

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY

FIELD OPERATIONS MANUAL FOR AIR INSPECTORS
Air Standard Operating Procedures (ASOPs)

ASOP - 5
GASOLINE DELIVERY TANK OPERATION, TESTING & CERTIFICATION

I. INTRODUCTION AND PURPOSE

The Regulations require gasoline delivery tanks to be certified as vapor tight, and to be maintained and operated in a vapor tight condition within the VOC control areas designated in Appendix P of the Regulations. The vapor tight certifications are sometimes conducted at facilities outside the designated VOC control areas. Therefore, the certification of a vapor tightness test station are applicable throughout Virginia. This procedure outlines the operation, testing and certification requirements the Board finds acceptable for determining compliance with the emission standards for gasoline delivery tanks prescribed in 9 VAC 5-40-5220 (G) of the Regulations for the Control and Abatement of Air Pollution and the U. S. Environmental Protection Agency requirements specified in 40 CFR, Part 60, Appendix A, Method 27. These procedures may not cover every possible situation which might arise; therefore, owners/operators of tank trucks should consult with the appropriate Regional Office for guidance and assistance when necessary.

II. DEFINITIONS

Bulk Gasoline Plants. A secondary distribution point for delivering gasoline to local farms, businesses, service stations and other distribution points, where the total gasoline throughput is 20,000 gallons or less per working day, based on the daily average for the most recent 12-month period.

Bulk Gasoline Terminal. A primary distribution point for delivering gasoline to bulk plants, service stations and other distribution points, where the total gasoline throughput is greater than 20,000 gallons per working day, based on the daily average for the most recent 12-month period.

Gasoline. Any petroleum distillate or petroleum distillate/alcohol blend having a Reid vapor pressure of 4.0 p.s.i. (27.6 kilopascals) or greater which is used as a fuel for internal combustion engines.

Delivery Tank. Any container, including associated pipes and fittings, that is attached to or forms a part of any truck, trailer or railcar used for the transport of gasoline.

Gasoline Dispensing Facility (Service Station). Any site where gasoline is dispensed to motor vehicle gasoline tanks from stationary storage tanks.

Vapor Collection/Control System All piping, seals, hoses, connections, pressure-vacuum vents and other possible leak sources between the delivery tanks and the vapor disposal unit and/or the storage tanks and vapor recovery unit.

Vapor Tight. Capable of holding a pressure of 18 inches of H₂O and a vacuum of 6 inches of H₂O without sustaining a pressure change of more than 3 inches of H₂O in 5 minutes.

VOC Control Area Cities and Counties listed under Volatile Organic Compounds in Appendix P of the Regulations.

III. REQUIREMENTS AND METHODS

The test methods and procedures outlined in this document are those specified in the U. S. Environmental Protection Agency (EPA) 40 CFR, Part 60, Appendix A, Method 27. No other test methods and procedures have been approved by the State Air Pollution Control Board.

- Delivery tanks must be designed, maintained and certified to be vapor tight. In addition, there shall be no avoidable visible liquid leaks. Invariably there will be a few drops of liquid from disconnection of dry breaks in liquid lines even when well maintained; these drops are allowed.
- Tank truck and account truck hatches shall be closed at all times during loading and unloading operations (period during which there is liquid flow) at facilities subject to the regulations.
- During loading or unloading operations, there shall be no volatile organic compound concentrations greater than or equal to 100 percent of the lower explosive limit (LEL, measured as propane) at 2.5 centimeters around the perimeter of a potential leak source as detected by a combustible gas detector. In addition, there shall be no avoidable visible liquid leaks. Invariably there will be a few liquid drops from the disconnection of properly maintained bottom loading dry breaks and the raising of properly maintained top loading vapor heads. These few drops are allowed.
- The vapor collection and vapor disposal equipment must be designed and operated to prevent gauge pressure in the delivery tank from exceeding 18 in H₂O and prevent vacuum from exceeding 6 in H₂O.
- Testing to determine vapor tightness as specified in 9 VAC 5-40-5220 (G) (6) shall be conducted using test methods specified in Appendix A of this Procedure and Method 27 of the 40 CFR, Part 60, Appendix A. All tests shall be conducted by, or under the

direction of, a person qualified by training and/or experience in the field of air pollution testing or delivery tank maintenance and testing and approved, in writing, by the regional office.

- Regional Office personnel will conduct initial inspections of test facilities desiring to be approved. Such inspection will be at the mutual convenience of the facility desiring approval and the Regional Office. Normally, one week prior notification should be sufficient for scheduling and observing a vapor tightness test. The purpose of the approval is to verify that the required test equipment is available and that the approved test methods and procedures are followed.
- Once a test facility is approved, in writing, by the appropriate Regional Office, such facilities are authorized to conduct the vapor tightness tests for any company-owned delivery tank as well as those owned and operated by others. Regional re-inspection of the test facility will be conducted whenever the person qualified to conduct the certification is changed or every two years, whichever comes first. The appropriate Regional Office will recertify the test facility in writing.
- Monitoring to confirm the continuing existence of leak tight conditions during tanker operations shall be conducted using test methods specified in Appendix B of this document.
- Owners of delivery tanks shall obtain certification from an approved test facility, on an annual basis, that the tanks are vapor tight in accordance with test procedures specified in Appendix A of the procedure. Tanks that are not vapor tight must be repaired within 15 days of the test and be retested and certified as vapor tight.
- Each delivery tank shall have information displayed indicating the tank is certified vapor tight. The information is to be displayed on each side of the delivery tank at the widest (largest diameter) point, or as close as possible to be clearly visible, as near to the front end of the delivery tank as possible. In case there are other markers or informational displays in the above mentioned location, then the information required by this procedure should be placed on the same line to the rear of the existing information. The information shall be displayed using stenciled letters or equivalent that are at least 2" high and are in a contrasting color to that of the tank. The information display shall contain the letters VR followed by the month and year of the certification expiration date with dashes in between. Example: VR-04-97 would be for a test conducted in April 1996 and expiring in April 1997. The information shall be maintained in a clean and legible condition at all times.
- The owner of a vapor collection/control system shall repair and retest the system, within 15 days of testing, if it exceeds the leak limit specified in this procedure.
- The owner of a delivery tank and/or vapor collection/control system shall maintain

records of all certification testing and repairs. In addition, each test facility must maintain records for all delivery tanks tested. The records must consist of a control log sheet and identify the delivery tank or vapor collection/control system; the owner; the name of the test facility; the date and/or repair and the date of retest. The records must be maintained for inspection by Regional Office personnel in a legible, readily available condition for a least 2 years after the date testing or repair was completed.

- Records of raw data to support the certification test control log required by this procedure shall be kept with the control log and maintained as same and shall, as a minimum, contain the following:
 - a. The delivery tank identification number.
 - b. The first and second, passing, consecutive differential test pressure results and their average.
 - c. The first and second, passing, consecutive differential test vacuum results and their average.
 - d. Date of test.
 - e. Name of the test facility (including the name of the person) Conducting the test.

A copy of the current record of certification for each tank truck/account truck must be available on each tank truck/account truck for review by field enforcement officers.

Agency personnel may, at any time, monitor delivery tank or vapor collection/control system, Using the methods of this procedure to confirm continuing compliance with requirements of this procedure.

Copies of all records and reports required by this procedure shall immediately be made available to the agency personnel, upon verbal or written request, at any reasonable time.

APPENDIX A

DETERMINATION OF VAPOR TIGHTNESS OF GASOLINE DELIVERY TANK USING PRESSURE-VACUUM TEST (REFERENCE 40 CFR APPENDIX A, METHOD 27)

1. PRINCIPLE

Pressure and vacuum are applied alternately to the compartments of a gasoline delivery tank and the change in pressure/vacuum is recorded after a specified period of time.

2. APPLICABILITY

This method is applicable for the determination of vapor tightness of a gasoline delivery tank which is equipped with vapor collection equipment.

3. DEFINITIONS

3.1 Gasoline. Any petroleum distillate or petroleum distillate/alcohol blend having a Reid vapor pressure of 4.0 P.S.I. (27.6 kilopascals) or greater which is used as a fuel for internal combustion engines.

3.2 Delivery tank. Any container, including associated pipes and fittings, that is attached to or forms a part of any truck, trailer or railcar used for the transport of gasoline.

3.3 Compartment. A liquid-tight division of a delivery tank.

3.4 Delivery tank vapor collection equipment. Any piping, hoses, and devices on the delivery tank used to collect and route gasoline vapors either from the tank to a bulk terminal vapor control system or from a bulk plant or service station into the tank.

4. APPARATUS

4.1 Pressure source. Pump or compressed gas cylinder of air or inert gas sufficient to pressurize the delivery tank to 500 mm (approximately 20 inches H₂O) above atmospheric pressure.

- 4.2 Regulator. Low pressure regulator for controlling pressurization of the delivery tank.
- 4.3 Vacuum source. Vacuum pump capable of evacuating the delivery tank to 250 mm (approximately 10 inches H₂O) below atmospheric pressure.
- 4.4 Pressure-Vacuum supply hose.
- 4.5 Manometer. Liquid manometer, or equivalent instrument, capable of measuring up to 500 mm (approximately 20 inches H₂O) pressure with ± 2.5 mm (± 0.1 inch H₂O) precision.
- 4.6 Pressure/vacuum relief valves. The test apparatus shall be equipped with an in-line pressure/vacuum relief valve set to activate at 675 mm (approximately, 26 inches H₂O) above atmospheric pressure or 250 mm (approximately 10 inches H₂O) below atmospheric pressure, with a capacity equal to the pressurizing or evacuating pumps.
- 4.7 Test cap for vapor recovery hose fittings. This cap shall have a tap for manometer connection and a fitting with shut-off valve for connection to the pressure/vacuum supply hose.
- 4.8 Caps for liquid delivery hoses.

5. PRETEST PREPARATIONS

- 5.1 Emptying of tank. The delivery tank shall be emptied of all liquid.
- 5.2 Purging of vapor. As much as possible the delivery tank shall be purged of all volatile vapors by any safe, acceptable method. One method is to carry a load of non-volatile liquid fuel such as diesel or heating oil, immediately prior to the test. A second method is to remove the volatile vapors by blowing ambient air into each tank compartment for at least 20 minutes. This second method is usually not as effective and often causes stabilization problems, requiring a much longer time for stabilization during the testing.
- 5.3 Location. The delivery tank shall be tested where it will be protected from direct sunlight and the tank temperature should be allowed to equilibrate in the test environment.

6. TEST PROCEDURE

- 6.1 Open and close each dome cover.

- 6.2 Connect static electrical ground connections to tank. Attach the liquid delivery and vapor return hoses, remove delivery elbows, and plug the liquid delivery fittings. The purpose of testing the liquid delivery hoses is to detect tears or holes that would allow liquid leakage during a delivery. Liquid delivery hoses are not considered to be possible sources of vapor leakage and thus, do not have to be attached for a vapor leakage test. Instead a liquid delivery hose could be either visually inspected, or filled with water to detect any liquid leakage.
- 6.3 Attach the test cap to the end of the vapor recovery hose of the delivery tank.
- 6.4 Connect compartments of the tank internally to each other if possible. (If not possible, each compartment must be tested separately.)
- 6.5 Connect compartments of the tank internally to each other if possible. (If not possible, each compartment must be tested separately.)
- 6.6 Open the shut-off valve in the vapor recovery hose cap. Applying air pressure slowly, pressurize the tank, or alternatively the first compartment, to 457 mm (approximately 18 inches H₂O).
- 6.7 Close the shut-off valve and allow the pressure in the tank to stabilize, adjusting the pressure if necessary to maintain 457 mm (18 inches H₂O). When the pressure stabilizes, record the time and initial pressure.
- 6.8 At the end of five minutes, record the time and final pressure.
- 6.9 Repeat steps 6.6 through 6.8 until the change in pressure for two consecutive runs agree with ± 12.5 mm (approximately ± 0.5 inches H₂O). Calculate the arithmetic average of the two results.
- 6.10 Compare the average measured change in pressure to the allowable pressure change of no more than 3 inches H₂O in 5 minutes. If the delivery tank does not meet the standard, repair the sources of leakage and repeat the pressure test.
- 6.11 Disconnect the pressure source from the pressure/vacuum supply hose, and slowly open the shut-off valve to bring the tank to atmospheric pressure.
- 6.12 Connect the vacuum source to the pressure/vacuum supply hose.
- 6.13 Open the shut-off valve in the vapor recovery hose cap. Slowly evacuate the tank, or alternatively the first compartment, to 152 mm (6 inches H₂O).

- 6.14 Close the shut off valve and allow the pressure in the truck tank to stabilize, adjusting the pressure if necessary to maintain 152 mm (6 inches H₂O vacuum). When the pressure stabilizes, record the time and initial vacuum.
- 6.15 At the end of 5 minutes, record the time and final vacuum.
- 6.16 Repeat steps 6.13 through 6.15 until the change in vacuum for two consecutive runs agree within ± 12.5 mm (approximately ± 0.5 inches H₂O). Calculate the arithmetic average of the two results.
- 6.17 Compare the average measured change in vacuum to the allowable vacuum change of no more than 3 inches H₂O in 5 minutes. If the delivery tank does not meet the standard, repair the sources of leakage and repeat the vacuum test.
- 6.18 Repeat steps 6.5 through 6.15 for each compartment if they were not interconnected.

7. ALTERNATIVE TEST PROCEDURES

- 7.1 The pumping of water into the bottom of the delivery tank is an acceptable alternative to the pressure source described above. Likewise the drawing of water out of the bottom of the delivery tank may be substituted for the vacuum source. Some of the step-by-step procedures in the method must be altered slightly to accommodate these different pressure and vacuum sources.
- 7.2 Techniques, other than specified above, may be used for purging and pressurizing a delivery tank, if prior approval is obtained from the Regional Office. Such approval will be based upon demonstrated equivalency with the above method.

VAPOR RECOVERY TANK TRUCK CERTIFICATION (VA/DEQ Form of July 1997)

TESTING FACILITY: NAME: _____ DATE: _____

ADDRESS: _____

TANK OWNER: _____ OWNERS
 SERIAL NO: _____
 MAKE-TANK: _____ DATE MFG: _____ MFG.
 SERIAL NO: _____

TEST RESULTS: (For procedures see: CFR 40, PART 60, APPENDIX A, METHOD 27 AND DEQ ENF-2)

A	1ST RUN	PRESSURE	TIME	2ND RUN
	PRESSURE			
		TIME		
	INITIAL			INITIAL
	FINAL			FINAL
	DIFF.	in. H20	min.	DIFF.
		(a)		(b)

a-b or b-a = _____ (Difference in consecutive runs must be less than 0.5)

$\frac{a+b}{2}$ = _____ in. H20 (Avg. must be no more than 3)

B	1ST RUN	VACUUM TIME	TIME		2ND RUN	VACUUM
	INITIAL	_____	_____		INITIAL	
	FINAL	_____	_____		FINAL	
	DIFF.	_____ in. H2O	_____ min.		DIFF.	
		(a)				(b)

$a - b \text{ or } b - a = \underline{\hspace{2cm}}$ (Difference in consecutive runs must be less than 0.5)

$\frac{a + b}{2} = \underline{\hspace{2cm}}$ in. H2O (Avg. must be no more than 3)

C OVERFILL PROTECTION SYSTEM: TYPE: _____
 OPERATING PROPERLY (YES/NO)

PASSED FAILED CERTIFICATION TEST

EXPIRATION DATE: _____

Necessary repairs must be accomplished within 15 days or if

parts delayed in 45 days. For parts delay, attach a copy of the ordering invoice.

I HEREBY CERTIFY THAT THE TANK DESCRIBED ABOVE HAS BEEN TESTED IN ACCORDANCE WITH PROCEDURES SPECIFIED IN CFR 40, PART 60, APPENDIX A, METHOD 27, AND WITH REGULATIONS AND PROCEDURES OF THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY.

(Signature) (Date) (Name)

Testing authority granted by: DEQ/ [] Reg Office
Expires on: _____

*Records of all tests, repairs and retests, shall be kept on file for at least two (2) years.
A copy of the current test results must be carried on the tank truck at all times.*

APPENDIX B
GASOLINE VAPOR LEAK DETECTION PROCEDURE
BY COMBUSTIBLE GAS DETECTOR

1. PRINCIPLE

A combustible gas detector is used to indicate any incidence of leakage from gasoline delivery tanks and vapor control systems. This qualitative monitoring procedure is an enforcement tool to confirm the continuing existence of leak-tight conditions.

2. APPLICABILITY

This method is applicable to determining the leak-tightness of gasoline truck tanks during loading without taking the truck tank out of service. The method is applicable only if the vapor control system does not create back-pressure in excess of the pressure limits of the truck tank compliance leak test. For vapor control systems, this method is applicable to determining leak-tightness at any time.

3. DEFINITIONS

- 3.1 Delivery tank. Any container, including associated pipes and fittings, that is attached to or forms a part of any truck, trailer or railcar used for the transport of gasoline.
- 3.2 Delivery tank vapor collection equipment. Any piping, hoses, and devices on the delivery tank used to collect and route the gasoline vapors either from the tank to a bulk terminal vapor control system or from a bulk plant or service station into the tank.
- 3.3 Vapor control system. Any piping, hoses, equipment, and devices at the bulk terminal, bulk plant, or service station, which is used to collect, store, and/or process gasoline vapors.

4. APPARATUS AND SPECIFICATIONS

- 4.1 Combustible gas detector. A portable hydrocarbon gas analyzer with associated sampling line and probe.
- 4.1.1 Safety. Certified as safe for operation in explosive atmospheres.
- 4.1.2 Range. Minimum range of 0 - 100 percent of the lower explosive limit (LEL) as propane.
- 4.1.3 Probe diameter. Sampling probe internal diameter of 0.625 cm ($\frac{1}{4}$ inch).
- 4.1.4 Probe length. Probe sampling line of sufficient length for easy

maneuverability during testing.

4.1.5 Response time. Response time for full - scale deflection of less than 8 seconds for detector with sampling line and probe attached.

5. TEST PROCEDURE

5.1 Calibration. Calibrate the combustible gas detector with 2.2 percent propane by volume in air for 100 percent of LEL response.

5.2 Monitoring procedure. During loading or unloading, check the periphery of all potential sources of leakage of the truck tank and of the terminal, plant, or service station vapor collection system with a combustible gas detector.

5.2.1 Probe distance. The probe inlet shall be 2.5 cm (1 inch) from the potential leak source.

5.2.2 Probe movement. Move the probe slowly (2.0 cm/second). If there is any meter deflection at a potential leak source, move the probe to locate the point of highest meter response.

5.2.3 Probe position. As much as possible, the probe inlet shall be positioned in the path of (parallel to) the vapor flow from a leak.

5.2.4 Wind. Attempt as much as possible to block the wind from the area being monitored.

5.3 Recording. Record the highest detector reading and location for each incidence of leakage.