

Regulation No. 24 Control of Volatile Organic Compound Emissions

Section 43 - Bulk Gasoline Marine Tank Vessel Loading Facilities.

8/8/94

a. Applicability

1. This section applies to all loading berths at any bulk marine tank loading facility that delivers gasoline into marine tank vessels. Operations conducted in association with crude oil handling are not subject to this section.
2. Any facility subject to this section which has an annual throughput of less than or equal to 15,000 gallons of gasoline is exempt from this regulation except for the recordkeeping and reporting requirements of paragraphs (g.) and (h.), respectively.
3. Any facility that becomes or is currently subject to the provisions of this section will remain subject to these provisions even if its throughput later falls below the applicability threshold.
4. Nothing in this section shall be construed as to require any act or omission that would be in violation of any regulation or other requirements of the United States Coast Guard or prevent any act that is necessary to secure the safety of a vessel or the safety of the passengers or crew.

b. Definitions. As used in this section, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments (CAAA), or in Section 2 of this regulation.

"Ballasting" means the loading of water or other liquid into a marine tank vessel's cargo tank to obtain proper propeller, rudder and hull immersion.

"Boiler" means any enclosed combustion device that uses fuel to produce energy in the form of steam.

"Car-sealed" means having a seal that is placed on the device used to change the position of a valve (e.g., from open to closed) such that the position of the valve cannot be changed without breaking the seal and requiring the replacement of the old seal, once broken, with a new seal.

"Combustion device" means all equipment, including, but not limited to, incinerators, flares, boilers, and process heaters used for combustion or destruction of organic vapors displaced from the loading berths.

"Flare" means an engineered control device designed for direct combustion of waste gases.

"Facility" means any plant, terminal, refinery or other location where there exists a dock, berth, or anchorage capable of bulk loading on marine tank vessels.

"Gasoline" means any petroleum product having a Reid Vapor Pressure of 4 psia or greater and used as automotive fuel and aviation fuel.

"Housekeeping" means altering the composition of gases contained within marine vessel tanks by tank washing, gas freeing, or purging.

"Inlet to the control device" means any point on the vapor line between the vessel and the control device prior to the addition of any inert, dilution or enrichment gas.

"Loading berth" means the loading arms, pumps, meters, shutoff valves, relief valves, and other piping and valves necessary to fill marine vessels. This includes those items necessary for off shore loading.

"Loading cycle" means the time period from the beginning of filling a marine vessel until flow of product into the vessel ceases, as measured by the flow indicator.

"Marine tank vessel" means any tank ship or barge which transports liquid product such as gasoline in bulk.

"Non-vapor tight" means any marine vessel that does not pass the required vapor-tightness test.

"Process heater" means a device that transfers heat liberated by burning fuel to fluids contained in tubes, except water that is heated to produce steam.

"Recovery device" means an individual unit of equipment, including but not limited to an absorber, carbon adsorber, or condensers, capable of and used for the purpose of removing vapors and recovering liquids.

"Vapor collection system" means any equipment located at the affected facility used for containing vapors displaced during the loading of marine tank vessels. This does not include the vapor collection system that is part of any marine vessel vapor collection manifold system.

"Vapor-tight" means any marine tank vessel that has demonstrated within the preceding 12 months to have no leaks. This demonstration shall be made using

40 C.F.R. Part 60, App. A., Method 21 (7/1/92), during the last 20 percent of loading in a product tank. A reading of greater than 10,000 ppmv as methane shall constitute a leak. As an alternative, a marine vessel owner or operator may use the vapor-tightness test described in paragraph (f.) of this section to demonstrate vapor-tightness. A marine vessel loaded at negative pressure is assumed to be vapor-tight.

c. Standards. On or before December 31, 1995:

1. The owner or operator of a bulk gasoline marine tank vessel loading facility subject to this section shall ensure that each loading berth is equipped with a vapor collection system that is designed to collect all VOC vapors displaced from marine tank vessels during loading, ballasting, or housekeeping.
2. Each vapor collection system shall be designed to prevent any VOC vapors collected at one loading berth from passing to another loading berth.
3. The owner or operator of a bulk gasoline marine tank vessel loading facility subject to this section shall comply with paragraph (c.)(3.)(i.), (c.)(3.)(ii.), or (c.)(3.)(iii.) of this section.
 - i. Reduce total VOC emissions by 98 weight-percent using a combustion device. If a boiler or process heater is used to comply with this paragraph, the vent stream shall be introduced into the flame zone of the boiler or process heater.
 - ii. Combust the VOC emissions in a flare that meets the requirements of 40 CFR 60.18 (7/1/92).
 - iii. Reduce VOC emissions by 95 weight-percent using a vapor recovery device.
4. Loading of gasoline into marine tank vessels shall be limited to marine tank vessels that have been approved by the United States Coast Guard for connection to marine vapor control systems and are vapor tight. Vapor tightness shall be determined using the following procedures:
 - i. Prior to initiating the loading process, the loading berth owner or operator shall obtain the vapor tightness documentation described in paragraph (g.) of this section for each marine tank vessel that is to be loaded at the

loading berth subject to this section.

- ii. If there is no documentation of a successful vapor tightness test conducted on the marine tank vessel, the owner or operator of the loading berth subject to this section shall require that a vapor tightness test be conducted during the last 20% of loading of the marine tank vessel or shall not load the marine tank vessel.
 - iii. Within 3 weeks after the loading has occurred, the loading berth owner or operator shall notify the owner or operator of each non-vapor-tight marine tank vessel loaded at the loading berths subject to this section that the marine tank vessel is not vapor-tight.
 - iv. The loading berth owner or operator shall take steps to assure that the non-vapor-tight marine tank vessel will not be reloaded at the loading berth subject to this section until vapor tightness documentation for that marine tank vessel is obtained.
5. The owner or operator of a bulk gasoline marine tank loading facility subject to this section shall limit loading of gasoline to marine tank vessels equipped with vapor collection equipment that is compatible with the vapor collection system of the bulk gasoline marine tank loading facility.
6. The owner or operator of a bulk gasoline marine tank loading facility subject to this section shall limit loading of gasoline to marine tank vessels whose vapor collection system is connected to the vapor collection system of the bulk gasoline marine tank loading facility.
7. The owner or operator of a bulk gasoline marine tank loading facility subject to this section shall ensure that the maximum normal operating pressure of the marine tank vessel vapor collection equipment shall not exceed 0.8 times the set relief pressure of the pressure-vacuum vents in the vessel compartment. This level is not to be exceeded when measured by the procedures described in paragraph (e.)(12.) of this section.
8. Each calendar month, the owner or operator shall inspect the vapor collection system, the vapor control system, and each loading berth that loads gasoline into marine tank vessels for total organic compound liquid and vapor leaks during product transfer operations. For purposes of this paragraph, detection methods incorporating sight, sound, or smell are acceptable. Each detection of a leak shall be tagged and recorded and the

source of the leak repaired within 15 days. A first attempt at repair shall be made no later than 5 calendar days after the leak is detected.

9. Loading of gasoline marine tank vessels shall be restricted to the use of submerged fill.

d. Monitoring requirements

1. The owner or operator of a bulk gasoline marine tank vessel loading facility that uses an incinerator to comply with the VOC emission reduction specified under paragraph (c.)(3.)(i.) of this section shall install, calibrate, maintain, and operate according to manufacturer's specifications a temperature monitoring device equipped with a continuous recorder and having an accuracy of ± 1 percent of the temperature being monitored expressed in Celsius or $\pm 0.5^\circ$, whichever is greater.
 - i. Where an incinerator other than a catalytic incinerator is used, a temperature monitoring device shall be installed in the firebox.
 - ii. Where a catalytic incinerator is used, temperature monitoring devices shall be installed in the gas stream immediately before and after the catalyst bed.
2. The owner or operator of a bulk gasoline marine tank vessel loading facility that uses a flare to comply with paragraph (c.)(3.)(ii.) of this section shall install, calibrate, maintain, and operate according to manufacture's specifications a heat-sensing device, such as an ultra-violet sensor or thermocouple, at the pilot light to indicate the continuous presence of a flame.
3. The owner or operator of a bulk gasoline marine tank vessel loading facility that uses a boiler or process heater to comply with paragraph (c.)(3.)(i.) of this section shall install, calibrate, maintain, and operate according to manufacturer's specifications the following equipment, or monitor and record operating parameters described as follows:
 - i. A temperature monitoring device in the firebox equipped with a continuous recorder and having an accuracy of ± 1 percent of the temperature being measured expressed in degrees Celsius or $\pm 0.5^\circ\text{C}$, whichever is greater, for boilers or process heaters of less than 44 megawatts (MW) (150 million British thermal units per hour [BTU/hr]) heat input

design capacity.

- ii. Monitor and record the periods of operation of the boiler or process heater if the design capacity of the boiler or process heater is 44 MW (150 million BTU/hr) or greater. The records shall be readily available for inspection.
4. The owner or operator of a bulk gasoline marine tank vessel loading facility that uses a carbon adsorption system to comply with paragraph (c.)(3.)(iii.) of this section shall install, calibrate, maintain, and operate according to manufacture's specifications the following equipment:
 - i. An integrating steam flow monitoring device having an accuracy of ± 10 percent if steam regeneration is used, or a vacuum monitoring device with timing capability having an accuracy of ± 5 percent of full scale if vacuum regeneration is used, and a carbon bed temperature monitoring device having an accuracy of ± 1 percent of the temperature being measured expressed in degrees Celsius or $\pm 0.5^{\circ}\text{C}$, whichever is greater, both equipped with a continuous recorder, or
 - ii. An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared, photoionization, or thermal conductivity, and equipped with a continuous recorder.
5. The owner or operator of a bulk gasoline marine tank vessel loading facility subject to this section who wishes to demonstrate compliance with the percent reduction requirements specified in paragraph (c.)(3.)(i.) and (c.)(3.)(iii.) of this section using control devices other than an incinerator, boiler, process heater, carbon adsorber, or flare shall provide the Department with information describing the operation of the control device and the process parameter(s) that would indicate proper operation and maintenance of the device. The Department may request further information and shall specify appropriate monitoring procedures or requirements.
6. The owner or operator of a bulk gasoline marine tank vessel loading facility subject to this section that uses a vent system that contains valves that could divert a vent stream from a control device used to comply with the requirements of this section shall do the following:

- i. Install a flow indicator immediately downstream of each valve that if opened would allow a vent stream to bypass the control device and be emitted, either directly or indirectly, to the atmosphere. The flow indicator shall be capable of recording flow at least every 15 minutes, or
 - ii. Monitor the valves once a month, checking the position of the valves and the condition of the car seal, and identify all times when the car seals have been broken and the valve position changed (i.e., from open to closed for valves in the vent piping to the control device and closed to open for valves that allow the stream to be vented directly or indirectly to the atmosphere).
- e. Test method and procedures for control devices. The following methods from 40 C.F.R. Part 60, App. A. (7/1/92), shall be used as reference methods to demonstrate compliance with paragraphs (c.)(3.)(i) and (iii) of this section:
 1. Method 1 or 1A, as appropriate, for selection of the sampling sites. The control device sampling site for determining vent stream molar composition or VOC reduction efficiency shall be prior to the inlet of the control device and after the recovery system.
 2. Method 2, 2A, 2C, or 2D, as appropriate, for determining the volumetric flow rates, and Method 18 for determining the vent gas composition.
 3. Method 25A or 25B, as appropriate, for determining the total organic compounds concentration upstream and downstream of the control device. The calibration gas shall be either propane or butane. This test shall be conducted for at least 30 minutes during the transfer of the last 50 percent of total liquid cargo. For events of less than one hour duration, the test shall include the entire last 50 percent of total liquid cargo.
 4. All testing equipment shall be prepared and installed as specified in the appropriate test methods.
 5. Immediately prior to each performance test required for determination of compliance with paragraph (c.)(3.) of this section, all potential sources of vapor leakage in the vapor collection system equipment shall be monitored for detectable emissions according to the procedures in **Appendix "F"** of this regulation. The monitoring shall be conducted only while a vapor tight marine tank vessel is being loaded. All leaks shall be repaired prior to conducting the performance test.

6. An emission testing interval shall consist of each 5 minute period during the performance test. For each interval:
 - i. The reading from each measurement instrument shall be recorded.
 - ii. The volume exhausted and the average total organic compounds concentration upstream and downstream of the control device shall be determined, as specified in the appropriate test method. The average total organic compounds concentration shall correspond to the volume measurement by taking into account the sampling system response time.

7. The mass emitted during each testing interval shall be calculated as follows:

$$M_{ei} = 10^{-6}KV_{es}C_e$$

where:

- M_{ei} = Mass of total organic compounds (milligrams [mg]) emitted during testing interval i.
- V_{es} = Volume of air-vapor mixture exhausted (cubic meters [m³]), at standard conditions.
- C_e = Total organic compounds concentration (measured as carbon) at the exhaust vent (ppmv).
- K = Density of calibration gas (milligrams/cubic meter [mg/m³]) at standard conditions.
 = 1.83×10^6 for propane
 = 2.41×10^6 for butane
- s = Standard conditions, 20°C and 760 millimeters of mercury (mm Hg).

8. The total organic compounds mass emission rate before and after the control device shall be calculated as follows:

$$E = \frac{\sum_{i=1}^n M_i}{T}$$

where:

E = Mass of total organic compounds emitted, kilograms per hour (kg/hr)

M_i = Mass of total organic compounds emitted during testing interval i, kg

T = Total time of all testing intervals, hr

n = Number of testing intervals

9. The percent reduction across the control device shall be calculated as follows:

$$R = \frac{E_b - E_a}{E_b} 100$$

where:

R = Efficiency of control device, %

E_b = Mass flow of total organic compounds prior to control device, kg/hr

E_a = Mass flow of total organic compounds after control device, kg/hr

10. The owner or operator may adjust the emission results to exclude the methane and ethane content in the exhaust vent by any method approved by the Department.
11. When a flare is used to seek to comply with paragraph (c.)(3.)(ii.) of this section, the flare shall comply with the requirements of 40 CFR 60.18 (7/1/92).
12. The test procedure for determining compliance with paragraph (c.)(7.) of this section is as follows:
- i. Calibrate and install a pressure measurement device that is capable of measuring up to the relief set pressure of the pressure-vacuum vents.
 - ii. Connect the pressure measurement device to a pressure tap in the bulk gasoline marine tank vessel loading facility vapor

collection system, located as close as possible to the connection with the marine tank vessel.

- iii. During the performance test, record the pressure every 5 seconds and record the highest instantaneous pressure that occurs during each loading cycle.

f. Test methods and procedures for marine tank vessels. The following test methods shall be used to comply with the marine tank vessel vapor tightness requirements specified in paragraph (c.)(4.) of this section:

1. Each marine tank vessel shall be pressurized with dry air or inert gas to not less than 1.0 psig and not more than the pressure of the lowest relief valve setting.
2. Once the pressure is obtained, the dry air or inert gas source shall be shut off and the pressure reading recorded.
3. At the end of 30 minutes, the pressure in the marine tank vessel and piping shall be measured and recorded. The change in pressure shall be calculated as follows:

$$\Delta P = P_i - P_f$$

where:

ΔP = Change in pressure, inches of water (in. H₂O)

P_i = Initial pressure in marine tank vessel after air/gas is shut off, in. H₂O

P_f = Pressure in marine tank vessel at the end of the 30 minute period, in. H₂O

4. The change in pressure, ΔP , shall be compared to the pressure calculated as follows:

$$\Delta PM = 0.861 P_{ia} \frac{L}{V}$$

where:

ΔPM = Maximum allowable pressure change, in. H₂O

P_{ia} = Initial pressure in marine tank after air/gas is shut off, pounds per square inch absolute (psia)

L = Maximum permitted loading rate of vessel, barrels per hour

V = Total volume of marine tank, barrels

5. If $\Delta P \leq \Delta PM$, the marine tank vessel is vapor tight.
6. If $\Delta P > \Delta PM$, the marine tank vessel is not vapor tight and the source of the leak must be identified and repaired prior to retesting.

g. Recordkeeping. The owner or operator of a bulk gasoline marine tank vessel loading facility subject to this section shall keep the records specified in this paragraph in a readily accessible location for at least 5 years. These records shall be made available to the Department immediately upon verbal or written request.

1. An operator or owner subject to this section seeking to demonstrate compliance with paragraph (c.)(3.)(i.) of this section through using either a thermal or catalytic incinerator shall record:
 - i. The average firebox temperature of the incinerator (or the average temperature upstream and downstream of the catalyst bed), measured at least every 2 minutes of the loading cycle if the time period of the loading cycle is less than 3 hours or every 15 minutes if the total time period of the loading cycle is equal to or greater than 3 hours. The measured temperature shall be averaged over the loading cycle.
 - ii. The percent reduction of total organic compounds determined as specified in paragraph (e.)(8.) and (e.)(9.) of this section.
 - iii. The duration of each loading cycle.
2. An operator or owner subject to this section seeking to demonstrate compliance with paragraph (c.)(3.)(i.) of this section through use of a boiler or process heater shall record:
 - i. A description of the location at which the vent stream is introduced into the boiler or process heater.
 - ii. The average combustion temperature of the boiler or process heater with a design capacity of less than 44 MW (150 million BTU/hr) measured at least every 2 minutes of the

loading cycle if the time period of the loading cycle is less than 3 hours or every 15 minutes if the total time period of the loading cycle is equal to or greater than 3 hours. The measured temperature shall be averaged over the loading cycle.

iii. The duration of each loading cycle.

3. An operator or owner subject to this section seeking to demonstrate compliance with paragraph (c.)(3.)(ii.) of this section through use of a smokeless flare or other flare design (i.e., steam-assisted, air-assisted or nonassisted) shall record:

i. All visible emission readings, heat content determinations, flow rate measurements, and exit velocity determinations made during the compliance test.

ii. Continuous records of the flare pilot flame monitoring.

iii. Records of all periods of operation during which the pilot flame is absent during the loading cycle.

iv. The duration of each loading cycle.

v. Any flare system that is designed to cease operation upon loss of pilot and that automatically shuts down vessel loading and isolates the vessel vent stream from the flare by closing automatic block valves shall be exempt from the requirements of (ii) and (iii) above.

4. An operator or owner subject to this section seeking to demonstrate compliance with paragraph (c.)(3.)(iii.) of this section through use of a carbon adsorber where an organic monitor is not used shall record:

i. The total steam mass flow measured at least every 15 minutes and averaged over each loading cycle or the continuous records of the vacuum during regeneration.

ii. The duration of the carbon bed regeneration cycle.

iii. Continuous records of the carbon bed temperature after regeneration.

iv. The duration of each loading cycle.

5. An operator or owner subject to this section seeking to demonstrate compliance with paragraph (c.)(3.)(iii.) of this section through use of a carbon adsorber where an organic monitor is used shall record:
 - i. Continuous records of the organic compounds concentration in the exhaust gases.
 - ii. The duration of each loading cycle.

6. The owner or operator subject to this section shall keep up-to-date, readily accessible, continuous records of the equipment operating parameters specified to be monitored under paragraph (d.) of this section, as well as permanent, up-to-date, readily accessible, continuous records of periods of operation during which the parameter boundaries established during the most recent performance test are exceeded. The Department may at any time require a report of these data. Periods of operation during which parameter boundaries established during the most recent performance test are exceeded are defined as follows:
 - i. For thermal incinerators, all periods during the loading cycle during which the average combustion temperature was more than 28°C below the average loading cycle temperature during the most recent performance test at which compliance with paragraph (c.)(3.)(i.) of this section was determined.
 - ii. For catalytic incinerators, all periods during the loading cycle during which the average temperature of the vent stream immediately before the catalyst bed is more than 28°C below the average temperature of the vent stream during the most recent performance test at which compliance with paragraph (c.)(3.)(i.) of this section was determined.
 - iii. All periods of operation during the loading cycle during which the average combustion temperature was more than 28°C below the average loading cycle temperature during the most recent performance test at which compliance with paragraph (c.)(3.)(i.) of this section was determined for boilers or process heaters with a designed heat input capacity of less than 44MW (150 million BTU/hr).
 - iv. For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under paragraph (c.)(3.)(i) of this section.

- v. For carbon adsorbers where an organic monitor is used, all 3-hour periods during the loading cycle during which the average organic compounds concentration or readings of organics in the exhaust gases is more than 20 percent greater than the average organic compounds concentration or reading measured by the organic monitoring device during the most recent performance test at which compliance with paragraph (c.)(3.)(iii.) of this section was determined.
 - vi. For carbon adsorbers where an organic monitor is not used:
 - A. All carbon bed regeneration cycles during which the total mass steam flow was below 10 percent of the total mass steam flow during the most recent compliance test that demonstrated that the facility was in compliance.
 - B. All carbon bed regeneration cycles during which the temperature of the carbon bed after regeneration (and after completion of any cooling cycle(s)) was greater than 10 percent of the carbon bed temperature (in degrees Celsius) during the most recent compliance test that demonstrated that the facility was in compliance.
7. Each owner or operator subject to the provisions of this section using a boiler or process heater with a design heat input capacity of 44 MW (150 million BTU/hr) or greater to comply with paragraph (c.)(3.)(i.) of this section shall keep up-to-date, readily accessible records of all periods of operation of the boiler or process heater.
8. Each owner or operator subject to the provisions of this section shall keep up-to-date, readily accessible, continuous records of the flare pilot flame monitoring data specified in paragraph (d.)(2.) of this section as well as up-to-date, readily accessible, records of all periods of operation in which the pilot flame is absent except as exempted under paragraph (g.)(3.)(v.).
9. Each owner or operator subject to the provisions of this section that uses a vent system with valves that could divert the vent stream from the control device shall keep readily accessible records of:
- i. All periods when flow is indicated if flow monitors are installed under paragraph (d.)(6.)(i.) of this section.

- ii. All times when maintenance is performed on car-sealed valves, when the car seal is broken, and when the valve position is changed (i.e., from open to closed for valves leading to the control device and closed to open for valves that vent the stream directly or indirectly to the atmosphere bypassing the control device) if valves are monitored under paragraph (d.)(6.)(ii.) of this section.
- 10. The owner or operator of a bulk gasoline marine tank loading facility subject to this section shall keep up-to-date documentation of each marine tank vessel's vapor tightness test results by paragraph (c.)(4.)(i.) of this section to include as a minimum the following:
 - i. Marine tank vessel owner(s) name(s) and address.
 - ii. Marine tank vessel identification number.
 - iii. Date and location of test.
 - iv. Test results.
- h. Reporting requirements. The owner or operator of a bulk gasoline marine tank loading facility subject to this section shall:
 - 1. Comply with the initial compliance certification requirements of Section 5(a.) of Regulation No. 24.
 - 2. Comply with the requirements of Section 5(b.) of Regulation No. 24 regarding excess emissions related to the control devices required to comply with this section, as well as any other State of Delaware exceedance reporting requirements.