Source Test Procedure **ST-33**

GASOLINE CARGO TANKS

(Adopted October 7, 1987)

REF: Regulation 8, Rules 33 & 39; CH&SC, Section 41962

1. APPLICABILITY

1.1 This test procedure is used to quantify the leak rate from gasoline cargo tanks. It is applicable for the determination of compliance with the five-minute performance standards adopted by the California Air Resources Board (CARB) pursuant to Section 41962 of the California Health and Safety Code.

2. PRINCIPLE

2.1 Upon completion of loading operations at the bulk gasoline distribution facility, the gasoline cargo tank is pressurized, with nitrogen, to 18 inches of water column (inches H_2O). By using the total cargo tank shell capacity, post-loading headspace volume, and the Ideal Gas Law, a one-minute maximum allowable pressure decay is calculated. This one-minute allowable pressure decay will correspond to the allowable five-minute performance standards for an empty cargo tank. The pressure decay is monitored for one minute and compliance is determined by comparison with the maximum allowable calculated value. The leak rate through the cargo tank internal vapor vent valve is similarly obtained.

3. RANGE AND SENSITIVITY

3.1 If a mechanical pressure gauge is used, it shall be a minimum of two (2) inches in diameter.

3.1.1 If a mechanical pressure gauge is used for the Leak Test it shall have a full scale range not to exceed 30 inches H_2O with a minimum readability of 0.20 inches H_2O and a minimum accuracy of one percent of full scale.

3.1.2 If a mechanical pressure gauge is used for the Vapor Valve Test it shall have a full scale range not to exceed 10 inches of H_2O with a minimum readability of 0.10 inches H_2O and a minimum accuracy of one percent of full scale.

3.2 If an electronic pressure measuring device is used, the full-scale range of the device shall not exceed 20 inches H_2O with a minimum accuracy of

0.5 percent of full-scale. This type of gauge can be used for both the Leak Rate Test and Vapor Valve Test.

4. INTERFERENCES

4.1 Thermal expansion due to direct sunlight on an exposed cargo tank can bias the results obtained from this test procedure. A maximum of 25 percent of the total length of the cargo tank may be exposed to direct sunlight during the test.

4.2 Cargo tank leakage exceeding the nitrogen feed rate precludes the use of this method. Such leakage demonstrates the inability of the cargo tank to meet the state five-minute performance standard. The minimum nitrogen flowrate shall be calculated as shown in Equation 9.2, or obtained from Table 33-V. The recommended minimum nitrogen flowrate is 2.0 cubic feet per minute (CFM).

4.3 Pressure stability may not be achievable, within a reasonable time period, if the tank has been purged with air prior to loading gasoline. This may tend to bias the test results toward determination of compliance. For the purpose of this interference, the cargo tank may be moved, to induce saturation of the headspace, prior to testing.

4.4 Vapor leaks due to a faulty cargo tank vapor coupler or facility vapor hose coupler may preclude the use of this method. Such leaks are subject to compliance with the vapor tight standards of Rules 33 and 39 of the BAAQMD's Regulation 8.

4.5 If the load prior to testing is diesel over gasoline, the absorption of gasoline vapor into the liquid diesel may tend to bias the results toward a determination of non-compliance. The pressure decay portion of the test shall be conducted three times to compensate for this absorption. Only the results of the third test shall be used for compliance status determination. For the purpose of this interference, diesel shall be defined as any petroleum distillate with a vapor pressure less than 4.0 pounds Reid.

5. APPARATUS

5.1 Nitrogen High Pressure Cylinder. Use a high pressure cylinder capable of maintaining a pressure of at least 2000 psig. The cylinder shall be equipped with a compatible two-stage regulator with a one (1) psig relief valve and a flow control metering valve. The outlet of the metering valve shall be equipped with flexible tubing, a quick-connect fitting, and a one psi relief valve.

5.2 Vapor System Pressure Assembly. Use an OPW 634-B, or equivalent, cap (or OPW 634-A plug if applicable). The assembly shall be equipped

with a pressure gauge as described in Section 3, a metering valve, and a quick connect fitting (see Figure 33-1).

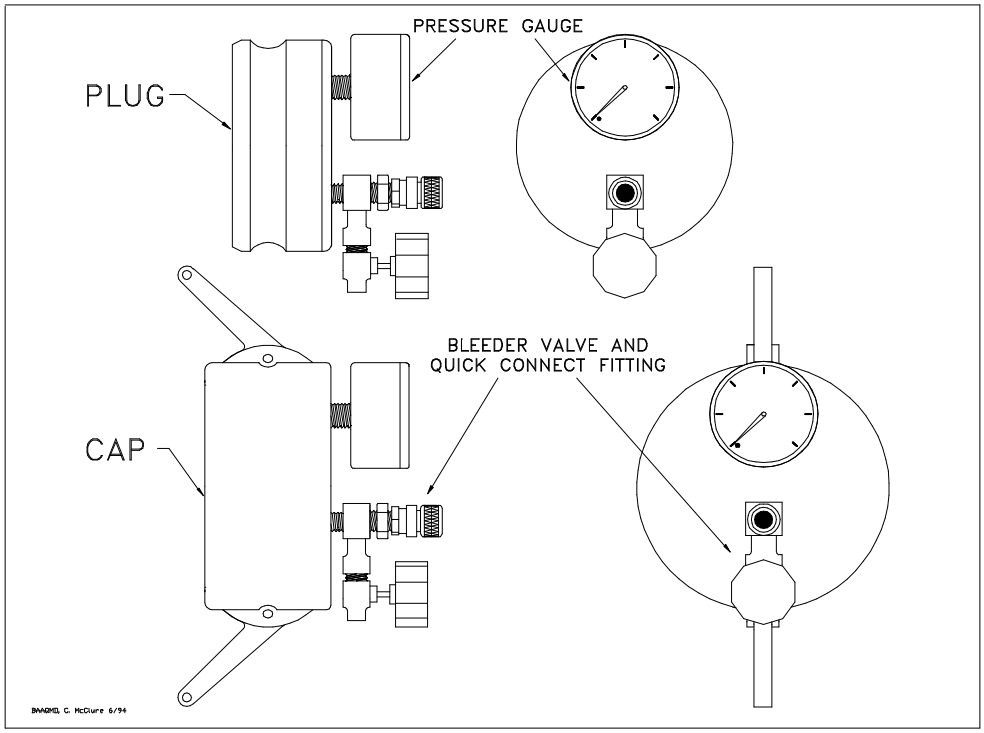
5.3 Vapor Valve Pressure Gauge. Use a Dwyer Model 2010 Magnehelic gauge (0-10 inches H_2O), or equivalent as described in Section 3, equipped with a quick connect fitting.

5.4 Leak Test Assembly. Use OPW 633-D, 633-F, and 633-A (or 633-B if applicable) couplers, as shown in Figure 33-2, to leak test the vapor system pressure assembly.

5.5 Flexible Tubing. Use high-pressure tubing equipped with a quick-connect fitting at each end to connect the nitrogen supply to the pressure assembly.

Figure 33-1

Vapor System Pressure Assembly



5.6 Nitrogen. Use a commercial grade nitrogen.

5.7 Stopwatch. Use a stopwatch accurate to within 0.2 second.

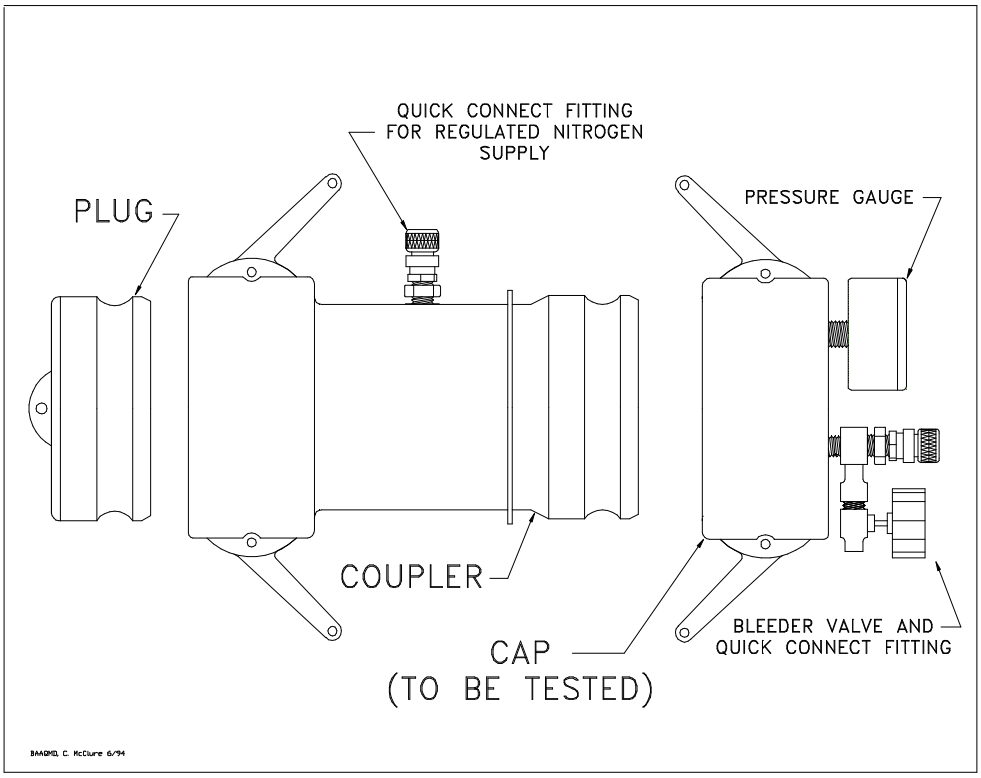
5.8 Liquid Leak Detector. Use Snoop liquid leak detector, or equivalent, to detect gas leaks in the vapor system pressure assembly.

5.9 Flowmeter. Use a Dwyer flowmeter, Model RMC-104, or equivalent, to determine the required pressure setting of the delivery pressure gauge on the nitrogen supply pressure regulator. This pressure shall be set such that the nitrogen flowrate exceeds the value obtained from Equation 9.2 or Table 33-V.

5.10 Combustible Gas Detector. Use a Bacharach Instrument Company Model 0023-7356, or equivalent, to quantify any vapor leaks at the cargo tank vapor coupler during loading operations.

Figure 33-2

Leak Test Assembly



6. PRE-TEST PROCEDURES

6.1 Assemble the vapor system pressure assembly as shown in Figure 33-1.

6.2 Leak test the vapor system pressure assembly by connecting it to the leak test assembly and pressurizing, with nitrogen, to 20 inches H_2O. The pressure decay rate shall not exceed 2 inches in five minutes.

6.3 Facility safety procedures shall determine whether the loading rack ground cable shall remain connected to the cargo tank during this test. This test

may be conducted at either the load rack or another location, provided that the location meets the requirements of Section 4.1.

6.4 Use the flowmeter to determine the nitrogen regulator delivery pressures which correspond to nitrogen flowrates between 1.0 and 5.0 CFM. These pressures define the allowable range of delivery pressures acceptable for this test procedure. Also record which regulator delivery pressure setting, and the corresponding nitrogen flowrate, will be used during the test. As an alternative, the flowmeter may be connected, in-line between the nitrogen supply regulator and Vapor System Pressure Assembly, during the test. In no case shall a nitrogen flowrate less than the value obtained from Equation 9-2 be used during the test.

7. TESTING

Note: For those cargo tanks with manifolded product lines the test must be conducted on a per compartment basis.

7.1 From the cargo tank calibration sheet or the identification plate on the cargo tank, determine and record the cargo tank shell capacity on Line 1 of the data sheet shown in Form 33-1. Record, in the upper right hand corner of the data sheet, whether the cargo tank's vapor coupler is equipped with a poppet and/or cap.

7.2 Upon completion of the loading operations, record the total gallonage loaded on Line 2 of the data sheet.

7.2.1 If the system back pressure during loading was measured, enter the maximum observed pressure and number of arms loading simultaneously on Line 4 of the data sheet.

7.3 Connect the vapor system pressure assembly to the vapor coupler of the cargo tank. Open the internal vapor valve(s) of the cargo tank and record the initial headspace pressure on Line 5 of the data sheet.

7.4 If the initial headspace pressure exceeds 18 inches H_2O, use the metering valve on the vapor system pressure assembly to reduce the pressure to 18.0 inches H_2O.

7.4.1 If the initial headspace pressure is less than 18 inches H_2O, adjust the delivery pressure on the nitrogen cylinder regulator such that the nitrogen feed rate exceeds the minimum allowable flowrate for an empty cargo tank. See Equation 9.2 or Table 33-V. Connect the nitrogen supply to the pressure assembly and increase the cargo tank headspace pressure to 18 inches H_2O. Failure to achieve a pressure of at least 18.0 inches H_2O within twice the time derived from Equation 9-5 demonstrates the inability of the cargo tank to meet pressure decay performance standards.

7.5 Allow 30 (± 5) seconds to stabilize the headspace pressure.

7.5.1 Zero and restart the stopwatch with the headspace pressure at 18.0 inches H_2O. After 60 (± 1) seconds record the final headspace pressure on Line 7 of the data sheet.

7.5.2 If the one-minute final headspace pressure is less than 10 inches H_2O, the internal vapor vent valve portion of the test, as specified in Section 7.6, cannot be conducted.

7.6 Re-pressurize the cargo tank headspace to 18 inches H_2O. Close the internal vapor vent valve(s), wait for 30 (± 5) seconds, then remove the pressure assembly cap to relieve the pressure, to atmospheric, downstream of the vapor vent valve. Wait for 15 (± 5) seconds. Replace the pressure assembly cap.

7.6.1 Connect the 0-10 inches H_2O pressure gauge to the quick connect fitting on the vapor system pressure assembly.

7.6.2 Zero and start the stopwatch. After 60 (± 1) seconds record the pressure increase on Line 11 of the data sheet. Compliance is demonstrated when the pressure increase across the internal vapor valve(s) on Lines 11-15 of the data sheet meets any of the five criteria, as shown in Section 9.3. Non-compliance is demonstrated if the pressure increase exceeds all of these five criteria.

7.6.3 In some cases the leak rate across the internal vapor vent valve(s) is large enough to relieve all of the headspace pressure during the 15 second period specified in Section 7.6. This can be verified by opening the internal vapor valve immediately upon conclusion of the vent valve portion of the test. If the headspace pressure is less than one fifth of the final one-minute pressure, as determined in Section 7.5, the internal vapor vent valve(s) shall be deemed to exceed the allowable five-minute performance standard.

7.7 Remove the vapor system pressure assembly from the cargo tank.

8. POST-TEST PROCEDURES

8.1 Determine compliance with the five-minute performance standard by comparing the actual one-minute final pressure with the minimum allowable one-minute final pressure from equation 9.1 or the applicable of Tables 33-I through 33-IV.

8.2 Determine the compliance status of the internal vapor vent valve(s). The allowable pressure increase caused by leakage past the vapor vent valve(s) is obtained from Section 9.3

9. CALCULATIONS

9.1 The minimum allowable one-minute final headspace pressure of a complying loaded cargo tank shall be calculated as follows, or obtained from the applicable of Tables 33-I through 33-IV:

$$P_f = [18]\left[\frac{N}{18}\right]^{\left[\frac{V_s}{5(V_h)}\right]} \qquad \text{[Equation 9-1]}$$

where:

P_f = The minimum allowable one-minute final pressure, inches H_2O
V_s = The total cargo tank shell capacity, gallons
V_h = The cargo tank headspace volume after loading, gallons
18 = The initial pressure at start of test, inches H_2O
5 = Minutes
N = The allowable five-minute final pressure, inches H_2O

If (***Vs***) is:	Then (**N**) equals:
+ 2,500	15.5
l,500 - 2,499	15.0
1,000 - 1,499	14.5
0 - 999	14.0

Important: If individual compartments are to be tested, both V_s and V_h must be the volumes relating to that compartment alone, not all compartments.

9.2 The minimum nitrogen flowrate required to test a cargo tank shall exceed the following calculated value by at least ten percent, or obtained from Table 33-V:

$$F_n = \frac{[V_s][18.0 - N]}{[7.481][5][406.9]} \qquad \text{[Equation 9-2]}$$

where:

F_n = The minimum required nitrogen flowrate, CFM
V_s = The total cargo tank shell capacity, gallons
18 = The initial pressure at start of test, inches H_2O

N = The allowable five-minute final pressure, inches H_2O
5 = Minutes
406.9 = Atmospheric pressure, inches H_2O

9.3 The compliance status of the cargo tank internal vapor vent valve(s) shall be determined as follows:

Test Time, Minutes	Maximum Allowable One-Minute Pressure Increase, inches H_2O
1.0	1.1
2.0	2.2
3.0	3.3
4.0	4.4
5.0	5.5

Thermal conductivity due to the temperature difference between the fuel being loaded and cargo tank shell accounts for the 10 percent difference between the state performance standard and the allowable five-minute pressure increase.

9.4 The conversion of the one-minute final pressure to the equivalent five-minute final pressure of an empty cargo tank shall be calculated as follows:

$$P_{f5} = 18e^{-\left[\frac{5(V_h)}{V_s}\right]\ln\left[\frac{18}{P_{f1}}\right]} \qquad \text{[Equation 9-3]}$$

where:

P_{f5} = The equivalent five-minute final pressure for an empty cargo tank, inches H_2O
V_s = The total cargo tank shell capacity, gallons
V_h = The cargo tank headspace volume after loading, gallons
P_{f1} = The final one-minute pressure from Section 7.5, inches H_2O
18 = The initial pressure at start of test, inches H_2O
5 = Minutes
ln = Natural logarithm
e = Constant approximately equal to 2.71828

9.5 The minimum time required to pressure the cargo tank headspace from zero (0) to eighteen (18.0) inches H_2O gauge pressure shall be calculated as follows:

$$t_{18} = \frac{V}{[169.1]F} \qquad \text{[Equation 9-5]}$$

Where:

t_{18} = The minimum time to pressurize the headspace to two inches H_2O, minutes
V = The total vapor headspace affected by the test, gallons
F = The nitrogen flowrate into the system, CFM
169.1 = The conversion factor for pressure and gallons

10. REPORTING

10.1 The results shall be reported as shown in Form 33-1.

TABLE 33-I

HEADSPACE VOLUME AFTER LOADING, GALLONS

	100	150	200	250	300	350	400	450	500	550	600	650	700
	---	---	---	---	---	---	---	---	---	---	---	---	---
4,000	5.4	8.1	9.9	11.2	12.1	12.8	13.3	13.8	14.2	14.5	14.7	15.0	15.2
4,100	5.3	7.9	9.8	11.0	12.0	12.7	13.2	13.7	14.1	14.4	14.7	14.9	15.1
4,200	5.1	7.8	9.6	10.9	11.8	12.6	13.1	13.6	14.0	14.3	14.6	14.8	15.0
4,300	5.0	7.6	9.5	10.8	11.7	12.5	13.1	13.5	13.9	14.2	14.5	14.8	15.0
4,400	4.8	7.5	9.3	10.6	11.6	12.4	13.0	13.4	13.8	14.2	14.5	14.7	14.9
4,500	4.7	7.3	9.2	10.5	11.5	12.3	12.9	13.3	13.8	14.1	14.4	14.6	14.9
4,600	4.5	7.2	9.0	10.4	11.4	12.1	12.8	13.3	13.7	14.0	14.3	14.6	14.8
4,700	4.4	7.1	8.9	10.3	11.3	12.0	12.7	13.2	13.6	13.9	14.2	14.5	14.7
4,800	4.3	6.9	8.8	10.1	11.2	11.9	12.6	13.1	13.5	13.9	14.2	14.4	14.6
4,900	4.2	6.8	8.7	10.0	11.0	11.8	12.5	13.0	13.4	13.8	14.1	14.4	14.6
5,000	4.0	6.6	8.5	9.9	10.9	11.7	12.4	12.9	13.3	13.7	14.0	14.3	14.5
5,100	3.9	6.5	8.4	9.8	10.8	11.6	12.3	12.8	13.3	13.6	14.0	14.2	14.5
5,200	3.8	6.4	8.3	9.7	10.7	11.5	12.2	12.7	13.2	13.6	13.9	14.2	14.4
5,300	3.7	6.3	8.1	9.5	10.6	11.4	12.1	12.7	13.1	13.5	13.8	14.1	14.4
5,400	3.6	6.1	8.0	9.4	10.5	11.3	12.0	12.6	13.0	13.4	13.8	14.0	14.3
5,500	3.5	6.0	7.9	9.3	10.4	11.3	11.9	12.5	13.0	13.3	13.7	14.0	14.2
5,600	3.4	5.9	7.8	9.2	10.3	11.2	11.8	12.4	12.9	13.3	13.6	13.9	14.2
5,700	3.3	5.8	7.7	9.1	10.2	11.1	11.8	12.3	12.8	13.2	13.5	13.8	14.1

	300	350	400	450	500	550	600	650	700	750	800	850	900
	---	--	---	---	---	---	---	---	---	---	---	---	---
9,200	7.2	8.2	9.0	9.8	10.4	10.9	11.4	11.8	12.1	12.5	12.8	13.0	13.3
9,300	7.1	8.1	8.9	9.6	10.3	10.9	11.3	11.7	12.1	12.4	12.7	13.0	13.2
9,400	7.1	8.1	8.9	9.6	10.3	10.8	11.3	11.7	12.0	12.4	12.7	12.9	13.2
9,500	7.0	8.0	8.8	9.6	10.2	10.7	11.2	11.6	12.0	12.3	12.6	12.9	13.1
9,600	6.9	7.9	8.8	9.5	10.1	10.7	11.2	11.2	11.9	12.3	12.6	12.8	13.1
9,700	6.8	7.9	8.7	9.4	10.1	10.6	11.1	11.5	11.9	12.2	12.5	12.8	13.0
9,800	6.8	7.8	8.7	9.4	10.0	10.6	11.0	11.5	11.8	12.2	12.5	12.8	13.0
9,900	6.7	7.7	8.6	9.3	10.0	10.5	11.0	11.4	11.8	12.1	12.4	12.7	12.9

$$P_f = [18]\left[\frac{15.5}{18}\right]^{\left[\frac{V_s}{5(V_h)}\right]}$$

Minimum one-minute final pressure for gasoline cargo tank capacities greater than 2,500 gallons, inches H_2O

TABLE 33-II

HEADSPACE VOLUME AFTER LOADING, GALLONS

	50	100	150	200	250	300	350	400	450	500	550	600
	---	---	---	---	---	---	---	---	---	---	---	---
1,500	6.0	10.4	12.5	13.7	14.5	15.0	15.4	15.7	15.9	16.1	16.3	16.4
1,550	5.8	10.2	12.3	13.6	14.4	14.9	15.3	15.6	15.9	16.1	16.2	16.4
1,600	5.6	10.0	12.2	13.4	14.3	14.8	15.2	15.6	15.8	16.0	16.2	16.3
1,650	5.4	9.9	12.1	13.3	14.1	14.7	15.2	15.5	15.7	16.0	16.1	16.3
1,700	5.2	9.7	11.9	13.2	14.0	14.6	15.1	15.4	15.7	15.9	16.1	16.2
1,750	5.0	9.5	11.8	13.1	13.9	14.6	15.0	15.3	15.6	15.8	16.0	16.2
1,800	4.8	9.3	11.6	13.0	13.8	14.5	14.9	15.3	15.6	15.8	16.0	16.1
1,850	4.7	9.2	11.5	12.8	13.7	14.4	14.8	15.2	15.5	15.7	15.9	16.1
1,900	4.5	9.0	11.3	12.7	13.6	14.3	14.8	15.1	15.4	15.7	15.9	16.0
1,950	4.3	8.8	11.2	12.6	13.5	14.2	14.7	15.1	15.4	15.6	15.8	16.0
2,000	4.2	8.7	11.1	12.5	13.4	14.1	14.6	15.0	15.3	15.6	15.8	15.9
2,050	4.0	8.5	10.9	12.4	13.3	14.0	14.5	14.9	15.2	15.5	15.7	15.9
2,100	3.9	8.4	10.8	12.3	13.3	13.9	14.5	14.9	15.2	15.4	15.7	15.8
2,150	3.8	8.2	10.7	12.2	13.2	13.9	14.4	14.8	15.1	15.4	15.6	15.8
2,200	3.6	8.1	10.5	12.1	13.1	13.8	14.3	14.7	15.1	15.3	15.6	15.7
2,250	3.5	7.9	10.4	11.9	13.0	13.7	14.2	14.7	15.0	15.3	15.5	15.7
2,300	3.4	7.8	10.3	11.8	12.9	13.6	14.2	14.6	14.9	15.2	15.5	15.7
2,350	3.2	7.6	10.2	11.7	12.8	13.5	14.1	14.5	14.9	15.2	15.4	15.6
2,400	3.1	7.5	10.0	11.6	12.7	13.4	14.0	14.5	14.8	15.1	15.4	15.6
2,450	3.0	7.4	9.9	11.5	12.6	13.4	13.9	14.4	14.8	15.1	15.3	15.5
2,499	2.9	7.2	9.8	11.4	12.5	13.3	13.9	14.3	14.7	15.0	15.3	15.5

$$P_f = [18]\left[\frac{15.0}{18}\right]^{\left[\frac{V_s}{5(V_h)}\right]}$$

Minimum one-minute final pressure for gasoline cargo tank capacities between 1,500 and 2,499 gallons, inches of H_2O

TABLE 33-III

HEADSPACE VOLUME AFTER LOADING, GALLONS

	25	50	75	100	125	150	175	200	225	250
	---	---	---	---	---	---	---	---	---	---
1,000	3.2	7.6	10.1	11.7	12.7	13.5	14.1	14.5	14.9	15.1
1,050	2.9	7.3	9.8	11.4	12.5	13.3	13.9	14.3	14.7	15.0
1,100	2.7	7.0	9.5	11.2	12.3	13.1	13.7	14.2	14.6	14.9
1,150	2.5	6.7	9.3	10.9	12.1	12.9	13.5	14.0	14.4	14.8
1,200	2.3	6.4	9.0	10.7	11.9	12.7	13.4	13.9	14.3	14.6
1,250	2.1	6.1	8.8	10.5	11.7	12.6	13.2	13.7	14.2	14.5
1,300	1.9	5.8	8.5	10.3	11.5	12.4	13.1	13.6	14.0	14.4
1,350	1.7	5.6	8.3	10.0	11.3	12.2	12.9	13.4	13.9	14.3
1,400	1.6	5.4	8.0	9.8	11.1	12.0	12.7	13.2	13.6	14.0
1,450	1.5	5.1	7.8	9.6	10.9	11.8	12.6	13.2	13.6	14.0
1,499	1.3	4.9	7.6	9.4.	10.7	11.7	12.4	13.0	13.5	13.9

$$P_f = [18]\left[\frac{14.5}{18}\right]^{\left[\frac{V_s}{5(V_h)}\right]}$$

Minimum one-minute final pressure for gasoline cargo tank capacities between 1,000 and 1,499 gallons, inches of H_2O

TABLE 33-IV

HEADSPACE VOLUME AFTER LOADING, GALLONS

	25	50	75	100	125	150	175	200	225	250
	---	---	---	---	---	---	---	---	---	---
300	9.8	13.3	14.7	15.5	16.0	16.3	16.5	16.7	16.8	17.0
350	8.9	12.7	14.2	15.1	15.6	16.0	16.3	16.5	16.6	16.8
400	8.1	12.0	13.8	14.7	15.3	15.7	16.0	16.3	16.5	16.6
450	7.3	11.4	13.3	14.4	15.0	15.5	15.8	16.1	16.3	16.4
500	6.6	10.9	12.9	14.0	14.7	15.2	15.6	15.9	16.1	16.3
550	6.0	10.4	12.5	13.7	14.4	15.0	15.4	15.7	15.9	16.1
600	5.4	9.8	12.0	13.3	14.1	14.7	15.2	15.5	15.7	16.0
650	4.9	9.4	11.6	13.0	13.9	14.5	14.9	15.3	15.6	15.8
700	4.4	8.9	11.3	12.7	13.6	14.2	14.7	15.1	15.4	15.6
750	4.0	8.5	10.9	12.3	13.3	14.0	14.5	14.9	15.2	15.5
800	3.6	8.1	10.5	12.0	13.0	13.8	14.3	14.7	15.1	15.3
850	3.3	7.7	10.2	11.7	12.8	13.5	14.1	14.5	14.9	15.2
900	2.9	7.3	9.8	11.4	12.5	13.3	13.9	14.4	14.7	15.0
950	2.7	6.9	9.5	11.2	12.3	13.1	13.7	14.2	14.6	14.9
999	2.4	6.6	9.2	10.9	12.0	12.9	13.5	14.0	14.4	14.7

$$P_f = [18]\left[\frac{14.0}{18}\right]^{\left[\frac{V_s}{5(V_h)}\right]}$$

Minimum one-minute final pressure for gasoline cargo tank capacities less than 1,000 gallons, inches of H_2O

TABLE 33-V

MINIMUM NITROGEN FEED-RATE FOR A SPECIFIC CARGO TANK CAPACITY

CARGO TANK CAPACITY GALLONS	MINIMUM NITROGEN FEED-RATE, CFM
2,500	0.41
2,700	**0.49**
2,900	0.52
3,100	**0.56**
3,300	0.60
3,500	**0.63**
3,700	0.69
3,900	**0.71**
4,100	0.74
4,300	**0.78**
4,500	0.81
4,700	**0.85**
4,900	0.89
5,100	**0.92**
5,300	0.96
5,500	**0.99**
5,700	1.03
5,900	**1.07**
9,000	1.63
9,200	**1.66**
9,400	1.70
9,600	**1.74**
9,800	1.77

Form 33-1

Company: _____ Plt # or N #: _____

Address: _____ City:_____ ZIP: _____

Driver: _____ Tel No: _____

Terminal: _____ Plt#: _____

Attention:

Poppets - Truck	
Poppets - Trailer	
Vapor Cap - Truck	
Vapor Cap - Trailer	

GASOLINE CARGO TANK
YEAR - ROUND
LEAK RATE TEST

	TRUCK	TRAILER
CT #		
CARB DECAL #		
EXP. DATE		

INITIAL DATA

1) Cargo Tank Capacity, Gallons		
2) Total Volume Loaded into Cargo Tank, Gallons		
3) Head Space Volume After Loading (#1 - #2), Gallons		
4) System Back Pressure, Inches H_2O		

STATIC PRESSURE PERFORMANCE

5) Initial Pressure Before Nitrogen Feed, Inches H_2O		
6) Initial Pressure Leak Rate (18.0), Inches H_2O	**18**	**18**
7) One Minute Final Pressure, Inches H_2O		
8) Allowable One-Minute Final Pressure, Inches H_2O		
9) Comparable 5-Minute Pressure Change, Inches H_2O		

INTERNAL VAPOR VALVE PERFORMANCE

10) Initial Pressure (0.0), Inches H_2O	**0.0**	**0.0**
11) Interval Pressure After (1) Minute, Inches H_2O - Allowable = 1.1 Inches. H_2O		
12) Interval Pressure After (2) Minutes, Inches H_2O - Allowable = 2.2 Inches H_2O		
13) Interval Pressure After (3) Minutes, Inches H_2O - Allowable = 3.3 Inches H_2O		
14) Interval Pressure After (4) Minutes, Inches H_2O - Allowable = 4.4 Inches H_2O		
15) Interval Pressure After (5) Minutes, Inches H_2O - Allowable = 5.5 Inches H_2O		

TRUCK: **Comp't.**		TRAILER: **Comp't.**	
#1		**#1**	
#2		**#2**	
#3		**#3**	
#4		**#4**	
TOTAL		TOTAL	
LOAD TYPE		**LOAD TYPE**	

Form 33-1

COMMENTS: