

REGULATION 7.12 Standard of Performance for New Storage Vessels for Volatile Organic Compounds

Air Pollution Control District of Jefferson County Jefferson County, Kentucky

Relates To: KRS Chapter 77 Air Pollution Control

Pursuant To: KRS Chapter 77 Air Pollution Control

Necessity and Function: KRS 77.180 provides that the Air Pollution Control Board may make and enforce all needful order, rules, and regulations necessary or proper to accomplish the purposes of KRS Chapter 77. This regulation provides for the control of emissions of volatile organic compounds from new storage vessels.

SECTION 1 Applicability

This regulation applies to each affected facility which means each storage vessel for volatile organic compounds that commences construction or modification on or after April 19, 1972, and has a storage capacity greater than 250 gallons. Any source that is ever subject to this regulation will always be subject to it unless the source changes its process to one not covered by this regulation.

SECTION 2 Definitions

Terms used in this regulation not defined herein shall have the meaning given them in Regulation 1.02.

- 2.1 "External floating roof" means a storage vessel cover in an open top tank consisting of a double deck or pontoon single deck which rests upon and is supported by the volatile organic compound being contained and is equipped with closure seals to close the space between the roof edge and tank shell.
- 2.2 "Floating roof" means a storage vessel cover consisting of a double deck, pontoon single deck, internal floating cover or covered floating roof, which rests upon and is supported by the volatile organic compound being contained and is equipped with a closure seal or seals to close the space between the roof edge and tank wall.
- 2.3 "Internal floating roof" means a cover or roof in a fixed roof tank which rests upon or is floated upon the volatile organic compound being contained, and is equipped with closure seals to close the space between the roof edge and tank shell.
- 2.4 "Liquid-mounted" means a foam or liquid-filled primary seal mounted in contact with the liquid between the tank wall and the floating roof continuously around the circumference of the tank.
- 2.5 "Metallic shoe seal" includes but is not limited to a metal sheet held vertically against the tank wall by springs or weighted levers and is connected by braces to the floating roof. A flexible coated fabric (envelope) spans the annular space between the metal sheet and the floating roof.
- 2.6 "Reid vapor pressure" is the absolute vapor pressure of certain volatile organic compounds as determined by methods specified by the District.
- 2.7 "Seal" means a sliding seal, either a metallic-shoe-type or a nonmetallic resilient-type seal which prevents volatile organic compounds from escaping around the perimeter of the floating roof.

- 2.8 "Storage vessel" means any tank, reservoir, or container used for the storage of volatile organic compounds, but does not include:
 - 2.8.1 Pressure vessels which are designed to operate in excess of 15 pounds per square inch gauge without emissions to the atmosphere except under emergency conditions,
 - 2.8.2 Subsurface caverns or porous rock reservoirs,
 - 2.8.3 Underground tanks if the total volume of VOCs added to and taken from a tank annually does not exceed twice the volume of the tank, or
 - 2.8.4 Portable tanks of less than 500 gallons capacity which are used for the temporary storage of a product or intermediate product in a manufacturing process.
- 2.9 "Submerged fill pipe" means any fill pipe the discharge of which is entirely submerged when the liquid level is 6 inches above the bottom of the tank; or when applied to a tank which is loaded from the side, shall mean every fill pipe the discharge opening of which is entirely submerged when the liquid level is 2 times the fill pipe diameter above the bottom of the tank.
- 2.10 "True vapor pressure" means the equilibrium partial pressure exerted by a VOC as determined in accordance with methods described in American Petroleum Institute Bulletin 2517, "Evaporation Loss from Floating Roof Tanks" second edition, February 1980.
- 2.11 "Vapor-mounted" means a foam-filled primary seal mounted continuously around the circumference of the tank so there is an annular vapor space underneath the seal. The annular vapor space is bounded by the bottom of the primary seal, the tank wall, the liquid surface, and the floating roof.
- 2.12 "Vapor recovery system" means a vapor gathering system capable of collecting all VOCs discharged from the storage vessel and a vapor disposal system capable of processing such VOCs so as to prevent their emission to the atmosphere.

SECTION 3 Standard for Volatile Organic Compounds

The owner or operator of any storage vessel to which this regulation applies shall store VOCs as follows:

- 3.1 If the storage vessel has a storage capacity greater than 151,400 liters (40,000 gallons) and if the true vapor pressure of the VOCs as stored, is equal to or greater than 78 mm Hg (1.5 psia) but not greater than 570 mm Hg (11.1 psia) the storage vessel shall be equipped with a floating roof, a vapor recovery system, or their equivalents.
- 3.2 If the storage vessel has a storage capacity greater than 151,400 liters (40,000 gallons) and if the true vapor pressure of the VOCs as stored is greater than 570 mm Hg (11.1 psia), the storage vessel shall be equipped with a vapor recovery system or its equivalent.
- 3.3 If the storage vessel has a storage capacity greater than 946.25 liters (250 gallons), and if the true vapor pressure of the VOCs, as stored, is equal to or greater than 1.5 psia, as a minimum, it shall be equipped with a permanent submerged fill pipe. True vapor pressure "as stored" shall be determined on an instantaneous basis under conditions representing expected worst case conditions.
- 3.4 If the storage vessel is an external floating roof tank with a storage capacity greater than 151,400 liters (40,000 gallons), it shall be retrofitted with a continuous secondary seal extending from the floating roof to the tank wall (a rim-mounted secondary) if:
 - 3.4.1 The tank is a welded tank, the true vapor pressure of the contained liquid is 27.6 kilopascal (4.0 psia) or greater, and the primary seal is one of the following:

- 3.4.1.1 A metallic-type shoe seal, a liquid-mounted foam seal, or a liquid-mounted liquid-filled type seal, or
- 3.4.1.2 Any other closure device which can be demonstrated equivalent to the above primary seals.
- 3.4.2 The tank is a riveted tank and the true vapor pressure of the contained liquid is 10.3 kilopascal (1.5 psia) or greater.
- 3.4.3 The tank is a welded tank, the true vapor pressure of the contained liquid is 10.3 kilopascal (1.5 psia) or greater and the primary seal is vapor-mounted. If such primary seal closure device can be demonstrated equivalent to the primary seals described in section 3.4.1, then the secondary seal is required when the vapor pressure is 27.6 kilopascal (4.0 psia) or greater.

SECTION 4 Operating Requirements

- 4.1 There shall be no visible holes, tears, or other openings in the seal or any seal fabric.
- 4.2 All openings, except stub drains, shall be equipped with covers, lids, or seals such that:
 - 4.2.1 The cover, lid, or seal is in the closed position at all times except when in actual use,
 - 4.2.2 Automatic bleeder vents are closed at all times except when the roof is floated off or landed on the roof leg supports, and
 - 4.2.3 Rim vents, if provided, are set to open when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting.
- 4.3 External floating roof tanks subject to this regulation shall meet the additional requirements:
 - 4.3.1 The seals must be intact and uniformly in place around the circumference of the floating roof between the floating roof and the tank wall,
 - 4.3.2 The gap area of gaps exceeding 0.32 cm (1/8 in) in width between the secondary seal installed pursuant to section 3.4.1 and the tank wall shall not exceed 6.5 sq cm/0.3 m of tank diameter (1.0 sq in/ft),
 - 4.3.3 All openings in the external floating roof, except for automatic bleeder vents, rim space, and leg sleeves, are to provide a projection below the liquid surface, and
 - 4.3.4 Any emergency roof drain is to be provided with a slotted membrane fabric cover or equivalent that covers at least 90% of the area of the opening.

SECTION 5 Monitoring of Operations

- 5.1 When a liquid having a true vapor pressure greater than 7.0 kPa (1.0 psia) is stored in an external floating roof tank with a capacity of greater than 151,400 liters (40,000 gallons) not equipped with a secondary seal or approved alternative control technology, the owner or operator shall maintain a record of the average monthly storage temperature, the type of liquid, and the Reid vapor pressure of the liquid. The owner or operator shall retain the record for two years after the date on which the record was made.
- 5.2 The true vapor pressure shall be determined by using the average monthly storage temperature and typical Reid vapor pressure of the contained liquid or from typical available data on the contained liquid. Supporting analytical data shall be requested by the District if there is a question on the values reported.
- 5.3 The owner or operator of a petroleum liquid storage vessel with an external floating roof subject to this regulation shall:
 - 5.3.1 Perform routine inspections semi-annually in order to ensure compliance with Section 4, and the inspections shall include a visual inspection of the secondary seal gap,

- 5.3.2 Measure the secondary seal gap annually in accordance with Section 4 when the floating roof is equipped with a vapor-mounted primary seal, and
- 5.3.3 Maintain records of the types of volatile petroleum liquids stored, the maximum true pressure of the liquid, as stored, and the results of the inspections performed in section 5.3.1.
- 5.4 Compliance provision. Compliance with Section 4 shall be determined by:
 - 5.4.1 Physically measuring the length and width of all gaps around the entire circumference of the secondary seal in each place where a 0.32 cm (1/8 in) uniform diameter probe passes freely (without forcing or binding against the seal) between the seal and tank wall and
 - 5.4.2 Summing the area of the individual gaps.

SECTION 6 Exemptions

Any of the following types of external floating roof tanks storing liquid petroleum shall be exempt from section 3.4 as follows:

- 6.1 A metallic-type shoe seal in a welded tank which has a secondary seal from the top of the shoe seal to the tank wall (a shoe-mounted secondary),
- 6.2 External floating roof tanks storing waxy, heavy pour crudes, or
- 6.3 External floating roof tanks with a closure or other devices which can be demonstrated to the District to be equivalent to the seals required in section 3.4.1.

SECTION 7 Compliance

A new affected facility shall comply with the requirements of this regulation on startup.

SECTION 8 Additional Applicable Regulations

Any source subject to this regulation will also be subject to 40 CFR Part 60 Subpart K adopted by reference in Regulation 7.02.

Adopted v1/7-14-76; effective 9-1-76; amended v2/5-20-81, v3/4-21-82, v4/11-16-83, v5/2-19-86, v6/5-15-91.

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