

1301:7-9-07

**Release detection requirements and methods for UST systems.****(A) Purpose and scope.**

For the purpose of prescribing rules pursuant to section 3737.88 of the Revised Code, the fire marshal hereby adopts this rule to establish release detection requirements and methods for underground storage tanks containing petroleum or other regulated substances. This rule is adopted by the fire marshal in compliance with Chapter 119. of the Revised Code and shall not be considered a part of the "Ohio Fire Code." The following UST systems are exempt from this rule:

- (1) Wastewater treatment tank systems;
- (2) Any UST systems containing radioactive material that are regulated under the Atomic Energy Act of 1954 (42 U.S.C.A. 2014 and following);
- (3) Any UST system that is part of an emergency generator system at nuclear power generation facilities regulated by the United States nuclear regulatory commission;
- (4) Airport hydrant fuel distribution systems;
- (5) UST systems with field-constructed tanks; and
- (6) UST systems that store fuel solely for use by emergency power generators.

**(B) Release detection requirements for UST systems.**

- (1) USTs shall be monitored at least every thirty days for releases by the owner or operator using one of the methods listed in paragraphs (D)(2) to (D)(4)(b) of this rule except that:
  - (a) Tanks with a capacity of five hundred fifty gallons or less may use manual tank gauging in compliance with paragraphs (D)(1) to (D)(1)(d) of this rule as the sole method of release detection.
  - (b) Tanks with a capacity of five hundred fifty-one to two thousand gallons that contain new or used oil may use manual tank gauging in compliance with paragraphs (D)(1) to (D)(1)(d) of this rule as a method of release detection provided that a tank tightness test is performed in accordance with paragraph (F) of this rule once every five years.

- (c) Owners and operators using soil gas monitoring or ground water monitoring as the sole method of release detection for USTs and piping shall comply with one of the release detection methods as provided in paragraphs (D)(2) to (D)(4)(b) of this rule by December 31, 2005.
  - (d) If a method of release detection authorized in paragraph (B)(1) of this rule is found to be defective, owners and operators shall immediately repair or replace the method of release detection.
    - (i) While the method of release detection is being repaired or replaced, owners and operators may use product inventory control in accordance with paragraph (B)(2) of this rule in lieu of complying with the requirements of paragraph (B)(1) of this rule.
    - (ii) Owners and operators may use product inventory control in accordance with paragraph (B)(2) of this rule for a period of up to sixty days after the last passing result obtained in accordance with paragraph (B)(1) of this rule. Afterwards, owners and operators shall take the UST system out of service in accordance with rule 1301:7-9-12 of the Administrative Code until such time that the release detection method is repaired or replaced.
- (2) USTs containing motor or aviation petroleum fuels shall be monitored daily by the owner or operator using product inventory control conducted as described in "American Petroleum Institute 1621-01; Recommended Practice for Bulk Liquid Stock Control of Retail Outlets".
- (a) Inventory from UST systems shall be reconciled monthly. If the reconciliation for any month indicates an overage or shortage equal to or greater than one per cent of flow-through plus one hundred thirty gallons, owners and operators shall investigate the inventory discrepancy as described in "American Petroleum Institute 1621-01 Recommended Practice for Bulk Liquid Stock Control of Retail Outlets".
  - (b) If inventory discrepancies occur for two consecutive months, owners and operators shall perform an investigation in accordance with all of the following:
    - (i) Conduct a tightness test of the UST system in accordance with paragraph (F) of this rule within seven days of discovery of the discrepancy;

- (ii) Report any failure of a tightness test to BUSTR as a suspected release. A release is suspected and subject to the reporting requirements of sections 3737.88 and 3737.882 of the Revised Code and this chapter of the Administrative Code if a tightness test leak rate exceeds the amount designated for the testing method. Passing tightness test results do not have to be reported to the fire marshal, and
    - (iii) Maintain the results of all required tightness tests for a minimum of two years. All tightness test results shall be made available for inspection at the site within twenty-four hours of a request from the fire marshal.
  - (c) Other types of monitoring may be used if the owner and operator can demonstrate that the method can detect an inventory discrepancy or a release from the UST system, including containment equipment, as effectively as the methods allowed in paragraph (B)(1) or (B)(2)(a) of this rule. The method shall operate continuously or shall produce a conclusive result at least once a week. A release is suspected and subject to the reporting requirements of sections 3737.88 and 3737.882 of the Revised Code and this chapter of the Administrative Code if a release is detected by the monitoring method.
- (3) Underground piping that routinely contains regulated substances shall be monitored for releases by the owner or operator in a manner that meets one of the following requirements:
  - (a) Underground piping that conveys regulated substances under pressure shall be equipped with an automatic line leak detector attached to the piping that will alert the operator to the presence of a leak by restricting or shutting off the flow of regulated substances through the piping or triggering an audible or visual alarm if the automatic line leak detector detect a leak of three gallons per hour at ten pounds per square inch line pressure within one hour. The owner and operator is permitted to restart the flow of regulated substances only once to verify the presence of a piping leak or an equipment malfunction. If the flow of regulated substance is restricted or shut off or in the event of an audible or visual alarm after a restart by an operator, a release is suspected and subject to the reporting requirements of sections 3737.88 and 3737.882 of the Revised Code and this chapter of the Administrative Code.
  - (b) Underground piping that conveys regulated substances under suction shall have a line tightness test conducted at least once every thirty-six month

period in compliance with paragraph (F)(2) of this rule unless the owner and operator can readily demonstrate that the suction piping is designed and constructed to meet all of the following standards:

- (i) The underground piping operates at less than atmospheric pressure;
  - (ii) The underground piping is sloped so that the contents of the pipe will drain back into the tank if the suction is released;
  - (iii) Only one check valve is included in each suction line; and
  - (iv) The check valve is located directly below and as close as practical to the suction pump.
- (4) New underground piping and containment systems installed pursuant to paragraph (B)(2), (B)(3) or (C) of rule 1301:7-9-06 of the Administrative Code shall comply with all of the following:
- (a) Piping and containment systems shall be monitored with sensors capable of detecting a ~~liquid~~ release of a regulated substance before the release reaches the lowest penetration in the containment system. Sensors shall be located in every containment.
    - ~~(i) Liquid sensors shall be located in every containment.~~
    - ~~(ii) Sensors shall be designed to discriminate between regulated substances and water.~~
  - (b) Any alarm from a sensor in any containment system shall be evaluated within twenty four hours to confirm proper operation or to confirm the presence of a release. A release is suspected and subject to the reporting requirements of sections 3737.88 and 3737.882 of the Revised Code and this chapter of the Administrative Code if any regulated substance ~~is present in~~ has collected in the containment sump and risen to a level above the lowest penetration in the containment system or if any regulated substance ~~or~~ escapes from the containment system.
- (5) All methods of release detection shall be properly installed in accordance with the manufacturer's instructions and either "Petroleum Equipment Institute Publication RP100-2000; Recommended Practices for Installation of Underground Liquid Storage Systems" or "American Petroleum Institute Publication 1615-01; Installation of Underground Petroleum Storage Systems." Where there is a conflict between requirements the more protective

requirement shall prevail.

- (6) Performing work pursuant to this rule does not relieve a person engaged in underground storage tank activity from the obligation to comply with any other applicable federal, state, or local laws and regulations, including but not limited to, the Ohio Fire Code and the Ohio Building Code, etc.
- (C) Release detection requirements for UST systems containing hazardous substances and UST systems located in sensitive areas containing petroleum.
- (1) In addition to meeting the requirements in paragraph (B)(2) to (B)(6) of this rule, UST systems containing hazardous substances and UST systems that were installed in areas designated as sensitive areas after the effective dates listed in paragraphs (C) to (E) of rule 1301:7-9-09 of the Administrative Code, shall be monitored by the owner or operator in accordance with the following:
    - (a) UST systems shall be monitored at least every thirty days for releases in accordance with paragraph (D)(3) of this rule;
    - (b) Underground piping and containment systems shall comply with all new piping and containment requirements pursuant to paragraph (B)(4) of this rule; and
    - (c) All underground piping that conveys regulated substances under pressure shall be equipped with an automatic shut off line leak detector which alerts the operator to the presence of a leak by shutting off the flow of regulated substance through piping and triggering an audible or visual alarm when a leak of three gallons per hour at ten pounds per square inch pressure within one hour occurs. The automatic shut off line leak detector shall be designed and installed in such a manner that will permit the operator to restart the flow of regulated substance only one time to verify the presence of a piping leak or an equipment malfunction. If the automatic shut off line leak detector is activated after a restart by the operator, the flow of regulated substance through the attached underground piping shall automatically be stopped until the piping and the automatic shut off line leak detector are inspected under the supervision of an installer certified pursuant to rule 1301:7-9-11 of the Administrative Code. A release is suspected and subject to the reporting requirements of sections 3737.88 and 3737.882 of the Revised Code and this chapter of the Administrative Code if the line leak detector activates after a restart by the operator as described in this paragraph, unless an installer certified pursuant to rule 1301:7-9-11

of the Administrative Code determines that an equipment malfunction occurred.

- (2) UST systems that were installed in areas designated as sensitive areas prior to the effective dates listed in paragraph (C) to (E) of rule 1301:7-9-09 of the Administrative Code, shall be monitored in accordance with paragraphs (B)(1) to (B)(6) of this rule.
- (3) Existing UST systems located in newly designated sensitive areas under paragraph (E) of rule 1301:7-9-09 of the Administrative Code shall undergo modification within one year of the designation of the sensitive area to comply with paragraph (C)(1)(c) of this rule.

(D) Methods of release detection for USTs.

- (1) Manual tank gauging shall be conducted weekly and comply with the following requirements:
  - (a) Tank liquid level measurements shall be taken at the beginning and end of a time period of at least thirty-six hours during which no liquid is added to or removed from the tank;
  - (b) Level measurements are based on an average of two consecutive stick readings at both the beginning and ending of the period;
  - (c) The equipment used is capable of measuring the level of product over the full range of the tank's height to the nearest one-eighth of an inch; and
  - (d) A release is suspected and subject to the reporting requirements of sections 3737.88 and 3737.882 of the Revised Code and this chapter of the Administrative Code if the variation between the beginning and ending measurements exceeds the weekly or monthly standards in the following table:

Tank Capacity	Weekly Standard (One test)	Monthly Standard (Average of four tests)
550 gallons or less	10 gallons	5 gallons
551-1,000 gallons	13 gallons	7 gallons
1,001-2,000 gallons	26 gallons	13 gallons

- (2) Equipment for automatic tank gauging that tests for the loss of regulated substance and conducts inventory control shall comply with the following requirements:
  - (a) The automatic product level monitor test can detect a two-tenth of a gallon per hour leak rate from any portion of the tank; and
  - (b) A release is suspected and subject to the reporting requirements of sections 3737.88 and 3737.882 of the Revised Code and this chapter of the Administrative Code if a two-tenth of a gallon per hour leak rate is detected from any portion of the tank.
- (3) Interstitial monitoring between the UST system and a secondary barrier immediately around or beneath the UST system may be used, but only if the UST system is designed, constructed and installed to detect a release from any portion of the tank that routinely contains a regulated substance and complies with one of the following three requirements:
  - (a) For double-walled UST systems, the sampling or testing method can detect a release through the inner wall or a failure of the outer wall in any portion of the tank that routinely contains a regulated substance. A release is suspected and subject to the reporting requirements of sections 3737.88 and 3737.882 of the Revised Code and this chapter of the Administrative Code if any regulated substance is detected between the inner and outer wall, or if the outer wall fails.
  - (b) For UST systems with a secondary barrier within the excavation zone, the sampling or testing method used can detect a release between the UST system and the secondary barrier by means of the following:
    - (i) The secondary barrier around or beneath the UST system is consists of constructed of artificial material that is sufficiently thick so as to have no more than a 0.000001 centimeters per second permeability rate for the regulated substance stored in the UST and to direct a release to the monitoring point and permit its detection.
    - (ii) The barrier is compatible with the regulated substance stored so that a release from the UST system will not cause a deterioration of the barrier;
    - (iii) For cathodically protected tanks, the secondary barrier shall be

installed so that it does not interfere with the proper operation of the cathodic protection system;

- (iv) The ground water, soil moisture, rainfall, or other known interferences will not render the testing or sampling method used inoperative so that a release could go undetected for more than thirty days;
  - (v) The site is assessed to ensure that the secondary barrier is always above the ground water and not in a twenty-five year flood plain, unless the barrier and monitoring designs are for use under such conditions; and
  - (vi) Monitoring wells are clearly marked and secured to avoid unauthorized access, tampering, and surface runoff contamination. Owners and operators shall keep an accurate log of all drillings and borings in compliance with this chapter and shall maintain at the location of the monitoring well a method of access for fire marshal inspection at all times.
  - (vii) A release is suspected and subject to the reporting requirements of sections 3737.88 and 3737.882 of the Revised Code and this chapter of the Administrative Code if any regulated substance is detected between the UST system and the secondary barrier.
- (c) For tanks with an internally fitted liner, an automated device that can detect a release between the inner wall of the tank and the liner, and the liner shall be compatible with the regulated substance stored. A release is suspected and subject to the reporting requirements of sections 3737.88 and 3737.882 of the Revised Code and this chapter of the Administrative Code if any regulated substance is detected between the inner wall of the tank and the liner.
- (4) Any other type of release detection method, or combination of methods, can be used if approved in writing by the fire marshal prior to installation and if:
- (a) The method can detect a two-tenths of a gallon per hour leak rate or a release of one hundred fifty gallons within thirty days with a probability of detection of 0.95 and a probability of falsely indicating a release of 0.05; or
  - (b) The owner and operator can demonstrate the method can detect a release



as effectively as any of the methods allowed in paragraphs (D)(1) to (D)(4)(a) of this rule. In comparing methods, the fire marshal shall consider the size of release that the method can detect and the frequency and reliability with which it can be detected. If the method is approved, the owner and operator shall comply with any terms and conditions imposed by the fire marshal on its use.

- (c) A release is suspected and subject to the reporting requirements of sections 3737.88 and 3737.882 of the Revised Code and this chapter of the Administrative Code if a release exceeds the leak rates established for the method approved by the fire marshal.

(E) Release detection recordkeeping.

All UST system owners and operators shall maintain records in compliance with this chapter demonstrating compliance with all applicable requirements of this rule. These records shall include, without limitation, the following:

- (1) All written performance claims pertaining to any release detection system used, and the manner in which these claims have been justified or tested by the equipment manufacturer or installer, shall be maintained for the life of the UST system and for five years after the closure of the UST system in compliance with this chapter;
- (2) The results of any sampling, testing, or monitoring shall be maintained for at least two years, except that the results of tank tightness testing conducted in compliance with paragraph (F) of this rule shall be retained until the next test is conducted; and
- (3) Written documentation of all calibration, maintenance, and repair of release detection equipment permanently located at the facility shall be maintained for the life of the equipment. Any schedules of required calibration and maintenance provided by the release detection equipment manufacturer shall be retained for the life of the UST system.

(F) Testing methods for UST systems.

- (1) Tightness testing for underground storage tanks.
  - (a) Tank tightness testing of the primary shell of both single wall and double wall tanks shall be capable of detecting a one tenth of a gallon per hour leak rate from any portion of the tank while accounting for the effects of thermal expansion or contraction of the regulated substance, vapor

pockets, tank deformation, evaporation or condensation, and the location of the water table.

- (b) Tightness testing of the interstice of double wall tanks shall follow the manufacturers testing requirements.

(2) Tightness testing for piping.

- (a) Piping tightness testing of the primary piping of both single wall and double wall pressure piping may be conducted only if it can detect a one-tenth of a gallon per hour leak rate at one and one-half times the operating pressure.

- (b) Tightness testing of the primary piping of both single wall and double wall suction and gravity piping shall be conducted as follows:

- (i) Piping that can be isolated from the UST shall be tested using a method capable of detecting a one-tenth of a gallon per hour leak rate at a minimum of fifteen pounds per square inch pressure.

- (ii) Piping that can not be isolated from the UST shall be tested using a method capable of detecting a one-tenth of a gallon per hour leak rate.

- (c) Tightness testing of the interstice of double wall piping shall follow the manufacturers testing requirements.

(3) Testing of containment systems and other ancillary equipment:

- (a) Testing of automatic line leak detectors shall be performed as follows:

- (i) Automatic line leak detector shall be capable of detecting a release of three gallon per hour at ten pounds per square inch line pressure within one hour; and

- (ii) Automatic line leak detectors shall be tested in a manner that introduces a simulated leak into the product line between the tank and the dispenser, and the automatic line leak detector functions within design specifications and the flow of product is restricted, stopped or an alarm is activated.

- (b) Testing of containment systems shall be performed as follows:
    - (i) All penetrations must be completed prior to testing, including electrical;
    - (ii) The containment system shall be filled with water or other approved liquid to a height that covers the highest penetration by six inches;
    - (iii) During in-ground tests, the containment system shall not be backfilled prior to the test; and
    - (iv) The test duration shall be sixty minutes with no drop in liquid levels.
  - (c) Any containment system or ancillary equipment that fails a test method listed in paragraph (F)(3) of this rule shall undergo routine maintenance, modification or major repair, as appropriate, to restore the containment system or ancillary equipment to working order.
- (4) All testing methods listed in paragraphs (F)(1) and (F)(2) of this rule shall be third party approved to perform in a manner where the method can detect a release at the designated release rate with a probability of detection of 0.95 and a probability of falsely indicating a release of 0.05. A release is suspected and subject to the reporting requirements of sections 3737.88 and 3737.882 of the Revised Code and this chapter of the Administrative Code if a leak rate exceeds the amount designated for the testing method.
  - (5) Testing shall be performed in accordance with the manufacturer's instructions, petroleum equipment institute publication RP100-2000; "Recommended Practices for Installation of Underground Liquid Storage Systems", American petroleum institute publication 1615-01; "Installation of Underground Petroleum Storage Systems", national fire protection association publication NFPA 30-03 "Flammable and Combustible Liquids Code", and national fire protection association publication NFPA 30A-03 "Motor Fuel Dispensing Facilities and Repair Garages". Where there is a conflict between requirements the more protective requirement shall prevail.
  - (6) No pressure testing with air shall be performed on a component of an UST system that has contained a flammable regulated substance or flammable vapors. The manufacturers instructions shall be followed when using gases for the test method.

(7) ~~Starting no later than January 1, 2006, all~~ All testing methods defined in paragraphs (F) to (F)(3)(b)(iv) of this rule shall be performed by ~~an installer certified pursuant to rule 1301:7-9-11 of the Administrative Code~~ a person who is:

- (a) Recognized by the manufacturer of the tightness testing method to be proficient in performing the testing method;
- (b) Recognized by an accredited third party to be proficient in performing the tightness testing method; or
- (c) Recognized by the fire marshal to be proficient in performing the tightness testing method.

(G) General performance standards, permits, certified UST installers and inspectors.

- (1) Any person performing work in accordance with this rule shall obtain a permit as required in paragraph (C) of rule 1301:7-9-10 of the Administrative Code prior to performing the work. All work performed pursuant to this rule shall be overseen by a certified UST installer and a certified UST inspector as required in paragraph (D) of rule 1301:7-9-10 of the Administrative Code.
- (2) For an existing UST system, no modification permit is required when switching to product inventory control or manual tank gauging as a method of release detection as described in paragraph (B)(2) or (D)(1) of this rule. A modification permit is required when switching from product inventory control or manual tank gauging to another method of release detection as described in paragraphs (D)(2) to (D)(3) of this rule for an existing UST system.
- (3) Prior to going into operation, a functionality test shall be performed on any new or existing UST system component that undergoes work requiring a permit under paragraph (G)(1) or (G)(2) of this rule. The UST system shall not be placed into operation until a passing functionality result is obtained for the UST system component undergoing work.
- (4) Other release detection requirements and methods may be used in place of any requirements or methods described in this rule if an owner and operator demonstrates that the alternative method is no less protective of human health and the environment than the method or requirement specified in this rule, and the fire marshal approves the alternative method in writing prior to the use of the method. If the alternative method is approved, the owner and

operator shall comply with any terms and conditions imposed on its use by the fire marshal.

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Certification

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Date

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