



Air Resources Board




Matthew Rodriguez
Secretary for
Environmental Protection

Mary D. Nichols, Chair
1001 I Street • P.O. Box 2815
Sacramento, California 95812 • www.arb.ca.gov

Edmund G. Brown Jr.
Governor

TO: Michael T. Benjamin, Chief
Monitoring and Laboratory Division

FROM: George Lew, Chief 
Vapor Recovery and Fuel Transfer Branch

DATE: May 20, 2017

SUBJECT: SCREENING PROCEDURES FOR CERTIFICATION OF BULK PLANTS

I am requesting that you sign the attached Executive Order G-17-042, which will deem the attached "Screening Procedure for Vapor Recovery Systems of Bulk Plants," dated May 19, 2017 (2017 Screening Procedure), equivalent to TP-201.1, "Determination of Emission Factor of Vapor Recovery Systems of Bulk Plants." Executive Order G-17-042 and the 2017 Screening Procedure were reviewed and approved by Claudia Nagy of the Office of Legal Affairs. The Chief of the Monitoring and Laboratory Division is delegated by Executive Order P-017-001 to approve alternative or equivalent test methods for measuring emissions from vapor recovery and non-vehicular emissions sources pursuant to Title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 8, Article 1 (commencing with section 94000).

BACKGROUND

Executive Order (EO) G-846, issued on November 2, 1993, deemed the "Screening Test Procedures for Certification of Gasoline Bulk Plant Vapor Recovery Systems" (1993 Screening Procedure) to be equivalent to Method 202, "Certification and Test Procedure for Vapor Recovery Systems at Gasoline Bulk Plants." Method 202 was repealed on June 11, 1996, and replaced by CP-202, "Certification Procedure for Vapor Recovery Systems at Bulk Plants" and TP-202.1 "Determination of Emission Factor of Vapor Recovery Systems of Bulk Plants."

The 1993 Screening Procedure is an alternative to the test procedure for determining the compliance with the 90 percent efficiency performance standard for bulk plant vapor recovery systems. This standard was specified in Method 202 and remained unchanged when CP-202 was first adopted on April 12, 1996, and last amended on March 17, 1999. The test procedure specified in TP-202.1 is identical in concept and basis to Method 202. The 1993 Screening Procedure is identical to the 2017 Screening Procedure. Therefore, the 2017 Screening Procedure is equivalent to TP-202.1.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: <http://www.arb.ca.gov>.

California Environmental Protection Agency

Michael Benjamin
May 20, 2017
Page 2

The screening procedure is also a more efficient test, allowing staff to conduct more than one bulk plant certification test within a week, and reduces cost to the bulk plant operators. In addition, the 2017 Screening Procedure, like the 1993 Screening Procedure, increases the vent emissions by 1.47 times of recovered emissions to provide a worst-case efficiency estimate. This worst-case factor was based on emission tests conducted by CARB staff at bulk plants in the late 1980s and early 1990s.

If you have questions or need further information, please contact Merrin or me.

Attachments

**State of California
AIR RESOURCES BOARD**

Executive Order G-17-042

Relating to Approval of an Alternate Vapor Recovery Test Procedure

**Screening Test Procedure as an Alternative to the Test Procedure for
Determination of Emission Factor of Vapor Recovery Systems at Gasoline Bulk
Plants**

WHEREAS, the California Air Resources Board (CARB) has established pursuant to California Health and Safety Code sections 39600, 39601, and 41954 certification procedures for systems designed to control gasoline vapor emissions during the loading of cargo tanks at bulk plants and the filling of bulk plants in its Certification Procedure for Vapor Recovery Systems at Gasoline Bulk Plants (CP-202), as last amended on March 17, 1999, incorporated by reference in Title 17, California Code of Regulations, section 94012;

WHEREAS, CARB has established, pursuant to California Health and Safety Code sections 39600, 39601, 39607, and 41954, test procedures to determine compliance with the performance standard listed in section 4.1.1.1 of CP-202 in its Determination of Emission Factor of Vapor Recovery Systems of Bulk Plants (TP-202.1) as last amended on March 17, 1999, incorporated by reference in Title 17, California Code of Regulations, section 94012;

WHEREAS, Executive Order G-846 issued on November 2, 1993, deemed the Screening Test Procedures for Certification of Gasoline Bulk Plant Vapor Recovery Systems (1993 Screening Procedure) as equivalent to Method 202, Certification and Test Procedure for Vapor Recovery Systems at Gasoline Bulk Plants;

WHEREAS, Method 202 was repealed on June 11, 1996, and replaced by CP-202 and TP-202.1 on April 12, 1996;

WHEREAS, the basis and concepts of TP-202.1 are identical to the test procedure specified in Method 202;

WHEREAS, the attached Screening Procedure for Vapor Recovery Systems at Bulk Plants dated May 19, 2017, is identical to the 1993 Screening Procedure specified in Executive Order G-846 and is deemed equivalent to TP-202.1;

WHEREAS, Section 13 of TP-202.1 authorizes the Executive Officer to approve an alternative test procedure if deemed equivalent with TP-202.1;

WHEREAS, Executive Order P-07-001 delegates to the Chief of the Monitoring and Laboratory Division authority to approve alternate or equivalent test procedures for

WHEREAS, Executive Order P-07-001 delegates to the Chief of the Monitoring and Laboratory Division authority to approve alternate or equivalent test procedures for measuring emissions from vapor recovery systems pursuant to title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 8, Article 1 (commencing with section 94000);

NOW, THEREFORE, IT IS ORDERED that the Screening Procedure for Vapor Recovery Systems of Bulk Plants dated May 19, 2017, is approved as an alternative to TP-202.1 for determining compliance with performance standard specified in Section 4.1.1.1 of CP-202.

IT IS FURTHER ORDERED that Executive Order G-846 is hereby rescinded.

Executed at Sacramento, California this 29th day of May 2017.


Michael T. Benjamin, Chief
Monitoring and Laboratory Division

California Environmental Protection Agency



Screening Procedure for
Vapor Recovery Systems of
Bulk Plants

May 19, 2017

**California Environmental Protection Agency
Air Resources Board**

**Screening Procedure for
Vapor Recovery Systems of
Bulk Plants**

1 APPLICABILITY

A set of definitions common to all certification and test procedures is in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "CARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the Executive Officer of CARB or his or her authorized representative or designate.

The following test procedures shall be for determining the efficiency of vapor recovery systems controlling gasoline vapors emitted during loading of cargo tanks at the bulk plant, and during the filling of bulk plant storage tanks.

2 PRINCIPLE AND SUMMARY OF TEST PROCEDURE

2.1 Principle

At a bulk plant (during loadings of cargo tanks and filling of the storage tanks), all possible leak points due to test equipment installation shall be checked for vapor leaks. During the tests, the volume of gasoline delivered from the bulk plant storage tanks to the cargo tanks is recorded, the volume of gasoline delivered to any storage tank(s) is recorded, and the volume of the vapors emitted from the system are measured.

This screening procedure assumes a worst case scenario for the gasoline vapor's hydrocarbon concentration in order to dispense with the measurement of this parameter. The worst case scenario assumes that the hydrocarbon concentration of vapors vented from the system is 1.47 times the concentration of the vapors controlled (recovered) by the system, and has its basis in CARB source tests performed from January 1988, through December 1992. With this assumed worst case concentration, the system efficiency is determined by measuring the volume of gasoline vapors recovered and vented to the atmosphere. Pressure and temperature measurements are made of the vapors controlled and vented to standardize volumes.

2.2 Special Considerations

- 2.2.1 With prior written approval of the Executive Officer, careful visual reading and manual recording of data is acceptable in lieu of automatic sensing and recording procedures, where feasible.
- 2.2.2 Venting shall only be allowed during testing if
- (a) all emissions of hydrocarbons from absolutely every vent source can be reliably quantified and included in emissions calculations; or
 - (b) the "ith" vent with the apparent path of least resistance to venting the vapor recovery system to the atmosphere and all other vent(s) are sealed or manifold so that the "ith" vent is the only allowed emission point to the atmosphere.

3 BIASES AND INTERFERENCES

Temperature changes throughout the test may introduce biases.

4 EQUIPMENT

- 4.1 Use rotary type positive displacement meter(s) or turbine meter(s), meeting the requirements of the U.S. Environmental Protection Agency (EPA) Method 2A, and with a back pressure limit (BPL) less than:
- 1. 1.10 inches water column at a flowrate of 3,000 cubic feet per hour (CFH) down to 0.05 inches water column at a flowrate of 30 CFH for a meter with a rating over 1000 CFH, and
 - 2. 0.70 inches water column at a flowrate of 800 CFH down to 0.04 inches water column at a flowrate of 16 CFH for a meter with a rating of or under 1000 CFH.

Meter(s) shall be equipped with taps accommodating the following equipment:

- 1. taps on the inlet side for
 - (a) Use a K-type thermocouple with a range of at least 0 to 150 °F, and
 - (b) a pressure gauge with a range providing absolute pressure readings within 10 to 90% of the range (more than one gauge shall be used, if

necessary).

2. taps on the inlet and outlet sides for a differential pressure gauge with a range of 0 to $< 2x$ BPL (i.e. full scale shall be less than twice the back pressure limit) or any other range appropriate to allow detection of a pressure drop greater than the BPL.
- 4.2 Coupler for the vapor vent line (when no processor is present) to accommodate the gas meter with thermocouple and pressure taps. Coupler is to be sized for a minimum pressure drop.
- 4.3 Coupler for the cargo tank vapor return line to accommodate the gas meter with thermocouple and pressure taps. Coupler is to be the same diameter as the vapor return line.
- 4.4 Barometer, or alternative atmospheric pressure data, such as the National Weather Service.
- 4.5 Appropriate manometers or other pressure sensing devices capable of measuring system pressures.
- 4.6 Coupler for attaching PV valve to volume meter.
- 4.7 Portable hydrocarbon analyzer such as RKI Eagle 2 Model 72-5201RK Gas Monitor or equivalent for vapor leak detection.

5 CALIBRATION PROCEDURE

- 5.1 Flow Meters. Standard methods and equipment shall be used to calibrate the flow meters annually.
- 5.2 Temperature Instruments. Shall be sent out annually for National Institute of Standards and Technology traceable certification of the sensors.
- 5.3 Pressure Instruments. Shall be calibrated annually following manufacturer's instructions.
- 5.4 A record of all calibrations made shall be maintained in the test report file.

6 PRE-TEST PROTOCOL

- 6.1 Specification of Test, Challenge, and Failure Modes

The specification of test, challenge, and failure modes such as the number of liquid transfer episodes, volume and volumetric rate of liquid transfer, storage tank volumes, etc. shall be done according to the principles of CP-202 § 5 for the testing and evaluation of vapor recovery equipment.

6.2 Transfer to Cargo Tank from Bulk Plant

6.2.1 Specific Pre-Test Protocol Items

During loading of a cargo tank at the bulk plant, direct measurements volume of gas vented and recovered shall be made. All possible vent points shall be either capped to prevent emissions, or vented through a meter and quantified. Test equipment shall be checked for vapor leaks using a portable analyzer. The volume of gasoline dispensed to the cargo tank is recorded. The efficiency of the vapor recovery system is calculated from these measurements.

6.2.2 Test Conditions

The number of cargo tank loadings to be tested shall be established at the discretion of the Executive Officer based on an engineering evaluation, or a minimum of one delivery to the storage tank and one cargo tank loading operation shall be tested. The minimum volume for each delivery shall be 500 gallons. The system shall be tested under normal operating conditions as close as possible, excluding dispensing of gasoline to vehicle fuel tanks. Dispensing rates shall be at the maximum rate possible consistent with safe and normal operating practices. The Executive Officer shall have the discretion of conducting additional tests, if deemed necessary.

6.3 Transfer to Bulk Plant from Cargo Tank

6.3.1 Specific Pre-Test Protocol Items

During a fuel delivery to the bulk plant, direct measurements of the volume of vapors vented and recovered shall be made. All possible points of test equipment shall be checked for vapor leaks. The volume of gasoline delivered from the cargo tank is recorded.

6.4 System and Facility Preparation

System equipment and components shall be completely operational and any storage tanks involved in the test shall be filled to the appropriate volume a minimum of 24 hours prior to the scheduled test.

In addition, the system and facility shall be prepared to operate according to any specified test, challenge, and failure modes.

The required preliminary evaluation shall set the final requirements for facility preparation. The dominant principle shall be that testing activities minimally alter facility and system conditions.

Install all equipment and wait until a cargo tank arrives. Until then, provide conditions which minimally disturb facility and system operations due to the presence of such equipment for such time.

7 TEST PROCEDURE

The facility and system shall be prepared to operate according to any specified test, challenge, and failure modes. The Executive Officer will verify that the cargo tank used for the tests has a CARB certification sticker.

For systems with multiple vents all system vents shall be monitored. Alternatively, if system vents are manifolded, then one vent may be monitored while the others are appropriately sealed. Attempt to monitor the vent with the least resistance to atmospheric emissions.

When sealing valves, do not seal vacuum valves or the vacuum side of pressure/vacuum valves. On any vacuum valves, use a portable analyzer according to EPA Method 21 calibrated to the lower explosive limit for propane (21,000 ppm).

7.1 Transfer to Cargo Tank from Bulk Plant

- 7.1.1 Connect coupler to vent of bulk tank, or if the vent has a PV valve, remove the PV valve and then connect the coupler to the vent.
- 7.1.2 Connect the appropriate volume meter, thermocouple and pressure gauge to the vent coupler and connect the PV valve to the gas meter.
- 7.1.3 Connect a coupler, volume meter, thermocouple, and pressure gauge to the bulk storage tank vapor return lines.
- 7.1.4 Connect bulk storage tank fill and vapor return lines to the cargo tank in accordance with owner or operator established procedures for the system.
- 7.1.5 Check the cargo tank and all connections for a tight seal with an explosimeter before and during the test.
- 7.1.6 Record the initial reading of the volume meter(s).
- 7.1.7 Start refueling the cargo tank in accordance with manufacturer's established normal procedure. (This step shall be performed by the owner, operator, or

authorized representative.)

- 7.1.8 Volume, temperature and pressure measurements shall be recorded throughout the fueling episode.
 - 7.1.9 Record, during the test, barometric pressure and ambient temperature.
 - 7.1.10 At the end of the cargo tank loading, disconnect the cargo tank from the bulk tank in accordance with owner's or operator's instructions (normal procedure). (This step shall be performed by the owner, operator, or authorized representative.)
 - 7.1.11 Continue recording temperatures, pressure and gas meter readings at the bulk tank vent at about five-minute intervals until four consecutive intervals yield the same reading or until venting due to gasoline loading has stopped per the Executive Officer's judgment.
 - 7.1.12 Record final reading of gas meter.
 - 7.1.13 Record volume of gasoline that is delivered.
 - 7.1.14 Disconnect instrumentation from the vent.
 - 7.1.15 Repeat procedure as necessary for additional cargo tank loading.
- 7.2 Transfer to Bulk Plant from Cargo Tank
- 7.2.1 Connect appropriate coupler to vent of bulk tank, or if the vent has a PV valve, remove the PV valve and then connect the coupler to the vent
 - 7.2.2 Connect the appropriate volume meter, thermocouple and pressure gauge to the vent coupler and connect the PV valve to the volume meter.
 - 7.2.3 Connect appropriate coupler, volume meter, thermocouple and pressure gauge to the cargo tank vapor return lines.
 - 7.2.4 Connect cargo tank fuel and vapor return lines to appropriate bulk tank lines in accordance with the owner or operator's established procedures for the system.
 - 7.2.5 Check the cargo tank and all connections for a tight seal before and during the test with an explosimeter.
 - 7.2.6 Record the initial reading of the gas meter(s).
 - 7.2.7 Start filling of the bulk tank in accordance with owner's or operator's

established normal procedure. (This step shall be performed by the owner, operator, or authorized representative.)

- 7.2.8 Volume, temperature and pressure measurements shall be recorded throughout the fueling episode.
- 7.2.9 Record barometric pressure and ambient temperature during the test.
- 7.2.10 At the end of the bulk tank delivery, disconnect the cargo tank from the bulk tank in accordance with owner's or operator's instructions (normal procedure). (This step shall be performed by the owner, operator, or authorized representative.)
- 7.2.11 Continue recording temperatures, pressure and volume meter readings at the bulk tank vent until venting due to gasoline loading has stopped per the Executive Officer's judgment.
- 7.2.12 Record final reading of gas meter.
- 7.2.13 Record volume of gasoline that is delivered.
- 7.2.14 Disconnect instrumentation from the vent.

8 CALCULATING RESULTS

8.1 Transfer to Cargo Tank from Bulk Plant and Transfer from Bulk Plant to Cargo Tank

- 8.1.1 Review pressures recorded during the loading of cargo tanks to determine if any value was greater than or equal to 18 inches H₂O gauge pressure. Record and report such instances.
- 8.1.2 Volumes measured shall be corrected to standard conditions.

$$V = V_p \left(\frac{528}{T_p} \right) \left(\frac{P_b + \left(\frac{P}{13.6} \right)}{29.92} \right)$$

where:

V Volume of gas discharged, cubic feet (ft³) corrected to 68°F (528°R) and 29.92 inches of mercury ("Hg)

P_b	Barometric pressure, "Hg
P	Gauge pressure at exhaust coupler, inches water column
V_p	Volume of gas determined by flowmeter (actual volume) at each point (vapor return or vent) in ft^3
T_p	Average temperature at each point, in $^{\circ}R$

8.2 Efficiency for Each Transfer Operation

8.2.1 For each transfer operation, calculate the efficiency.

$$\text{Efficiency, } E = (V_r - 1.47V_v) / (V_r)$$

Where,

V_r	The standardized volume of vapors recovered during the transfer
V_v	The standardized volume of vapors vented during the transfer
1.47	Factor uses to assume that hydrocarbon concentration of vent is greater than concentration recovered