RULE 425. STORAGE OF VOLATILE ORGANIC COMPOUNDS

(Adopted 7/12/94; Revised 7/22/09)

A. APPLICABILITY. The provisions of this Rule shall apply to equipment used to store crude oil or volatile organic compounds (VOCs) with a vapor pressure greater than or equal to 0.50 pounds per square inch absolute (psia).

B. DEFINITIONS

1. "Alternate test method": A new method for testing that is not referenced in this Rule or which involves major changes to a referenced test method.

2. "Appropriate Analyzer": A hydrocarbon analyzer that meets the requirements of United States Environmental Protection Agency (EPA) Reference Method 21 and is calibrated with methane.

3. "Automatic Bleeder Vent": A floating roof vent that automatically vents air only during initial filling operations and during subsequent landings of the roof.

4. "Background": A reading expressed as methane on a portable hydrocarbon detection instrument which is taken at least three meters upwind from any components to be inspected and which is not influenced by any specific emission point.

5. "Degassing": The process of removing organic gases from a stationary tank, reservoir, or other container.

6. "Emergency Standby Tank": A tank which is not used (filled or partially filled) more than twice in any twelve (12) month period and for which such use is reported to the APCO within 24 hours of the start of such use.

7. "Leak":

   a. The detection of total gaseous hydrocarbons for any component in excess of 10,000 ppmv as methane above background measured according to the test procedure in Subsection J.3, or

   b. Exclusive of intermediate barrier seal fluids, any liquid leak which drips liquid organic compounds at the rate of more than three drops per minute or one (1) cubic centimeter per minute.

   c. A "leak" is not a gaseous emission from pressure relief devices on tanks or delivery vessels when normal process pressure exceeds the limit specified for the device.

8. "Out of Service": Any tank with no liquid present that is configured to allow easy verification of such emptiness by inspection, and with no concentrations of VOCs

greater than 1000 ppmv detected outside the tank using EPA Reference Method 21.

9. "Pressure Tank": Any tank rated, as indicated by an ASME pressure rating stamp, and operated to contain normal working pressures of at least 15 psig without vapor loss to the atmosphere.

10. "Preventive Maintenance": A regularly scheduled course of procedure designed to prevent equipment failure or decline in function.

11. "Submerged Fill Pipe": Any fill pipe or discharge nozzle which meets any of the following conditions:

    a. The discharge opening is entirely submerged when the liquid level is six (6) inches above the bottom of the container.

    b. When applied to a container which is loaded from the side, the discharge opening is entirely submerged when the liquid level is 18 inches above the bottom of the container.

12. "Vapor Loss Control Efficiency": A comparison of controlled emissions to those which would occur from a geometrically similar fixed or cone roof tank in the same product service without a vapor control system. Baseline emissions shall be calculated by using the criteria outlined in EPA document AP-42.

13. "Vapor Pressure": The vapor pressure measured as described in Subsection J.1 of this Rule.

14. "Vapor Recovery System": Any volatile organic compound vapor control system which is designed to prevent the release or venting of volatile organic compounds to the atmosphere under normal operating conditions.

C. EXEMPTIONS

1. The provisions of this Rule shall not apply to:

    a. Any storage tank having a capacity of less than or equal to 1,500 gallons.

    b. Any storage tank containing a volatile organic compound having a true vapor pressure of less than 0.50 psia. Organic compounds having the reference properties listed in Table 1 shall be deemed to be in compliance with the appropriate vapor pressure limits for the tank in which it is stored provided the actual storage temperature does not exceed the corresponding maximum temperature listed. Any person claiming exemption for a storage tank pursuant to Subsection C.1.b must maintain adequate records demonstrating that the true vapor pressure of all materials stored in that tank is less than 0.50 psia.

c. Gasoline storage tanks which are equal to or less than 40,000 gallons capacity subject to Rule 424, Gasoline Dispensing Facilities.

Table 1
Maximum Allowable Temperature Versus True Vapor Pressure

Organic Compounds	Reference Properties			Maximum Temp. °F Not to Exceed	
	Density (lb/gal)	°API	IBP (°F)	0.5 psia (tvp)	1.5 psia (tvp)
Middle Distillates					
Kerosene	--	42.5	350	195	250
Diesel	--	36.4	372	230	290
Gas Oil	--	26.2	390	249	310
Stove Oil	--	23.0	421	275	340
Jet Fuels					
JP-1	--	43.1	330	165	230
JP-3	--	54.7	110	--	25
JP-4	--	51.5	150	20	68
JP-5	--	39.6	355	205	260
JP-7	--	44-50	360	205	260
JP-8	--	--	--	167	222
Fuel Oil					
No. 1	--	42.5	350	195	250
No. 2	--	36.4	372	230	290
No. 3	--	26.2	390	249	310
No. 4	--	23.0	421	275	340
No. 5	--	19.9	560	380	465
Residual	--	19-27	--	405	--
No. 6	--	16.2	625	450	--
Asphalts					
60-100 pen.	--	--	--	490	550
120-150 pen.	--	--	--	450	500
200-300 pen.	--	--	--	360	420
Acetone	6.6	47.0	133	--	35
Acrylonitrile	6.8	41.8	173	30	62
Benzene	7.4	27.7	176	34	70
Carbon Disulfide	10.6	22.1	116	--	10
Carbon Tetrachloride	13.4	--	170	20	63
Chloroform	12.5	--	142	--	40
Cyclohexane	6.5	49.7	177	30	65
1,2 Dichloroethane	10.5	--	180	35	75
Ethyl Acetate	7.5	23.6	171	38	70
Ethyl Alcohol	6.6	47.0	173	55	85
Isopropyl Alcohol	6.6	47.0	181	62	95
Methyl Alcohol	6.6	47.0	148	30	62
Methyl Ethyl Ketone	6.7	44.3	175	30	70
Toluene	7.3	30.0	231	75	120
Vinyl Acetate	7.8	19.6	163	30	65

2. The provisions of Subsections D.3 and D.4 shall not apply to an emergency standby tank not equipped with a vapor loss control device when:

a. The tank is drained of volatile organic compounds or breakdown relief under Rule 107, Breakdown or Upset Conditions and Emergency Variances, is granted by the APCO.

b. Operation of the standby tank shall not occur beyond the period of the primary tank's breakdown and shall not exceed more than 15 calendar days per calendar year.

3. The provisions of Sections E, F, G, H, and I shall not apply to out-of-service or empty storage tanks while they are undergoing cleaning; stock change; tank and roof repairs; or removal of contaminated stock provided that the following are accomplished:

a. At least 72 hours prior to such work being done, verbal or written notice is received by the APCO.

b. For floating roof tanks, when the floating roof is resting on its leg supports, the process of filling, emptying, and refilling shall be continuous. Emissions shall be minimized during the process of filling, emptying, and refilling.

c. Vapor recovery shall be used on tanks so equipped during filling, flushing, and emptying procedures prior to opening tanks for cleanout.

d. A turn around report is submitted to the APCO no later than the first day of the quarter following the return to normal operation which provides information showing compliance with Subsection C.3. The first day of each quarter shall be considered January 1, April 1, July 1, and October 1 of any given year.

4. The provisions of Sections E, F, G, H, and I shall not apply to in-service floating roof tanks undergoing preventive maintenance, including but not limited to roof repair, primary seal inspection, or removal and installation of primary or secondary seals, provided that the following conditions are met:

a. The tank is in compliance with this Rule prior to notification.

b. Product shall move neither in or out of the storage tank and emissions shall be minimized.

c. If an Authority to Construct is required in accordance with Rule 202, Permits, then it shall be obtained prior to commencing work.

d. The time of exemption allowed under this section shall not exceed 72 hours.

e. Prior to the removal of any primary or secondary seal on an in-service tank, the permit holder shall submit an emission and odor minimization plan to the APCO and APCO approval of the plan shall be obtained. All requirements of the plan shall be followed during seal replacement.

f. A maintenance report is submitted to the APCO no later than the first day of the quarter following the return to normal operation which provides information showing compliance with Subsection C.4. The first day of each quarter shall be considered January 1, April 1, July 1, and October 1 of any given year.

5. The provisions of Subsection E.3 shall not apply to in-service tanks undergoing preventive maintenance, including but not limited to repair of regulators, fittings, deck components, hatches, valves, flame arrestors, or compressors, provided that the following conditions are met:

a. The tank is in compliance with this Rule prior to notification.

b. The APCO is notified when preventive maintenance work is completed.

c. Emissions are minimized during maintenance operations.

d. The time of exemption allowed under this section shall not exceed 24 hours.

e. A maintenance log is maintained which contains sufficient information to show compliance with Subsection C.5. That record shall be retained and available for inspection by District personnel for at least two (2) years.

D. STORAGE TANK REQUIREMENTS

1. A person shall not store crude oil or other volatile organic compounds in any storage tank with a capacity equal to or less than 40,000 gallons unless such tank is equipped with at least one of the following:

a. A submerged fill pipe, or

b. One of the vapor loss control devices listed in Section E.

2. A person shall not store crude oil or volatile organic compounds with a vapor pressure greater than or equal to 1.50 psia in any above ground storage tank with a capacity equal to or greater than 10,000 gallons, and less than 20,000 gallons, unless such tank is equipped with one of the following:

a. A pressure-vacuum relief valve set to within ten (10) percent of the maximum allowable working pressure of the tank or in accordance with appropriate recommendations of the American Petroleum Institute (API) or the American Society of Mechanical Engineers (ASME). The pressure-

vacuum relief valve shall be properly installed, maintained in good operating order, and shall remain in a leak-free condition except when the operating pressure exceeds the valve set pressure; or

b. One of the vapor loss control devices in Section E.

3. A person shall not store crude oil or volatile organic compounds with a vapor pressure greater than or equal to 1.50 psia in any storage tank with a capacity equal to or greater than 20,000 gallons, and less than 40,000 gallons, without using one of the vapor loss control devices listed in Section E.

4. A person shall not store crude oil or volatile organic compounds with a vapor pressure greater than or equal to 0.50 psia in any storage tanks with a capacity equal to or greater than 40,000 gallons without using one of the vapor loss control devices listed in Section E.

5. A person shall not store organic liquids with a vapor pressure greater than or equal to 11.0 psia in any tank unless such tank is:

a. A pressure tank maintaining working pressures sufficient at all times to prevent organic vapor loss to the atmosphere, or

b. Designed and equipped with a vapor loss control device listed in Subsection E.3 or E.4.

E. VAPOR LOSS CONTROL DEVICES. The following are the vapor loss control devices that satisfy the storage tank requirements of Section D.

1. External Floating Roof. A floating roof, consisting of a pontoon-type or double-deck-type cover that rests on the surface of the liquid contents and is properly installed, properly maintained and in good operating order. External floating roofs shall have both a primary and a secondary seal, one above the other. Primary and secondary seals shall comply with the criteria specified in Sections F and G.

2. Internal Floating Roof. A fixed roof tank with an internal-floating-type cover consisting of a pan, pontoon, or double-deck that rests on the liquid surface and is properly installed, properly maintained and in good operating order. Internal floating roof seals shall comply with the criteria specified in Sections F and H.

3. Vapor Recovery System. A closed-type vapor recovery system capable of collecting all volatile organic compounds, and one of the following: a vapor return system handling natural gas for fuel, sale, or underground injection; or a disposal system capable of processing such vapors and gases, so as to prevent their emission to the atmosphere at a vapor loss control efficiency of at least 95 percent by weight.

Vapor recovery systems shall comply with the following requirements:

a. Any tank gauging or sampling device on a tank vented to the vapor recovery system shall be equipped with a leak-free cover which shall be closed at all times except during gauging or sampling.

b. All piping, valves and fittings shall be designed and constructed to operate in a leak-free condition, and shall be maintained and operated in a leak-free condition so as to minimize the release of volatile organic compound vapors.

c. Pressure-vacuum relief valves on above ground tanks shall be set to within ten (10) percent of the maximum allowable working pressure of the tank or in accordance with appropriate recommendations of the API or the ASME, and shall be properly installed, maintained in good operating order, and shall remain in a leak-free condition except when the operating pressure exceeds the valve set pressure.

4. Other Vapor Loss Control Device. Any other equipment having a vapor loss control efficiency of at least 95% by weight, of volatile organic compounds, provided an application for installation of such equipment is submitted to and approved by the Air Pollution Control Officer.

F. REQUIREMENTS FOR ALL CLOSURE DEVICES. The closure device on any external floating roof tank or any internal floating roof tank shall meet the following requirements:

1. Secondary seals shall extend from the roof to the tank shell, shall not be attached to primary seals, and shall not be shoe-mounted.

2. All openings in the roof, except pressure-vacuum relief valves and automatic bleeder vents, shall provide a projection at least two (2) inches below the liquid surface to prevent belching of liquid and to reduce escaping vapors. All openings and fittings shall be covered and shall have gaskets at all times with no visible gap, except when in use. For inaccessible openings on internal floating roof tanks, there shall be no visible gaps as viewed from the fixed roof manway, except when the opening is in use.

3. Pressure-vacuum relief valves shall be set to within ten (10) percent of the maximum allowable working pressure of the roof or in accordance with appropriate recommendations of the API or the ASME, and shall be properly installed, maintained in good operating order, and shall remain in a leak-free condition except when operating pressure exceeds the valve set pressure.

4. Solid sampling or gauging wells, and similar fixed projections through a floating roof such as an anti-rotational pipe, shall meet the following requirements:

a. The well shall provide a projection of at least two (2) inches below the liquid surface.

b. The well shall be equipped with a cover, seal or lid, which shall at all times be in a closed position with no gap exceeding 1/8 inch, except when the well is in use.

c. In no case shall the gap between the well and the roof exceed 1/2 inch. The length of the gap between the well and the roof shall be added to the cumulative length of the gaps measured to determine compliance of the secondary seal as specified in Subsection G.2.c, G.3.a, G.4.b, or G.5.b.

5. Slotted sampling or gauging wells shall meet the following requirements:

a. The well shall provide a projection of at least two (2) inches below the liquid surface.

b. The well shall have an internal float designed to minimize the gap between the float and the well, provided that the gap in no case exceeds 1/2 inch.

c. In no case shall the gap between the well and the roof exceed 1/2 inch. The length of the gap between the well and the roof shall be added to the cumulative length of the gaps measured to determine compliance of the secondary seal as specified in Subsection G.2.c, G.3.a, G.4.b, or G.5.b.

6. Any emergency roof drain that drains back to the stored liquid shall be provided with a slotted membrane fabric cover, or equivalent, that covers at least 90 percent of the area of the opening.

7. Any metallic shoe-type seal shall meet the following requirements:

a. One end of the shoe shall extend at least two (2) inches into the stored liquid and the other end shall extend a minimum vertical distance of 24 inches above the liquid surface.

b. The gap between the shoe and tank wall shall not exceed three (3) inches for a welded tank or five (5) inches for a riveted tank at any point from the liquid surface to 18 inches above it.

G. EXTERNAL FLOATING ROOF REQUIREMENTS. External floating roofs shall meet the following conditions in addition to the closure device requirements in Section F.

1. There shall be no holes, tears, or other openings in the primary seal, the secondary seal, or the seal fabric which allow the emission of volatile organic compounds to the atmosphere.

2. Welded Tanks with Primary Metallic Shoe Seals:

a. The cumulative length of all gaps between the primary seal and the tank shell exceeding 1/2 inch shall not be more than ten (10) percent, and exceeding 1/8 inch shall not be more than 40 percent of the tank circumference.

b. No gap between the tank shell and the primary seal shall exceed 1-1/2 inches; no continuous gap greater than 1/8 inch shall exceed ten (10) percent of the circumference of the tank.

c. The cumulative length of all gaps between the secondary seal and the tank shell exceeding 1/8 inch shall not be more than five (5) percent of the tank circumference.

d. No gap between the tank shell and the secondary seal shall exceed 1/2 inch.

e. The secondary seal shall allow easy insertion of probes up to 1-1/2 inches in width in order to measure gaps in the primary seal.

3. Tanks with Primary Resilient-Toroid Seals:

a. The cumulative length of all gaps between the tank shell and the primary or secondary seal exceeding 1/8 inch shall not be more than five (5) percent of the circumference of the tank.

b. No gap between the tank shell and the primary or secondary seal shall exceed 1/2 inch.

c. The secondary seal shall allow easy insertion of probes up to 1/2 inch in width in order to measure gaps in the primary seal.

d. The primary resilient toroid seal shall be liquid-mounted.

4. Riveted Tanks with Primary Metallic Shoe Seals:

a. Gaps between the tank shell and the primary seal shall not exceed 2-1/2 inches. The cumulative length of all primary seal gaps exceeding 1-1/2 inches shall be not more than ten (10) percent of the circumference of the tank.

b. The secondary seal shall consist of at least two sealing surfaces, such that the sealing surfaces prevent the emission of volatile organic compounds around the rivets. Serrated sealing surfaces are allowable if the length of serration does not exceed six (6) inches. No gap between the tank shell and the secondary seal shall exceed 1/2 inch. The cumulative length of all secondary seal gaps exceeding 1/8 inch shall be not more than five (5) percent of the circumference.

5. Welded Tanks with Zero Gap Secondary Seals. Any secondary seal, when installed or retrofitted on a welded tank for which an Authority to Construct was granted on or after July 12, 1994 shall be a zero gap secondary seal. A secondary seal shall be considered to be retrofitted if at least a cumulative 50 percent of the circumference of the seal is replaced on or after July 12, 1994. A zero gap secondary seal shall meet the following conditions:

   a. No gap between the tank shell and the primary seal shall exceed 1-1/2 inches. No continuous gap in the primary seal greater than 1/8 inch shall exceed ten (10) percent of the circumference of the tank. The cumulative length of all primary seal gaps exceeding 1/2 inch shall be not more than ten (10) percent of the circumference and the cumulative length of all primary seal gaps exceeding 1/8 inch shall be not more than 40 percent of the circumference.

   b. There shall be no visible or measurable gap between the tank shell and the secondary seal, excluding gaps less than two (2) inches from vertical weld seams.

6. Primary Seal Inspection for External Floating Roof Tanks (Selected Locations). The primary seal envelope shall be made available for unobstructed inspection by the APCO on an annual basis at four (4) locations selected along its circumference at random by the APCO. In the case of riveted tanks with toroid-type seals, eight (8) such locations shall be made available. In all other cases, a minimum of four (4) such locations shall be made available. If any violations are suspected, the APCO may require such further unobstructed inspection of the primary seal as may be necessary to determine the seal condition for its entire circumference.

7. Primary Seal Inspection for External Floating Roof Tanks (Full Circumference). For tanks with secondary seals, the primary seal envelope shall be made available for unobstructed inspection by the APCO for the full circumference at the following times:

   a. Prior to installation of the secondary seal.

   b. At least once every five (5) years, or once every ten (10) years if the seal is a zero gap secondary seal which is installed pursuant to Subsection G.5.

   c. If the secondary seal is voluntarily removed by the owner or operator, it shall be made available for such inspection at that time. The owner or operator shall provide notification to the APCO no less than 72 hours prior to voluntary removal of the secondary seal.

H. INTERNAL FLOATING ROOF REQUIREMENTS. Internal floating roofs shall meet the following conditions in addition to the closure device requirements in Section F.

1. For any fixed roof tank with an internal floating-type cover, the closure device shall consist of one of the following:

    a. A liquid mounted primary seal only, mounted in full contact with the liquid in the annular space between the tank shell and floating roof, or

    b. Both a primary and a secondary seal, one above the other.

2. There shall be no holes, tears, or other openings in the seal or seal fabric which allow the emission of volatile organic compound vapors through the primary or secondary seals.

3. Any internal floating-type cover on a fixed roof tank shall be made available for inspection each time the tank is degassed and emptied. Visual inspections through the manholes or roof hatches on the fixed roof shall be conducted on an annual basis, provided such an inspection can be conducted safely. The APCO shall be notified at least 72 hours in advance of each degassing.

I. INSPECTION REQUIREMENTS

1. For all primary seals, actual gap measurements shall be recorded upon installation or replacement of primary seals, or prior to installation of secondary seals, and at least once every five (5) years thereafter. If the secondary seal is a "zero gap seal" as per Subsection G.5, then actual gap measurements of the primary seal shall be recorded at least once every ten (10) years. For all secondary seals, actual gap measurements shall be recorded on an annual basis. In all cases, those records shall be of sufficient detail to determine compliance with the applicable requirements of this Rule.

2. The results of each inspection performed in accordance with Subsection I.1 shall be reported in writing to the APCO within 30 calendar days after the inspection date.

J. TEST METHODS

1. Vapor pressure of tank contents shall be determined as follows:

    a. The true vapor pressure of crude oils and distillate shall be determined, at actual storage conditions, by converting Reid Vapor Pressure using appropriate API nomograph found in EPA AP-42 or API nomograph found in API Publication 2517, Second Edition, February 1980. The true vapor pressure of crude oils with an API gravity of 26° or less, may be measured using the Lawrence Berkeley National Laboratory “Test Method for Vapor Pressure of Reactive Organic Compounds in Heavy Crude Oil Using Gas Chromotagraphy.”

b. The Reid vapor pressure shall be determined according to ASTM D-323-06 or California Code of Regulations, Title 13, Section 2297.

c. The API gravity shall be determined according to ASTM Method D-287-82.

d. Separate samples shall be taken for API gravity and vapor pressure determinations. Sampling for API gravity shall be according to ASTM Method D-4057-06.

e. An alternative test method may be used if it provides the same result for a given sample and is approved in advance as a source-specific State Implementation Plan (SIP) revision by EPA and ARB for the purpose of determining vapor pressure of liquids of the type subject to this Rule.

2. The test methods used for measuring the vapor loss control efficiency in Subsections E.3 and E.4 shall be ARB Methods 202 and 203 as published in Volume 2 of ARB's Stationary Source Test Methods dated September 12, 1990. Sections of these ARB methods which relate to certification and fees (i.e. Sections V, VI, and VII) apply only to tanks subject to vapor recovery system certification requirements independently of this Rule. The applicability of Methods 202 and 203 shall be determined as follows:

a. ARB Method 202 applies to tanks receiving organic liquid by truck.

b. ARB Method 203 applies to tanks receiving organic liquid other than by truck.

3. The test method used for detecting and measuring leaks is EPA Reference Method 21. The analyzer shall be calibrated with methane.

K. RECORDKEEPING

1. The operator of any tank subject to this Rule shall maintain the following records:

a. Type of compound stored in each tank. The vapor pressure ranges of such compounds are required if records immediately available do not establish that the compound is a substance listed in Table 1 and kept below the temperature listed therein for that substance.

b. The settings of any pressure-vacuum relief valve and the basis for that setting.

c. The inspection reports required by Section I. Such records shall contain, at a minimum, the following information:

1) Date of inspection and initials of inspector.

2) For all floating roof tanks, actual gap measurements between the tank shell and seals.

3) Data, supported by calculations as necessary, to demonstrate compliance with the requirements of this Rule.

4) Any corrective actions or repairs taken to comply with the requirements of this Rule and the date these actions were taken.

2. The operator of any tank exempted by Subsections C.3, C.4, and C.5 of this Rule shall maintain turnaround or maintenance records. These records contain, at a minimum, the following:

a. Permit number, tank identification, and type of vapor controls.

b. Description of specific maintenance procedure performed.

c. Estimate of emissions caused by maintenance procedure and description of estimation method.

d. Start and finish times and dates of procedure.

e. Copies of the reports required by Subsections C.3.d, C.4.e, and C.5.e.

3. Records required by Section K of this Rule shall be maintained for a period of at least two (2) years from the date of each entry, and such records shall be made available to the APCO upon request.