

California Environmental Protection Agency



Vapor Recovery Test Procedure

TP-204.1

Determination of
Five Minute Static Pressure Performance of
Vapor Recovery Systems of
Cargo Tanks

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Amended: November 7, 2014

**California Environmental Protection Agency
Air Resources Board**

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1 APPLICABILITY

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

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

1.1 General Applicability

This procedure is used to determine compliance with the five minute static pressure performance standard referenced in Vapor Recovery Certification Procedure 204 (CP-204), "Certification Procedure for Vapor Recovery Systems of Cargo Tanks." This procedure may be used to determine the five minute static pressure associated with the dispensing of any fluid, although it is written to reflect application to the hydrocarbon vapors associated with the dispensing of gasoline.

2 PRINCIPLE AND SUMMARY OF TEST PROCEDURE

The cargo tank, mounted on either the truck or trailer, is pressurized to 18 inches water column (WC) and the pressure in the system is then allowed to decay for five (5) minutes. Similarly in a separate test, the cargo tank is evacuated to negative six (-6) inches WC and the pressure in the system is then allowed to decay for five (5) minutes. The acceptability of the final pressure or vacuum level is based on the capacity of the cargo tank and is listed in CP-204. The performance of the cargo tank internal vapor valve can be determined by pressurizing the cargo tank to 18 inches WC and then closing the internal vapor valves. The system is then allowed to decay for five (5) minutes. The acceptability of final pressure level for the internal

vapor valve is listed in CP-204.

3 BIASES AND INTERFERENCES

Thermal expansion due to direct sunlight on an exposed cargo tank can bias the results of this test procedure. Keep 100 percent of the length of the vapor space of a cargo tank in shade during testing.

4 EQUIPMENT

- 4.1 Source of air or inert gas capable of pressurizing tanks to 27.7 inches of water (1 psi) above atmospheric pressure.
- 4.2 Low pressure (5 psi divisions) regulator for controlling pressurization of tank.
- 4.3 Water manometer, or equivalent, with 0 to 25 inch range, with scale readings of 0.1 inch.
- 4.4 Test cap for vapor line with a shut-off valve for connection to the pressure and vacuum supply hoses. The test cap is to be equipped with a tap for connecting the manometer.
- 4.5 Caps for liquid delivery line.
- 4.6 Vacuum pump of sufficient capacity to evacuate tank to ten inches of water.
- 4.7 Pressure and vacuum supply hose of 1/4 inch internal diameter.
- 4.8 In-line, pressure vacuum relief valve set to activate at one (1) psi and with a capacity equal to the pressurizing or evacuating pumps.

5 PRE-TEST PROTOCOL

- 5.1 The requirement that each compartment shall have its own internal vapor valve must be met to conduct this test.
- 5.2 The following shall be performed for all cargo tanks subject to testing in accordance with this test procedure:
 - 5.2.1 Cargo tank and trailers shall be empty of gasoline or product to conduct this test.

Warning: Under no circumstances shall the vapors in any cargo tank be purged or vented directly to the atmosphere.

5.2.2 Cargo tank shall be purged by one of the following methods:

- (a) Air from the purged cargo tank shall be routed to an incinerator that is certified by ARB and permitted by a district.
- (b) Cargo tank vapors shall be routed to an ARB certified vapor recovery system at a bulk plant or terminal when water is used to purge the cargo tank. The water can be reused. If the water is disposed of, it shall conform to all applicable federal, state, and local regulations.
- (c) Cargo tank vapors shall be routed to an ARB certified vapor recovery system at a bulk plant or terminal when a liquid with a vapor pressure of less than four pounds Reid Vapor Pressure (<4 psi RVP) is used to purge the cargo tank.
- (d) Any purging method or system must be approved in writing by the Executive Officer.

6 TEST PROCEDURE

This test shall be conducted with product hoses and vapor hoses connected and exposed to the pressurized cargo tanks or compartments. The cargo tank shall meet the standards for all three tests in consecutive runs.

6.1 Static Pressure Performance, Positive Pressurization

- 6.1.1 Open and close the dome covers.
- 6.1.2 Connect static electrical ground connections to tank. Attach the delivery and vapor hoses, remove the delivery elbows and plug the liquid delivery fittings.
- 6.1.3 Attach the test cap to the vapor recovery line of the cargo tank.
- 6.1.4 Connect the vacuum and pressure supply hose and the pressure-vacuum relief valve to the shut-off valve. Attach the pressure source to the hose. Attach a manometer to the pressure tap.

- 6.1.5 Connect compartments of the tank internally to each other if possible.
 - 6.1.6 Applying air pressure slowly, pressurize the tank, or alternatively the first compartment, to 18 inches WC.
 - 6.1.7 Close the shut-off valve, allow the pressure in the cargo tank to stabilize (adjust the pressure if necessary to maintain 18 inches WC), record the time and initial pressure.
 - 6.1.8 At the end of five minutes, record the final time and pressure.
 - 6.1.9 Calculate and record the pressure change (inches WC) between initial pressure of +18 inches WC and the final pressure.
 - 6.1.10 Repeat sections 6.1.6 through 6.1.9 for each compartment if they are not interconnected.
- 6.2 Static Pressure Performance, Vacuum Test (Negative Pressurization)
- 6.2.1 Connect vacuum source to pressure and vacuum supply hose referenced in section 6.1.4.
 - 6.2.2 Slowly evacuate the tank, or alternatively the first compartment, to six (6) inches WC vacuum. Close the shut-off valve, allow the pressure in the cargo tank to stabilize (adjust the pressure if necessary to maintain a vacuum or negative six (-6) inches WC), and record the initial pressure and time. At the end of five (5) minutes, record the final pressure and time.
 - 6.2.3 Calculate and record the pressure change (inches WC) from the initial 6 inches of WC and the final pressure. If pressurized air lines or other equipment penetrate the cargo tank headspace, record and report the value of the pressure change as zero.
 - 6.2.4 Repeat sections 6.2.2 to 6.2.3 for each compartment if they are not interconnected.
- 6.3 Internal Vapor Valve Performance, Positive Pressurization
- 6.3.1 After completing the vacuum and pressure tests (section 6.1 and 6.2), pressurize the tank as in section 6.1.6 18 inches WC.

- 6.3.2 Close the cargo tank's internal valve(s) thereby isolating the vapor return line and manifold from the cargo tank.
- 6.3.3 Relieve the pressure in the vapor return line to atmospheric pressure.
- 6.3.4 Seal the vapor return line and after five (5) minutes record the final gauge pressure existing in the vapor return line and manifold.
- 6.3.5 Calculate the pressure change (inches WC) from + 18 inches WC to the final pressure.

7 REQUIREMENTS AT CONCLUSION OF PRESSURE TESTING

The entire cargo tank, including tank, domes, dome vents, piping hose connections, adaptors, couplings, hoses and delivery elbows shall be inspected for evidence of wear, damage, or maladjustment that could be a potential leak source. Any part found to be defective shall be adjusted, repaired or replaced as necessary.

8 REPORTING RESULTS

Results for a given cargo tank shall be reported by the company responsible for testing as listed on the 48 hour test notification that was submitted to the Board. Results can be submitted through the ARB Online Cargo Tank Vapor Recovery Certification Program that can be accessed through the ARB webpage at www.arb.ca.gov/enf/cargotanks/cargotanks.htm.

9 ALTERNATE TEST PROCEDURES

9.1 U.S. EPA Method 27

U.S. EPA Method 27 referenced in the Code of Federal Regulations – Title 40, Chapter I, Subchapter C, Part 63, Subpart R, section 63.425(e), (as last amended on December 19, 2003) may be used as an alternate to the procedure described in Section 6 with the following exceptions:

- a. The purging of vapor from cargo tanks and compartments shall be conducted in accordance with section 5.
- b. Results of each test conducted shall comply with the performance standards reference in section 3.1 CP-204 without taking the arithmetic

mean of two successive results as allowed by section 40 CFR 63.425(e)

- c. Results from three consecutive tests (pressure, vacuum, and internal vapor valve) run in any sequence shall comply with performance standards reference in section 3.1 of CP-204.

9.2 Other Alternate Test Procedures

This test procedure shall be conducted as specified. Modifications to this test procedure shall not be used to determine compliance unless prior written approval has been obtained from the Executive Officer, pursuant to section 5 of Certification Procedure 204 (CP-204).