and 2., or cannot be affirmatively demonstrated to be the result of theft, the accessible parts of the storage system shall be checked for damage or leaks.

4. Monitoring wells and leak detection systems shall be checked for signs of a discharge.

5. Calibration of the inventory measuring system and any dispensers shall be checked.

6. The entire storage system, excluding the vent but including joints and remote fill lines, shall be tested in accordance with the applicable sections of 527 CMR 9.00.

7. If a discharge, leak, or threat of release is discovered, the requirements of the applicable sections of 527 CMR 9.07(H) shall be met by the owner of the tank.

(d) An abnormal gain of water shall be a gain in the water level inside any tank of more than one inch in a 24-hour period.

(e) In the event of any abnormal gain of water, the owner shall, at the owner's expense, have the water removed from the tank and disposed of in a manner as directed by the Massachusetts Department of Environmental Protection and shall have the tank checked for water 24 hours later, during which time no product shall be added to the tank.

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(f) Apart from abnormal gains of water, the owner of any tank in which water has accumulated to a depth of ½ inch or more shall at the owner's expense, have the water removed and disposed of in a manner as directed by the Massachusetts Department of Environmental Protection.

(g) For every storage facility covered by the inventory control requirements of 527 CMR 9.05(E), the operator shall maintain record on the premises or readily available for inspection by the Marshal or the Head of the Fire Department or their designee. These inventory records shall be kept on the premises or readily available for a minimum of the prior 12 months.

(Reference: Massachusetts Contingency Plan 310 CMR 40.300 *et seq*)

(2) For failure to comply with 527 CMR 9.05(E), see 527 CMR 9.05(F)(6).

(F) Testing for Tightness of Underground Storage Facilities.

(1) The owner of every new or existing storage facility shall have all new or replacement piping tested, at the owner's expense, in accordance with 527 CMR 9.05 during a period of 12-24 months after the date of installation.

(2) If any testing discloses a leak or a loss which is not reconcilable, the operator and the owner shall comply immediately with the requirements of 527 CMR 9.07(H), and the Head of the Fire Department may direct the owner, at the owner's expense, to have all other tanks on the premises and their components tested in the same manner.

(3) The owner or operator of every new or existing storage facility shall conduct mandatory inventory record keeping in accordance with 527 CMR 9.05(E) when used in conjunction with Statistical Inventory Reconciliation (SIR), by an independently managed third party certified person, and shall have the tank tested every two years. If a leak is suspected using statistical inventory reconciliation, the SIR manager shall immediately notify the owner or operator and the Head of the Fire Department.

(4) Every existing suction piping system not of European design shall either have secondary containment with an approved interstitial space monitoring system or shall be tested during the third, sixth, and ninth year after installation and at three year intervals thereafter.

(5) With respect to any tank to which the inventory control requirements of 527 CMR 9.05(E) are applicable, the Head of the Fire Department shall require the operator to have it and its piping promptly tested, at the owner's expense, whenever the operator fails to prepare, reconcile, and maintain the daily inventory records or fails to perform the required monthly calculations.

(6) The Head of the Fire Department may require the owner of any existing tank to have it and its piping tested, at the owner's expense, in any case in which the owner has failed to make timely application for a permit as required under 527 CMR 9.07(M).

(7) Except for testing performed on a tank and its piping prior to their being covered, a tank shall be tested by any final or precision test not involving air pressure which can accurately detect a leak of 0.10 gallon per hour with a probability of detection of 0.95, and a probability of false alarm of 0.05.

(8) All tests shall be approved and administered by qualified persons, and shall be performed in accordance with the most recent test protocols established by the testing equipment manufacturer. Such persons shall notify the Head of the Fire Department and provide the test protocol which will be used prior to administering a test.

(9) The owner of every existing pressurized piping system shall comply with the provisions of 527 CMR 9.05(G)(8).

(10) Every existing pressurized piping system which has secondary containment and an approved interstitial space monitor shall be exempt from tightness testing of the piping.

(11) The person performing any test under 527 CMR 9.05(F) shall promptly supply the owner and the Head of the Fire Department with certified copies of all test results for a tank and its piping. The Head of the Fire Department shall keep his copy with the records of that storage facility.

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(G) Upgrading of Existing Underground Storage Tank Systems.

(1) Consumptive use fuel oil tanks shall be exempt from the requirements of 527 CMR 9.05(G)(4) through (10). Tanks used solely for emergency power generators and tanks used for a combination of consumptive use fuel oil and emergency power generators shall be exempt from 527 CMR 9.05(G)(4) through (8). Waste oil tanks shall comply with the upgrade schedule in 527 CMR 9.06(C). Hazardous waste tanks shall be exempt from the requirements of 527 CMR 9.05(G)(1) through (10) and 527 CMR 9.06(C).

(2) All existing underground storage tanks shall be retrofitted with a spill containment manhole with a minimum capacity of three gallons, capable of returning product to the tank and an overfill prevention device on or before September 30, 1994 unless the storage tank is required to be upgraded with Stage II Vapor recovery in accordance with 310 CMR 7.00 before that date. On all tanks which are required to implement Stage II Vapor recovery before September 30, 1994 a spill containment manhole and an overfill prevention device shall be installed and operational on the date Stage II Vapor recovery is to be in effect in accordance with 310 CMR 7.00. Fuel oil tanks of 1,100 gallons or less capacity utilized exclusively for consumptive use on the premises shall be exempt from the retrofit of a spill containment manhole, provided the tank was installed before January 1, 1989. On a pressure filled system, any fuel oil tank that has an audible alarm and a tight connection shall be exempt from the spill containment manhole retrofit requirements. All fuel oil tanks filled by gravity shall be upgraded with a spill containment manhole and an overfill prevention device. Any underground storage tank not meeting the upgrade requirements of 527 CMR 9.05(G)(2) shall be removed from the ground or closed in accordance with 527 CMR 9.07(J)(1).

(3) An overfill prevention device shall be designed so as not to preclude the ability to perform any required tightness test on the tank and piping. The following options are acceptable:

(a) A device which shall automatically shut off flow into the tank when the tank is no more than 95% full.

(b) A device which shall alert the individual delivering product when the tank is no more than 90% full by restricting the flow into the tank or triggering a high-level alarm.

(4) All tanks shall be equipped with leak detection. The following methods are acceptable:

(a) A double-walled tank with an approved interstitial space monitor.

(b) An approved in-tank monitor which shall be utilized in accordance with 527 CMR 9.05(D)(2)(b), (d) or (e).

(c) Monitoring for vapors in the soil through the use of a continuous monitor.

(d) Monitoring for vapors in the soil through the use of a monthly monitoring device. All monthly monitoring records shall be kept for the remaining operating life of the facility and shall be made readily available upon request of the Marshal or the Head of the Fire Department or his designee.

NOTE 1: 527 CMR 9.05(G)(4)(c) or (4)(d) is used, the provisions for observation and vapor monitoring wells provided in 40 CFR parts 280 and 281 Environmental Protection Agency Underground Storage Tanks Technical Requirements - shall be deemed acceptable unless the Head of the Fire Department determines that more stringent measures are required.

NOTE 2: Not all the above-mentioned leak detection methods will be adequate to detect the presence of all products covered within the scope of 527 CMR 9.00. The owner/operator shall use a leak detection method and associated equipment which is capable of detecting the product being stored.

(5) If the tank does not have leak detection installed, the owner/operator shall have the tank removed from the ground.

(6) All pressurized piping shall meet one of the following requirements by December 22, 1990 or shall be removed from the ground.

(a) If the piping has secondary containment, an approved interstitial space monitor may be used.

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- (b) An automatic flow restrictor, an automatic shutoff device, or a continuous alarm system shall be installed. These devices shall accurately detect a leak of three gallons per hour at ten psi in line pressure within one hour with the probability of detection of 0.95 and a probability of false alarm of 0.05. If this option is utilized, an annual test of the operation of the leak detector must be conducted in accordance with the manufacturer's requirements. In addition, if this option is utilized, one of the following must be performed and documented.
1. an annual tightness test on the piping; or
 2. monthly monitoring for vapors in the soil; or
 3. monthly SIR analysis conducted in accordance with 527 CMR 9.05(D)(2)(b).
 4. Pressurized line leak detection systems with a leak detection capability of 0.1 GPH at 1.5 times the operating pressure with a probability of detection at 100% and a false alarm rate of 0% are exempt from the requirements of 527 CMR 9.05(G)(6)(b)1. through 3..
- (7) If a European Suction System is used, leak detection is not required on the piping.
- (8) If a suction system is used which is not a European Suction System, one of the following leak detection options shall be required for the piping:
- (a) If the piping has secondary containment, an approved interstitial space monitor shall be used.
 - (b) A line tightness test shall be conducted every three years.
- (9) If the facility has unprotected steel tanks and/or piping, they shall be retrofitted with cathodic protection by December 22, 1998 or the tanks and/or piping shall be removed from the ground.
- (10) All single wall steel tanks shall be removed from the ground by August 7, 2017.
- Exception: This requirement shall not apply to those tanks that were relined prior to August 8, 2007 in accordance with A.P.I. 1631, 1983 Edition, if the following conditions have been met:
- (a) A proper permit and approval was issued by the Head of the Fire Department for such relining, and
 - (b) A legally valid warranty exists for said relining.
- (H) Corrosion Protection.
- (1) Underground storage tanks subject to corrosion shall be provided with a properly engineered and installed cathodic protection system capable of providing continuous protection to the metal components of that portion of the tank and piping that are in contact with the ground.
 - (2) Cathodic protection systems shall be designed by a corrosion expert. A corrosion expert shall supervise the installation and testing of any cathodic protection system. Cathodic protection systems shall be designed, installed and tested in accordance with a code of practice developed by a nationally recognized association or testing laboratory.
 - (3) Prior to installation or replacement and substantial modification of a cathodic protection system a permit shall be obtained from the Head of the Fire Department in accordance with 527 CMR 9.07(M). Any permit application shall be accompanied by a design plan prepared by a corrosion expert which shall include:
 - (a) "Native" structure to soil potential baseline data
 - (b) Soil/water resistivity
 - (c) Electrical continuity verification
 - (d) Stray current characteristics
 - (e) Interference effects
 - (f) A site diagram identifying structures to be protected and all cathodic protection system components, including the reference cell locations and structure contacts used to make the measurements required by 527 CMR 9.05(H)(3)(a), (c), (d) and (e).
 - (g) Suitable drawings shall be prepared to designate the overall layout of the tanks and piping to be protected and the location of significant items of structure hardware, corrosion control test stations, electrical bonds, electrical isolation devices, and neighboring buried or submerged metallic structures. The location of anode installations shall be recorded on drawings showing anode type, weight, spacing, depth and backfill.

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- (4) Sacrificial or galvanic anode cathodic protection systems shall be tested to determine whether the storage system is protected against corrosion or installation and at least every three years thereafter. If test results indicate a negative voltage of at least -0.90 volts the system shall be tested at three year intervals thereafter. If test results indicate a negative voltage of between -0.85 to -0.90 the system shall be tested annually thereafter. If test results indicate a negative voltage of less than -0.85 the system shall be deemed inadequate and the owner/operator shall immediately cause an investigation to determine if the system is providing adequate cathodic protection.
- (5) Impressed current cathodic protection systems shall be tested to determine whether the storage system is protected against corrosion at installation and at least annually thereafter. In addition to the annual testing, impressed current systems shall be inspected every 60 days to insure the equipment is operating as designed. Acceptable system operating voltage and amperage ranges as determined by the corrosion expert shall be affixed to each rectifier. System voltage and amperage readings shall be recorded every 60 days. If the system voltage and amperage readings are outside the range determined to be acceptable by the corrosion expert, the owner/operator shall immediately cause an investigation to determine if the system is operating as designed. Systems installed without voltage and/or amperage meters shall be retrofitted with meters upon the first annual test of the system.
- (6) Cathodic protection systems shall be tested for proper operation within 60 days following the completion of any replacement and substantial modification or following excavation on the property that may have affected the cathodically protected system.
- (7) Cathodic protection system design plans, applications, surveys, drawings, test data and results, must be reviewed, approved and bear the full name, signature, address, certification number and seal of a corrosion expert.
- (8) If test data indicates to the corrosion expert that the system is not operating as designed the corrosion expert shall immediately notify the system owner/operator who shall notify the Head of the Fire Department. The owner/operator shall restore the system to operation as designed, or conduct an investigation which shall determine to the Head of the Fire Department's satisfaction that factors other than a system failure caused the failed test results.
- (9) Records of cathodic protection system design plans, applications, surveys, drawings, test data and results, shall be maintained for the life of the cathodic protection system. All records shall be maintained on site or made readily available at the request of the Office of the State Fire Marshal and/or the Head of the Fire Department.

9.06: Waste Oil Storage Tanks

- (A) Installation of Aboveground Waste Oil Storage Tanks.
- (1) Permanent Storage Outside a Building.
- (a) Tanks and containers that contain only crankcase drainings shall be considered as containing Class IIIB liquids. Class IIIB liquids shall be permitted to be stored in tanks and containers that meet the requirements of Sections 2.2 and 4.2 of NFPA 30, Flammable and Combustible Liquids Code-2000, as applicable.
- (b) A permit shall be required to install, maintain, and store from the Head of the Fire Department in accordance with 527 CMR 14.03(1) through (5).
- (c) Tanks shall be located in accordance with Table 2.3.2.1.5 of NFPA 30-2000, and shall be located at least five feet from any building openings.
- (d) Tanks shall be double walled or shall have a containment dike capable of containing 110% of the capacity of all product within the dike.
- (e) The tanks, based upon the building's occupancy, shall be protected against damage from vehicular traffic. The type of protection shall be steel posts, I-beams, or similar protection at the discretion of the Head of the Fire Department.
- (f) For security purposes, a fence or an enclosure capable of being locked shall be erected to prevent unauthorized filling of the tank. If the tank does not have a fence or enclosure, the fill shall be capable of being locked.
- (g) The tanks shall be vented and the vents shall be a minimum of 1¼ inches in diameter. Vents shall terminate not less than 12' above the adjacent ground level and shall be so located that vapors will not be trapped by eaves or other obstructions and shall be at least five feet from any building opening.

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- (h) The tank fill shall be located on the top of the tank and be a minimum of 1½ inches in diameter.
- (i) The fill shall be a funnel-type hopper fill large enough to prevent dripping and spillage when filling. The funnel-type hopper shall have a tight-fitting hinged or chained cap which shall be closed when not in use.
- (j) The port used for pumping out the tank shall be located on the top of the tank. The fill and the port used for pumping out shall not be the same port.
- (k) The support for waste oil tanks shall be of noncombustible material and capable of supporting the superimposed load; and the tank shall be secured against settling, sliding, or lifting.
- (l) Each tank in which hazardous waste is being accumulated shall be clearly marked and labeled throughout the period of accumulation with the following:
 1. The words "HAZARDOUS WASTE."
 2. The hazardous waste identified in words (*e.g.*, WASTE OIL).
 3. The type hazard associated with the waste indicated in words (*e.g.*, TOXIC).
 4. The date on which each period of accumulation begins in that tank.

NOTE: Marks and labels shall be placed on the sides of each tank in such a manner than they are clearly visible for inspection.

- (m) All tanks and associated piping shall be installed by a qualified person. This shall include certified burner technicians as well as licensed petroleum system installers.
- (n) The Head of the Fire Department may allow for alternative means of compliance provided the design is satisfactory and complies with the intent of this and other applicable regulations.

(2) Permanent Storage Inside a Building.

- (a) Tanks and containers that contain only crankcase drainings shall be considered as containing Class IIIB liquids. Class IIIB liquids shall be permitted to be stored in tanks and containers that meet the requirements of Sections 2.2 and 4.2 of NFPA 30, Flammable and Combustible Liquids Code-2000, as applicable. Tanks storing Class IIIB liquids inside buildings shall be permitted to be located at, below, or above grade.
- (b) A permit shall be required to install, maintain, and store from the Head of the Fire Department in accordance with 527 CMR 14.03(1) through (5).
- (c) Shall be located at least five feet from exits. Overhead garage doors shall not be considered exits.
- (d) Shall have a drip pan or accidental spill containment at the discretion of the Head of the Fire Department. The drip pan or spill containment is for minor spills and shall not be considered a dike. No containment diking is required.
- (e) The tank, based upon the occupancy of the building, shall be protected against damage from vehicular traffic. The type of protection shall be steel posts, I-beams, or similar protection at the discretion of the Head of the Fire Department.
- (f) The tank shall be vented to the outside of the building.
- (g) Vents shall be a minimum of 1¼ inches in diameter. Vents shall terminate not less than 12' above the adjacent ground level and shall be so located that vapors will not be trapped by eaves or other obstructions and shall be at least five feet from any building opening.
- (h) The tank fill shall be located on the top of the tank and be a minimum of 1½ inches in diameter.
- (i) The tank fill shall be a funnel-type hopper fill large enough to prevent dripping and spillage when filling. The funnel-type hopper shall have a tight-fitting hinged or chained cap which shall be closed when not in use.
- (j) The port used for pumping out the tank shall be located on the top of the tank. The fill and the port used for pumping out shall not be the same port.
- (k) The support for waste oil tanks shall be of noncombustible material and capable of supporting the superimposed load; and the tank shall be secured against settling, sliding or lifting.
- (l) Each tank in which hazardous waste is being accumulated shall be clearly marked and labeled throughout the period of accumulation with the following:
 1. The words "HAZARDOUS WASTE"
 2. The hazardous waste identified in words (*e.g.*, WASTE OIL)
 3. The type hazard associated with the waste indicated in words (*e.g.* TOXIC)

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4. The date on which each period of accumulation begins, marked on each tank at the time the accumulation begins in the tank.

NOTE: Marks and labels shall be placed on the sides of each tank in such a manner that they are clearly visible for inspection.

(m) Underlying all aboveground tanks in which hazardous waste is accumulated shall be a surface that is designed and at all times operated so that it is free of cracks and gaps and is sufficiently impervious to contain leaks and spills until the collection material is detected and removed. All aboveground hazardous waste tanks shall be placed so that the entire surface beneath each such tank can be inspected for spills and structural integrity.

(n) All tanks and associated piping shall be installed by a qualified person. This shall include certified burner technicians as well as licensed petroleum system installers.

(o) The Head of the Fire Department may allow for alternative means of compliance provided the design is satisfactory and complies with the intent of this and other applicable regulations.

(3) Removable Storage Inside a Building.

(a) Tanks and containers that contain only crankcase drainings shall be considered as containing Class IIIB liquids. Class IIIB liquids shall be permitted to be stored in tanks and containers that meet the requirements of Sections 2.2 and 4.2 of NFPA 30, Flammable and Combustible Liquids Code-2000, as applicable. Tanks and containers storing Class IIIB liquids inside buildings shall be permitted to be located at, below, or above grade.

(b) A permit shall be required to install, maintain, and store from the Head of the Fire Department in accordance with 527 CMR 14.03(1) through (5).

(c) Shall be located as far as possible from exits. Overhead garage doors shall not be considered exits.

(d) Shall have a drip pan or accidental spill containment at the discretion of the Head of the Fire Department. The drip pan or spill containment shall not be considered a dike. No containment diking is required.

(e) The container(s), based upon the occupancy of the building, shall be protected against damage from vehicular traffic. The type protection shall be steel posts, I-beams, or similar protection at the discretion of the Head of the Fire Department.

(f) A funnel-type hopper fill large enough to prevent dripping and spillage when filling shall be on site and used during filling procedures.

(g) At the discretion of the Head of the Fire Department, emergency relief venting shall be installed on all containers.

(h) When not in use, the container(s) shall be capped vapor tight.

(i) Each tank in which hazardous waste is being accumulated shall be clearly marked and labeled throughout the period of accumulation with the following:

1. The words "HAZARDOUS WASTE"
2. The hazardous waste identified in words (*e.g.*, WASTE OIL)
3. The type hazard associated with the waste indicated in words (*e.g.*, TOXIC)
4. The date on which each period of accumulation begins marked on each tank.

NOTE: Marks and labels shall be placed on the sides of each tank in such a manner that they are clearly visible for inspection.

(j) Underlying all aboveground tanks in which hazardous waste is accumulated shall be a surface that is designed and at all times operated so that it is free of cracks and gaps and is sufficiently impervious to contain leaks and spills until the collection material is detected and removed. All aboveground hazardous waste tanks shall be placed so that the entire surface beneath each such tank can be inspected for spills and structural integrity.

(k) The location of the removable container(s) shall be specified by the Head of the Fire Department.

(l) The Head of the Fire Department may allow for alternative means of compliance provided the design is satisfactory and complies with the intent of this and other applicable regulations.

9.06: continued

(B) Automotive Lubrication Service Centers.

(1) The following applies to the storage of flammable or combustible liquids within an automotive lubrication service center when the storage is to be in tanks and containers installed aboveground. Tanks and containers that contain only crankcase drainings shall be considered as containing Class IIIB liquids. Class IIIB liquids shall be permitted to be stored and dispensed from tanks and containers that meet the requirements of Sections 2.2 and 4.2 of NFPA 30, Flammable and Combustible Liquids Code-2000, as applicable.

(a) A permit shall be required to install, maintain, and store from the Head of the Fire Department in accordance with 527 CMR 14.03(1) through (5).

(b) The tanks shall be located in a separate room (known as the storage room) from the main work area by a two-hour fire-rated concrete block wall or other acceptable separation.

(c) The storage room shall be equipped with a fixed fire suppression system designed and installed in accordance with NFPA 17.

(d) The entrance to the storage room shall have a threshold a minimum of 12" high with a two-hour fire-rated door closed when not in use.

(e) The storage room shall be large enough to act as a containment dike capable of containing 110% of the largest tank capacity plus 10% of the aggregate amount of all other tanks.

(f) All tanks shall be vented to the out side of the building. Waste oil tank vents shall be a minimum of 1¼ inches in diameter and shall terminate not less than 12' above the adjacent ground level and shall be so located that vapors will not be trapped by eaves or other obstructions and shall be at least five feet from any building opening.

(g) The support for the tank(s) shall be of noncombustible material and capable of supporting the superimposed load; and the tank shall be secured against settling, sliding, or lifting.

(h) All tanks and associated piping shall be installed by a qualified person.

(i) Each tank in which hazardous waste is being accumulated shall be clearly marked and labeled throughout the period of accumulation with the following:

1. The words "HAZARDOUS WASTE"
2. The hazardous waste identified in words (*e.g.*, WASTE OIL)
3. The type hazard associated with the waste indicated in words (*e.g.* TOXIC)
4. The date on which each period of accumulation begins, marked on each tank at the time accumulation begins in that tank.

NOTE: Marks and labels shall be placed on the sides of each tank in such a manner that they are clearly visible for inspection.

(j) Underlying all aboveground tanks in which hazardous waste is accumulated shall be a surface that is designed and at all times operated so that it is free of cracks and gaps and is sufficiently impervious contain leaks and spills until the collection material is detected and removed. All aboveground hazardous waste tanks shall be placed so that the entire surface beneath each such tank can be inspected for spills and structural integrity.

(k) The waste oil tank(s) shall be equipped with a valve which will close when the tank has been filled to within 95% of its capacity to prevent further filling of the tank or shall be equipped with an audible high level alarm which shall sound when the tanks(s) has been filled to within 95% of its capacity.

(l) The basement shall be constructed entirely of noncombustible materials, including storage racks and platforms.

(m) The basement shall be provided with a mechanical ventilation system capable of providing a minimum of six air changes per hour with duct openings located not less than six inches nor more than 12 inches above the floor.

(n) The basement area shall have proper means of egress in accordance with 780 CMR: *the Massachusetts State Building Code.*

(o) The oil and lube oil pumps and product delivery lines shall not be left under pressure when the lubrication center is not open for business unless a protective device is installed that will prevent continuous pumping of product in the event of a line or pipe rupture.

(p) The Head of the Fire Department may allow for alternative means of compliance provided the design is satisfactory and complies with the intent of this and other applicable regulations.

9.06: continued

(C) Upgrade of Existing Underground Waste Oil Storage Tank Systems.

(1) All existing underground waste oil storage systems shall be equipped with leak detection. Unprotected steel tanks shall be equipped with cathodic protection or be removed from the ground on or before December 22, 1998.

(2) Existing underground waste oil storage tanks shall have weekly tank gauging conducted according to the following:

(a) Tank liquid level measurements are taken at the beginning and ending of a period of at least 24 hours during which no liquid is added to or removed from the tank.

(b) Tank liquid level measurements are based on an average of three consecutive stick readings at both the beginning and ending of that period. The stick used for measuring the level of the waste oil shall be divided in $\frac{1}{8}$ of an inch increments

(c) Tank liquid level measurements shall not be required if a double-walled tank with continuous monitoring is utilized.

(d) A leak is suspected and subject to the requirements 527 CMR 9.07(M) and 310 CMR 40.0300 if the variation between beginning and ending measurements exceeds the weekly standards derived from averaging four consecutive weekly tests. The standards are in the following table:

NOMINAL TANK CAPACITY	WEEKLY STD. (One Test)	MONTHLY STD. (Avg. of 4 Tests)
550 gallons or less	10 gallons	5 gallons
551 - 1000 gallons	13 gallons	7 gallons
1001 - 2000 gallons	25 gallons	13 gallons

(e) The beginning and ending measurements, variation and average figures shall be recorded and maintained in a log book until the tank is removed from the ground.

Note: The averaging shall be done as follows: Average weeks 1 through 4, average weeks 5 through 8 *etc.*)

(f) Waste oil tanks connected to oil burning equipment shall be exempt from 527 CMR 9.06(C)(2)(a) through (e) during periods when oil burning equipment is in use.

(3) All existing tanks shall be equipped with one of the leak detection methods specified in 527 CMR 9.05(G)(4) except that 527 CMR 9.05(G)(4)(d) shall not be utilized for a waste oil tank. Leak detection shall be retrofitted in accordance with the schedule outlined in 527 CMR 9.05(G).

(4) A removable funnel at least 12 inches in diameter shall be used to prevent a spillage when filling the waste oil tank. This funnel shall be in use on or before December 30, 1990. The tank shall have a tight fitting cap which shall be closed when not in use.

(5) Owners or operators shall ensure that releases due to overfilling do not occur. The owner and/or operator shall ensure that the volume available in the tank is greater than the volume of waste oil to be transferred to the tank before the transfer is made and that the operation is monitored constantly to prevent over spilling.

9.07: General Provisions(A) Material and Construction of Tanks and Containers: (Reserved)(B) Fill and Vent Pipes for All Tanks and Containers. (Reference: 527 CMR 4.00 where applicable)

(1) Each storage tank shall be provided with a filler pipe and a vent pipe, and may have a gauge pipe. If gauge pipe terminates within a building, the opening to same shall be protected.

(2) Filler pipes of tanks shall be not less than $1\frac{1}{4}$ inches in diameter, and shall extend down to within four inches of the bottom of the tanks.

(a) All fill covers, including at least six inches onto the adjoining fixed metal, cement or pavement surface shall be painted in accordance with the following color codes:

Unleaded - White	Unleaded Plus - Blue
Premium Unleaded - Red	Diesel - Yellow
Kerosene - Brown	Fuel Oil - Green

9.07: continued

- (b) The tank owner shall insure that all tanks and appurtenances including adapters, gaskets and caps are secure, operable and without excessive wear.
- (3) The receiving end of the filler pipe of a storage tank shall be designed to provide for a tight connection between a discharge hose and inlet. A filler pipe shall be located outside the building and shall be provided with a nonferrous plug or cap capable of preventing vapors from escaping or water from entering.
- (4) Where a filler pipe runs to a sidewalk, alley, private way, or public highway, it shall terminate in a metal box with a metal cover set flush with the surface of the sidewalk at the curb, alley, private way, or highway; and it shall be provided with a nonferrous plug cap.
- (5) Vent pipes of tanks shall be not less than 1¼ inches in diameter, shall be carried up to a point not less than 12 feet above the ground level at the filling point of the tank, shall terminate not less than five feet from any door or window opening, and shall be fitted with an approved weather hood screen with noncorrosive wire not coarser than 30-mesh. (Reference: 527 CMR 9.07(B)(6)).
- (6) The provisions of 527 CMR 9.07(B)(5), 9.05(B)(2), and 9.03(D)(1) notwithstanding, the vent pipes of underground storage tanks may be manifolded for the purpose of effecting a vapor recovery system provided that the pipe size shall be such as to discharge, within the maximum pressure limitations of the system, the vapors they may be required to handle when manifolded tanks are filled simultaneously. The use of pressure vacuum valves on vent pipes shall be permitted provided the vapor collection and control system is certified by the Department of Environmental Protection, is listed, allows the underground storage tank system to vent to the atmosphere in the event of emergency conditions and is maintained in accordance with the manufacturer's instructions. The person supplying the vapor recovery system shall specify the minimum vent pipe size to conform to these requirements, and such specifications shall be followed by the installer.
- (7) All tanks shall have one or more vents large enough to relieve any undue pressure to which they may be subjected. The vent pipe shall be arranged to discharge to the open air and to pitch toward the storage tank.
- (C) Product Transfer. The owner and/or operator shall ensure that the volume available in the tank is greater than the volume of product to be transferred to the tank before the transfer is made and that the transfer operation is monitored constantly to prevent overfilling and spilling. It is the responsibility of the owner and/or operator to make available to the person delivering product the proper tank chart.
- (D) Piping for All Tanks. (Reference: 527 CMR 4.00 where applicable) All piping, fittings and valves shall be constructed of materials that are compatible with the product to be stored in the tank to which the piping is connected.
- (E) Pumping System.
- (1) No flammable or combustible liquid shall be delivered to any storage facility tank by means of a pump under pressure unless such storage tank is designed to withstand the additional stress to which it may be subjected to or unless the vent pipe for such tank is of sufficient size to relieve the tank of any undue pressure.
- (2) No suction pumping system shall be equipped with more than one check valve, and shall be so installed that it may be tested or replaced without disturbing other elements of the storage facility. In no case shall there be a return waste pipe from the pump to the tank, which has any opening to the atmosphere. When a pump is located within a building, it shall be in a well-ventilated portion thereof.
- (3) Remote pumping systems shall be designed or equipped so that no part of the system will be subjected to pressures above its allowable working pressure.
- (4) All remote pumping systems shall be equipped with an automatic line leak detector.
- (5) On a remote pumping system, a listed rigidly-anchored emergency shutoff valve incorporating a fusible link or other thermally actuated device designed to close automatically in event of severe impact or fire exposure shall be properly installed in the supply line at the base of each individual island-type dispenser. The automatic closing feature of this valve shall be tested by a qualified person at the time of initial installation and at least once a year thereafter by manually tripping the hold-open linkage.

9.07: continued

(6) The operator shall immediately advise the owner should a leak detector signal a suspected product loss or a suction product system indicate a potential symptom of a leak (*i.e.*, meter display jumping or skipping, liquid not being pumped when pump is on, initial pump overspeed followed by slow pumping, erratic liquid flow indicating air and liquid mixture, continued loss of prime in the pumping unit, *etc.*).

(7) The owner and/or operator shall take immediate action to verify the operation of the pumping system when a leak is suspected. Should a loss be determined, the owner and/or operator shall take immediate corrective action. The affected pumping system shall be taken out of service until the necessary corrective action has been taken.

(8) All new and replacement remote pumping system dispensers shall be equipped with a dispenser sump. The sump shall be monitored for product loss.

Exception: This requirement shall not apply to the replacement or repair of the product dispenser alone due to damage or malfunction, but shall apply to any replacement of both the dispenser and the equipment used to connect the dispenser to an underground storage tank.

(F) Non-flammable Hazardous Substances

(1) Hazardous substances with a flash point are considered flammable liquids and shall follow all the provisions of 527 CMR 9.00.

(2) All new or replacement non-flammable hazardous substance underground storage tanks and piping shall comply with all provisions of 527 CMR 9.00.

(3) All existing non-flammable hazardous substances underground storage tank systems shall be upgraded in accordance with the provisions of 527 CMR 9.05(G).

(G) Pressure Vessels. The construction of any tank subject to pressure shall meet the design standards of NFPA 30, sections 2.2.3.2 and 2.2.3.3, provided section 2.2.3.3.2 shall not apply.

(H) Response to Leaks.

(1) In the event of a leak, whether determined by testing or otherwise, the following steps shall be taken:

(a) The operator shall immediately notify the owner

(b) The owner or operator shall immediately notify the head of the fire department and the DEP.

(c) If testing has confirmed that the source of the leak is the piping for a particular tank, the operator shall take that tank out of service immediately.

(d) If testing has confirmed that the source of the leak is a particular tank, the owner shall within 24 hours cause that tank to be emptied of all its product.

(2) The Head of the Fire Department shall verify that the requirements of 527 CMR 9.07(H)(1) are complied with.

(3) Upon the arrival of the representative of DEP, the Head of the Fire Department shall advise him of the conditions at the site and the results of the investigations required by 527 CMR 9.07(H)(1).

(4) The owner and the operator shall cooperate with the representative of DEP in all efforts to locate the source of the leak, to contain it, *etc.*

(5) The Head of the Fire Department shall remain in command during the containment procedures as long as, in his opinion, a fire or explosion hazard exists. During this period, the elimination of the fire/explosion hazard will have priority over all other concerns, while recognizing that the protection of the environment should be considered at all times. Once such hazards cease, the representative of DEP shall direct the owner/operator regarding the required response action necessary to mitigate the release to the environment. (*Reference:* Massachusetts Contingency Plan 310 CMR 40.300 *et seq.*)

(I) Tank Repair.

(1) No underground tank shall be relined.

(2) The Head of the Fire Department shall determine whether any other tank shall be removed and replaced or whether it may be repaired, and he shall notify the owner of his decision.

(3) Any repair of a tank or replacement or repair of its components shall be by an approved tank company, performed by qualified technicians, following the manufacturer's directions, and recommendations of American Petroleum Institute in effect as of the date of such repair or replacement.

9.07: continued

(4) If the Head of the Fire Department determines that a tank and its components shall be removed, the owner shall first obtain a permit from him pursuant to M.G.L. c. 148, § 38A. Any removal shall be completed within 90 days after the Head of the Fire Department has notified the owner of his decision.

(5) The owner and/or operator shall maintain records of each repair or relining for the remaining operating life of the underground storage tank system.

(J) Tanks Abandoned or Temporarily Out of Service.

(1) If the owner decides to abandon a tank which is either located under a building and cannot be removed from the ground without first removing the building or which is so located that it cannot be removed from the ground without endangering the structural integrity of another tank, the owner shall notify the Head of the Fire Department of this condition. After verification by a registered professional engineer that such a condition so exists, the owner shall have all product removed from the tank, by hand pump if necessary, under the direction of the Head of the Fire Department, and shall have the tank filled with a concrete slurry mix or any other inert material approved by the Marshal for this purpose. Before permanent closure in place of an underground tank and/or underground piping is completed, the owner/operator, at his or her own expense shall measure for the presence of a release of oil or hazardous material, where contamination is most likely to be present on the site. If contamination is found, the owner/operator shall immediately notify the Head of the Fire Department and DEP.

(2) Except as provided in 527 CMR 9.07(J)(1), no tank may be abandoned in place. Any owner of a tank who has decided to abandon it and any owner of a tank which has been out of service for a period of time constituting abandonment as defined in 527 CMR 9.02, shall immediately obtain a permit from the Head of the Fire Department pursuant to M.G.L. c. 148, § 38A, and, subject to the directions of the Head of the Fire Department, shall have any product removed from the tank, all openings properly secured, and the tank removed from the ground. The product and tank shall be disposed of in accordance with 310 CMR 30.00, at the owner's expense, as directed by the Head of the Fire Department.

(3) The owner of every underground storage tank licensed under M.G.L. c. 148, which the owner has decided to take out of service for a period of less than six months, shall promptly notify the Head of the Fire Department of the decision, shall have all product removed from the tank and disposed of in accordance with 310 CMR 30.00: *Hazardous Waste*, as directed by the Head of the Fire Department, and shall have all openings properly secured and the tank rendered inert. During any period a tank is temporarily out of service the owner must continue operation and maintenance of corrosion protection in accordance with 527 CMR 9.05(E)(2). Before any such tank may be restored to service, the owner of the tank shall notify the Head of the Fire Department, who may require that the owner have the tank and its piping tested, at the owner's expense, in accordance with the provisions of 527 CMR 9.05(F).

EXCEPTION: Double walled tanks may be taken out of service for a period not to exceed 24 months provided the provisions of 527 CMR 9.07(J)(3) are met.

(4) The owner of every aboveground tank of more than 10,000 gallons capacity for the storage of any fluid other than water, required to have a permit from the Marshal under the provisions of M.G.L. c. 148, § 37 which has been out of service for more than 12 consecutive months shall promptly notify the Head of the Fire Department and shall have all product removed from the tank and the tank cleaned properly.

(5) The owner of every aboveground tank referred to in 527 CMR 9.07(J)(4) which has been out of service for more than 24 consecutive months and who intends to restore the tank to service must first notify the Head of the Fire Department and must have, at the owners expense, an examination of the tank conducted by a qualified registered professional engineer not permanently employed by the owner or operator of the tank. The examination of the tank will include a visual inspection of the tank welds, walls, foundation and an ultrasonic test of the floor plate thickness. A copy of the engineers report must be filed with the Head of the Fire Department. The tank must also be inspected by the State Fire Marshal before the tank can be restored to service.

9.07: continued

(6) The owner of every aboveground tank, referred to in 527 CMR 9.07(J)(4), who intends to restore to service any such tank that has been out of service for more than 60 consecutive months must first notify the Head of the Fire Department and must have at the owner's expense a physical inspection and hydrostatic test of the tank conducted by a qualified registered professional engineer not permanently employed by the owner or operator of the tank. The physical examination shall include the same requirements as 527 CMR 9.07(J)(5). The person conducting such tests and examinations shall notify the Head of the Fire Department prior to the tests and examinations. This person shall promptly supply the tank owner (or operator) and the Head of the Fire Department with certified copies of all tank tests and examinations. Prior to the tank being restored to service it must also be examined by the Marshal.

(7) If an aboveground tank subject to the requirements of 527 CMR 9.07(J)(7) which has been used for the keeping or storage of gasoline or other petroleum products, has been abandoned, in accordance with the requirements of 527 CMR 9.00, the Head of the Fire Department shall order the owner or operator of the tank to dismantle and dispose of the tank except where the Fire Marshal determines that the integrity of said tank complies with the construction intent of 527 CMR 9.00, and the Head of the Fire Department concurs.

(K) Tank Removal.

(1) Any person granted a permit by the Marshal or the Head of the Fire Department to remove a tank under the provisions of M.G.L. c. 148, or 527 CMR 9.00, shall within 72 hours provide the permit-granting authority with a receipt for delivery of said tank to the site designated on the permit.

(2) Before any person is granted a permit by the Marshal or the Head of the Fire Department to remove a tank under the provisions of M.G.L. c. 148, or 527 CMR 9.00, and said tank is not being transported to an approved tank yard, the person requesting the permit shall provide the permit-granting authority with written approval for the designated site of disposition. (Reference: 502 CMR 3.00 for tank removal and disposal procedure)

(3) Underground piping shall not be abandoned in place unless the Head of the Fire Department believes that the removal would constitute a danger to public safety. If the Head of the Fire Department believes that removal of the underground piping constitutes a danger to public safety the piping shall be cleaned and rendered safe as specified by the Head of the Fire Department.

(4) Within 24 hours after the removal of underground tanks and/or underground piping the owner/operator shall measure for the presence of a release of oil or hazardous materials to the environment where contamination is most likely to be present on the site. If contamination is found the owner/operator shall immediately notify the Head of the Fire Department as well as the DEP.

(L) Enforcement and Appeals.

(1) Any owner or operator who violates any provision of 527 CMR 9.00 shall be subject to the penalties provided under M.G.L. c. 148, § 38H, as amended. Each day during which such violation continues shall constitute a separate offense. Upon request of the Head of the Fire Department, the licensing authority and the town/city counsel shall take any legal action necessary to enforce the provisions of 527 CMR 9.00.

(2) In the event of a violation of 527 CMR 9.00 by the owner or operator of a storage facility, the Head of the Fire Department or the Marshal, instead of or in addition to requesting enforcement under 527 CMR 9.07(L)(1), may revoke or suspend the owner's permit or may require more frequent testing than would otherwise be required under 527 CMR 9.05(F); and if a permit is revoked or if a storage facility has been installed or maintained without a permit, the Head of the Fire Department or the Marshal may order that the storage facility be removed from the ground. Before revoking or suspending an owner's license or requiring removal of the storage facility from the ground, the licensing authority shall hold a public hearing on the proposed action, and shall by certified mail give the owner at least ten days' advance notice of the hearing, and shall render its decision in writing with a brief statement of the reasons therefor.

9.07: continued

(3) After a public hearing, the Head of the Fire Department may, with the concurrence of the Marshal, vary the application of any provision of 527 CMR 9.00 unless otherwise required by law when in his opinion the applicant has demonstrated that an equivalent degree of protection will still be provided to public and private water supplies. Notice of the public hearing shall be given at least ten days prior thereto, by certified mail at the applicant's expense to all abutters to the applicant's property, and by publication in a newspaper or general publication in a town or city. The notice shall include a statement of the variance sought and the reasons therefor. Any grant or denial shall be in writing and shall contain a brief statement of the reasons for the grant or denial.

(4) All tanks used for the storage of flammable and combustible liquids shall be subject to 527 CMR.

(5) All tanks and their appurtenances shall be maintained in a safe condition at all times.

(6) No tank for which a permit has been issued for the storage of any liquid with a specific gravity of one or less shall be used for the storage of any liquid with a specific gravity of more than one.

(7) No wooden tank shall be used for the storage of any flammable or combustible liquid.

(8) No open tank shall be used for the storage of any flammable or combustible liquid.

(M) Permits.

(1) Permits issued under 527 CMR 9.07(M) shall be issued and renewed contingent upon passing the inspection conducted pursuant to 527 CMR 9.07(P). Either the original or photographic copy of all current permits granted under the provisions of 527 CMR 9.00 shall be conspicuously posted or kept on the premises.

(2) New Tank or Storage Facilities:

(a) No tank storage facility shall be installed unless the owner shall first have obtained a permit from the Head of the Fire Department. This permit shall be in addition to any license or any other permit required by M.G.L. c. 148, or by any regulations issued thereunder.

(b) The application for a permit shall be on a form prescribed by the Marshal and obtained from the Head of the Fire Department and shall include, but not limited to the following information:

1. Name, address, and telephone numbers (day and night) of the owner.
2. Name, address, and telephone numbers (day and night) of the operator.
3. The number of tanks in the proposed facility and the capacity of each proposed tank.
4. The proposed type of construction of each tank and its piping, together with the tank's approval number if any, and a description of any provisions made for cathodic protection, electrical isolation, and early detection of leaks through a monitoring system.
5. The depth below ground level of the lowest and highest points of each proposed tank.

EXCEPTION: Aboveground Storage tanks regulated under 527 CMR 9.04, shall be exempt from providing information on any provisions made for 527 CMR 9.07(M)(2)(b)5. the depth below ground level of the lowest and highest points of each proposed tank.

(c) In a storage facility with more than one proposed tank, the applicant shall furnish the Head of the Fire Department with a certificate signed by a qualified person stating that the proposed facility meets all the design requirements of 527 CMR 9.00.

(d) The applicant shall also furnish a plot plan of the site and the area surrounding it, showing the location of each proposed tank and its components and of any building on the site, and the approximate location of any public or private well and of any body of surface water within 500 feet of the proposed storage facility.

(e) The Head of the Fire Department may require secondary containment or equivalent protection for new installations where groundwater below the facility is within Zone II (Zone of Contribution) of municipal water wells, or where private potable water wells or a water supply reservoir is within 300 feet of the tank installation.

9.07: continued

(3) Existing Storage Facilities:

(a) The owner of every underground storage facility installed prior to May 9, 1986, shall apply to the Head of the Fire Department for a permit to maintain the storage facility. Application shall be made on forms obtained from the Head of the Fire Department.

(b) The applicant shall furnish a plot plan to scale of the facility site and the area surrounding it, showing the location of each tank and its components and of any building on the site, and the approximate location of any public or private well and of any body of surface water within 500 feet of the storage facility. Legend notes shall include, to the extent available to the owner, the following information and any other information required by the Head of the Fire Department.

1. Name, address, and telephone numbers (day and night) of the owner.
2. Name, address, and telephone numbers (day and night) of the operator.
3. The number of tanks in the facility and the capacity and contents of each tank.
4. The type of construction for each tank and its piping, together with a description of any provisions made for cathodic protection, electrical isolation, and early detection of leaks through a monitoring system.
5. The date of installation of each tank.

(c) The owner shall furnish evidence of the date of installation. Such evidence may include, but is not limited to, a copy of any license or permit issued by the local licensing authority and the Head of the Fire Department. If no substantial evidence of the date of installation is supplied, the tank shall be presumed to have been installed 20 years prior to May 8, 1986.

(d) The following storage facilities shall be exempt:

- (i) Farm or residential tanks of 1100 gallons capacity or less used for storing motor fuel for noncommercial purposes.
- (ii) Residential or commercial tanks storing or having stored heating oil (fuel oil) for consumptive use on the premises.

(e) The filing deadline for a permit to maintain an existing storage facility is May 8, 1986.

(4) Replacement or Substantial Modification:

(a) There shall be no replacement of a tank or its components or substantial modification thereto, unless the owner has first applied for and obtained a permit from the Head of the Fire Department, who shall keep a copy of the permit with the records for that storage facility.

(b) Any application for approval under 527 CMR 9.07(K)(4) shall be in writing and shall clearly describe the type of construction of any replacement tank or component of the modification that is proposed.

(c) If the Head of the Fire Department determines that the proposed replacement or modification constitutes a danger to a public or private well, aquifer, recharge area or body of surface water, or for any other reason, the Head of the Fire Department may deny the application or approve it subject to conditions that he may deem necessary to protect such public or private water supply.

(d) No replacement or substantial modification shall be made except by a contractor who has been certified by the manufacturer as qualified for that purpose.

(e) The Head of the Fire Department may require that existing tanks other than those used for heating purposes shall be equipped with observation wells or other detection systems if in his opinion the location of the tanks could jeopardize safety of the public.

(5) Renewal of Permits and Changes of Ownership:

(a) The owner of any new or existing facility for which a permit has been issued under 527 CMR 9.07(M) must apply to the Head of the Fire Department for renewal of the permit upon expiration. The application for renewal must include any changes required under 527 CMR 9.07(M). No application for renewal may be denied except for violations of 527 CMR 9.00 and in accordance with the procedural requirements of 527 CMR 9.07(L)(2).

(b) The owner of any storage facility shall within seven working days notify the Head of the Fire Department of any change in the name, address, or telephone numbers of the owner or of the operator. In the case of any transfer of ownership, the new owner shall be responsible for the notification of this transfer.

9.07: continued

(c) The owner of any storage facility shall within seven working days notify the Marshal of any tank replacement, repair, modification, or upgrading, and of any change in the name, address, or telephone numbers of the owner or the operator. In the case of any transfer of ownership, the new owner shall be responsible for the notification of this transfer.

(N) Financial Responsibility Requirements. In accordance with the provisions of Federal regulations 40 CFR parts 280 and 281 owners and operators of petroleum underground storage tanks shall demonstrate financial responsibility for taking corrective action and for compensating third parties for bodily injury and property damage caused by accidental release arising from the operation of petroleum underground storage tanks. The amount of financial coverage and the dates for coverage implementation are specified in 40 CFR parts 280 and 281. The following tanks are exempt from the financial responsibility requirements;

- (1) UST's containing hazardous wastes already regulated under the Federal Resource Conservation and Recovery Act.
- (2) UST systems containing electrical equipment and hydraulic lifts.
- (3) Wastewater treatment UST's that are regulated by the Clean Water Act.
- (4) UST's with a capacity of less than 110 gallons, and tanks holding a minimal concentration of regulated substances.
- (5) UST's that serve as emergency backup, hold regulated substances for only a short time, and are expeditiously emptied after use.
- (6) Field constructed tanks.
- (7) UST's containing radioactive materials and UST's used as backup diesel tanks at nuclear facilities.
- (8) Airport hydrant fueling systems.
- (9) Farm or residential tanks with a capacity of 1,100 gallons or less storing motor fuel which is not for resale.
- (10) Tanks for storing heating oil which is consumed on site.
- (11) Septic tanks.
- (12) Certain pipeline systems, such as those regulated under the Natural gas Pipeline Safety Act of 1968.
- (13) Surface impoundment's, pits, ponds or lagoons.
- (14) Storm or waste water collection systems.
- (15) Flow-through process tanks.
- (16) Liquid trap and other lines used in oil or gas production.
- (17) Storage tanks on or above the floor of an underground area, such as a basement or tunnel.

(O) Delivery Prohibition Orders.

- (1) In addition to the enforcement measures specified in 527 CMR 9.07(L), the Marshal, Head of the Fire Department or their designees may after notice to the owner/operator of any underground storage tank, prohibit delivery of product to said tank or tanks for one or more of the following reasons:
 - (a) Failure to properly install, operate and or maintain leak detection equipment; or
 - (b) Failure to properly install, operate and or maintain spill, overfill, or corrosion protection equipment; or
 - (c) Failure to maintain financial responsibility; or
 - (d) Any other condition that endangers the public health, safety or environment.
- (2) The Marshal, Head of the Fire Department or their designees shall issue the delivery prohibition order to be in effect by taking the following actions.
 - (a) Delivering a written order to the underground storage tank owner or operator prohibiting the introduction of any product into the underground storage tank(s).
 - (b) Affixing an orange delivery prohibition tag to the fill pipe of the effected tank or tanks.
 - (c) Notifying, in writing, the product supplier (if known) of the delivery prohibition.

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(3) The owner/operator of the underground storage tank(s) subject a delivery prohibition order shall notify the official issuing said order upon correcting the condition(s) specified in 527 CMR 9.07(O)(1)(a) through (d). The issuing official shall, within 24 hours (Saturdays, Sundays, and Holidays excepted) of notification of said corrections shall verify that the corrections have been made. If the conditions have been corrected, the official shall cause the delivery prohibition tag to be removed, and the product supplier notified.

(P) Third-party Inspections.

(1) Prior to August 8, 2010, and at a minimum once every three years thereafter the owner/operator of every underground storage tank shall at his/her own expense cause said tank(s) and related piping to be inspected by a third-party inspector, as defined in 527 CMR 9.02.

(2) Effective August 8, 2007, every newly installed underground storage tank and related piping shall be inspected by a third party inspector, as defined in 527 CMR 9.02, at the time installation is completed.

(3) The Third-party inspectors shall verify that the owner/operator possess the following documents.

(a) A current license for the storage of flammable and combustible liquids issued by the local licensing authority under M.G.L c. 148, § 13, if applicable; and

(b) A valid permit issued pursuant to 527 CMR 9.00, to maintain a new or existing underground storage tank facility; and

(c) A current, accurate and valid underground storage tank registration form (Form FP-290); and

(d) Copies of the manufacturer's operating instructions for all leak detection, tank monitoring and corrosion protection systems; and

(e) Current inspection/testing records for all leak detection, tank monitoring and corrosion protection systems; and

(f) Evidence of financial responsibility; and

(g) Records of any release reporting and investigation; and

(h) Permanent or temporary closure records.

(4) Third-party inspectors shall conduct an inspection of the following underground storage tank system components in accordance with the equipment manufacturers inspection/testing instructions and sound industry practices:

(a) Appropriate and operational corrosion protection (if applicable)

(b) Overfill prevention in place and operational.

(c) Spill prevention in place and operational.

(d) Tank and piping release detection is appropriate, in place and operational.

(e) Secondary containment is in place (if applicable) and operational.

(5) The third-party inspector shall record the results of the document verification, and the inspection on a form or in a format approved by the Marshal. This form shall be signed under the pains and penalties of perjury.

(6) The third-party inspector shall transmit one copy of the inspection form to the Head of the Fire Department and one copy to the Marshal within 14 business days from of the completion of inspection.

(7) The Head of the Fire Department and the Marshal shall routinely conduct random inspections of facilities that have been inspected by third -party inspectors to ensure integrity of the inspection.

(8) Nothing contained in 527 CMR 9.07(P) shall be construed to limit the authority of the Marshal, the Head of the Fire Department or their designees from conducting inspections of underground storage tank systems.

(9) The following facilities shall be exempt from third-party inspection requirements:

(a) Farm or residential tanks of 1100 gallons capacity or less used for storing motor fuel for noncommercial purposes.

(b) Residential or commercial tanks storing or having stored heating oil (fuel oil) for consumptive use on the premises.

(10) The Marshal may, after notice and an opportunity for a hearing, suspend or revoke the right of any third-party inspector to conduct inspections required under 527 CMR 9.07(P), if the Marshal determines that any of the following has occurred.

(a) An inspection was not conducted under the direct supervision of the third-party inspector submitting the inspection form.

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- (b) third-party inspector is an owner or operator of the underground storage tank, an employee of the owner/operator of the underground storage tank, or a person having daily on-site responsibility of the underground storage tank.
- (c) The third-party inspector submits false or misleading inspection reports.
- (d) The third-party inspector fails to conduct an inspection in accordance with manufacturers inspection and testing instructions, and accepted industry practice.
- (e) For any other reason which reasonably questions the qualifications of said inspector to continue to conduct further inspections.

(Q) Additional Operator Requirements.

- (1) Written operator response guidelines shall include spill reporting procedure, contact phone numbers, malfunctioning equipment notification procedures, and initial mitigation protocol for emergencies.
- (2) Monthly visual inspections meeting the following minimum requirements shall be conducted at all underground storage systems.
 - (a) Inspection shall be conducted by or under the direction of the Class A or B operator.
 - (b) The results of each inspection shall be recorded in a monthly inspection report and be readily available for inspection for a period of no less than three years.
 - (c) The following items shall be inspected and shall be reported on the inspection report as no defect, defect, and how any defect was resolved:
 - 1. Product shear valve properly anchored.
 - 2. Verify the presence each pressure/vacuum vent cap and if the cap is missing, replace the cap.
 - 3. Inspect each spill bucket for the presence of oil, water, or debris, remove and dispose of any motor fuel, water, or debris in accordance with the applicable federal, state, and local requirements, and repair each spill bucket as necessary.
 - 4. Inventory conducted daily, reconciled monthly.
 - 5. Verify that Underground storage tank sumps have been inspected at least semi-annually and that sump sensors are set below the lowest sidewall penetration within each sump.
 - 6. Inspect each motor fuel dispenser hose for tears, leaks, holes, kinks, crimps or defects of any kind and replace as necessary.
 - 7. Inspect each motor fuel dispenser nozzle for leaks, obstruction of vapor recovery holes, or defects of any kind and replace as necessary.
 - 8. Inspect each motor fuel dispenser cabinet interior and dispenser sump for leaking components and the presence of motor fuel, water or debris, remove and dispose of any motor fuel, water or debris in accordance with all applicable federal, state, and local requirements, and repair each component as necessary.
 - 9. Verify that grade level fill covers are tight fitting and properly color-coded.
 - 10. Inspect each automatic tank gauge detector panel for proper operation of product monitoring and leak detection systems and repair or replace components as necessary.
 - 11. Deficiencies discovered during the monthly visual inspection shall be repaired or otherwise corrected within 30 days.
 - 12. The Class B operator shall ensure that the underground storage tank system that will store or dispense product is compatible with the product that will be stored or dispensed.
- (3) Delegation of the responsibilities of 527 CMR 9.07(Q) to designated Class A, B, or C operators shall not relieve the owner or operator from liability for non-compliance with the requirements of 527 CMR 9.07(Q).

9.08: Referenced Publications

Documents or portions thereof that are referenced within 527 CMR 9.00 shall be considered a part of the requirements of 527 CMR 9.00. Refer to 527 CMR 49.00 for a complete listing of all documents referenced in 527 CMR.

REGULATORY AUTHORITY

527 CMR 9.00: M.G.L. c. 22, § 14; c. 22D, § 4; c. 148, §§ 9, 10, 13, 28, 37, 38 and 38E.