

California Environmental Protection Agency

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**Vapor Recovery Test Procedures**

**TP-204.3**

**Determination of Leak(s)**

Adopted: April 12, 1996  
Amended: March 17, 1999  
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

The procedure is used to determine the leak-tightness of vapor control systems used in the loading of gasoline cargo tanks. It may be utilized to determine the leak-tightness of gasoline cargo tanks during loading without taking the delivery tank out of service and to determine the leak-tightness of vapor control systems at gasoline terminals and bulk plants at any time. It is also effective to determine leak tightness when the vapor control system does not create back-pressure in excess of the pressure limits of the cargo tank certification test (18 inches of water column (WC) referenced in CP-204, Certification Procedure for Vapor Recovery Systems of Cargo Tanks.

**2 PRINCIPLE AND SUMMARY OF TEST PROCEDURE**

A portable instrument is used to detect VOC leaks from individual sources. A leak definition concentration based on a reference compound is specified in each applicable regulation. This procedure is intended to locate and classify leaks only, and is not to be used as a direct measure of mass emission rates from individual sources.

**3 BIASES AND INTERFERENCES**

**Individual Vapor Leak Check Duration**

The duration of vapor leak checks will systematically bias the results positively (toward a determination of violation). To control this bias, leak checks shall be

performed individually with a fresh air purge between each leak check. Each leak check shall have a duration of less than twice the instrument response time (typically, less than sixteen seconds). Leak checks with a duration of greater than twice the instrument response time are invalid. The probe must be purged with fresh air for more than two instrument response times (more than sixteen seconds) between individual leak checks.

## **4 EQUIPMENT AND SUPPLIES**

### **4.1 Manometer**

Liquid manometer, or equivalent, capable of measuring up to 7500 pascals (30 inches WC) gauge pressure with  $\pm 25$  pascals (0.1 inch WC) precision.

### **4.2 Combustible gas detector**

A portable hydrocarbon gas analyzer with associated sampling line and probe using catalytic oxidation to detect and measure concentrations of combustible gas in air.

#### **4.2.1 Safety**

Personnel shall assume that the combustible gas detector will be operated in an explosive atmosphere and comply with all pertinent regulations.

#### **4.2.2 Range**

Minimum range of 0-100 percent of the lower explosive limit (LEL) expressed as propane (0 to 21,000 ppm).

#### **4.2.3 Probe Diameter**

Sampling probe internal diameter of 0.625 cm (1/4 inch).

#### **4.2.4 Probe Length**

Probe sampling line of sufficient length for easy maneuverability during testing.

#### **4.2.5 Response Time**

Response time to 90 percent of the final stable reading shall be less than 8 seconds for detector with sampling line and probe attached.

#### 4.3 Stopwatch

Accurate and precise to within  $\pm 0.2$  sec.

#### 4.4 Graduated cylinder

Glass or plastic. 1 milliliter (mL) graduations, minimum volume 50 mL.

### 5 CALIBRATION PROCEDURE

Calibration is part of each application of the test procedure, see §6.2.

### 6 TEST PROCEDURE

#### 6.1 Pressure

Place a pressure tap in the terminal or bulk plant vapor control system, as close as reasonably possible to the connection with the cargo tank and before any check valves in the terminal or bulk plant recovery system. Connect the manometer. Record the pressure periodically during testing.

#### 6.2 Calibration

Calibrate the combustible gas detector with 2.1 percent by volume (21,000 ppm) propane in air for 100 percent LEL response. Calibration gas shall be traceable to NIST-SRM.

#### 6.3 Monitoring Procedure - Vapor Leaks

During loading, check the periphery of all potential sources of leakage of the cargo tank and of the terminal or bulk plant, vapor collection system with a combustible gas detector.

##### 6.3.1 Probe Distance

For a mobile leak source (e.g. cargo tank) the detector probe inlet shall be 2.5 cm from the potential leak source. The distance can be maintained during monitoring by putting a 2.5 cm extension on the probe tip.

For a stationary leak source (e.g. loading rack) the probe tip shall be placed at the surface of the suspected leak interface except for a moving part, such as a rotating shaft, for which the probe tip distance shall be 1 cm. The distance can be maintained during monitoring by putting a 1 cm extension on the probe tip.

### 6.3.2 Probe Movement

Move the probe slowly (approximately 4 cm/sec). If there is any meter deflection at a potential leak source, move the probe to locate the point of highest meter response.

### 6.3.3 Probe Position

The probe inlet shall be positioned in the path of the vapor flow from a leak so as to maximize the measured concentration.

### 6.3.4 Wind

Attempt to block the wind from the area being monitored.

### 6.3.5 Detector Response Time

The detector response time must be equal to or less than 8 seconds and the detector shall not probe any potential leak source for longer than twice the detector response time.

### 6.3.6 Recording

Record the highest detector reading and location for each leak being monitored.

## 6.4 Monitoring Procedure - Liquid Leaks

Check cargo tank and bulk plant or terminal system for liquid leaks. Count the number of drops for two minutes.

### 6.4.1 For Liquid Leaks during Disconnect

Capture liquid lost upon disconnect and measure the volume using graduated cylinder.

### 6.4.2 Recording

For liquid leaks, record location and number of drops per minute. For liquid leaks during disconnect, record location (loading arm, recovery arm), cargo tank and volume for each consecutive disconnects.

## 7 ALTERNATE PROCEDURES

### 7.1 U.S. EPA Method 21 - Determination of Volatile Organic Compound Leaks

U.S. EPA Method 21 is an approved alternative procedure as it applies to the performance of this test procedure subject to the provisions of 6.3.1 regarding probe distances.

## 7.2 Other Alternative Test Procedures

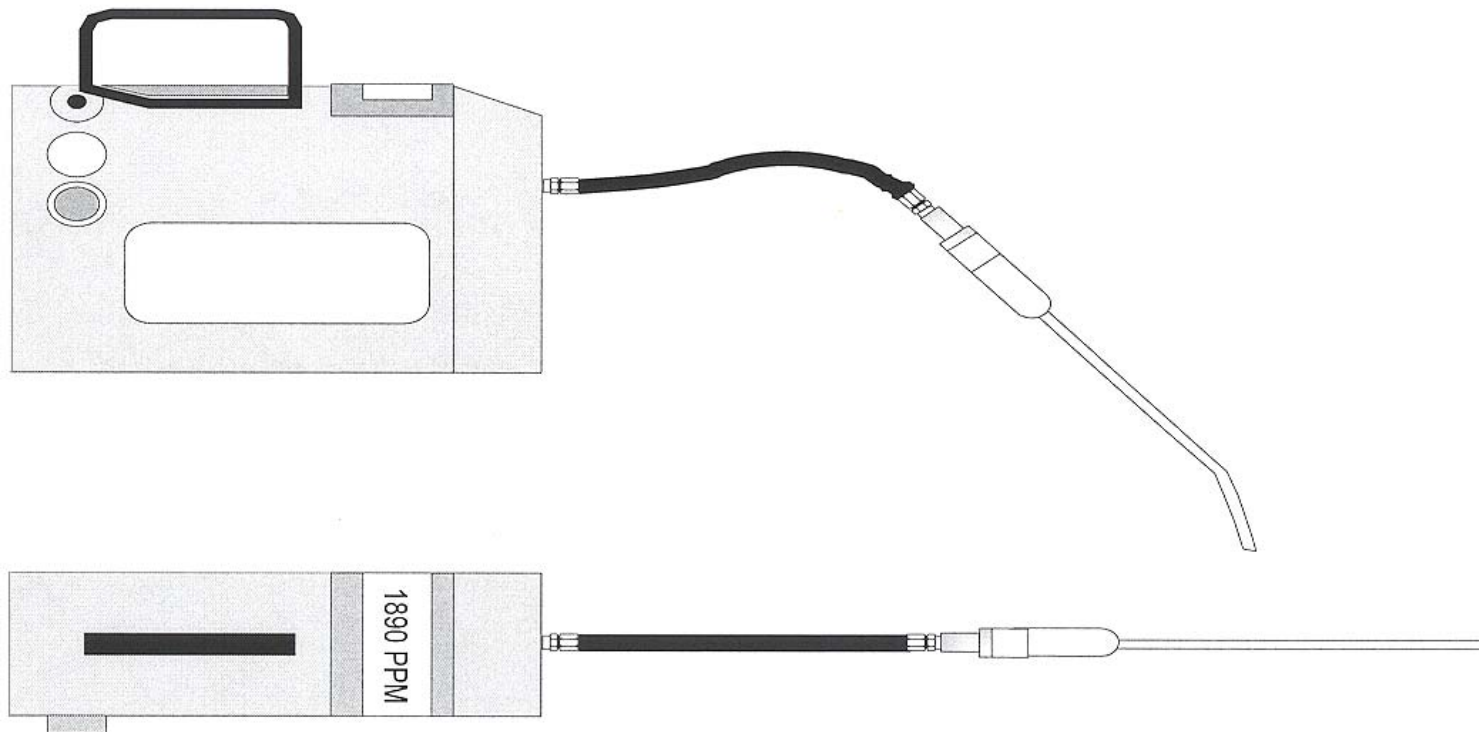
This test procedure shall be conducted as specified. Modifications to this test procedure shall not be used to determine compliance unless prior written approval has been obtained from the Executive Officer, pursuant to section 5 of Certification Procedure 204 (CP-204).

## 8 FIGURES

Each figure provides an illustration of an implementation which conforms to the requirements of this test procedure; other implementations which so conform are acceptable, too. Any specifications or dimensions provided in the figures are for example only, unless such specifications or dimensions are provided as requirements in the text of this or some other required test procedure.

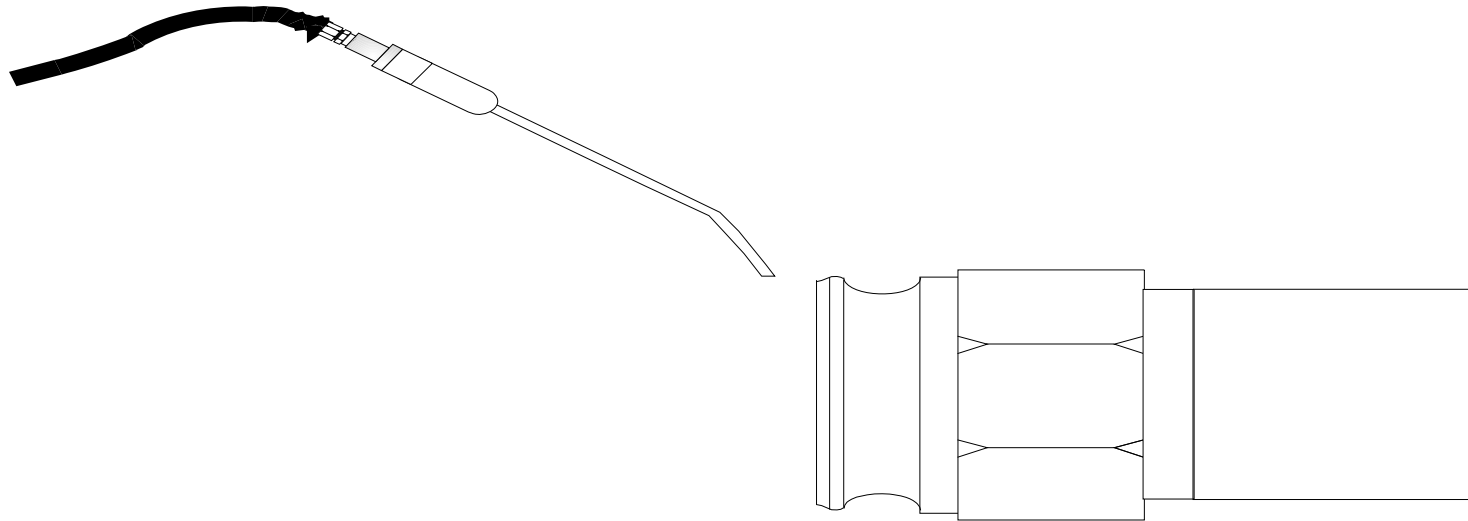
Figures 1 and 2 provide illustrations of a combustible gas meter alone and in use.

**FIGURE 1**  
**Phase I Leak Check (View of Combustible Gas Detector)**



TP 204.3 F.1/ B. CORDOVA '95

**FIGURE 2**



TP 204.3 F.2/ B. CORDOVA '95