

RULE 463

Storage of Organic Liquids

(A) General Description

(1) Purpose:

To control the emissions of Volatile Organic Compounds (VOC) and toxic compounds during the storage of organic liquids.

(2) Applicability:

- (a) All aboveground Gasoline storage tanks of capacity of at least 250 gallons (950 liters);
- (b) All aboveground Organic Liquid storage tanks of capacity of at least 19,815 gallons (75,000 liters); and
- (c) All Organic Liquid storage tanks of capacity of at least 39,630 gallons (150,000 liters).

(3) Severability:

- (a) If any portion of this rule shall be found to be unenforceable, such finding shall have no effect on the enforceability of the remaining portions of the rule, which shall continue to be in full force and effect.

(B) Definitions

The definitions contained in District Rule 102 – *Definition of Terms*, shall apply unless a term is otherwise defined herein:

- (1) “Metallic-Shoe Seal” - A type of seal used to minimize evaporative losses of Organic Liquids from a storage tank equipped with an External Floating Roof. It serves as a primary seal, and is constructed with vertical metal plates or "shoes", connected by braces or other devices to the circumference of the floating roof. They are partially immersed in the liquid being stored, and are suspended in such a way that they are forced outward against the inner tank wall.
- (2) “Resilient-Toroid Seal” - A type of seal used to minimize evaporative losses of Organic Liquids from a storage tank equipped with an External Floating Roof. It is a toroidal tube, or "donut", made of fabric or other resilient material, that rests on the surface of the stored liquid. It serves as a primary seal that minimizes evaporative losses from the tank. The toroid seal may be filled with air, foam, or other resilient material.

- (3) “Vapor Tight” – is the detection of less than 1,000 ppm, as methane, using an appropriate hydrocarbon analyzer when sampling is performed according to the procedures specified in EPA Method 21.

(C) Requirements

- (1) Tanks Over 39, 630 gallons of Capacity

No person shall place, store or hold in any storage tank, with a capacity of 39,630 gallons (150,000 liters) or greater, any organic liquid having a True Vapor Pressure of 25.8 mm Hg (0.5 psi) or greater, unless such tank is a pressure tank maintaining working pressures sufficient at all times to prevent organic vapor or gas loss to the atmosphere, or is designed and equipped with one of the following vapor loss control devices, which is properly installed, properly maintained, and in good operating order:

- (a) An External Floating Roof, that rests on the surface of the liquid contents at all times, except as provided in Subsection (C)(3)(c) and is equipped with a closure device between the tank shell and roof edge. Except as provided in Subsections (C)(1)(a)(iii) and (C)(1)(a)(iv), the closure device shall consist of two seals, one above the other; the one below shall be referred to as the primary seal, and the one above shall be referred to as the secondary seal. Seal designs shall be submitted to the APCO and shall not be installed or used unless they are approved by the APCO as meeting the criteria set forth in Section (F) - Specifications for Closure Devices, as applicable.
- (i) For a closure device on a welded tank shell which uses a Metallic-Shoe- Seal as its primary seal: refer to Section (F)(1) for specifications.
- (ii) For a closure device which uses a Resilient-Toroid- Seal as its primary seal: refer to Section (F)(2) for specifications.
- (iii) For a closure device on a riveted tank shell which uses a Metallic-Shoe- Seal as its primary seal: refer to Section (F)(3) for specifications.
- (iv) EXEMPTION: The requirements of Subsections (F)(1) through (F)(3) shall not apply to any person who demonstrates to the APCO that a closure device has been installed, which by itself or in conjunction with other vapor loss control devices, controls vapor loss at all tank levels with an effectiveness equivalent to a closure device on a welded tank which meets the requirements of Subsection (F)(1). This exemption is subject to the specifications of Section (F)(4) of this rule.
- (v) ANNUAL DISTRICT INSPECTIONS: The primary seal envelope shall be made available for unobstructed inspection by the APCO on an annual basis at the location selected along its circumference at random by the APCO. In the case of riveted tanks with toroid-type seals, eight such locations shall be made available; in all other cases, four such locations shall be made

available. If a violation is discovered during an annual inspection, the APCO may require further unobstructed inspection of the primary seal to determine the seal condition for its entire circumference. In addition, for tanks installing a secondary seal the primary seal envelope shall be made available for inspection by the APCO prior to installation of the secondary seal. Secondary seals that are already in place shall be made available for unobstructed inspection by the APCO for its full length every five (5) years. In the event that a secondary seal is voluntarily removed by the Owner/Operator, it shall be made available for such inspection at that time. The Owner/Operator shall provide notification to the APCO no less than seven (7) working days prior to voluntary removal of the secondary seal.

- (vi) All openings in the roof except Pressure-Vacuum Valves, which shall be set to within ten percent (10%) of the maximum allowable working pressure of the roof, shall provide a projection below the liquid surface to prevent belching of liquid and to prevent entrained or formed organic vapor from escaping from the liquid contents of the tank and shall be equipped with a cover, seal, or lid. The cover, seal, or lid shall at all times be in closed position, with no visible gaps, except when the device or appurtenance is in use.
 - (vii) Any emergency roof drain shall be provided with a slotted membrane fabric cover, or equivalent, that covers at least nine-tenths of the area of the opening.
 - (viii) A floating roof shall not be used if the organic liquid stored has a True Vapor Pressure of 569 mm Hg (11 psi) absolute or greater under storage conditions.
- (b) A fixed roof with an internal-floating-type cover that rests on the surface of the liquid contents at all times except as provided in Subsection (C)(3)(c) and is equipped with a closure device.
- (i) For a fixed roof tank the closure device shall consist of either a liquid mounted primary seal only, or two seals: a primary and a secondary seal. All openings and fittings shall be fully gasketed and/or controlled in a manner specified by the APCO. The closure device shall control vapor loss with an effectiveness equivalent to the outlined criteria in Subsection (F)(1). Internal Floating Roof and seal designs shall be submitted to the APCO and shall not be installed or used unless they are approved by the APCO.
 - (ii) A fixed roof tank with an internal-floating-type cover shall not be used if the organic liquid stored has a True Vapor Pressure of 569 mm Hg (11 psi) absolute or greater under actual storage conditions.
 - (iii) Compliance shall be verified by measuring the vapor space above the floating roof with an explosimeter, which will determine the lower explosive limit (LEL). LEL readings for the Internal Floating Roof shall not exceed 50 percent (50%) for those installed

prior to December 19, 1988 and 30 percent (30%) of the LEL for those installed after December 19, 1988.

- (iv) Visual inspection of the secondary seal shall be performed by the tank operators semi-annually. A record of such inspections shall be maintained and such records shall be made available for review by the APCO upon request.
- (v) The primary and secondary seals shall be inspected and repaired, if necessary, each time the tank is emptied and gas-freed. The APCO shall be notified at least 48 hours in advance of each such gas-freing.

(c) A fixed roof tank with a vapor recovery system consisting of a system capable of collecting all organic vapors and gases, and a vapor return or disposal system capable of processing such vapors and gases, so as to prevent their emission to the atmosphere at an efficiency of at least 95 percent (95%) by weight.

- (i) Any tank gauging or sampling device on a tank vented to the vapor recovery system shall be equipped with a Vapor Tight cover which shall be closed at all times except during gauging or sampling.
- (ii) All piping, valves and fittings shall be constructed and maintained both Liquid Tight and Vapor Tight, such that no organic vapor or gas leaks are detectable.

(d) Other equipment, having a vapor loss control efficiency of at least 95 percent (95%) by weight, shall provide an application for installation and obtain written approval from the APCO prior to the commencement of construction and/or operation.

(2) Tanks with 39,630 Gallons or Less Capacity

A person shall not place, store or hold in any aboveground storage tank with a capacity of 39,630 gallons (150,000 liters)) or less, any organic liquid having a True Vapor Pressure of 77.5 mm Hg (1.5 psia) or greater under actual storage conditions, unless such tank is equipped with a pressure-vacuum valve which is set to within ten percent (10%) of the maximum allowable working pressure of the tank, or is equipped with a vapor loss control device which complies with the requirements set forth in Section (C)(1).

(3) Additional Requirements

- (a) All of the components of a facility including but not limited to tanks, flanges, seals, pipes, pumps, valves, meters, connectors, shall be maintained and operated so as to prevent Fugitive Vapor Leaks, Fugitive Liquid Leaks, and excess organic liquid drainage during transfer, storage and handling operations.
- (b) Efficiency, as outlined in Subsections (C)(1)(c) and (C)(1)(d) means a comparison of controlled emissions to those emissions which would occur from a fixed or cone roof tank in the same product service without a vapor

control system. Base line emissions shall be calculated by using the criteria outlined in American Petroleum Institute Bulletin 2518.

(c) The roof of any Internal or External Floating Roof tank is to be floating on the liquid at all times (i.e. free of the roof leg supports) except when the tank is being completely emptied for cleaning, or repair. The process of emptying, and/or refilling, when the roof is resting on the leg supports, shall be continuous and shall be accomplished as rapidly as possible, and;

(i) If the tank has been gas-freed and is to be refilled with Gasoline, the roof shall be refloated with water, or equivalent procedure approved by the APCO.

(d) Floating Roof Tank Inspection Requirements:

(i) All floating roof tanks subject to this rule shall be inspected twice per year at 4 to 8 months intervals.

(ii) Additionally, the primary and secondary seals shall be inspected each time a floating roof tank is emptied and degassed. Gap measurements shall be performed on an External Floating Roof tanks when the liquid surface is still but not more than 24 hours after the tank roof is refloated.

(e) Floating Roof Tank Maintenance Requirements:

Any floating roof tank which does not comply with any provision of this rule shall be brought into compliance within 72 hours of the determination of non-compliance. The repaired or replacement component shall be reinspected the first time the component is in operation after the repair or replacement.

(f) Non-Floating Roof Tank Inspection Requirements:

Any tank in retail service shall be inspected for compliance with this rule not less frequently than once per month. All other tanks shall be inspected not less than once a year.

(D) Record Keeping and Recording

- (1) A person whose tanks are subject to this rule shall keep an accurate record of liquids stored in such tanks and the True Vapor Pressure ranges of such liquids.
- (2) Organic liquids listed on the addendum to this rule 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 as recorded on a daily basis.
- (3) The Owner/Operator shall maintain a log of all inspections, repairs and maintenance on equipment subject to this rule. Such a log or records shall be

maintained at the facility for at least five (5) years and shall be made available to the APCO upon request.

(E) Exemptions

- (1) The provisions of Subsection (C)(3)(c) shall not apply to Gasoline storage tanks at bulk Gasoline distribution terminals which do not have:
 - (a) Existing facilities for treatment of wastewater used to refloat the tank roof; or
 - (b) Facilities for equivalent emission control when refloating the roof with product.
- (2) Notwithstanding the secondary and primary seal requirements of subparagraphs (F)(1), a secondary or primary seal may be loosened or removed for preventive maintenance, inspection and/or repair upon prior notification and subject to the prior written approval of the APCO and for a period not exceeding 72 hours.

(F) Specifications for Closure Devices

- (1) For a closure device on a welded tank shell which uses a Metallic-Shoe- Seal as its primary seal:
 - (a) Gaps between the tank shell and the primary seal shall not exceed 1 ½ inches (3.8 centimeters) for an accumulative length of 10 percent (10%), ½ inch (1.3 centimeters) for another 30 percent (30%), and 1/8 of an inch (0.32 centimeter) for the remaining 60 percent (60%) of the circumference of the tank. No gap between the tank shell and the primary seal shall exceed 1 ½ inches (3.8 centimeters). No continuous gap greater than a 1/8 of an inch (0.32 centimeter) shall exceed 10 percent (10%) of the circumference of the tank.
 - (b) Gaps between the tank shell and the secondary seal shall not exceed a 1/8 of an inch (0.32 centimeter) for an accumulative length of 95 percent (95%) of the circumference of the tank, and shall not exceed a ½ an inch (1.3 centimeters) for an accumulative length of the remaining 5 percent (5%) of the circumference of the tank. No gap between the tank shell and the secondary seal shall exceed ½ an inch (1.3 centimeters).
 - (c) Metallic-Shoe- Seals installed on or after date of adoption of this rule, shall be installed so that one end of the shoe extends into the stored liquid and the other end extends a minimum vertical distance of 24 inches (61 centimeters) above the stored liquid surface.
 - (d) The geometry of the shoe shall be such that the maximum gap between the shoe and the tank shell is no greater than double the gap allowed by the seal gap criteria for a length of at least 18 inches (46 centimeters) in the vertical plane above the liquid surface. There shall be no holes or tears in, or openings which allow the emission of organic vapors through the

secondary seal or in the primary seal envelope surrounding the annular vapor space enclosed by the roof edge, stored liquid surface, shoe, and seal fabric.

- (e) The secondary seal shall allow easy insertion of probes up to 1 ½ inches (3.8 centimeters) in width in order to measure gaps in the primary seal in accordance with section (C)(1)(a)(v).
 - (f) The secondary seal shall extend from the roof to the tank shell and shall not be attached to the primary seal.
- (2) For a closure device which used a Resilient-Toroid- Seal as its primary seal:
- (a) If installation was commenced prior to February 20, 1980, gaps between the tank shell and the primary seal shall not exceed an 1/8 of an inch (0.32 centimeter) for an accumulative length of 95 percent (95%) of the circumference of the tank, and shall not exceed a ½ an inch (1.3 centimeters) for an accumulative length of the remaining 5 percent (5%) of the tank circumference. No gap between the tank shell and the primary seal shall exceed a ½ an inch (1.3 centimeters).
 - (b) If installation was commenced prior to February 20, 1980 gaps between the tank shell and the secondary seal shall not exceed an 1/8 of an inch (0.32 centimeter) for an accumulative length of 95 percent (95%) of the circumference of the tank, and shall not exceed a ½ an inch (1.3 centimeters) for an accumulative length of the remaining 5 percent (5%) of the tank circumference. No gap between the tank shell and the secondary seal shall exceed a ½ an inch (1.3 centimeters).
 - (c) If installation is commenced after February 20, 1980, the tank Owner/Operator shall, prior to installation, demonstrate to the APCO, that the closure device controls vapor loss with an effectiveness equivalent to a closure device on a welded tank which meets the requirements of Subsection (F)(1)(a). The APCO shall determine whether equivalence exists in accordance with Subsection (C)(1)(a)(iv). If equivalence is demonstrated using primary or secondary seal gap criteria (if any) different from the criteria specified in Subsections (F)(2)(a) or (b), those criteria shall be controlling for all purposes of this rule in lieu of the criteria specified in Subsections (F)(2)(a) and (b).
 - (d) There shall be no holes or tears in, or openings which allow the emission of organic vapors through the secondary seal or in the primary seal envelope surrounding the annular vapor space enclosed by the roof edge, seal fabric and secondary seal.
 - (e) The secondary seal shall allow easy insertion of probes up to 1 ½ inches (3.8 centimeters) in width in order to measure gaps in the primary seal.
 - (f) The secondary seal shall extend from the roof of the tank shell and not be attached to the primary seal.

- (3) For a closure device on a riveted tank shell which uses a Metallic-Shoe- Seal as its primary seal;
- (a) The closure device shall consist of two seals, one above the other; the one below shall be referred to as the primary seal, and the one above shall be referred to as the secondary seal.
 - (b) The closure device shall control vapor loss with an effectiveness equivalent to a closure device on a welded tank which meets the requirements of Subsection (F)(1). The APCO shall determine whether equivalence exists in accordance with Subsection (C)(1)(a)(iv). Gaps between the primary and secondary seals shall not exceed the gaps (if any) associated with the closure device approved as equivalent by the APCO, and shall be controlling for all purposes of this rule.
 - (c) Metallic-Shoe- Seals installed on or after February 20, 1979 shall be installed so that one end of the shoe extends into the stored liquid and the other end extends a minimum vertical distance of 24 inches (61 centimeters) above the stored liquid surface. The geometry of the shoe shall be such that the maximum gap between the shoe and the tank shell is no greater than double the gap allowed by the seal gap criteria for a length of at least 18 inches (46 centimeters) in the vertical plane.
 - (d) There shall be no holes or tears in, or openings which allow the emission of organic vapors through the envelope surrounding the annular vapor space enclosed by the roof edge, stored liquid surface, shoe, and seal fabric.
 - (e) Any secondary seal shall allow easy insertion of probes up to 1 ½ inches (3.8 centimeters) in width in order to measure gaps in the primary seal.
 - (f) Any secondary seal shall extend from the roof to the tank shell and shall not be attached to the primary seal.
- (4) The Owner/Operator of any tank with a closure device, or proposed to be equipped with such a system, shall, prior to use on installation, demonstrate equivalence to the USEPA, CARB and the APCO as follows:
- (a) By an actual emissions test in a full-size or scale sealed tank facility which accurately collects and measures all hydrocarbon emissions associated with a given closure device, and which accurately simulates other emission variables, such as temperature, barometric pressure and wind. The test facility shall be subject to prior approval by the USEPA, CARB and the APCO, or,
 - (b) By a pressure leak test, engineering evaluation or other means, where the USEPA, CARB and the APCO determines that the same is an accurate method of determining equivalence.

(H) Compliance Verification Test Methods

- (1) When more than one test method is specified for testing, a violation determined by any one of these test methods shall constitute a violation of the rule.
 - (a) ASTM METHOD D-323-06: Reid vapor pressure shall be determined in accordance with American Society of Testing and Materials D323-06, Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method).
 - (b) ASTM METHOD D-2879-97 (2002)(e1): True vapor pressure shall be determined in accordance with American Society of Testing and Materials D2879-97(2002)(e1), Standard Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope.
 - (c) EPA METHODS 2A OR 2B: The gas flow rate shall be determined in accordance with EPA Method 2A, Direct Measurement of Gas Volume Through Pipes and Small Ducts; or EPA Method 2B, Determination of Exhaust Gas volume flow rate From Gasoline Vapor Incinerators, as applicable.
 - (d) EPA METHOD 18: Exempt compounds shall be determined in accordance with EPA Method 18, Measurement of Gaseous Organic Compound Emissions by Gas Chromatography.
 - (e) EPA METHOD 21: The gas tight condition shall be determined in accordance with EPA Method 21, Determination of Volatile Organic Compound Leaks, using a portable analyzer calibrated with methane gas.
 - (f) EPA METHODS 25, 25A OR 25B: VOC emissions shall be determined in accordance with EPA Method 25 – Gaseous Nonmethane Organic Emission, or 25A - Gaseous Organic Concentration, Flame Ionization; or EPA Method 25B - Gaseous Organic Concentration, Infrared Analyzer, as applicable.
 - (g) CARB TEST PROCEDURE TP-203.1: The terminal vapor recovery system efficiency shall be determined in accordance with CARB Vapor Recovery Test Procedure TP-203.1, Determination of Emission Factor of Vapor Recovery Systems of Terminals.
- (2) Other test methods demonstrated to provide results that are acceptable for determining Reid or true vapor pressure for purposes of demonstrating compliance with this rule, after review and approval in writing by the District, the CARB, and the USEPA, may also be used.

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
RULE 463 - ADDENDUM

STORAGE TEMPERATURES vs. TRUE VAPOR PRESSURE
(gravity/initial boiling points referenced)

	Reference Property		Temperature, °F	
	A - API	B - IBP, °F	Not to Exceed Vapor Pressure	
<u>Organic Liquids</u>	<u>A</u>	<u>B</u>	<u>0.5 pisa</u>	<u>1.5 pisa</u>
Crude Oils	12	---	---	---
	13	---	120	180
	14	---	85	145
	16	---	60	107
	18	---	55	93
	20	---	52	84
	22	---	49	77
	24	---	45	73
	26	---	42	70
	28	---	40	67
	30	---	38	64
<u>Middle Distillates</u>				
Kerosene	42.5	350	195	250
Diesel	36.4	372	230	290
Gas Oil	26.2	390	249	310
Stove Oil	23	421	275	340
<u>Jet Fuels</u>				
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

	Reference Property		Temperature, °F	
	A - API	B - IBP, °F	<u>Not to Exceed Vapor Pressure</u>	
<u>Fuel Oil</u>				
# 1	42.5	350	195	250
# 2	36.4	372	230	290
# 3	26.2	390	249	310
# 4	23.0	421	275	340
# 5	19.9	560	380	465
# 6	16.2	625	450	---
<u>Asphalts</u>				
60-100 pen.	---	---	490	550
120-150 pen.	---	---	450	500
200-300 pen.	---	---	360	420
Acetone	47.0	133	---	35
Acrylonitrile	41.8	173	30	60
Benzene	27.7	176	35	70
Cyclohexane	49.7	177	35	70
Ethylacetate	23.6	171	35	70
Ethyl Alcohol	47.0	173	45	83
Isopropyl Alcohol	47.0	181	45	87
Methyl Alcohol	47.0	148	---	50
Mehylethyl Ketone	44.3	175	30	70
Toluene	30.0	231	73	115
Vinyl Acetate	19.6	163	---	60
Carbon Disulfide	10.6	116	---	10
Carbon Tetra-Chloride	13.4	170	30	60
Chloroform	12.5	142	---	40

	Reference Property		Temperature, °F	
	A - API	B - IBP, °F	<u>Not to Exceed Vapor Pressure</u>	
1,2-Dichloro-ethane	10.5	180	35	77
Methylene Chloride	11.1	104	---	70
1,1,1-Trichloro-ethane	11.2	165	60	100
Trichloroethylene	12.3	188	50	91

See SIP Table at <http://www.mdaqmd.ca.gov/>