State of Oregon Department of Environmental Quality

Attachment D: Rules Table Attachments

Gasoline Dispensing Facility Emissions Rulemaking

The following documents are included with the staff report to the Environmental Quality Commission proposed for adoption in Action item 'F' of the 431st EQC meeting on March 21, 2024.

The following documents are included as 'Attachment D' to the staff report.

Proposed for adoption with the text of the rule language as presented in the staff report includes:

1. A table attachment to OAR 340-244-0246: "Enhanced Vapor Recovery Systems, Manufacturer's Requirements, Installation Specifications, and Warranty Information"
2. A table attachment to OAR 340-244-0249: "Gasoline Dispensing Facility Test Methods"

State of Oregon Department of Environmental Quality

OAR 340-244-0246

Enhanced Vapor Recovery Systems, Manufacturer's Requirements, installation Specifications, and Warranty Information

1. VR-101, Table 2
2. VR-102, Table 2
3. VR-104, Table 2
4. VR-105, Table 2
5. PV Zero, Table 2
6. Aboveground Storage Tanks, Table 2

State of Oregon
Department of
Environmental
Quality

Equipment and Components

CARB Executive Order VR-101-V

Franklin Fueling Systems, Inc.
Phil-Tite/EBW/FFS
Stage I Enhanced Vapor Recovery System

EXHIBIT 1

Franklin Fueling Systems (Phil-Tite/EBW/FFS) Stage I EVR System Equipment List NOTE: (Gas/E85) = Identifies that these components are approved for standard gasoline and E85 fuel blends. (Gas) = Identifies that these components are only approved for standard gasoline fuel blends.

Equipment	**Manufacturer/Model Number**
Spill Container (Phil-Tite Series Spill Containers)	Phil-Tite 85000 and 85000-1 Series (Gas/E85) 85W0X and 85W0X-1 legend: W represented by: 1=replacement spill container X represented by: 0 = product spill container 0-EXT = product spill container w extension collar 1 = vapor spill container 1-EXT = vapor spill container w extension collar
Spill Container (Defender Series Spill Containers)	EBW Defender 705 Series (Gas/E85) Defender 705 Series Legend (Gas/E85) 7055XYZAB where XYZAB is represented by: X = containment 4 = singe wall 5 = double wall Y = installation 2 = multiport bucket 5 = direct bury Z = interstitial monitoring method 0 = no sensor/gauge (i.e. single wall) 1 = I2 monitor (float gauge, visual) 2 = TSP-ULS (electronic sensor) A = spill container base thread 0 = NPSM (straight thread) 1 = NPT (taper thread) B = drain valve 1 = with drain valve (typical on product/fill side) 2 = without drain valve (typical on vapor side)
Spill Container (EBW Series Spill Containers)	EBW 7XX-49Y-0Z (Gas) XX indicates spill bucket gallon size: 05 = 5 Gallon 15 = 15 Gallon Y indicates level and base material: 0 = grade level with cast iron base (5 gallon) 2 = below grade level with cast iron base (5 and 15 gallon) Z indicates drain valve:

Equipment	**Manufacturer/Model Number** 1 = drain valve 2 = no drain valve
Spill Container Lid (Phil-Tite Series Spill Containers)	Phil-Tite 85011 (Gas/E85) (Not required with sump configuration lid, see Figure 2B in Exhibit 2)
Spill Container Lid (Defender and EBW Series Spill Containers)	EBW 7054401X (Gas/E85) X = Lid Color, Varies
Replacement Drain Valve (Phil-Tite Series Spill Containers)	Phil-Tite 85400 (Gas/E85)
Replacement Drain Valve (Defender Series Spill Containers)	EBW 70533729 (Gas/E85)
Replacement Drain Valve (EBW Series Spill Container)	EBW 70533719 (Gas) 70533729 (Gas/E85)
Drain Valve Blank Kit (EBW Series Spill Container)	EBW 90022
Drain Valve Isolation Kit (EBW Series Spill Containers)	EBW 70825501
Drain Valve Isolation Test Kit (EBW Series Spill Containers)	EBW 90079
Product Adaptor	Phil-Tite SWF-100-B (Gas) Phil-Tite SWF-100-SS (Gas/E85)
Vapor Adaptor	Phil-Tite SWV-101-B (Gas) Phil-Tite SWV-101-SS (Gas/E85)
Riser Adaptor	Phil-Tite M/F 4X4 (Gas/E85) Phil-Tite M/F 4X4-R (Gas/E85)
Riser Support Bracket	Phil-Tite M 1600 (Gas/E85)

Equipment	**Manufacturer/Model Number**
Drop Tube Riser Clamp (Defender Series Spill Containers)	FFS 70550901EC (Gas/E85)
Dust Cap	Morrison Brothers 323C-0100ACEVR (vapor) (Gas/E85) Morrison Brothers 305C-0100ACEVR (product)(Gas/E85) OPW 1711T-EVR (vapor) (Gas/E85) OPW 634TT-EVR (product) (Gas/E85) OPW 634LPC (product) (Gas) OPW 1711LPC (vapor) (Gas) CompX CSP1-634LPC (product) (Gas) CompX CSP3-1711LPC (vapor) (Gas) CompX CSP2-634LPC (product) (Gas) CompX CSP4-1711LPC (vapor) (Gas) EBW 77720102 (product) (Gas/E85) EBW 77720202 (product) (Gas/E85) EBW 30430103 (vapor) (Gas/E85) EBW 30420006 (vapor) (Gas/E85)
Pressure/Vacuum Vent Valve	FFS PV-Zero 407215901 (Gas/E85) Husky 5885 (Gas/E85) OPW 723V (Gas/E85)
Tank Gauge Port Components	Veeder-Root 312020-952 (cap and adaptor kit) (Gas/E85) Morrison Brothers 305XPA1100AKEVR (cap and adaptor kit) (Gas/E85) Morrison Brothers 305-0200AAEVR (replacement adaptor) (Gas/E85) Morrison Brothers 305XP-110ACEVR (replacement cap) (Gas/E85) EBW 90037-E (In Tank Probe Cap and Adapter Kit) (Gas/E85)
Drop Tube Overfill Prevention Device[1]	Defender Series OPV 70859X9YZ (Gas/E85) Defender Series OPV 70869X9YZ (Gas/E85) Defender Series OPV legend: X = upper drop tube length: 1 = 5 feet 2 = 10 feet Y = Tube compatibility: 0 = Gas 2 = Gas/E85 Z = lower drop tube length: 1 = 8 feet 2 = 10 feet

Equipment	**Manufacturer/Model Number**
	EBW 70849X1Y (Gas) EBW 70849X3Y (Gas/E85) X represented by: 1 = 5 foot length upper drop tube section 2 = 10 foot length upper drop tube section Y represented by: 1 = 8 foot length bottom thread on section drop tube 2 = 10 foot length bottom thread on section drop tube
Drop Tube[1]	OPW 61-T (various lengths) (Gas)(Phil-Tite Series Spill Containers only) EBW 7822041X-2 (X = various lengths) (Gas) EBW 7822043X-2 (X = various lengths) (Gas/E85)
Riser Offset[1]	Phil-Tite M-6050-X (x = various offsets) (Gas/E85)
Double Fill[1] Tank Riser Configuration	Phil Tite (configuration only) (Gas/E85) Defender (configuration only) (Gas/E85)
Tank Bottom Protector[1]	Phil-Tite TBP-3516-E (Gas/E85)
Emergency Vent	Exhibit 5 (for below-grade vaulted tank configuration)
Fuel Lock[1]	McGard FL1 – Stick Only Fuel Lock (125007) (Gas) McGard FL2 – Stick/Sampling Fuel Lock (125008) (Gas)
Bladder Plug	McGard PSI104 (Gas)

[1] If these components are installed or required by regulations of other agencies, only those components and model numbers specified above shall be installed or used.

Table 1
Components Exempt from Identification Requirements

Component Name	Manufacturer	Model Number
Drop Tube	OPW EBW EBW	61-T Straight Drop Tube (Gas) 7822041X-2 (X = various lengths) (Gas) 7822043X-2 (X = various lengths) (Gas/E85)
Dust Caps	Morrison Brothers	323C-0100ACEVR (vapor)* (Gas/E85) 305C-0100ACEVR (product)* (Gas/E85)
Tank Gauge Port Components	Veeder-Root	312020-952 (cap & adaptor) (Gas/E85)
	Morrison Brothers	305XPA1100AKEVR (cap and adaptor kit) (Gas/E85) 305-0200AAEVR (replacement adaptor) (Gas/E85) 305XP-1100ACEVR (replacement cap) (Gas/E85)
	EBW	90037-E (In Tank Probe Cap and Adaptor Kit) (Gas/E85)
Riser Adaptor	Phil-Tite	M/F 4X4 (Gas/E85) M/F 4X4-R (Gas/E85)
Riser Offset	Phil-Tite	M-6050-X (X = various offsets) (Gas/E85)
Riser Support Bracket	Phil-Tite	M-1600 (Gas/E85)
Spill Container Lid	Phil-Tite EBW	85011 (Gas/E85) 7054401X (Gas/E85)
Sump/Sump Lids	Varies	Varies (Gas/E85)
Drop Tube Riser Clamp	FFS	70550901EC (Gas/E85)
Replacement Drain Valve	EBW	EBW 70533729 EBW 70533719
Drain Valve Blank Kit	EBW	90022
Fuel Lock	McGard	FL1, FL2

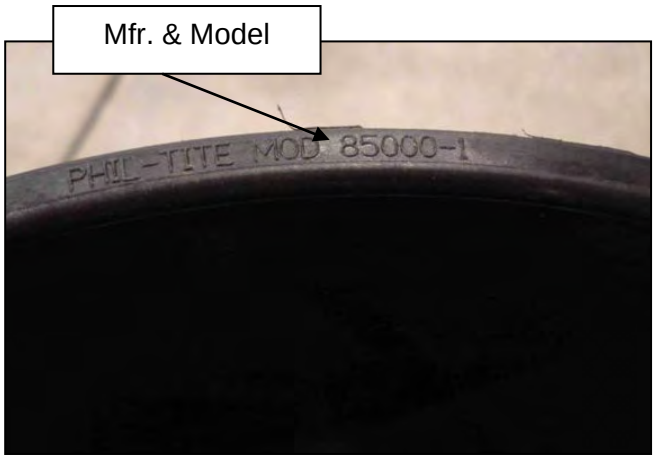
* Morrison Brothers dust caps identified as 323C EVR and 305C EVR respectively.

The component in Table 2 may not be installed as a new or replacement part on or after September 1, 2002. This component, if installed prior to September 1, 2002, may be used for the remainder of it's useful life.

Table 2

Component Name	Manufacturer	Model Number
Drop Tube	Emco Wheaton	A0020 (various lengths) (Gas)

Component Identification and Location



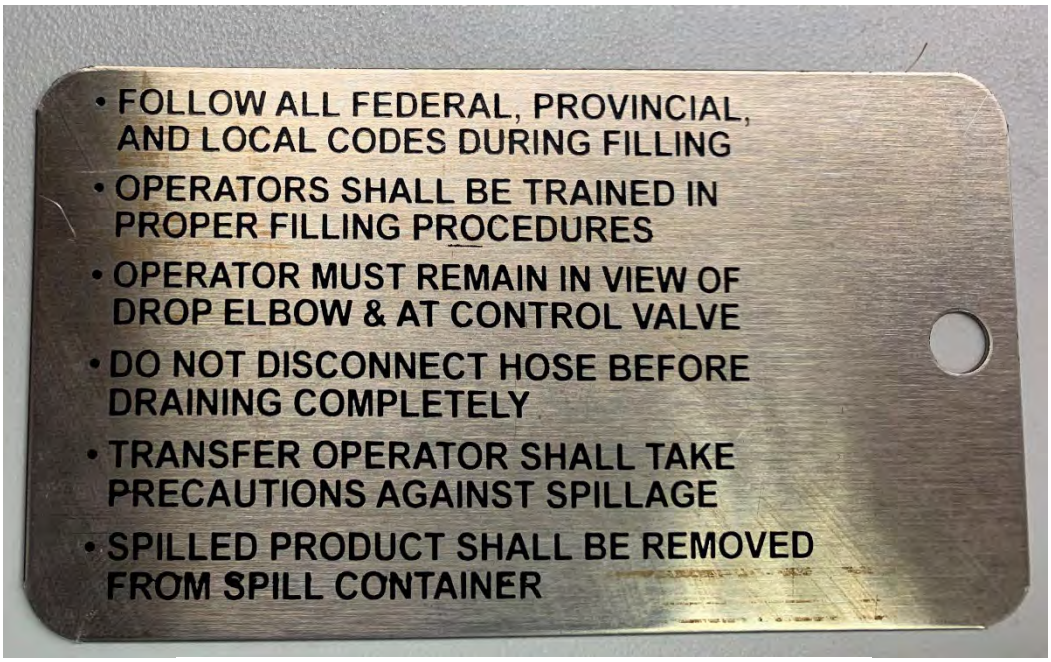
Phil-Tite Model 85000 Series Spill Containers

Defender 705 Series Spill Container-double wall (Gas/E85 Compatible)

Defender 705 Series Spill Container-single wall (Gas/E85 Compatible)

Component Identification and Location

(New Tag Front) Defender Series Spill Container (Gas/E85 Compatible)

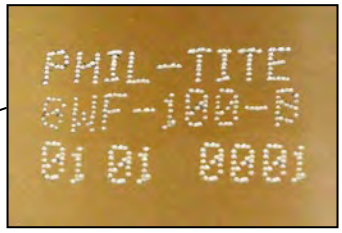


(New Tag Back) Defender Series Spill Container (Gas/E85 Compatible)

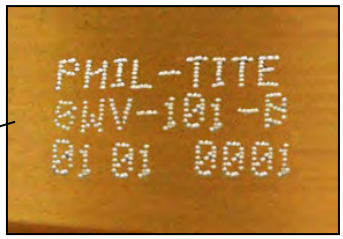
Component Identification and Location

Spill Container EBW 7XX-49Y-0Z

Component Identification and Location



Phil-Tite Model SWF-100-B
Product Adaptor



Phil-Tite Model SWV-101-B
Vapor Adaptor

Component Identification and Location

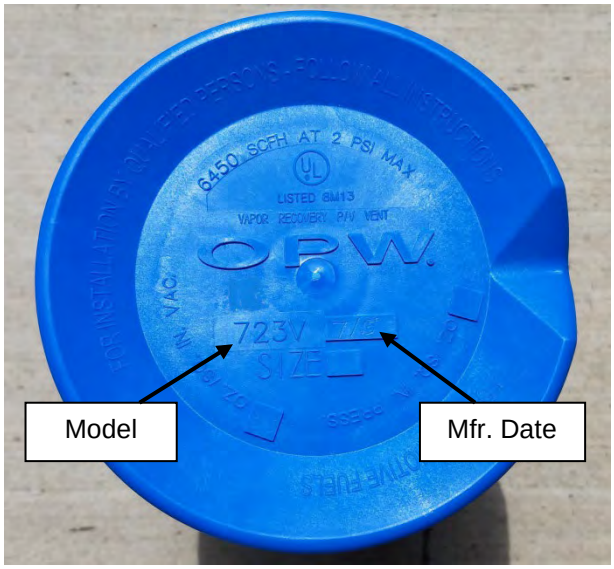
Phil-Tite SWF-100-SS Fill Adaptor

Phil-Tite SWF-101-SS Fill Adaptor

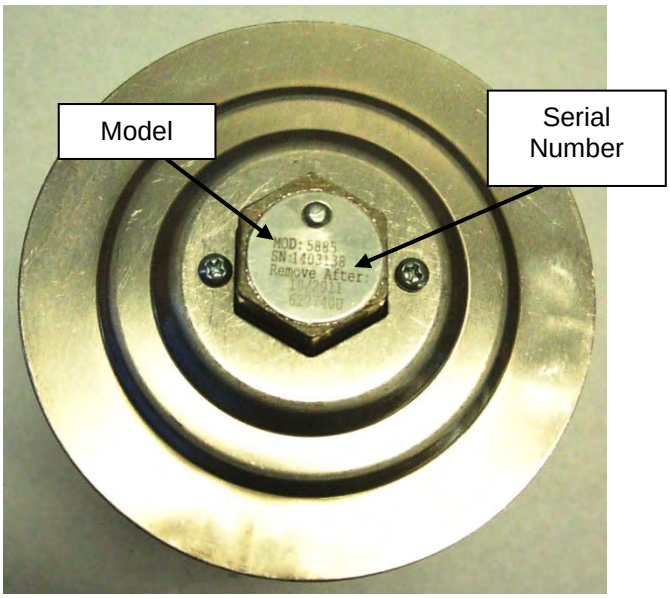
Component Identification and Location

FFS PV-Zero P/V Vent Valve (Gas/E85)
(Model and Serial Number on White Tag)

OPW 723V P/V Vent Valve (Gas/E85)



Husky 5885 P/V Vent Valve (Gas/E85)
(Husky Name on Bottom Flange)



Component Identification and Location

EBW Model 70849X1Y Overfill Prevention Device
(Gas Compatible)

EBW 70849X3Y Autolimiter
(Gas/E85 Compatible)

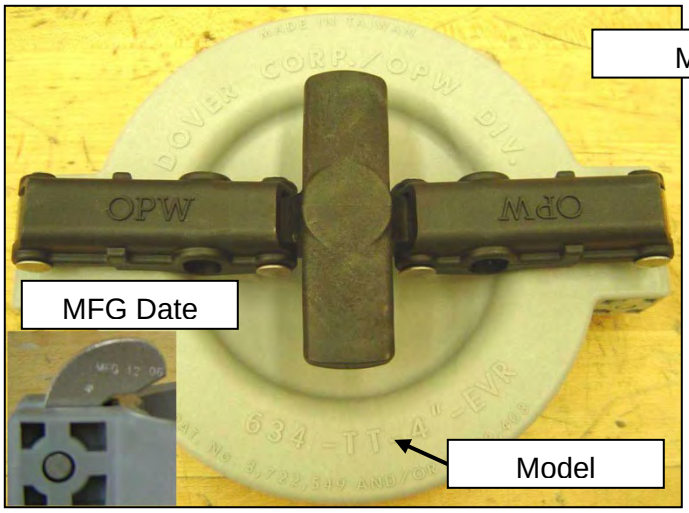
Component Identification and Location

Defender OPV series 70859X9YZ (Gas/E85 compatible)

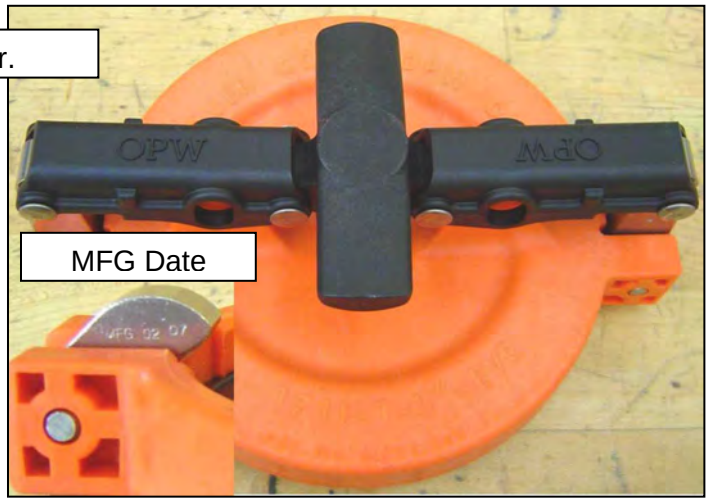
Component Identification and Location

Defender OPV series 70869X9YZ (Gas/E85 compatible)

Component Identification and Location



OPW 634-TT-EVR Product Dust Cap
(Gas/E85 Compatible)



OPW 1711-T-EVR Vapor Dust Cap
(Gas/E85 Compatible)

OPW 634LPC Product Dust Cap
(Gas Compatible)

OPW 1711LPC Vapor Dust Cap
(Gas Compatible)

Component Identification and Location

EBW 77720102 Product Dust Cap
(Gas/E85)

EBW 30430103 Vapor Dust Cap
(Gas/E85)

EBW 77720202 Product Dust Cap
(Gas/E85 Compatible)

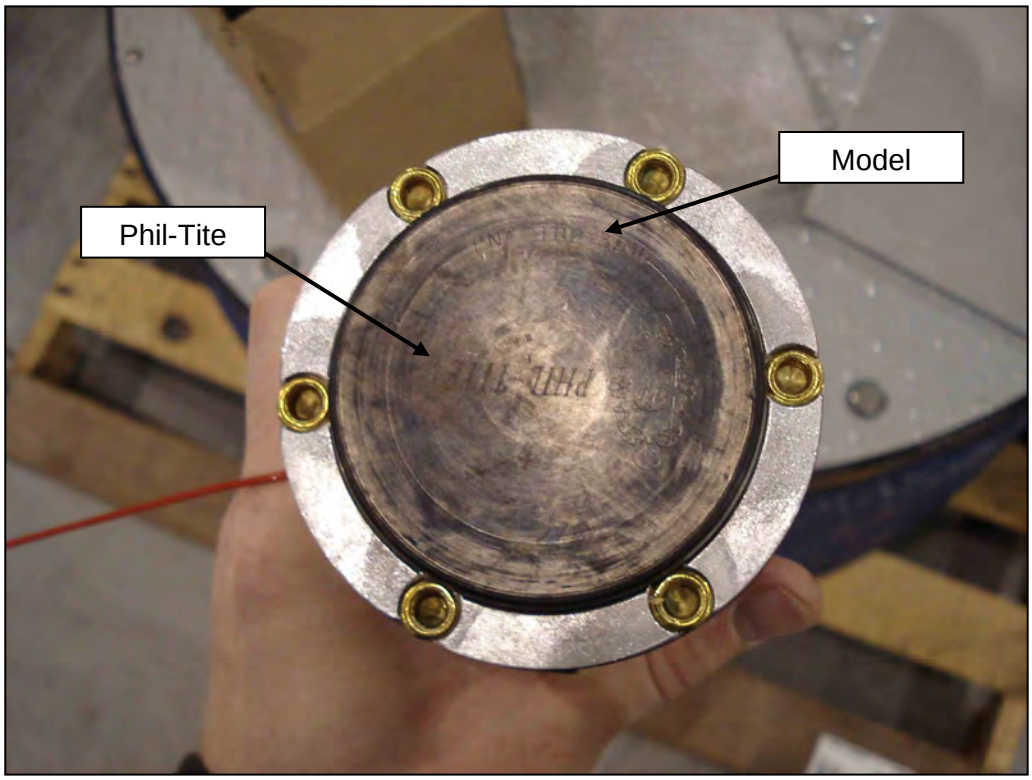
EBW 30420006 Vapor Dust Cap
(Gas/E85)

Component Identification

Morrison Brothers 323C EVR
Vapor Dust Cap
(Gas/E85 Compatible)

Morrison Brothers 305C EVR
Product Dust Cap
(Gas/E85 Compatible)

Component Identification and Location



Phil-Tite TBP-3516-E (Gas/E85) Series Tank Bottom Protector

Component Identification and Location

CompX CSP1-634LPC Product Dust Cap

CompX CSP3-1711LPC Vapor Dust Cap (Gas Only)

CompX Tank Commander Lid
Locks onto CSP1-634LPC and CSP3-1711LPC Dust Caps

Component Identification and Location

CompX CSP2-634LPC Product Dust Cap

CompX CSP4-1711LPC Vapor Dust Cap (Gas Only)

CompX Tank Commander Lid
Locks onto CSP2-634LPC and CSP4-1711LPC Dust Caps

Component Identification and Location

McGard Fuel Lock Installation Position[1]

McGard Fuel Lock (FL1 on Left, FL2 on Right)

[1] Optional component, but if installed this picture shows the correct installation location in the pipe just below the Product Rotatable Adaptor in the drop tube.

Exhibit 2

Installation, Maintenance and Compliance Specifications

This Exhibit contains the installation, maintenance and compliance standards and specifications applicable to the Franklin Fueling System (FFS) stage I Enhanced Vapor Recovery system installed in a gasoline dispensing facility (GDF). Table 2-1 summarizes the compliance standard and specification with the corresponding test method. Table 2-2 describes the maintenance interval for the FFS stage I EVR system components.

General Specifications

1. Typical installations of the FFS stage I EVR system and system components are shown in Figures 2A through 2N of the full CARB Executive Order.

2. The FFS stage I EVR system shall be installed, operated and maintained in accordance with this attachment, applicable Oregon Administrative Rules, and manufacturer's specifications.

3. Any repair or replacement of system components shall be done in accordance with this attachment, applicable Oregon Administrative Rules, and manufacturer's specifications.

4. Unless otherwise specified in this attachment or Oregon Administrative Rule, the FFS stage I EVR system shall comply with the applicable performance standards and performance specifications in CP-201.

5. Installation, maintenance and repair of system components, including removal and installation of such components in the course of any required tests, shall be performed in accordance with this attachment, applicable Oregon Administrative Rules, and manufacturer's specifications.

Pressure/Vacuum Vent Valves For Storage Tank Vent Pipes

1. No more than three certified pressure/vacuum vent valves (P/V valves) listed in Exhibit 1 shall be installed on any GDF underground storage tank system.

2. Compliance determination of the following P/V valve performance specifications shall be at the option of the owner or operator:

    a. The leak rate of each P/V valve shall not exceed 0.05 cubic feet per hour (CFH) at 2.00 inches of H_2O positive pressure and 0.21 CFH at -4.00 inches of H_2O negative pressure as determined by TP-201.1E, Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves.

    b. The positive pressure setting is 2.5 to 6.0 inches of H_2O and the negative pressure setting is 6.0 to 10.0 inches of H_2O as determined by TP-201.1E, Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves.

3. Compliance determination of the P/V valve performance specifications in items 2a and 2b for the FFS PV-Zero P/V vent valve shall be conducted with the valve remaining in its installed position on the vent line(s). The PV-Zero portion of this attachment for the Franklin Fueling Systems Phil-Tite/EBW/FFS) stage I EVR system outlines the equipment needed to test the valve in its installed position.

4. A manifold may be installed on the vent pipes to reduce the number of potential leak sources and P/V valves installed. Vent pipe manifolds shall be constructed of steel pipe or an equivalent material that has been listed for use with gasoline. If a material other than steel is used, the GDF operator must make available, upon request, information demonstrating that the material is compatible for use with gasoline. A tee may be located in a different position, or fewer pipes may be connected, or more than one P/V valve may be installed on the manifold.

5. Each P/V valve shall have permanently affixed to it a yellow, gold, or white colored label with black lettering stating the following specifications:

Positive pressure setting: 2.5 to 6.0 inches H_2O
Negative pressure setting: 6.0 to 10.0 inches H2O
Positive Leak rate: 0.05 CFH at 2.0 inches H2O
Negative Leak rate: 0.21 CFH at –4.0 inches H2O

1. The vapor adaptor poppet shall not leak when closed. Compliance with this requirement shall be verified by the use of commercial liquid leak detection solution, or by bagging, when the vapor containment space of the underground storage tank is subjected to a non-zero gauge pressure. (Note: leak detection solution will detect leaks only when positive gauge pressure exists.)

Vapor Recovery and Product Adaptor Dust Caps

Dust caps with intact gaskets shall be installed on all stage I EVR tank adaptors.

Spill Container Drain Valve

The spill container drain valve is configured to drain liquid directly into the drop tube and is isolated from the underground storage tank ullage space. The leak rate of the drain valve shall not exceed 0.17 CFH at 2.00 inches H_2O. Depending on the presence of the drop tube overfill prevention device, compliance with this requirement shall be demonstrated in accordance with either TP-201.1C, Leak Rate of Drop Tube/Drain Valve Assembly (October 8, 2003), or TP-201.1D, Leak Rate of Drop Tube Overfill Prevention Device and Spill Container Drain Valve (October 8, 2003).

Drop Tube Overfill Prevention Device

1. The Drop Tube Overfill Prevention Device (overfill device) is designed to restrict the flow of gasoline delivered to the underground storage when liquid levels exceed a specified capacity. The drop tube overfill device is not a required component of the EVR system, but may be installed as an optional component of the system. Other requirements may apply.

2. The leak rate of the overfill device shall not exceed 0.17 CFH at 2.00 inches H_2O when tested as in accordance with TP-201.1D, Leak Rate of Drop Tube Overfill Prevention Device and Spill Container Drain Valves (October 8, 2003).

3. The discharge opening of the fill pipe must be entirely submerged when the liquid level is six inches above the bottom of the tank as shown in Figures 2A and 2D.

Riser Adaptor

For “Phil-Tite” series spill container installations, the Riser Adaptor shall provide a machined surface on which a gasket can seal and ensures that the seal is not compromised by an improperly cut or improperly finished riser. A Threaded Riser adaptor shall be installed on the following required connections. As an option, the adaptor may be installed on other connections.

a. Product Spill Container (required)
b. Vapor Recovery Spill Container (required)
c. Tank Gauging Components (required)

For “Defender Series” spill container installations, the Riser Adaptor should only be used with the NPSM (straight thread) base. The Riser Adaptor should not be used with the Defender Series Base with NPT (tapered thread) base. This is applicable for both the vapor and fill/product sides. Field conditions will dictate which base to use. If the existing riser is not cut square, those conditions will require the riser adaptor.

Vapor Recovery Riser Offset

1. The EVR tank riser may be offset from the tank connection to the vapor recovery Spill Container provided that the maximum horizontal distance (offset distance) does not exceed twenty (20) inches. One example of an offset is shown in Figure 2E.

2. A vapor recovery riser shall be offset up to 20 inches horizontal distance with use of commercially available, four (4) inch steel pipe fittings, a Phil-Tite Model M-6050 Vapor Riser Offset, or a combination of the two products. An example of a Phil-Tite Model M-6050 configuration is shown in Figure 2E.

Tank Gauge Port Components

The tank gauge adaptor and cap are paired. Therefore, an adaptor manufactured by one company shall be used only with a cap manufactured by the same company.

Warranty

Each manufacturer listed in Exhibit 1 shall include a warranty tag with the certified component(s). The manufacturer warranty tag, included with each component, shall be provided to the service station owner/operator at the time of installation.

Connections and Fittings

All connections and fittings not specifically certified with an allowable leak rate shall not leak. The absence of vapor leaks shall be verified with the use of commercial liquid leak detection solution (LDS), or by bagging, when the vapor containment space of the underground storage tank is subjected to a non-zero gauge pressure. (Note: leak detection solution will detect leaks only when positive gauge pressure exists).

Double Fill Configuration

A Defender and or Phil-Tite Double Fill Configuration shall be allowed for installation provided that no more than two fill points are installed on any single underground storage tank and that no offset of the vapor recovery riser pipe is installed. An example of this configuration is shown in Figure 2C.

Maintenance Records

Each GDF operator or owner shall keep records of maintenance performed at the facility. Such record shall be maintained on site or otherwise readily available for review during the course of an on-site inspection. Additional information may be required in accordance with permit or OAR requirements. The records shall include the maintenance or test date, repair date to correct test failure, maintenance or test performed, affiliation, telephone number, and the name of the individual conducting maintenance or test. An example of a Stage I EVR Maintenance Record is shown in Figure 2O.

Table 2-1
Gasoline Dispensing Facility Compliance Standards and Specifications

Component / System	Test Method	Standard or Specification
Rotatable Phase I Adaptors	TP-201.1B	Minimum, 360-degree rotation Maximum, 108 pound-inch average static torque
Overfill Prevention Device	TP-201.1D	≤0.17 CFH at 2.00 inches H_2O
Spill Container Drain Valve	TP-201.1C or TP-201.1D	≤0.17 CFH at 2.00 inches H_2O
P/V Valve[1.]	TP-201.1E	Positive pressure setting: 2.5 to 6.0 inches H_2O Negative pressure setting: 6.0 to 10.0 inches H_2O Positive Leakrate: 0.05 CFH at 2.0 inches H_2O Negative Leakrate: 0.21 CFH at -4.0 inches H_2O
Vapor Recovery System	TP-201.3	As specified in TP-201.3 and/or CP-201
Connections and fittings certified without an allowable leak rate	Leak Detection Solution or bagging	No leaks

[1.] Compliance determination is at the option of the district.

Table 2-2
Maintenance Intervals for System Components[2]

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Manufacturer	Component	Maintenance Interval
All Models	Dust Caps	Annual
All Models	In Tank Gauge Port Probe Cap and Adaptor Kit	Annual
FFS	Drop Tube Overfill Prevention Device 70849X1Y series Drop Tube Overfill Prevention Device 70849X3Y series Drop Tube Overfill Prevention Device 70859X9YZ series Drop Tube Overfill Prevention Device 70869X9YZ series	Annual
FFS	782 Straight Drop Tube	Annual
Husky	Pressure/Vacuum Vent Valve	Annual
FFS	Pressure/Vacuum Vent Valve	Annual
OPW	Pressure/Vacuum Vent Valve	Annual
OPW	61-T Straight Drop Tube	Annual
FFS	Spill Container (all models)	Every 3 years
FFS	SWF-100-B Product Adaptor SWF-100-SS Product Adaptor	Annual
FFS	SWV-101-B Vapor Adaptor SWV-101-SS Vapor Adaptor	Annual

[2] Maintenance must be conducted within the interval specified from the date of installation and at least within the specified interval thereafter.

Figure 2O

Example of a GDF Stage I Maintenance Record

Date of Maintenance/ Test/Inspection/ Failure	Repair Date to Correct Test Failure	Maintenance/Test/Inspection Performed and Outcome	Affiliation	Name of Individual Conducting Maintenance or Test(s)	Telephone Number

State of Oregon
Department of
Environmental
Quality

Installation, Operation and Maintenance Manual

For Executive Order

VR-101-V
Franklin Fueling Systems, Inc.
Phil-Tite/EBW/FFS Stage I Enhanced
Vapor Recovery System

NOTICE:

This Installation, Operation and Maintenance Manual for the Franklin Fueling System stage I EVR System describes the tools and methods required to install the FFS stage I EVR System. While Oregon DEQ does not require specific certification or training to install, maintain, or repair stage I EVR systems, owners or operators may elect to contract with certified technicians.

Note: CARB requires that only technicians trained and certified by FFS (i.e. FFS Certified Technicians) are able to perform installation, maintenance or repairs of components manufactured by FFS or the warranty will be void. A list of FFS Certified Technicians can be viewed at http://www.franklinfueling.com/service/.

To schedule a training class, FFS can be contacted at the following:

Enhanced Vapor Recovery Systems
Franklin Fueling Systems
Phone: 800-225-9787
Email: techserve@franklinfueling.com

It is the responsibility of each service provider or technician to be familiar with the current requirements of state, federal and local codes for installation and repair of gasoline dispensing equipment. It is also the responsibility of the service provider or technician to be aware of all necessary safety precautions and site safety requirements to assure a safe and trouble free installation.

In addition to the requirements included in this attachment, the owner or operator of a GDF may wish to obtain a warranty tag for each stage I EVR component installed. Warranty tags are described in more detail in the CARB Executive Orders and may be included with each component, to the service station owner/operator at the time of installation.

Summary of Maintenance Activities Required of the **FFS Stage I EVR System**[1]		
Component	**Interval**	**Maintenance To Be Performed**
Spill Container Drain Valve **Phil-Tite "All Models with Drain Valves"**	Every year inspection; every 24 months for testing	• Inspect the black spill container and remove any standing liquid, grit, sand, debris or dirt from inside the spill container. • If the drain valve assembly, drop tube and spill container passes testing, no further maintenance is necessary. If the drop tube, or the drain valve assembly, or the spill container fails testing perform the steps listed below. **Spill Container with Drain Valve Maintenance Instructions** • Check the product swivel adaptor for any leakage. Replace the ¼" flat seal (85039) if suspected of leaking; see product and vapor swivel adaptor maintenance. Any leakage from the swivel adaptor seal or thru the swivel adaptor will mask the test results toward failure. Eliminate any leakage thru the product swivel adaptor. • If the spill container drain valve is suspected of leaking perform steps 1 thru 5. • If the spill container to riser adaptor/tank riser flat seal and/or the drop tube seal are suspected of leaking, perform steps 6 thru 10. *Note: For FFS EVR Phil-Tite Spill Container Installations the drop tube must be installed under the spill container. If not this could possibly be the source of any leaks. Install the drop tube under the spill container.* **1.** Remove the stainless retainer-ring from the inside of the spill container. Ensure the gray foam filter (602026001) is free of any debris, grit, sand, dirt, and liquid. The purpose of the foam filter is to trap and hold any debris (grit, dirt, sand, etc.) from reaching the drain valve and drain holes, blocking them from draining properly. This filter greatly improves the longevity and proper operation of the drain valve assembly. Replace the foam filter (602026001) if it is torn, has tears, and/or is damaged. **2.** With the retainer ring removed, loosen and remove the drain valve top hex screw from the top clamp. With the drain valve handle position in the middle of the spill container remove the drain valve and handle assembly by pulling up on the drain valve handle. **(Spill Container Drain Valve continued next page)**

[1] These maintenance requirements shall not circumvent use of the manufacturer's installation and maintenance instructions. Maintenance contractors or owner/operators shall refer to the manufacturers complete installation and maintenance instructions to ensure that all maintenance and torque requirements are met. Maintenance must be conducted within the interval specified from the date of installation and at least within the specified interval thereafter.

Spill Container Drain Valve (continued) **Phil-Tite "All Models with Drain Valves"**	Every year inspection; every 24 months for testing	**3.** Inspect the drain valve-screen assembly and ensure there are no cracks or cuts. Inspect the shut-off collar for nicks, cuts, wrapped, etc. If the above are damage, replace the drain valve assembly (85400). **4.** Remove any liquid and debris (sand, grit, dirt, dust, etc.) that may be under the drain valve assembly. Check the drain valve "O"-Ring (85035) for any wear, cuts, tears and debris. Clean and/or replace if necessary. **5.** Reinstall the drain valve and handle assembly (85400) using the Installation and Adjustment instructions found within IOM. Check the drain valve handle for proper operation. NOTE: The drain valve handle must snap into place when moved to the closed position! Re-adjust if necessary. **6.** Remove the black spill container using an approved installation/extraction tool (T-7101 or T-7002, Black) from Phil-Tite T-7043 Tool Kit. **7.** Inspect the ¼" flat seal (85039) (black spill container to M/F 4X4 riser adaptor seal) for cuts or damage, replace if necessary. **8.** If there is no M/F 4X4 riser adaptor installed on top of the tank riser this could be the reason for failing TP-201.1C performance test. Install a Phil-Tite M/F 4X4 Riser Adaptor. Note: Install only one (1) M/F 4X4 Riser adaptor per tank riser. Two or more on top of a single tank riser will cause test failures. **9.** Inspect the drop tube round seal for correct installation, cuts or damage, replace if necessary (85039-DT). Note: The drop tube seal must be Phil-Tite's special round seal (85039-DT), Do Not use a standard 'O'-Ring. **10.** Reinstall the black spill container using the installation instructions provided, and perform ARB test procedure TP-201.1C – Leak Rate of Drop Tube/ Drain Valve Assembly.
(Spill Container Drain Valve continued next page) **(Spill Container Drain Valve continued)**	Every year inspection; every 24 months for testing	1. Perform ARB test procedure TP-201.1C – Leak Rate of Drop Tube/Drain Valve assembly.

Summary of Maintenance Activities Required of the **FFS Stage I EVR System[1]**		
Component	**Interval**	**Maintenance To Be Performed**
Defender Series with EBW 70533729 **EBW Series with 70533719 Drain Valve; or 70533729 Drain Valve**	Every year inspection; every 24 months for testing	2. Clean any sand, gravel, or dirt from the snow plow ring. Buildup of material will prevent the manhole lid from sitting flat and diverting rain water. In addition to water infiltration, this can lead to premature lid failures and tripping hazards. 3. Inspect the cover gasket and replace if necessary. 4. Inspect the spill container for the presence of liquid. If any is present, identify the material (water of fuel) and dispose of it using your preferred acceptable method (pump it out or drain it into the tank). 5. Inspect the primary spill container and drain valve screen for any foreign material collecting in the area. Remove any large objects, (leaves, rags, etc.) and wipe the bottom of the tank with a disposable rag. *Note: For Defender EVR installations, the Defender Spill Container is installed first on the UST Fill Riser. The Drop Tube is installed through the installed spill container before installing the Drop Tube Riser Clamp inside the spill container.* 6. Inspect the entire spill container assembly and any components for obvious damage. Verify that all components are functioning properly. 7. Record inspection results.

1

[1] These maintenance requirements shall not circumvent use of the manufacturer's installation and maintenance instructions. Maintenance contractors or owner/operators shall refer to the manufacturers complete installation and maintenance instructions to ensure that all maintenance and torque requirements are met. Maintenance must be conducted within the interval specified from the date of installation and at least within the specified interval thereafter.

Summary of Maintenance Activities Required of the FFS Stage I EVR System[1] (continued)		
Component	Interval	Maintenance To Be Performed
Pressure/Vacuum Vent Valve FFS Model 407215901 PV-Zero (Gas/E85)	Annual	1. Visual inspect housing, pipe, fittings and rain cap for obvious signs of damage, missing parts or fluid leaks. 2. Visually inspect the rain cap, from ground level, for signs of bird nests or insect activity. 3. Every year, drain and inspect the fill fluid per the Fluid Inspection Procedure.
Pressure/Vacuum Vent Valve Husky Model 5885	Annual	1. Remove screws that hold top cover on. 2. Remove any debris that might be sitting inside the lower cover. 3. Check the drain holes in the lower cover for blockage. 4. Do not remove the two (2) screens. 5. Reinstall the top cover and retaining screws. 6. Tighten the screws firmly.
Pressure/Vacuum Vent Valve OPW Model 723V	Annual	Upper Screen Maintenance 1. Remove vent top by depressing tabs and lift top upwards. 2. Clean and replace filter screen as necessary. 3. Reinstall vent top by inserting into the body. Lower Screen Maintenance 1. Remove valve assembly from pipe adaptor. Grip assembly at the flats just above the pipe adaptor and unscrew. 2. Lift the filter screen out and clean or replace as necessary. 3. Reinstall filter screen in the pipe adaptor. 4. Reinstall valve assembly on pipe adaptor and tighten.
Dust Caps	Annual	Visually inspect the seal in cap and replace if damaged or missing.
Drop Tubes OPW 61T EBW 782-204-1 EBW 782-204-3	Every year inspection; every 24 months for testing	• Visually inspect Drop Tube to see if it is installed and ensure that the bottom of tube is within 6 inches of the bottom of tank. • Test the drop tube seal with procedure TP-201.1C. If the drop tube seal passes testing, no further maintenance is required. If the drop tube seal fails testing, replace the drop tube seal with Phil-Tite 85039-DT "O"-ring. • Re-test the drop tube seal with procedure TP-201.1C.
Overfill Prevention Devices	Annual	• Annually, inspect the valve for any noticeable damage by looking down the drop tube opening. If any damage is observed, the valve must be replaced. • Test the seals with procedure TP-201.1D. If the drop tube passes testing, no further maintenance is required. If the drop tube fails testing, replace the drop tube seal with Phil-Tite 85039-DT. • Re-test the valve with procedure TP-201.1D. If this does not correct the leak the valve needs to be replaced.

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Summary of Maintenance Activities Required of the FFS Stage I EVR System[1] (continued)		
Component	Interval	Maintenance To Be Performed
Vapor Recovery Adaptor Phil-Tite SWV-101-B and SWV-101-SS	Every year inspection; every 24 months for testing	*The Phil-Tite rotatable adaptors are not field serviceable, with the exception of the vapor swivel poppet 'O'-Ring found on the Vapor swivel adaptor (SWV-101-B and SWV-101-SS).* The swivel tops should rotate 360 degrees by hand. If you can rotate the swivel tops by hand you are applying less than 108 in. lbs. of static torque. If a leak is found in the vapor top poppet, inspect the brass/stainless steel vapor top for 'out of round' condition. Check the poppet 'O'-Ring seal for sand, dirt, dust, grit and abrasions between the poppet 'O'-Ring and the brass/stainless steel sealing surface. (These conditions are not covered by the warranty.) To check and/or replace the vapor swivel poppet 'O'-Ring: 1. Remove the vapor swivel adaptor (SWV-101-B or SWV-101-SS) from the black spill container riser using the special tool adaptor (T-7102, orange) from the Phil-Tite Tool Kit (T-7043). 2. Using a small blade common screwdriver remove the ¼ inch flat seal gasket from the bottom of the vapor adaptor. 3. Push down on the brass/stainless steel spider a ½ inch or so, using a small blade common screwdriver, remove the retainer ring. (Warning: The spider and spring assembly are spring loaded.) This will release the spider assembly, spring, and poppet assembly. By hand, carefully remove these parts. 4. With the vapor poppet assembly removed, inspect the poppet and poppet 'O'-Ring for cuts, tears or damage. Replace the 'O'-Ring if necessary. Before re-assembly spray a small amount of Silicone Spray on the poppet 'O'-Ring. NOTE: DO NOT USE ANY TYPE OF OIL OR GREASE. 5. Re-assemble the vapor poppet, spring and brass/stainless steel spider in the reverse order from which they were removed.
(Vapor Recovery Adaptor) continued next page)		

[1] These maintenance requirements shall not circumvent use of the manufacturer's installation and maintenance instructions. Maintenance contractors or owner/operators shall refer to the manufacturers complete installation and maintenance instructions to ensure that all maintenance and torque requirements are met. Maintenance must be conducted within the interval specified from the date of installation and at least within the specified interval thereafter.

Summary of Maintenance Activities Required of the FFS Stage I EVR System[1] (continued)		
Component	Interval	Maintenance To Be Performed
Vapor Recovery Adaptor Phil-Tite SWV-101-B and SWV-101-SS (continued)		6. Install the retainer ring and actuate the poppet by hand, making sure the assembly is secure and actuates properly. 7. Using a very small screwdriver, Install a new ¼ inch flat seal (85039). Make sure the ¼ inch flat seal is seated against the sealing surface below the swivel adaptor threads. 8. Reinstall the SWV-101-B or SWV-101-SS vapor swivel on the black spill container riser as described in the "Installation Instructions" and properly torque the swivel adaptor on the spill container riser between 50 and 75 ft. lbs. **Important: Apply an even coating of silicone based spray or a light coating of anti-seize compound to the male threads of the spill container riser and/or the swivel adaptor female threads. This will reduce the friction between these threads during installation and aid in removal of the swivel adaptor at a later date.**
Tank Gauge Components Morrison Brothers 305 series Veeder-Root 312020-952 EBW 90037 E	Annual	Visually inspect cap to see that it is not missing any seals and is properly installed. Whenever probe service is necessary, also inspect the service cap seal for damage and replace, if necessary, at that time.

[1] These maintenance requirements shall not circumvent use of the manufacturer's installation and maintenance instructions. Maintenance contractors or owner/operators shall refer to the manufacturers complete installation and maintenance instructions to ensure that all maintenance and torque requirements are met. Maintenance must be conducted within the interval specified from the date of installation and at least within the specified interval thereafter.

Summary of Maintenance Activities Required of the FFS Stage I EVR System[1] (continued)		
Component	**Interval**	**Maintenance To Be Performed**
Spill Container Lid Phil-Tite 85011 (Spill Container Lid continued next page)	Every year inspection; every 24 months for testing	***NOTE: DO NOT USE ANY PETROLEUM PRODUCTS ON THE WIPER SEAL, CAST IRON LID, OR THE STAINLESS STEEL SLEEVE.*** • Clean the wiper seal using a clean rag and silicone spray. The Wiper Seal must be free of any dirt, dust and/or film build up. If unable to properly clean, replace the wiper seal (SC-1513V). Check the Wiper Seal for Flexibility: 1. Place your thumbs on the outer surface of the seal approximately 4-6 inches apart. Push your thumbs toward each other. The wiper seal should have some movement between your thumbs. If there is no movement or flexibility, the wiper seal must be replaced and/or removed, cleaned, and rechecked. 2. Remove the wiper seal and clean the groove in the cast iron lid of any dirt or dust build up by using a clean rag and silicone spray. The use of a blunt tool may be required to remove any build up. 3. Clean all surfaces of the wiper seal using a clean rag and silicone spray. Any dirt or dust build up in the "U" section of the seal must be removed. The use of a wooden or plastic tipped instrument along with silicone spray may be required. If unable to properly clean, replace the wiper seal (SC-1513V). Installing the Wiper Seal (SC-1513V) into the Groove of the Cast Iron Lid 1. Install the wiper seal in the cast iron lid groove with the small (wiper) bulge facing outward and pointing upwards. Check the circumference of the installed seal for any twists or incorrect alignment of the seal in the groove.

[1] These maintenance requirements shall not circumvent use of the manufacturer's installation and maintenance instructions. Maintenance contractors or owner/operators shall refer to the manufacturers complete installation and maintenance instructions to ensure that all maintenance and torque requirements are met. Maintenance must be conducted within the interval specified from the date of installation and at least within the specified interval thereafter..

Summary of Maintenance Activities Required of the **FFS Stage I EVR System[1] (continued)**		
Component	**Interval**	**Maintenance To Be Performed**
Spill Container Lid Phil-Tite 85011 EBW/Defender Lids 7054401X	Every year inspection; every 24 months for testing	Check the Stainless Steel Sleeve for Cleanliness 1. Clean the area of the stainless steel sleeve where the wiper seal makes contact with the sleeve. Using a clean rag and silicone spray, wipe this area free of any dirt, dust and/or film build up. Reinsert the Lid with Wiper Seal over the Spill Container and into the Stainless Steel Sleeve. *Note: To ease installation use <u>silicone spray on the exposed surface of the wiper seal and on the lip of the stainless steel sleeve where the wiper seal makes contact. Do not use any petroleum products.</u>* • Push down on the cast iron lid until it seats into the stainless steel sleeve. • Hold the cast iron lid until it seats into the stainless steel sleeve. • If the cast iron lid does not stay seated, wait five (5) seconds then push down on the cast iron lid again. You will feel the cast iron lid go down and seat into the stainless steel sleeve. • Repeat this process until the cast iron lid stays seated in the stainless steel sleeve. • Wipe lid seal and spill container sealing surface with a rage to remove any dirt/debris. • Inspect the lid seal for any damage and replace if necessary. • Inspect the spill container sealing surface for any damage and replace if necessary. • • • (End of maintenance table.) .

These maintenance requirements shall not circumvent use of the manufacturer's installation and maintenance instructions. Maintenance contractors or owner/operators shall refer to the manufacturers complete installation and maintenance instructions to ensure that all maintenance and torque requirements are met. Maintenance must be conducted within the interval specified from the date of installation and at least within the specified interval thereafter

1

Franklin Fueling Systems
Stage I EVR Equipment Installation Check List
Installing Components per Executive Order VR-101

Date: _____

Site Location:*(name)* _____ Installing Contractor:(name

_____

Address_____ Address

_____

City/State

_____City/State_____

Contact/Phone_____Contact/Phone

_____

Tank Number:_____ Product:_____ Capacity:_____

Yes/No	Initials

Tank Number:_____ Product:_____

Capacity:_____

Tank Number:_____ Product:_____

Capacity:_____

Installing Technician: *(name)*:_____

Technician Certification Number:_____ Signature: _____

____

1. Is all of the installed equipment for Stage I EVR listed in Executive Order (E.O.) VR-101-O?

Note: All Stage I installed equipment must be listed in an E.O. within this attachment. If other approved equipment is installed, explain which components were substituted in this checklist. Mark/check off each item installed.

Yes/No	Initials

2. Have all tank risers been cut to the correct lengths and correctly installed into the tank bungs using an approved pipe dope?

Yes/No	Initials
Yes/No	Initials

3. For sites equipped with Phil-Tite series spill containers, and Defender Series spill containers with straight (NPSM) threads, do all tank risers that have a gasket/seal cap and/or spill containers have an M/F 4X4 Riser Adaptor installed?

a. Are all M/F 4X4 Riser Adaptors installed onto tank risers using approved pipe dope and torque to _____ ft. lbs.?

Yes/No	Initials

4. If a mechanical overfill prevention drop tube is installed, has the sealant (epoxy) been allowed to cure a minimum of 4 hours before installation? (EBW 70849X-1Y & 70849X-3Yonly)

5. For sites equipped with Phil-Tite series spill containers, on the fill riser – Is the Drop Tube installed (under the spill container) using Phil-Tite Special 'O' Ring (85039-DT) with the flared end on top of the M/F 4X4 Riser Adaptor?
6. For sites equipped with Defender spill containers, on the fill riser, is the Drop Tube installed inside the spill container and under the Drop Tube Riser Clamp.

Note: EBW 70849X1Y and EBW 70849X-3Y drop tubes with mechanical overfill prevention valves must be cut to the correct length and the upper end flared using Flaring Tool T-6100-FT before installing into the tank riser.

Franklin Fueling Systems
Stage I EVR Equipment Installation Check List (con't.)
Installing Products per ARB Executive Order VR-101-O

Yes/No	Initials

7. For sites equipped with Phil-Tite series spill containers, are they installed onto the M/F 4X4 riser adaptors using approved anti- seize compound or silicone spray and torque to _____ ft. lbs.?

Yes/No	Initials

8. Are the Fill and Vapor Swivel Adaptors installed onto the spill container risers using an approved anti-seizing compound or spray silicone and torque to_____ ft. lbs.?

Yes/No	Initials
Yes/No	Initials

8. Pressure Vacuum Vent Valve – Is there a P/V Vent valve installed on the top of each (Gas or Gas/E85) vent pipe (a maximum of three EVR P/V valves per GDF) or manifold?

a. P/V vent valve(s) torque to _____ ft. lbs.

Yes/No	Initials
Yes/No	Initials
Yes/No	Initials

9. Tank Gauge Port Cap and Adaptor – If installed,

a. Has an M/F 4X4 Riser Adaptor been installed onto the tank gauge riser using an approved pipe dope and torque to _____ ft. lbs.

b. Is the Tank Gauge Adaptor installed onto the M/F/ 4X4 riser adaptor using an approved anti-seize compound and torque to _____ ft. lbs.?

FFS Stage I Vapor Recovery System Exhibit 1 Equipment Checklist

On line below, write out what configuration you used. Follow the legend below for each series spill container.

Configuration used: _____

(Gas/E85) = Identifies equipment approved for use with standard gasoline fuel blends and E85
(Gas) = Identifies equipment approved for use only with standard gasoline fuel blends

Equipment | **Manufacturer/Model Number**

Spill Container (Phil-Tite Series)

- ☐ Phil-Tite 85100-1 and 85100 Series (Gas/E85)

(Replacement only for existing installations)

8510X-1 and 8510X legend:
X represented by:

- ☐ 0 = product spill container
- ☐ 0-EXT = product spill container w extension collar
- ☐ 1 = vapor spill container
- ☐ 1-EXT = vapor spill container w extension collar

Spill Container (Defender Series)

- ☐ EBW Defender 705 Series* (Gas/E85)

Defender 705 Series Legend* (Gas/E85)
7055XYZAB where XYZAB is represented by:
X = containment

- ☐ 4 = singe wall
- ☐ 5 = double wall

Y = installation

- ☐ 2 = multiport bucket
- ☐ 5 = direct bury

Z = interstitial monitoring method

- ☐ 0 = no sensor/gauge (i.e. single wall)
- ☐ 1 = I2 monitor (float gauge, visual)
- ☐ 2 = TSP-ULS (electronic sensor)

A = spill container base thread**

- ☐ 0 = NPSM (straight thread)
- ☐ 1 = NPT (taper thread)

B = drain valve

- ☐ 1 = with drain valve (typical on product/fill side)
- ☐ 2 = without drain valve (typical on vapor side)

EBW Series

- ☐ EBW 7XX49Y0Z

EBW Series Legend

XX indicates spill bucket size:

- ☐ 05 = 5 gallon
- ☐ 15 = 15 gallon

Equipment	**Manufacturer/Model Number**
	Y indicates level: □ 0 = grade level with cast iron base (5 gal only) □ 2 = below grade level with cast iron base (5 & 15 gal) Z indicates drain valve: □ 1 = drain valve □ 2 = no drain valve

*May be installed in direct bury or multi-port configurations including single fill or double tank riser orientations.

**NPSM base thread spill containers (straight thread) are designed for use with the Phil-Tite M/F 4X4 Riser Adaptor at sites where the NPT threads of the tank riser are not cut flat or square. NPT base spill containers (taper thread) do not require use of Phil Tite M/F Riser Adaptor at sites where the NPT threads of the tank riser are flat and cut square.

Spill Container Lid (Phil-Tite Series Spill Containers)	□ Phil-Tite 85011 (Gas/E85)
Spill Container Lid (Defender and EBW Series)	□ EBW 7054401X (Gas/E85) X = Lid Color
Replacement Drain Valve (Phil-Tite Series Spill Containers)	□ Phil-Tite 85400 (Gas/E85)
Replacement Drain Valve (Defender Series Spill Containers)	□ EBW 70533729 (Gas/E85)
Replacement Drain Valve (EBW Series Spill Container)	□ EBW 70533719 (Gas)
Drain Valve Blank Kit EBW Series Spill Container	□ EBW 90022
Drain Valve Blank Kit (Defender Series Spill Container)	□ EBW 9002201
Drain Valve Isolation Kit (EBW Series Spill Containers)	□ EBW 70825501
Drain Valve Isolation Test Kit (EBW Series Spill Containers)	□ EBW 90079

Equipment	**Manufacturer/Model Number**
Product Adaptor	☐ Phil-Tite SWF-100-B (Gas) ☐ Phil-Tite SWF-100-SS (Gas/E85)
Vapor Adaptor	☐ Phil-Tite SWV-101-B (Gas) ☐ Phil-Tite SWV-101-SS (Gas/E85)
Riser Adaptor	☐ Phil-Tite M/F 4X4* (Gas/E85) ☐ Phil-Tite M/F 4X4-R* (Gas/E85)
Riser Support Bracket	☐ Phil Tite M 1600 (Gas/E85)
Drop Tube Riser Clamp (Defender Series Spill Containers)	☐ FFS 70550901EC (Gas/E85)
Dust Cap	☐ Morrison Brothers 323C-0100ACEVR (vapor) (Gas/E85) ☐ Morrison Brothers 305C-0100ACEVR (product)(Gas/E85) ☐ OPW 1711T-EVR (vapor) (Gas/E85) ☐ OPW 634TT-EVR (product) (Gas/E85) ☐ OPW 634LPC (product) (Gas) ☐ OPW 1711LPC (vapor) (Gas) ☐ CompX CSP1-634LPC (product) (Gas) ☐ CompX CSP3-1711LPC (vapor) (Gas) ☐ CompX CSP2-634LPC (product) (Gas) ☐ CompX CSP4-1711LPC (vapor) (Gas) ☐ EBW 77720102 (product) (Gas/E85) ☐ EBW 77720202 (product) (Gas/E85) ☐ EBW 30420006 (vapor) (Gas/E85) ☐ EBW 30430103 (vapor) (Gas/E85)
Pressure/Vacuum Vent Valve	☐ FFS PV-Zero 407215901 (Gas/E85) ☐ Husky 5885 (Gas/E85) ☐ OPW 723V (Gas/E85)
Tank Gauge Port Components	☐ Veeder-Root 312020-952 (cap and adaptor kit) (Gas/E85) ☐ Morrison Brothers 305XPA1100AKEVR (cap and adaptor kit) (Gas/E85) ☐ Morrison Brothers 305-0200AAEVR (replacement adaptor) (Gas/E85) ☐ Morrison Brothers 305XP-110ACEVR (replacement cap) (Gas/E85) ☐ EBW 90037-E (In Tank Probe Cap and Adapter Kit) (Gas/E85)
Drop Tube Overfill Prevention Device[1]	☐ Defender Series OPV 70859X9YZ, 70869X9YZ (Gas/E85) Defender Series OPV legend X = upper drop tube length: ☐ 1 = 5 feet ☐ 2 = 10 feet Y = Tube compatibility:

Equipment	**Manufacturer/Model Number**
	□ 0 = Gas □ 2 = Gas/E85 Z = lower drop tube length: □ 1 = 8 feet □ 2 = 10 feet □ EBW 70849X1Y (Gas) □ EBW 70849X3Y (Gas/E85) X represented by: □ 1 = 5 foot length upper drop tube section □ 2 = 10 foot length upper drop tube section Y represented by: □ 1 = 8 foot length bottom thread on section drop tube □ 2 = 10 foot length bottom thread on section drop tube
Drop Tube[1]	□ OPW 61-T (various lengths) (Gas) □ EBW 7822041X-2 (X = various lengths) (Gas) □ EBW 7822043X-2 (X = various lengths) (Gas/E85)
Riser Offset[1]	□ Phil-Tite M-6050-X (x = various offsets) (Gas/E85)
Double Fill[1] Tank Riser Configuration	□ Phil Tite (configuration only) (Gas/E85) □ Defender (configuration only) (Gas/E85)
Tank Bottom Protector[1]	□ Phil-TiteTBP-3516-E (Gas/E85)
Fuel Lock[1]	□ McGard FL1 – Stick Only Fuel Lock (125007) (Gas) □ McGard FL2 – Stick/Sampling Fuel Lock (125008) (Gas)
Bladder Plug	□ McGard PSI104 (Gas)

[1] If these components are installed, only those, components and model numbers specified above shall be installed or used.

NOTE:

(Gas/E85) = Identifies that these components are approved for standard gasoline and E85 fuel blends.

(Gas) = Identifies that these components are only approved for standard gasoline fuel blends.

Table 1
Components Exempt from Identification Requirements

Component Name	Manufacturer	Model Number
Drop Tube	OPW EBW EBW	61-T Straight Drop Tube (Gas) 7822041X-2 (X = various lengths) (Gas) 7822043X-2 (X = various lengths) (Gas)
Dust Caps	Morrison Brothers	323C-0100ACEVR (vapor)* (Gas/E85) 305C-0100ACEVR (product)* (Gas/E85)
Tank Gauge Port Components	Veeder-Root	312020-952 (cap & adaptor) (Gas/E85)
	Morrison Brothers	305XPA1100AKEVR (cap and adaptor kit) (Gas/E85) 305-0200AAEVR (replacement adaptor) (Gas/E85) 305XP-1100ACEVR (replacement cap) (Gas/E85)
	EBW	90037-E (In Tank Probe Cap and Adaptor Kit) (Gas/E85)
Riser Adaptor	Phil-Tite	M/F 4X4 (Gas/E85) M/F 4X4-R (Gas/E85)
Riser Offset	Phil-Tite	M-6050-X (X = various offsets) (Gas/E85)
Riser Support Bracket	Phil-Tite	M-1600 (Gas/E85)
Spill Container Lid	Phil-Tite EBW	85011 (Gas/E85) 7054401X (Gas/E85)
Sump/Sump Lids	Varies	Varies (Gas/E85)
Drop Tube Riser Clamp	FFS	70550901EC (Gas/E85)
Replacement Drain Valve	EBW	EBW 70533729 EBW 70533719
Fuel Lock	McGard	FL1, FL2

* Morrison Brothers dust caps identified as 323C EVR and 305C EVR respectively.

Overfill Prevention Valve Installation Record Sheet

Date Installed _____ **Valve Serial Number** _ _ _ 5 0 _ _ _ _ _ _ _ O

Site information

Site # / Description _____

Site Address _____

Site Contact _____

Installing Contractor

Name _____

Company _____

Tank Information

Product Type _____

Underground Tank Manufacturer _____

Tank Full Volume _____

Tank Diameter _____

Tank Chart Available? ☐ Yes ☐ No

Tank Type ☐ Steel ☐ Fiberglass

☐ Square ☐ Cylinder ☐ Dome Ends

Tank have compartments? ☐ Yes ☐ No

Tank/Drop Tube Measurements

Upper Drop Tube Length (X) _____

Lower Drop Tube Length (Y) _____

Distance from Lower Drop tube to tank bottom _____

Dimensions

A _____

B _____

Operational Inspection Procedure Performed

☐ Yes

☐ No _____ _____

Initials *Date*

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State of Oregon
Department of
Environmental
Quality

Equipment and Components

Executive Order

VR-102-V
OPW
Stage I Enhanced Vapor
Recovery System

Exhibit 1

OPW Stage I EVR System Equipment List

Equipment	**Manufacturer/Model Number**

(GAS/E85) = Identifies that these components are approved for standard gasoline & E85 fuel blends

Spill Containers[1]

Direct Bury Spill Container OPW 1-Series (GAS/E85)
(Figure 1-1)
1-2100 Series
1WW-21XXY-ZEVR -G
1-2200 Series
1WW-22XQZ-G
1-3100 Series
1WW-3VVUTZ-G

1-Series legend

WW	A or Blank (Aluminum Cover)
	C (cast Iron or Ductile)
	SC (Sealable Cover, Cast Aluminum)
	PC (Plow Ring Rain Tight Cast Iron Ductile, 1-2000 only)
	PSC (Plow Ring Sealable Cover, Cast Aluminum, 1-2200 only)
XX	00 (5 Gal)
X	0 (5 Gal)
Y	C (Cast Iron Base)
	Blank (composite base)
Z	D (drain valve)
	P (plug)
VV	1 (5 gallon)
	15 (15 gallon)
	7 (5 gallon, steel cover)
U	0 (no gauge)
	1 (float gauge)
	2 (sensor)
	3 (float and sensor)
	4 (alternate sensor)
T	1 (single wall, cast iron 2100 style base)
	2 (double wall)
	3 (single wall, cast iron 3100 style base)
Q	0 (flange adaptor, cast iron base)
	4 (no flange, 4” thread cast iron base)
G	Color (varies)

[1] Drain valves are an optional component for OPW 1-Series product spill containers. If a drain valve is not installed in the OPW 1-Series product spill container, then either an OPW factory installed drain plug or OPW field drain plug kit 1DP-2100 must be installed.

Exhibit 1 (continued)

OPW Stage I EVR System Equipment List

Equipment	Manufacturer/Model Number
Spill Containers	Multiport Spill Container OPW 1-Series (GAS/E85) (Figure 1-2) 1-2100SH Series 1-2100Y-ZSH P700 Series P7MM-HHKK P500 Series P5MM-ZHHBJJJ P5MM-NN-HHKK 1-Series legend MM 11 (Composite Base) 11C (Cast Iron Base) 61 (Cast Iron Base) 61C (Cast Iron Base) NN Blank (5 gallon) 15 (15 gallon) HH EVR (Enhanced Vapor Recovery) FL (Fibrelite) KK DV (drain valve) PL (plug) Y C (Cast Iron Base) Blank (composite base) Z D (drain valve) P (plug) JJJ -14 (14” center spacing) BUCKET (16” or larger center spacing)
Replacement Drain Valve Kit	OPW 1DK-2100 (GAS/E85)
Replacement Drain Plug Kit	OPW 1DP-2100 (can be used with any OPW 1-Series Spill Containers) (Figure 1-3 and Figure 1-4)
Dust Caps	OPW 634LPC (product) (GAS/E85) (Figure 1-5) OPW 1711LPC (vapor) (GAS/E85) (Figure 1-6)

Exhibit 1 (continued)

OPW Stage I EVR System Equipment List

Equipment	Manufacturer/Model Number
Dust Caps (continued)	OPW 634TT-EVR (product) (GAS/E85) (Figure 1-7) OPW 1711T-EVR (vapor) (GAS/E85) (Figure 1-8) CompX CSP1-634LPC (Figure 1-9) CompX CSP3-1711LPC (vapor) (Figure 1-10) CompX CSP2-634LPC (product) (Figure 1-11) CompX CSP4-1711LPC (vapor) (Figure 1-12)
Product Adaptor	OPW 61SALP (Figure 1-13) OPW 61SALP-MA (GAS/E85) (Figure 1-15)
Vapor Adaptor	OPW 61VSA (Figure 1-14) OPW 61VSA-MA (GAS/E85) (Figure 1-16)
Pressure/Vacuum Vent Valve	FFS PV-Zero (Gas/E85) (Figure 1-17) OPW 723V (Gas/E85) (Figure 1-18) Husky 5885 (Gas/E85) (Figure 1-19)
Jack Screw Kit	OPW 61JSK-4410 (Only used with Composite Base Spill Container) (Figure 1-20) OPW 61JSK-44CB (Only used with Cast Iron Base Spill Container) (Figure 1-20) OPW 61JSK-4RMT (Only Used on Remote-Fill Configuration) (Figure 1-20) OPW 71JSK-44MA (GAS/E85) (Figure 1-21) OPW 71JSK-4RMT (GAS/E85) (Figure 1-21)
Face Seal Adaptor	OPW FSA-400 OPW FSA-400-S (GAS/E85) (Figure 1-22)
Drop Tube	OPW 61T (various lengths) OPW 61T-SS (various lengths) (GAS/E85)

Exhibit 1 (continued)

OPW Stage I EVR System Equipment List

Equipment	Manufacturer/Model Number
Drop Tube Overfill Prevention Device [2]	OPW 61SO (Figure 1-23) OPW 61SOM-412C-EVR (GAS/E85) OPW 71SO (Figure 1-24) OPW 71SO Testable (Figure 1-25) OPW 71SOM-412C (GAS/E85) (Figure 1-26) FFS Defender OPV series 70859X9YZ (Gas/E85 compatible) FFS Defender OPV series 70869X9YZ (Gas/E85 compatible) (Figure 1-27) Defender Series OPV legend: X = upper drop tube length: 1 = 5 feet 2 = 10 feet Y = Tube compatibility: 0 = Gas 2 = Gas/E85 Z = lower drop tube length: 1 = 8 feet 2 = 10 feet
Multiport	OPW (Configuration Only)
Remote Fill	OPW (Configuration Only)
Remote Additive Fill	OPW (Configuration Only)
Tank Bottom Protector[2]	OPW/Pomeco 6111-1400
Tank Gauge Port Components[2]	OPW 62M (Cap and Adaptor) (Figure 1-28) OPW 62M-MA (GAS/E85) (Figure 1-29) Morrison Brothers 305XPA1100AKEVR (GAS/E85) (cap & adaptor kit) Morrison Brothers 305-0200AAEVR (GAS/E85) (replacement adaptor) Morrison Brothers 305XP-110ACEVR (GAS/E85) (replacement cap)

[2] If these components are installed or required by regulations of other agencies, only those components and model numbers specified above shall be installed or used.

Fuel Lock[2]	Veeder-Root 312020-952 (cap & adaptor) McGard FL1 – Stick Only Fuel Lock (125007) (GAS) (Figure 1-30) McGard FL2 – Stick/Sampling Fuel Lock (125008) (GAS) (Figure 1-30)
Bladder Plug	McGard PSI104
Emergency Vent	Exhibit 5 (for below-grade vaulted tank configuration)

Exhibit 1 (continued)

Table 1-1
Components Exempt from Identification Requirements

Component Name	Manufacturer	Model Number
Product Adaptor	OPW	61SALP-MA (GAS/E85)
Vapor Adaptor	OPW	61VSA-MA (GAS/E85)
Replacement Drain Valve	OPW	1DK-2100
Replacement Drain Plug Kit	OPW	1DP-2100
Jack Screw Kit	OPW	61JSK-4410* 61JSK-44CB* 61JSK-4RMT* OPW 71JSK-44MA (GAS/E85) OPW 71JSK-4RMT (GAS/E85)
Tank Gauge Port Component (Cap and Adaptor)	Morrison Brothers Veeder-Root OPW	305XPA1100AKEVR (cap & adaptor kit) 305-0200AAEVR (replacement adaptor) 305XP-110ACEVR (replacement cap) Veeder-Root 312020-952 (cap & adaptor) 62M-MA (GAS/E85)
Drop Tube	OPW	61-T 61T-SS (various lengths) (GAS/E85)
Tank Bottom Protector	OPW/Pomeco	6111-1400
Sump / Sump Lids / Spill Container Covers	Varies	Varies
Fuel Lock	McGard	FL1, FL2

***** OPW 61JSK MFG date shall be stamped on each jack screw.

Figure 1-1
Direct Bury Spill Container OPW 1-Series (GAS/E85)

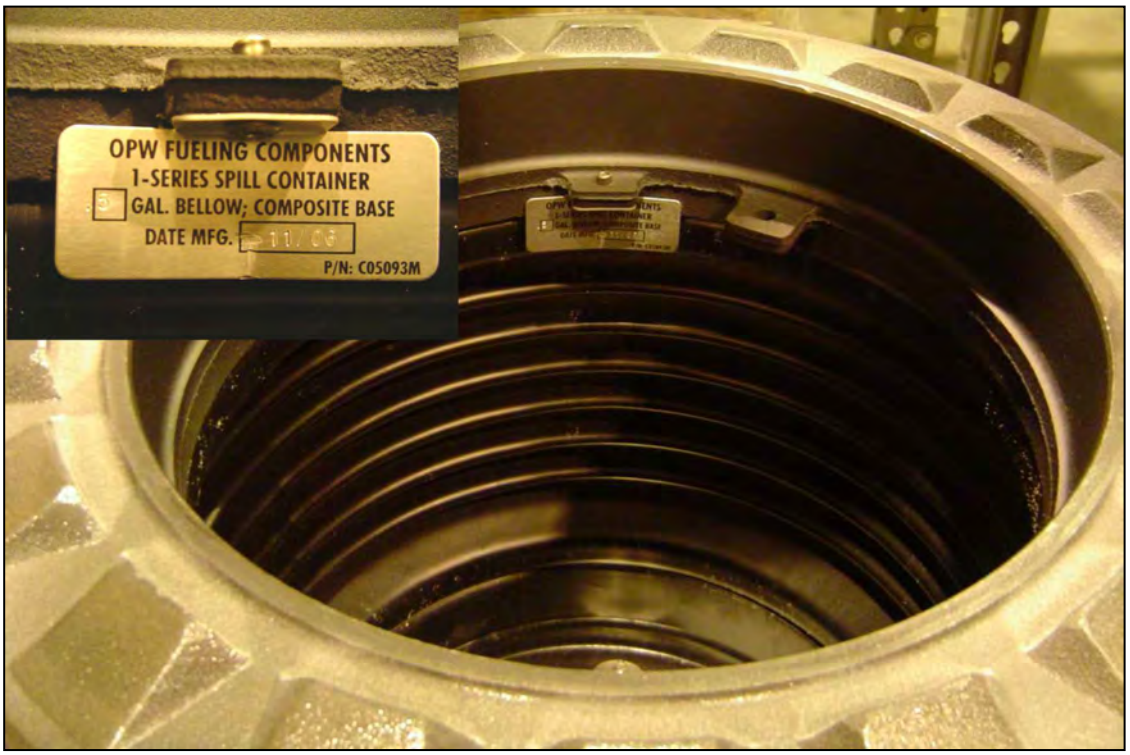

Figure 1-2
Multiport Spill Container OPW 1-Series (GAS/E85)

Figure 1-3
1DP-2100 Drain Plug Kit

Figure 1-4
1DP-2100 Field Installed Drain Plug

Figure 1-5
OPW 634LPC Product Dust Cap

Figure 1-6
OPW 1711LPC Vapor Dust Cap

Figure 1-7
OPW 634-TT-EVR Product Dust Cap

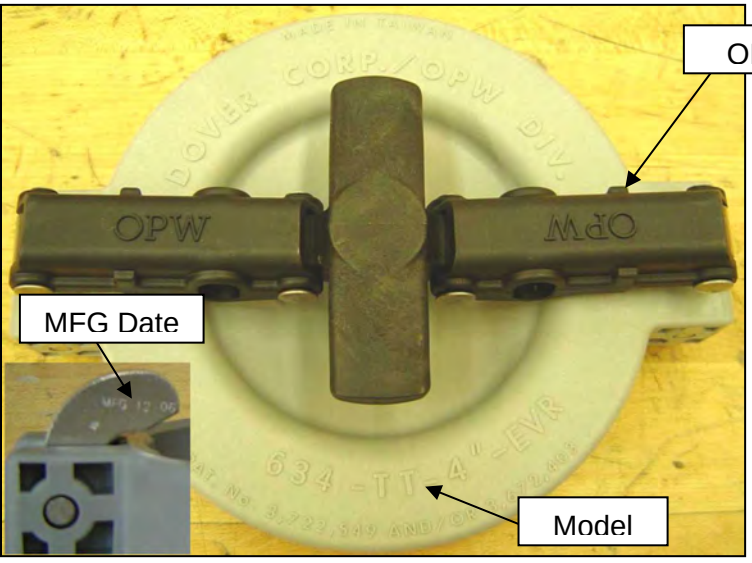

Figure 1-8
OPW 1711-T-EVR Vapor Dust Cap

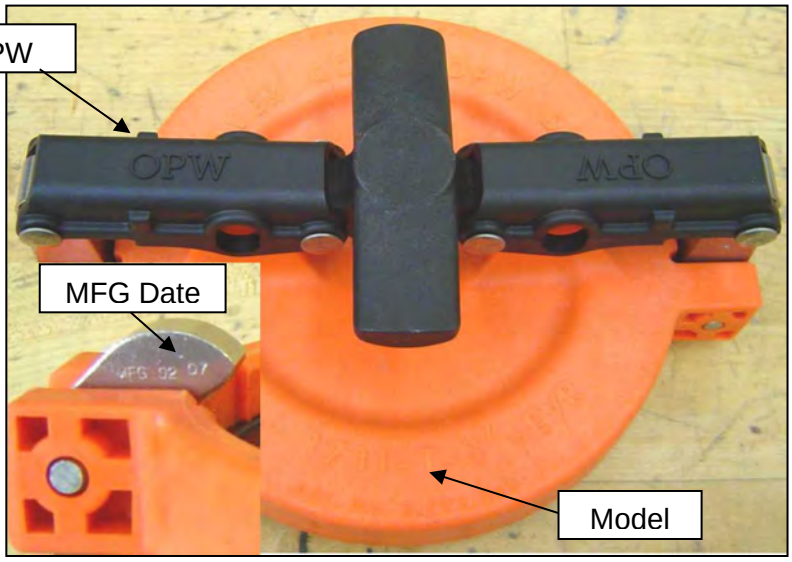

Figure 1-9
CompX CSP1-634LPC Product Dust Cap

Figure 1-10
CompX CSP3-1711LPC Vapor Dust Cap

CompX Tank Commander Lid
Locks onto CSP1-634LPC and CSP3-1711LPC Dust Caps

Figure 1-11
CompX CSP2-634LPC Product Dust Cap

Figure 1-12
CompX CSP4-1711LPC Vapor Dust Cap

CompX Tank Commander Lid
Locks onto CSP2-634LPC and CSP4-1711LPC Dust Caps

Figure 1-13
OPW 61SALP Product Adaptor

Figure 1-14
OPW 61VSA Vapor Adaptor

Figure 1-15
OPW 61SALP-MA Product Adaptor (GAS/E85)

Figure 1-16
OPW 61VSA-MA Vapor Adaptor (GAS/E85)

Figure 1-17
FFS PV-Zero P/V Vent Valve (Gas/E85)
(Model and Serial Number on White Tag)

Figure 1-18
OPW 723V P/V Vent Valve (Gas/E85)

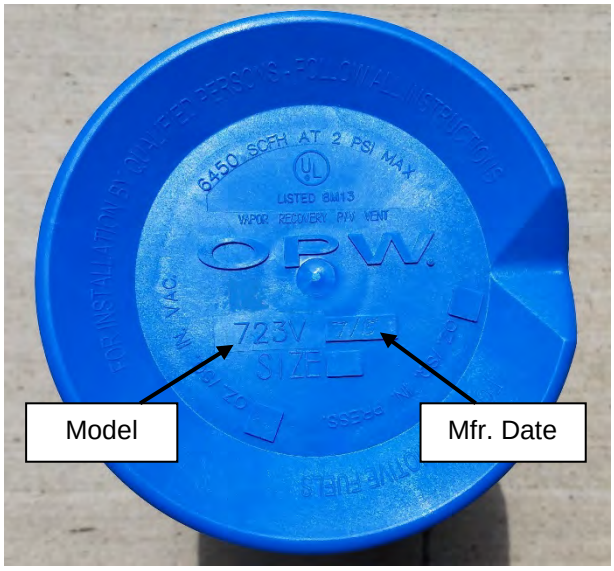

Figure 1-19
Husky 5885 P/V Vent Valve (Gas/E85)
(Husky Name on Bottom Flange)

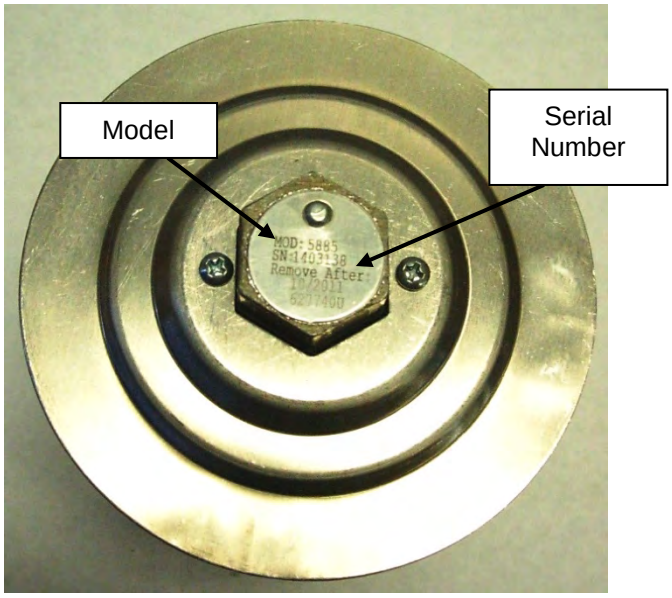

Figure 1-20
OPW 61JSK Jack Screw

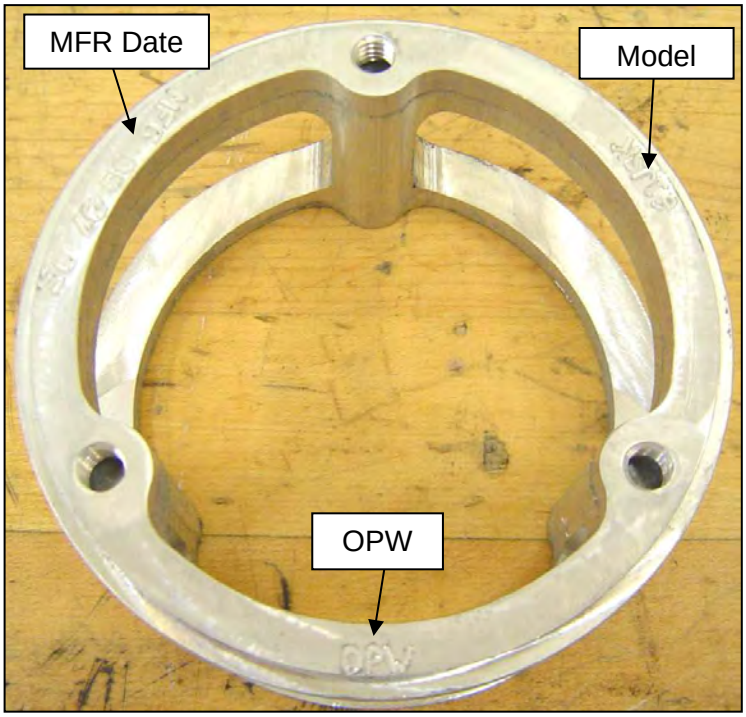

Figure 1-21
71JSK-44MA Jack Screw Kit (GAS/E85)
71JSK-4RMT Jack Screw Kit (GAS/E85)

Figure 1-22
OPW FSA-400-S Face Seal Adaptor (GAS/E85)

Figure 1-23
OPW 61SO Overfill Prevention Devices

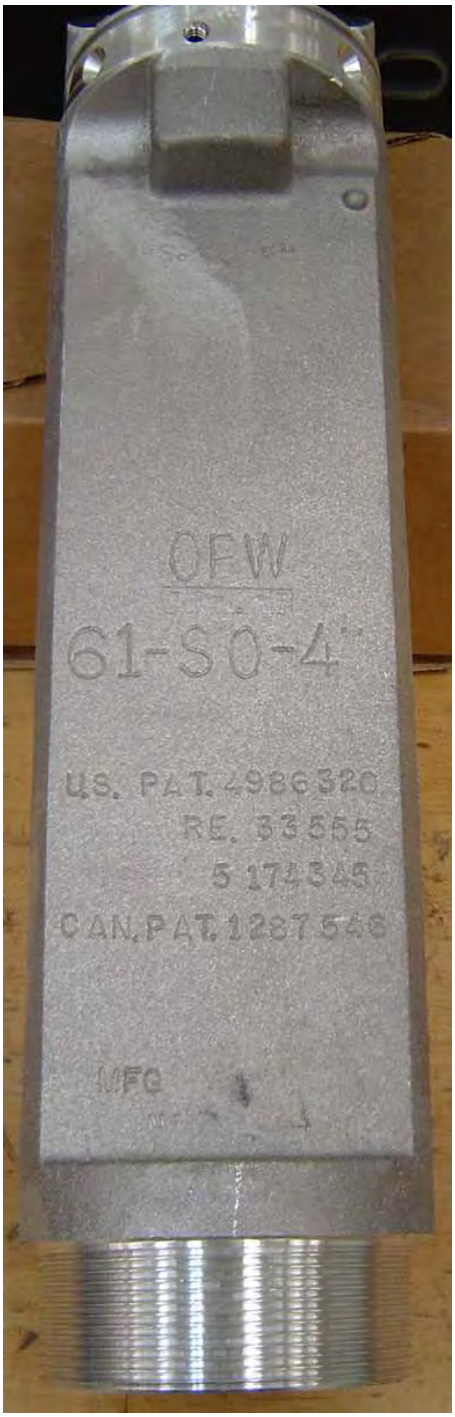

Figure 1-24
OPW 71SO Overfill Prevention Devices

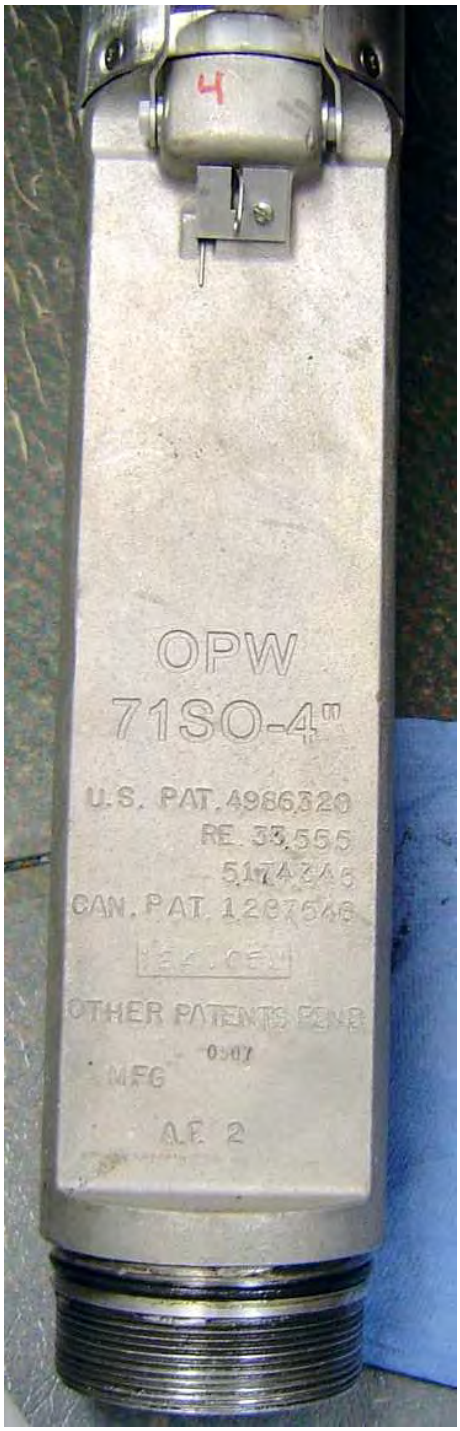

Figure 1-25
71SO Testable Drop Tube

Top View of 71SO Testable Drop Tube

Figure 1-26
OPW 71SOM-412C Overfill Prevention Device

Figure 1-27
Defender OPV series 70859X9YZ (Gas/E85 compatible)

Defender OPV series 70859X9YZ (Gas/E85)

Model number

Serial number

Defender OPV series
70869X9YZ (Gas/E85)
KIWA Label

Figure 1-28
OPW 62M Cap and Adaptor
(Only Cap is identified)

Figure 1-29
OPW 62M-MA Tank Gauge Port Component (GAS/E85)

Figure 1-30
McGard Fuel Lock (FL1 on Left, FL2 on Right)

McGard Fuel Lock Installation Position[3]

[3] Optional component, but if installed this picture shows the correct installation location in the pipe just below the Product Rotatable Adaptor in the drop tube.

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Exhibit 2
Installation, Maintenance, and Compliance Standards and Specifications

This exhibit contains the installation, maintenance and compliance standards, and specifications applicable to an OPW system installed in a gasoline dispensing facility (GDF).

General Specifications

1. Typical installations of the OPW system are shown in Figures 2-1 and 2-2 of the full CARB Executive Order. Typical installation of the OPW remote fill system is shown in Figures 2-4 and 2-5, and typical installation of the OPW remote additive fill system is shown in Figure 2-6 of the full CARB Executive Order.

2. The OPW system shall be installed, operated, and maintained in accordance with this attachment, applicable Oregon Administrative Rules, and manufacturer's specifications. Table 2-1 lists the maintenance intervals of OPW system components.

3. Any repair or replacement of system components shall be done in accordance with this attachment, applicable Oregon Administrative Rules, and manufacturer's specifications.

4. The OPW system shall comply with the applicable performance standards and performance specifications in Table 2-2.

5. Installation, maintenance, and repair of system components, including removal and installation of such components in the course of any required tests, shall be performed in accordance with this attachment, applicable Oregon Administrative Rules, and manufacturer's specifications.

Pressure/Vacuum Vent Valves For Storage Tank Vent Pipes –

1. No more than three certified pressure/vacuum vent valves (P/V valves) listed in Exhibit 1 shall be installed on any GDF underground storage tank system.

2. Compliance determination of the following P/V valve performance specifications shall be one of the following:

    a. The leak rate of each P/V valve shall not exceed 0.05 cubic feet per hour (CFH) at 2.00 inches of H_2O positive pressure and 0.21 CFH at 4.00 inches of H_2O negative pressure as determined by TP-201.1E, Leak Rate and Cracking Pressure of Pressure/ Vacuum Vent Valves (October 8, 2003).

    b. The positive pressure setting is 2.5 to 6.0 inches of H_2O and the negative pressure setting is 6.0 to 10.0 inches of H_2O as determined by TP-201.1E Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves (October 8, 2003).

3. Compliance determination of the P/V valve performance specifications in items 2a and 2b for the FFS PV-Zero P/V vent valve shall be conducted with the valve remaining in its installed position on the vent line(s). The PV-Zero portion of this attachment outlines the equipment needed to test the valve in its installed position.

4. A manifold may be installed on the vent pipes to reduce the number of potential leak sources and P/V valves installed. Vent pipe manifolds shall be constructed of steel pipe or an equivalent material that has been listed for use with gasoline. If a material other than steel is used, the GDF operator shall make available, information demonstrating that the material is compatible for use with gasoline. A tee may be located in a different position, or fewer pipes may be connected, or more than one P/V valve may be installed on the manifold.

5. Each P/V valve shall have permanently affixed to it a yellow, gold, or white colored label with black lettering stating the following specifications:

Positive pressure setting: 2.5 to 6.0 inches H_2O
Negative pressure setting: 6.0 to 10.0 inches H_2O
Positive Leakrate: 0.05 CFH at 2.0 inches H_2O
Negative Leakrate: 0.21 CFH at -4.0 inches H_2O

Rotatable Product and Vapor Recovery Adaptors

1. Rotatable product and vapor recovery adaptors shall be capable of at least 360-degree rotation and have an average static torque not to exceed 108 pound-inch (9 pound-foot). Compliance with this requirement shall be demonstrated in accordance with TP-201.1B, Static Torque of Rotatable Stage I Adaptors (October 8, 2003).

2. The vapor adaptor poppet shall not leak when closed. Compliance with this requirement shall be verified by the use of commercial liquid leak detection solution or by bagging, when the vapor containment space of the underground storage tank is subjected to a non-zero gauge pressure. (Note: leak detection solution will detect leaks only when positive gauge pressure exists.)

Vapor Recovery and Product Adaptor Dust Caps

Dust caps with intact gaskets shall be installed on all Stage I tank adaptors.

Product Spill Container Drain Valve

The spill container drain valve, if installed shall be configured to drain liquid directly into the drop tube and shall be isolated from the underground storage tank ullage space. The leak rate of the drain valve shall not exceed 0.17 CFH at 2.00 inches H_2O. Depending on the presence of the drop tube overfill prevention device, compliance with this requirement shall be demonstrated in accordance with either TP-201.1C, Leak Rate of Drop Tube/Drain Valve Assembly (October 8, 2003), or TP-201.1D, Leak Rate of Drop Tube Overfill Prevention Devices and Spill Container Drain Valves (October 8, 2003).

Product Spill Container Drain Plug (Optional)

The product spill container drain plug, either an OPW factory or field installed OPW 1DP-2100 drain plug, shall not leak. The absence of vapor leaks shall be verified with the use of commercial liquid leak detection solution (LDS) when the vapor space of the fill pipe is subjected to a positive gauge pressure.

Drop Tube Overfill Prevention Device

1. The Drop Tube Overfill Prevention Device (overfill device) is designed to restrict the flow of gasoline delivered to the underground storage tank when liquid levels exceed a specified capacity. The overfill device is not a required component of the vapor recovery system, but may be installed as an optional component. Other regulatory requirements may apply.

2. The leak rate of the overfill device shall not exceed 0.17 CFH at 2.00 inches H_2O when tested in accordance with TP-201.1D, Leak Rate of Drop Tube Overfill Prevention Devices and Spill Container Drain Valves (October 8, 2003).

3. For the 71SO Testable overfill prevention device, the threaded test plug shall not leak. The absence of vapor leaks shall be verified with the use of commercial liquid leak detection solution (LDS) when the vapor space of the underground storage tank is subjected to a positive gauge pressure.

4. The discharge opening of the fill pipe must be entirely submerged when the liquid level is six inches above the bottom of the tank as shown in Figure 2-1.

Face Seal Adaptor[2]

The Face Seal Adaptor shall provide a machined surface on which a gasket can seal and ensures that the seal is not compromised by an improperly cut or improperly finished riser. A Face Seal Adaptor shall be installed on the following required connections. As an option, the adaptor may be installed on other connections.

a. Product Spill Container (required)
b. Tank Gauging Components (required)
c. Vapor Recovery Spill Container (optional)
d. Rotatable Adaptors (optional)

Double Fill Configuration

OPW Double Fill Configuration shall be allowed for installation provided that no more than two fill and two vapor return points are installed on any single underground storage tank and that no offset of the vapor recovery riser pipe is installed. An example of an OPW Dual Fill configuration is shown in Figure 2-3 of the full CARB Executive Order.

[2] Face Seal Adaptor is not required with double wall 1-3100 and 1-2200 series spill containers.

Remote Fill Configuration

1. No liquid condensate traps are allowed with this configuration.

2. For new installations and existing installations undergoing major modifications, the Stage I vapor return piping from the remote vapor access point to the tank shall have a minimum slope of one-eighth (1/8) inch per foot of pipe run. A slope of one-quarter (1/4) inch or more per foot of pipe run is recommended wherever feasible. For existing installations, the Stage I vapor return piping from the remote vapor access point to the tank shall be installed so that any liquid in the line will drain toward the storage tank.

3. For new installations and existing installations undergoing major modifications, the Stage I vapor return piping from the remote vapor access point to the tank shall have a minimum nominal internal diameter of four inches (4" ID). For existing installations, the Stage I vapor return piping from the remote vapor access point to the tank shall have a minimum nominal internal diameter of three inches (3" ID).

4. The submerged fill pipe riser shall be fitted with a 4" pipe cap or if the submerged fill pipe riser is used as a port to manually gauge the fuel level in the UST (sticking port), a 62M cap and adaptor, as specified in Exhibit 1, shall be installed.

Remote Additive Fill Configuration

Any gasoline additive can be used only if prior to use, OPW provides a written response that the additive is compatible with the OPW Stage I system. OPW can be contacted at:

www.opwglobal.com/TechSupport/TechnicalServiceAssistance.aspx

Vapor Recovery Riser Offset

1. The vapor recovery tank riser may be offset from the tank connection to the vapor recovery Spill Container provided that the maximum horizontal distance (offset distance) does not exceed 20 inches.

2. The vapor recovery riser shall be offset up to 20 inches horizontal distance with use of commercially available, 4 inch diameter steel pipe fittings.

Tank Gauge Port Components

The tank gauge adaptor and cap are paired. Therefore, an adaptor manufactured by one company shall be used only with a cap manufactured by the same company.

Warranty

Each manufacturer listed in Exhibit 1 shall include a warranty tag with the certified component(s). The manufacturer warranty tag, included with each component, shall be provided to the service station owner/operator at the time of installation.

Connections and Fittings

All connections and fittings not specifically certified with an allowable leak rate shall not leak. The absence of vapor leaks shall be verified with the use of commercial liquid leak detection solution (LDS) or by bagging, when the vapor containment space of the underground storage tank is subjected to a non-zero gauge pressure. (Note: leak detection solution will detect leaks only when positive gauge pressure exists).

Maintenance Records

Each GDF operator or owner shall keep records of maintenance performed at the facility. Such record shall be maintained on site or otherwise readily available for review during the course of an on-site inspection. Additional information may be required in accordance with permit or OAR requirements. The records shall include the maintenance or test date, repair date to correct test failure, maintenance or test performed, affiliation, telephone number, and the name of the individual conducting maintenance or test. An example of a Stage I Maintenance Record is shown in Figure 2-3.

Table 2-1
Maintenance Intervals for System Components[3]
(Reference Exhibit 1 for list of certified components)

Manufacturer	Component	Maintenance Interval
OPW	Pressure/Vacuum Vent Valve	Annual
Husky	Pressure/Vacuum Vent Valve	Annual
FFS	Pressure/Vacuum Vent Valve	Annual
All Manufacturers	Tank Gauge Components	Annual
OPW	Dust Caps (all models)	Annual
CompX	Dust Caps (all models)	Annual
OPW	61-T Straight Drop Tube	Annual
OPW	Rotatable Phase I Adaptors	Annual
All Manufacturers	Drop Tube Overfill Prevention Valve	Annual
OPW	Spill Containers (all models)	Annual

Table 2-2
Gasoline Dispensing Facility Compliance Standards and Specifications

Component / System	Test Method	Standard or Specification
Rotatable Stage I Adaptors	TP-201.1B	Minimum, 360-degree rotation Maximum, 108 pound-inch average static torque
Overfill Prevention Device	TP-201.1D	≤0.17 CFH at 2.00 in H_2O
Spill Container Drain Valve	TP-201.1C or TP-201.1D	≤0.17 CFH at 2.00 in H_2O
P/V Valve	TP-201.1E	Positive pressure setting: 2.5 to 6.0 in H_2O Negative pressure setting: 6.0 to 10.0 in H_2O Positive Leakrate: 0.05 CFH at 2.0 in H_2O Negative Leakrate: 0.21 CFH at -4.0 in H_2O
Gasoline Dispensing Facility	TP-201.3	As specified in TP-201.3 and/or CP-201
Connections and fittings certified without an allowable leak rate	Leak Detection Solution or Bagging	No leaks

[3] Maintenance must be conducted within the interval specified from the date of installation and at least within the specified interval thereafter.

Figure 2-3
Example of a GDF Stage I Maintenance Record

Date of Maintenance/ Test/Inspection/Failure	Repair Date To Correct Test Failure	Maintenance/Test/Inspection Performed and Outcome	Affiliation	Name of Individual Conducting Maintenance or Test	Telephone Number

Executive Order VR-102-S
Assist Stage I EVR Systems

EXHIBIT 6

Required Items for Conducting TP-201.1C/TP-201.D on a Remote Fill System

Applicability

Exhibit 6 applies to CARB certified Stage I Remote Fill System (RFS), where the secondary product and vapor return pathway and adaptors are located in an alternate sump approximately 120 feet away from the primary product and vapor risers installed directly on top of the underground storage tanks (UST). This exhibit shall apply only to RMS with a length no greater than 200 feet. For RMS greater than 200 feet, written notification of a request for system evaluation must be submitted to DEQ. The application shall contain applicable information requested in Section 18 of the CARB Certification Procedures for Vapor Recovery Systems at Gasoline Dispensing Facilities (CP-201).

Existing Test Procedures

Sections 7.3 of TP-201.1C and section 7.5 of TP-201-1D require adjusting the nitrogen flow rate to maintain a pressure of 2.0 inches water column (WC) with a flow rate no greater than the allowable leak rate specified in CP-201. If the pressure (±0.05 inches H2O) cannot be maintained for at least five minutes, the system has a leak. This procedure works well when the product fill is directly above the UST for some RFS with vapor and product return lines less than 50 feet.

Procedure for Testing Remote Fill System

The TP.201.1D pressure up standard of five minutes may not be appropriate for RFS with lengths greater than 50 feet, since pressurizing the system to 2.0 inches WC may take longer than five minutes. The following steps shall be taken when conducting TP-201.1C or TP-201.1D on RFS that has a secondary product and vapor return pathway and adaptors located greater than 50 feet away. The following information shall be submitted to DEQ as part of a compliance test.

Required Steps	Verification (please circle)
Is the remote fill product adaptor less than 50 feet away from the top of the UST? If so, the maximum pressure up time shall be less than 5 minutes.	**Yes No**
Is the remote fill pipe lengths greater than 50 feet but less than 200 feet? See Table 1 for pressure up time.	**Yes No**

Test Company:_____ Facility Name:_____

_____ _____ _____

Print Name (Technician) Signature Date

_____ _____ _____

Technician Name
Technician Phone Number

Table 1
Time to Pressurize GDF Equipped with Remote Fill Pipe Configuration by Length

Horizontal Length of Remote Fill Pipe (feet)	Time to Pressurize (minutes)
≤50	5
>50, ≤100	10
>100, ≤150	15
>150, <200	20
<200, <250	25

State of Oregon
Department of
Environmental
Quality

Installation, Operation and Maintenance Manual

For Executive Order

VR-102-V
OPW
Stage I Enhanced Vapor Recovery System

NOTICE:

This **Installation, Operation and Maintenance Manual for the OPW Stage I EVR System** describes the tools and methods required to install the OPW Stage I EVR System. While DEQ does not require specific certification or training to install, maintain, or repair Stage I EVR systems, owners or operators may elect to contract with certified technicians.

Note: CARB requires that only technicians trained and certified by OPW are able to perform installation, maintenance or repairs of components manufactured by OPW or the warranty will be void. A list of OPW Certified Technicians can be viewed at http://www.opw-fc.com .

To schedule a training class, OPW can be contacted at the following:

OPW Fueling Components
Phone: 1-800-422-2525
Web: www.opw-fc.com

It is the responsibility of each service provider or technician to be familiar with the current requirements of state, federal and local codes for installation and repair of gasoline dispensing equipment. It is also the responsibility of the service provider or technician to be aware of all necessary safety precautions and site safety requirements to assure a safe and trouble free installation.

Note: CARB requires that only technicians that are trained and certified by FFS (i.e. FFS Certified Technicians) are able to perform installation, maintenance or repairs of components manufactured by FFS or the warranty will be void. A list of FFS Certified Technicians can be viewed at http://www.franklinfueling.com/service/.

To schedule a training class, FFS can be contacted at the following:

Enhanced Vapor Recovery Systems
Franklin Fueling Systems
Phone: 800-225-9787
Email: techserve@franklinfueling.com

It is the responsibility of each service provider or technician to be familiar with the current requirements of state, federal and local codes for installation and repair of gasoline dispensing equipment. It is also the responsibility of the service provider or technician to be aware of all necessary safety precautions and site safety requirements to assure a safe and trouble free installation.

In addition to the requirements included in this attachment, the owner or operator of a GDF may wish to obtain a warranty tag for each stage I EVR component installed. Warranty tags are described in more detail in the CARB Executive Orders and may be included with each component for the owner or operator at the time of installation.

Summary of Guidelines for Maintenance Activities Required of the OPW Stage I EVR System [1]

Component	Interval[2]	Maintenance To Be Performed
Pressure/Vacuum Vent Valve		1. Remove screws that hold top cover on. 2. Remove any debris that might be sitting inside the lower cover. 3. Check the drain holes in the lower cover for blockage.
Husky 5885	Annual	4. Do not remove the two (2) screens. 5. Reinstall the top cover and retaining screws. 6. Tighten the screws firmly.
FFS PV-Zero	Annual	1. Visual inspect housing, pipe, fittings and rain cap for obvious signs of damage, missing parts or fluid leaks. 2. Visually inspect the rain cap, from ground level, for signs of bird nests or insect activity. 3. Every **year**, drain and inspect the fill fluid per the **Fluid Inspection Procedure**.
OPW 723V	Annual	1. Remove and inspect filter screens. 2. Clean or replace as necessary. 3. Test as necessary.
Spill Containers and Drain Valves OPW "All Models"	Annual	Annually, clean the interior of the container and drain valve. Annually, remove accumulated dirt and grit. If the drain valve becomes clogged, remove the valve, soak in water, and use high-pressure air to clean. If valve is removed, reinstall to its proper position and perform Procedure TP-201.1C or TP-201.1D as applicable.
Dust Caps		
OPW "All Models"	Annual	Visually inspect the seal in cap and replace if damaged or missing.
CompX "All Models"	Annual	Inspect dust cap seal for nicks, tears or deformations and replace if necessary.
Product Adaptor OPW 61SALP	Annual inspect; test every 24 months	Visually inspect the adaptor for large dents, cracks, or deformations. Verify the static torque of the swivel adaptor by performing test procedure TP-201.1B.

[1] These maintenance requirements shall not circumvent use of the manufacturer's installation and maintenance instructions. Maintenance contractors or owner/operators shall refer to the manufacturers complete installation and maintenance instructions for the OPW Stage I System to ensure that all maintenance and torque requirements are met.

[2] Maintenance must be conducted within the interval specified from the date of installation and at least within the specified interval thereafter.

Summary of Guidelines for Maintenance Activities Required of the OPW Stage I EVR System [2]

Component	Interval[2]	Maintenance To Be Performed
Vapor Adaptor OPW 61VSA	Annual inspect; test every 24 months	Visually inspect the adaptor for large dents, cracks, or deformations. Check the vapor poppet for damage and ensure that the poppet seats evenly with the adaptor. Clean out any foreign objects from the vapor poppet's seal and seal surface if necessary. Test the poppet seal by applying a soap solution to the poppet while the underground storage tank is under a positive gauge pressure of at least 2.00 inches W.C and inspect for the presence of bubbles. If the facility continuously operates under vacuum, a bag test may be used by sealing a clear plastic bag to the adaptor's sides. If no bubbles appear at the poppet under positive pressure or the bag test shows no signs of the bag collapsing, no further maintenance is required. If bubbles appeared around the poppet seal or the bag collapsed, replace the poppet components and re-test. Verify the static torque of the swivel adaptor by performing procedure TP-201.1B.
Jack Screw Kit OPW 61JSK OPW 71JSK	Annual	Visually inspect the Jack Screw for proper alignment and installation.
Face Seal Adaptor OPW FSA-400 OPW FSA-400-S	None	No maintenance is required for this product.
Drop Tubes OPW 61T	Annual inspect; test every 24 months	Visually inspect Drop Tube to see if it is installed and ensure that the bottom of tube is within 6 inches of the bottom of tank. Test the drop tube seal with procedure TP-201.1C or TP-201.1D as applicable. If the drop tube seal passes testing, no further maintenance is required. If the drop tube seal fails testing, replace the drop tube seal with OPW P/N: H11931M for 4" Tubes. Re-test the drop tube seal with procedure TP-201.1C or TP-201.1D as applicable.

[2] These maintenance requirements shall not circumvent use of the manufacturer's installation and maintenance instructions. Maintenance contractors or owner/operators shall refer to the manufacturers complete installation and maintenance instructions for the OPW Stage I System to ensure that all maintenance and torque requirements are met.

[2] Maintenance must be conducted within the interval specified from the date of installation and at least within the specified interval thereafter.

Summary of Guidelines for Maintenance Activities Required of the OPW Stage I EVR System [3]

Component	Interval[2]	Maintenance To Be Performed
Drop Tube Overfill Prevention Device OPW 61SO	Annual inspect; test every 24 months	Annually, inspect the flapper in the 61SO to see that it is open by looking down the drop tube opening. Test the 61SO drop tube seals with procedure TP-201.1D. If the drop tube passes testing, no further maintenance is required. If the drop tube fails testing, replace the drop tube seal with OPW P/N: H11931M for 4" Tubes. Re-test the 61SO drop tube with procedure TP-201.1D. If this does not correct the leak, the 61SO needs to be replaced.
OPW 71SO/71SO Testable	Annual inspect; test every 24 months	Annually, inspect the flapper in the 71SO/71SO Testable to see that it is open by looking down the drop tube opening. Test the 71SO/71SO Testable drop tube seals with procedure TP-201.1D. If the drop tube seal passes testing, no further maintenance is required. If the drop tube fails testing, replace the drop tube seal with OPW P/N: H11931M for 4" Tubes. Re-test the 71SO drop tube with procedure TP-201.1D. The lower tube o-ring seal OPW P/N: H14840M can also be replaced. If this does not correct the leak the 71SO/71SO Testable needs to be replaced.
Tank Bottom Protector OPW/POMECO 6111-1400	None	No maintenance is required for this product.
Tank Gauge Port Components **OPW 62M** Morrison Brothers 305 Veeder-Root 312020-952	Annual	Visually inspect cap to see that it is not missing any seals and is properly installed.

[3] These maintenance requirements shall not circumvent use of the manufacturer's installation and maintenance instructions. Maintenance contractors or owner/operators shall refer to the manufacturers complete installation and maintenance instructions for the OPW Stage I System to ensure that all maintenance and torque requirements are met.

[2] Maintenance must be conducted within the interval specified from the date of installation and at least within the specified interval thereafter.

OPW
EVR Stage I Equipment
Installation Check List

Site Identification Information

Site Address:

_____

_____

_____

Installing Company: _____

Certified Technician Number: _____

Technician's Name **(Print Clearly)**: _____

Technician's Signature: _____

Date of Installation: _____

OPW
EVR Stage I Equipment
Installation Check List

Components Installed

OPW 1-Series EVR Fill Spill Containment Bucket	Yes ___	No___
OPW 1-Series EVR Vapor Spill Containment Bucket	Yes ___	No___
OPW FSA-400, or FSA-400-S Threaded Riser Adaptor (Face Seal Adaptor)		
On Fill Riser (Required)	Yes ___	No ___
On Tank Probe Riser (Required)	Yes ___	No ___
On Vapor Riser (Optional)	Yes ___	No ___
OPW 61SO Series Overfill Prevention Valve	Yes ___	No ___
OPW 71SO/71SO Testable Series Overfill Prevention Valve	Yes ___	No ___
OPW 61T Series Straight Drop Tube	Yes ___	No ___
OPW 61JSK Jack Screw Assembly		
61JSK-4410 (Use with composite base spill bucket)	Yes ___	No ___
61JSK-44CB (Use with cast iron base spill bucket)	Yes ___	No ___
61JSK-4RMT (Only used on Remote-Fill Applications)	Yes ___	No ___
71JSK-44MA (For use with E85 fueling facilities)	Yes ___	No ___
71JSK-4RMT (For use with E85 fueling facilities)	Yes ___	No ___
OPW 61VSA Vapor Swivel Adaptor	Yes ___	No ___
OPW 61SALP Fill Swivel Adaptor	Yes ___	No ___
OPW 634TT Top Seal EVR Fill Cap	Yes ___	No ___
OPW 1711T Top Seal EVR Vapor Cap	Yes ___	No ___
OPW 634LPC Low Profile Top Seal EVR Fill Cap	Yes ___	No ___
OPW 1711LPC Low Profile Top Seal EVR Vapor Cap	Yes ___	No ___
CompX CSP1-634LPC TuBAR Tank Commander Fill Cap	Yes ___	No ___
CompX CSP3-1711LPC TuBAR Tank Commander Vapor Cap	Yes ___	No ___
CompX CSP2-634LPC Padlock Tank Commander Fill Cap	Yes ___	No ___
CompX CSP4-1711LPC Padlock Tank Commander Vapor Cap	Yes ___	No ___
OPW 233 Extractor	Yes ___	No ___
OPW 53VML Ball Float Vent Valve	Yes ___	No ___
OPW 30MV Ball Float Vent Valve	Yes ___	No ___
OPW 62M Monitoring Probe Caps	Yes ___	No ___

Installation Acknowledgment

Installed OPW FSA-400 (-S) Threaded Riser Adaptor (Face Seal Adaptor) on fill riser and tightened to _____ ft. lb.

Thread sealant compound used_____

Installed OPW FSA-400 (-S) Threaded Riser Adaptor (Face Seal Adaptor) on tank probe riser and tightened to _____ ft. lb.

Thread sealant compound used_____

Optional

Installed OPW FSA-400 (-S) Threaded Riser Adaptor (Face Seal Adaptor) on vapor riser and tightened to _____ ft. lb.

Thread sealant compound used_____

Installed OPW 2100 Series ____, 3100 Series ____, or 500 Series ___ Fill spill containment bucket onto FSA-400 attached to fill riser and tightened to _____ ft. lb.

Thread sealant compound used_____

Installed OPW 2100 Series ____, 3100 Series ____, or 500 Series ____ vapor spill containment bucket onto vapor riser and tightened to _____ ft. lb.
Thread sealant compound used_____

Assembled OPW 61SO Series overfill prevention valve
Used OPW supplied epoxy Yes ___ No ___
Applied epoxy: To upper 1" inside of top tube, under cinch head bolts and lock washers, on threads of valve body at lower tube connection. Yes ___ No ___
Allowed epoxy to cure for 24 hours before exposure to fuel or vapor
Yes ___ No ___
Installed OPW 61SO Series overfill prevention valve into fill spill containment bucket.
Yes ___ No ___

Assembled OPW 71SO/71SO Testable Series overfill prevention valve Yes ___ No ___

Installed OPW 71SO/71SO Testable Series overfill prevention valve into fill spill containment bucket
Yes ___ No ___

Alternative to 61SO
Installed OPW 61T Straight Drop Tube into fill spill containment bucket. Yes ___ No ___

Installed OPW 61JSK Jack Screw assembly on top of 61SO Series overfill prevention valve or on top of 61T Series Straight Drop Tube. Yes ___ No ___
Lock-Tite applied to screws Yes ___ No ___
Screws tightened to _____ ft. lb.

Installed faced off 4" NPT pipe nipple in fill spill containment bucket and tightened nipple to _____ ft. lb.
Thread sealant compound used _____
Tool used to install nipple _____

Installed faced off 4" NPT pipe nipple in vapor spill containment bucket and tightened nipple to _____ ft. lb.
Thread sealant compound used _____
Tool used to install nipple _____

Installed OPW 61 SALP Fill Swivel Adaptor onto faced off 4" NPT pipe nipple in fill spill containment bucket and tightened fill adaptor to _____ ft. lb.
Thread sealant compound used _____
Tool used to install nipple _____

Installed OPW 61 VSA Vapor Swivel Adaptor onto faced off 4" NPT pipe nipple in vapor spill containment bucket and tightened vapor adaptor to _____ ft. lb.
Thread sealant compound used _____
Tool used to install nipple _____

OPW 61 SA-Tool used to install OPW components Yes ___ No ___

State of Oregon
Department of
Environmental
Quality

Equipment and Components

Executive Order

VR-104-L
CNI Manufacturing, Inc
Stage I Enhanced Vapor Recovery System

Exhibit 1

CNI Manufacturing Stage I Vapor Recovery System Equipment List

Equipment	Manufacturer/Model Number
Containment Assembly	CNI Manufacturing XXXX-31103 (31103 denotes EVR System) 2 point System Configuration: XXXX (four digit code) indicates: CON1 – Vapor Assembly (5, 10, and 15 gallons) CON2 – Product Assembly (5, 10, and 15 gallons) Stand Alone/Direct Bury Configuration[1]: XXXX (four digit code) indicates: 205P - Product Assembly 205V - Vapor Assembly (205 series are 5 gallons) 214P - Product Assembly 214V - Vapor Assembly (214 series are 5 gallons)
Pressure/Vacuum Vent Valve	OPW 723V FFS PV-Zero Husky 5885
Gravity Cover	CNI Mfg. GAC (used for CON1, CON2 or 214 Containments)
Snap Tight Cover	CNI Mfg. STP-200 (used for CON1, CON2 or 205 Containments)
Snap Tight Cover Ring	CNI Mfg. STP-39

[1] CNI Mfg. Stand Alone/Direct Bury Configurations 205P, 205V, 214P and 214V are not certified for use in a sump configuration.

Exhibit 1 (continued)

Drain Valve	CNI Mfg. RP12-Push
Dust Caps	CNI Mfg. 64 (product) CNI Mfg. 611-VR-3 (vapor) CompX CSP1-634LPC (product) CompX CSP3-1711LPC (vapor) CompX CSP2-634LPC (product) CompX CSP4-1711LPC (vapor) OPW 634LPC (product) OPW 1711LPC (vapor)
Dust Cap Gasket	CNI Mfg. 65 CNI Mfg. RP65 (replacement)
Product Adaptor	Emco Wheaton Retail A0030-124 Emco Wheaton Retail A0030-124S
Vapor Adaptor	Emco Wheaton Retail A0076-124 Emco Wheaton Retail A0076-124S
Jam Nut	CNI Mfg. 200JN
Tank Gauge Port Components	CNI Mfg. 613BC set (Cap 64, Adaptor 613)
Drop Tube[2]	CNI Mfg. DT100 (various lengths)
CNI Mfg. Drop Tube O-Ring[3]	CNI Mfg. DT101 (original) CNI Mfg. RP101 (replacement)
Drop Tube Overfill Prevention Valve[2]	EMCO Wheaton Retail A1100EVR Guardian
EMCO Wheaton Drop Tube O-Ring[4]	EMCO Wheaton Retail 569461
Fuel Lock[5]	McGard FL1 – Stick Only Fuel Lock (125007) McGard FL2 – Stick/Sampling Fuel Lock (125008)
Bladder Plug	McGard PSI104
Emergency Vent	Exhibit 5 (for below-grade vaulted tank configuration)

---

2 If these components are installed or required by regulations of other agencies, only those components and model numbers specified above shall be installed or used.

3 O-Rings used only with the CNI Mfg. DT100 drop configuration.

4 O-Ring used only with the EMCO Wheaton Retail A1100EVR Guardian Overfill drop tube configuration.

5 If these components are installed, only those components and model numbers specified above shall be installed or used.

Exhibit 1 (continued)

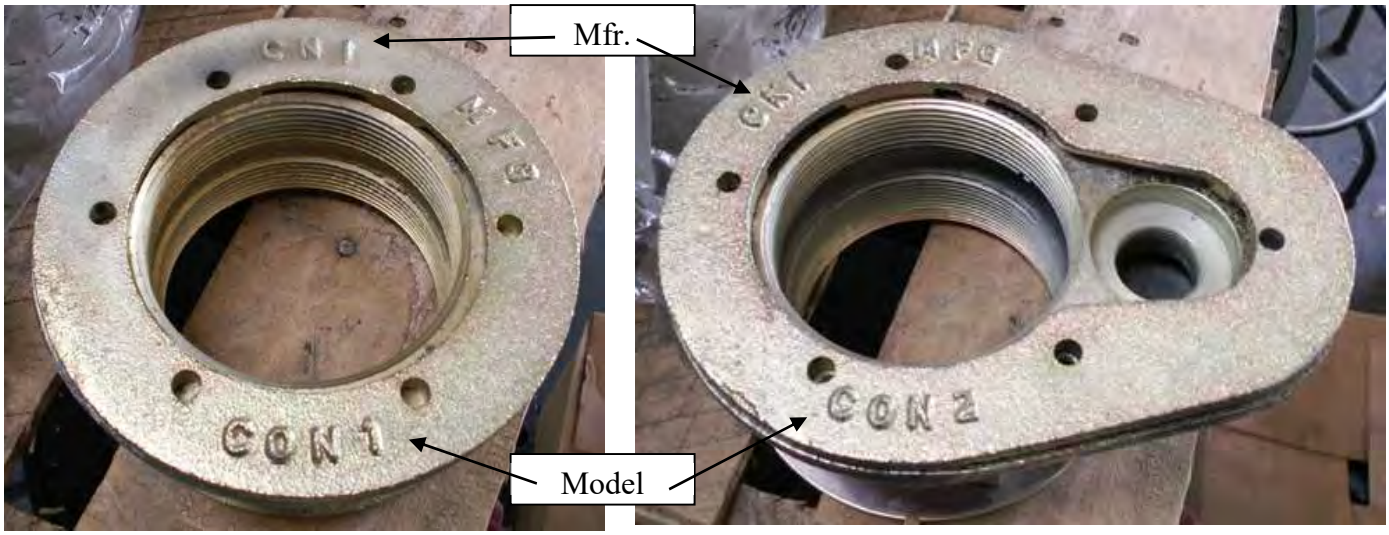
Table 1
Components Exempt from Identification Requirements

Component Name	Manufacturer	Model Number
Replacement Drain Valve	CNI Mfg.	RP12-Push
Jam Nut	CNI Mfg.	200JN
Tank Gauge Port Components (Cap and Adaptor)	CNI Mfg.	613BC Cap and Adaptor set; p/n 64 and 613
Dust Cap gaskets	CNI Mfg.	Gasket 65 original, RP65 for replacement
O-Rings and gaskets for product and vapor adaptors	EMCO Wheaton Retail	O-rings in kit 494301, gasket 409628; O-rings in kit 493995
Drop Tube O-Ring	CNI Mfg. EMCO Wheaton Retail	DT101 original, RP101 replacement 56941
Drop Tube[2]	CNI Mfg.	DT100
Containment Assembly	CNI Mfg.	XXXX-31103*
Gravity Cover	CNI Mfg.	CNI Mfg. GAC
Snap Tight Cover	CNI Mfg.	CNI Mfg. STP-200
Snap Tight Cover Ring	CNI Mfg.	CNI Mfg. STP-39
Fuel Lock	McGard	FL1, FL2

***CON1, CON2, 205, and 214 shall be marked on each containment assembly.**

[2] If these components are installed or required by regulations of other agencies, only those components and model numbers specified above shall be installed or used.

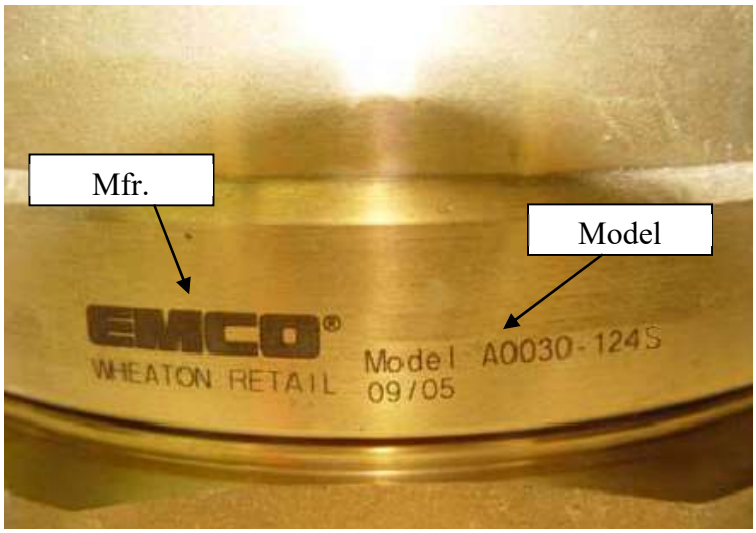
Exhibit 1 (continued)
Component Identification & Location

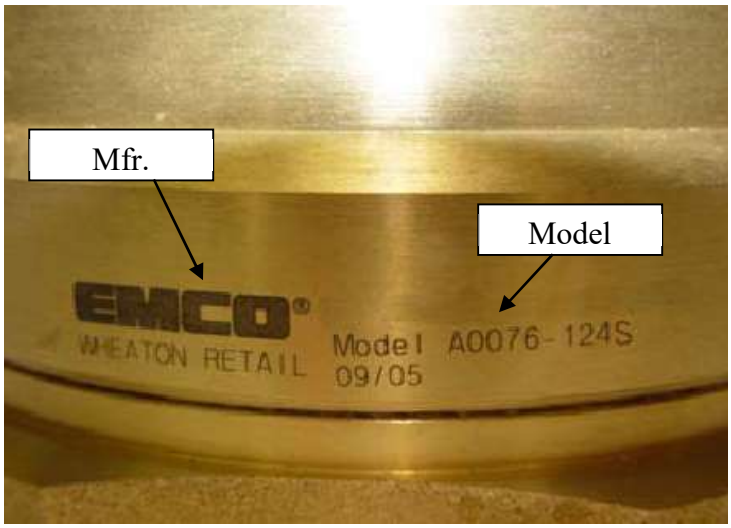


CNI Mfg. CON1 and CON2 Containment Assemblies

CNI Mfg. Model 205 and 214 Containment Assemblies

Exhibit 1 (continued)
Component Identification & Location

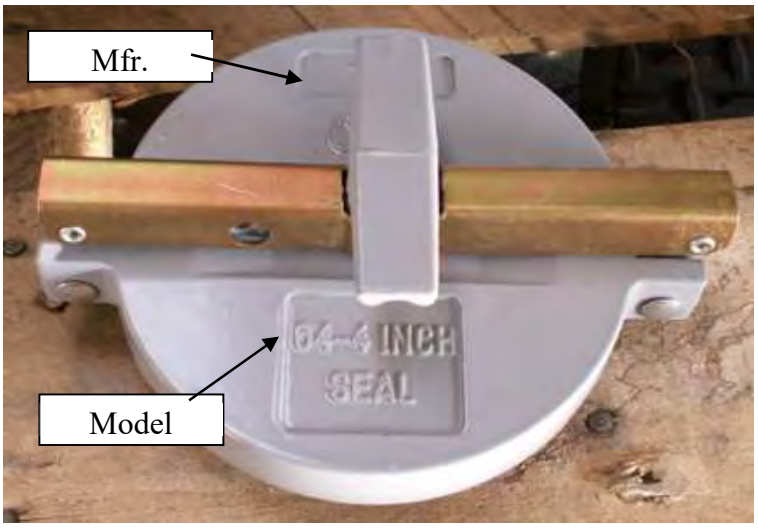




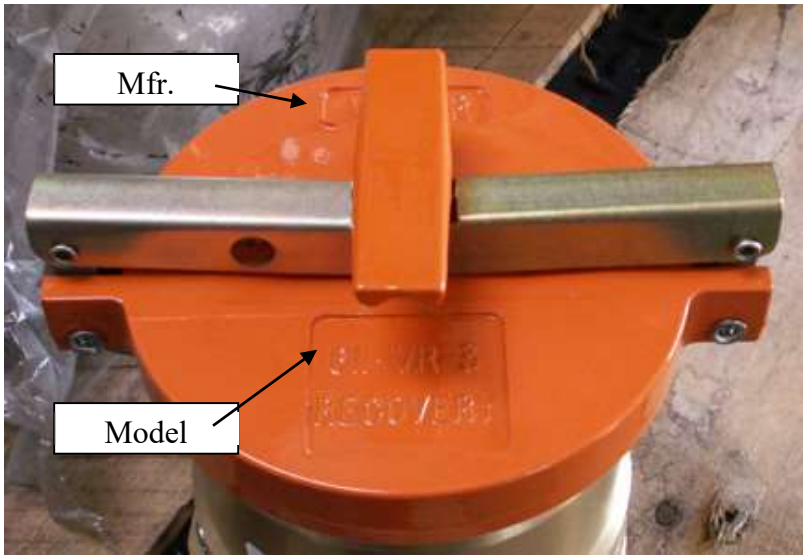
EMCO Wheaton Retail
Model A0030-124S Product Adaptor and Model A0076-124S Vapor Adaptor
(Models A0030-124 and A0076-124 identified in the same location)

EMCO Wheaton Retail
Model A1100EVR Overfill Prevention Valve

Exhibit 1 (continued)
Component Identification & Location



CNI Mfg. Model 64 Dust Cap



CNI Mfg. Model 611-VR-3 Dust Cap

Exhibit 1 (continued)
Component Identification & Location

OPW 634LPC Product Dust

OPW 1711LPC Vapor Dust

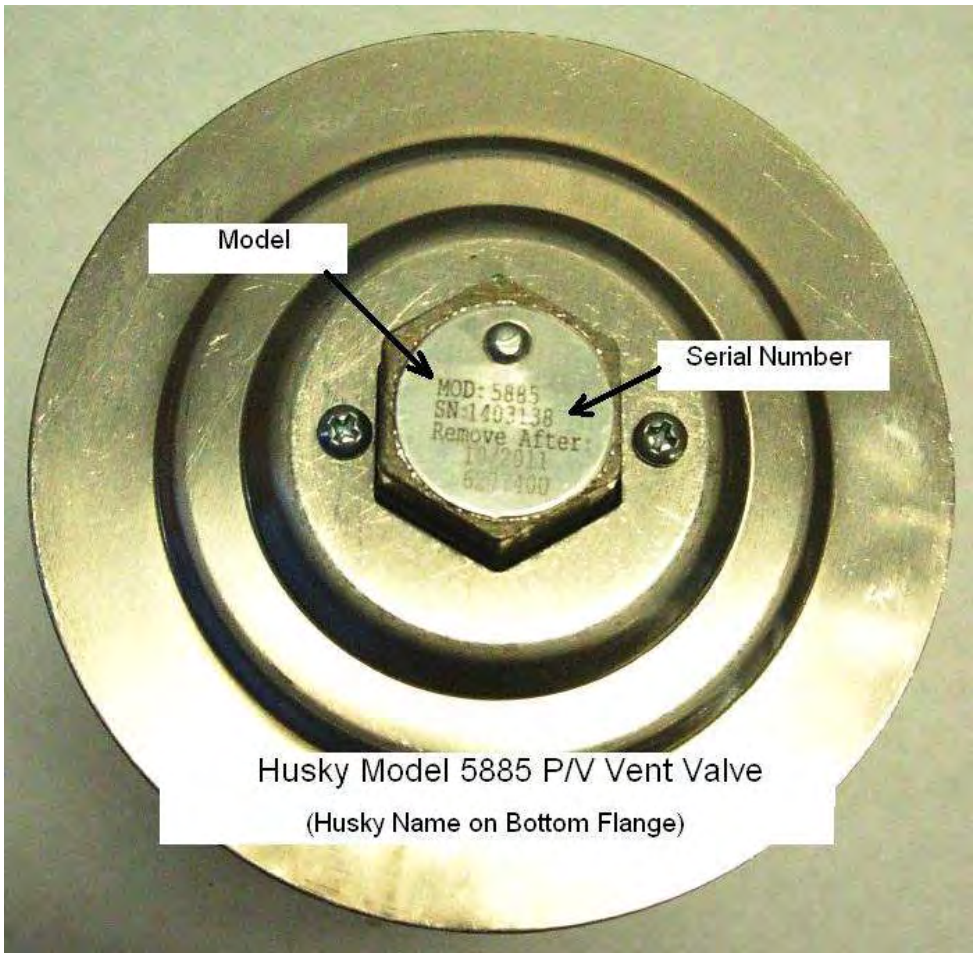


Exhibit 1 (continued)
Component Identification and Location

CompX CSP1-634LPC Product Dust Cap

CompX CSP3-1711LPC Vapor Dust Cap

CompX Tank Commander Lid
Locks onto CSP1-634LPC and CSP3-1711LPC Dust Caps

Exhibit 1 (continued)
Component Identification and Location

CompX CSP2-634LPC Product Dust Cap

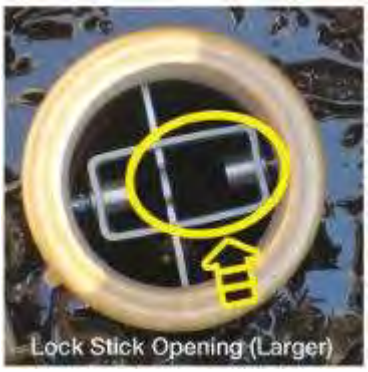
CompX CSP4-1711LPC Vapor Dust Cap

CompX Tank Commander Lid
Locks onto CSP2-634LPC and CSP4-1711LPC Dust Caps

Exhibit 1 (continued)
Component Identification and Location

FFS PV-Zero P/V Vent Valve
(Model and Serial Number on White Tag)

Exhibit 1 (continued)
Component Identification and Location

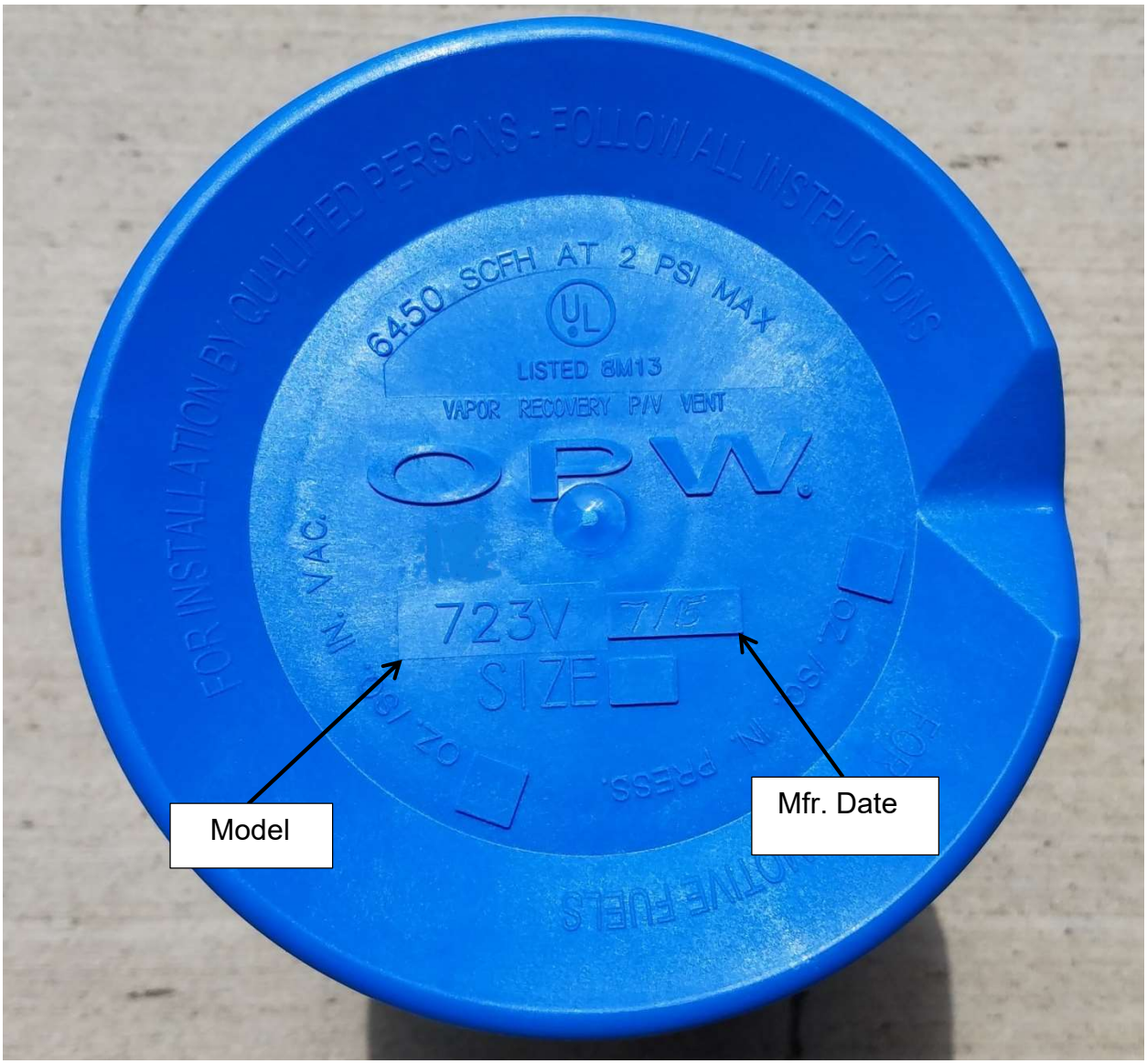


McGard Fuel Lock Installation Position[6]

McGard Fuel Lock (FL1 on Left, FL2 on Right)

[6] Optional component, but if installed this picture shows the correct installation location in the pipe just below the Product Rotatable Adaptor in the drop tube.

Exhibit 1 (continued)
Component Identification and Location



OPW Model 723V Pressure/Vacuum Vent Valve

Exhibit 2

Installation, Maintenance and Compliance Specifications

This exhibit contains the installation, maintenance and compliance standards and specifications applicable to a CNI Manufacturing Stage I Vapor Recovery System (CNI Manufacturing System) installed in a gasoline dispensing facility (GDF).

General Specifications

1. Typical installations of the CNI Manufacturing System are shown in Figures 2A, 2B, 2C 2D, 2E, 2F, and 2G of the full CARB Executive Order.

2. The CNI Manufacturing System shall be installed, operated and maintained in accordance with this attachment, applicable Oregon Administrative Rules, and manufacturer's specifications.

3. Any repair or replacement of system components shall be done in accordance with this attachment, applicable Oregon Administrative Rules, and manufacturer's specifications.

4. Unless otherwise specified, the CNI Manufacturing Stage I Vapor Recovery System shall comply with the applicable performance standards and performance specifications in CP-201.

5. Installation, maintenance and repair of system components, including removal and installation of such components in the course of any required tests, shall be performed in accordance with this attachment, applicable Oregon Administrative Rules, and manufacturer's specifications.

Pressure/Vacuum Vent Valves For Storage Tank Vent Pipes

1. No more than three certified pressure/vacuum vent valves (P/V Valves) listed in Exhibit 1 shall be installed on any GDF underground storage tank system.

2. Compliance determination of the following P/V valve performance specifications shall be one of the following:

    a. The leak rate of each P/V valve shall not exceed 0.05 cubic feet per hour (CFH) at 2.0 inches H_2O positive pressure and 0.21 CFH at 4.0 inches H_2O negative pressure as determined by TP-201.1E, Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves (October 8, 2003).

b. The positive pressure setting is 2.5 to 6.0 inches of H_2O and the negative pressure setting is 6.0 to 10.0 inches of H_2O as determined by TP-201.1E, Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves (October 8, 2003).

3. Compliance determination of the P/V valve performance specifications in items 2a and 2b for the FFS PV-Zero P/V vent valve shall be conducted with the valve remaining in its installed position on the vent line(s). The PV-Zero section of this attachment outlines the equipment needed to test the valve in its installed position.

4. At least one pressure/vacuum (P/V) vent valve shall be installed on each tank vent. If two or more P/V vent valves are used, they shall be installed in parallel, so that each can serve as a backup to the other if one should fail to open properly. A manifold may be installed on the vent pipes to reduce the number of potential leak sources and P/V valves installed. Vent pipe manifolds shall be constructed of steel pipe or an equivalent material that has been listed for use with gasoline. If a material other than steel is used, the GDF operator shall make available information demonstrating that the material is compatible for use with gasoline. A tee may be located in a different position, or fewer vent pipes may be connected, or more than one P/V valve may be installed on the manifold.

5. Each P/V valve shall have permanently affixed to it a yellow, gold, or white-colored label with black lettering stating the following specifications:

Positive pressure setting: 2.5 to 6 inches H_2O
Negative pressure setting: 6.0 to 10.0 inches H_2O
Positive Leak rate: 0.05 CFH at 2.0 inches H_2O
Negative Leak rate: 0.21 CFH at 4.0 inches H_2O

Rotatable Product and Vapor Recovery Adaptors

1. Rotatable product and vapor recovery adaptors shall be capable of at least 360-degree rotation and have an average static torque not to exceed 108 pound-inch (9 pound-foot). Compliance with this requirement shall be demonstrated in accordance with TP-201.1B, Static Torque of Rotatable Stage I Adaptors (October 8, 2003).

   Use CNI Manufacturing Torque Test Tool Part Number EVRSYS100, as an equivalent Torque Test Tool per section 5.2 of TP-201.1B, rather than Phil-Tite

Torque Test Tool Part Number 6004. The Phil-Tite tool is not compatible with CNI Manufacturing dust caps.

2. The vapor adaptor poppet shall not leak when closed. Compliance with this requirement shall be verified by the use of commercial liquid leak detection solution, or by bagging, when the vapor containment space of the underground storage tank is subjected to a non-zero gauge pressure. (Note: leak detection solution will detect leaks only when positive gauge pressure exists).

Vapor Recovery and Product Adaptor Dust Caps

Dust caps with intact gaskets shall be installed on all Stage I tank adaptors.

Spill Container Drain Valve

The spill container drain valve shall be configured to drain liquid directly into the drop tube and shall be isolated from the underground storage tank ullage space. The leak rate of the drain valve shall not exceed 0.17 CFH at 2.0 inches H_2O. Depending on the presence of the drop tube overfill prevention device, compliance with this requirement shall be demonstrated in accordance with either TP-201.1C, Leak Rate of Drop Tube/Drain Valve Assembly or TP-201.1D (October 8, 2003), Leak Rate of Drop Tube Overfill Prevention Devices and Spill Container Drain Valves (October 8, 2003).

Stage I Drop-Tubes with Overfill Prevention Devices

1. The Drop Tube Overfill Prevention Device (overfill device) is designed to restrict the flow of gasoline delivered to the underground storage when liquid levels exceed a specified capacity. The drop tube overfill device is not a required component of the vapor recovery system, but maybe installed as an optional component of the system. Other requirements may apply.

2. The leak rate of Stage I drop-tube overfill prevention devices shall not exceed 0.17 CFH at 2.0 inches H_2O). The leak rate shall be determined in accordance with TP-201.1D, Leak Rate of Drop Tube Overfill Prevention Devices and Spill Container Drain Valves (October 8, 2003).

3. The discharge opening of the fill-pipe must be entirely submerged when the liquid level is six inches above the bottom of the tank.

Stage I Drop-Tubes without Overfill Prevention Devices

1. Drop tubes that do not have an overfill prevention device shall not leak and shall be tested in accordance with TP-201.1C, Leak Rate of Drop Tube/Drain Valve Assembly (October 8, 2003).

2. The discharge opening of the fill-pipe must be entirely submerged when the liquid level is six inches above the bottom of the tank.

Vapor Recovery Riser Offset

1. The vapor recovery tank riser may be offset from the tank connection to the vapor recovery Spill Container provided that the maximum horizontal distance (offset distance) does not exceed twenty (20) inches. One example of an offset is shown in Figure 2l.

2. The vapor recovery riser shall be offset using commercially available, four (4) inch diameter steel pipe fittings.

Tank Gauge Port Components

The tank gauge adaptor and cap are paired. Therefore, an adaptor manufactured by one company shall be used only with a cap manufactured by the same company.

Warranty

Each manufacturer listed in Exhibit 1 shall include a warranty tag with the certified component(s). The manufacturer warranty tag, included with each component, shall be provided to the service station owner/operator at the time of installation.

Connections and Fittings

All connections and fittings not specifically certified with an allowable leak rate shall not leak. The absence of vapor leaks shall be verified with the use of commercial liquid leak detection solution, or by bagging, when the vapor containment space of the underground storage tank is subjected to a non-zero gauge pressure. (Note: leak detection solution will detect leaks only when positive gauge pressure exists.)

Maintenance Records

Each GDF operator/owner shall keep records of maintenance performed at the facility. Such records shall be maintained on site or otherwise readily available for review during the course of an on-site inspection. Additional information may be required in accordance with permit or OAR requirements. The records shall include the maintenance or test date, repair date to correct test failure, maintenance or test performed, affiliation, telephone number, and name of individual conducting maintenance or test. An example of a GDF Maintenance Record is shown in Figure 2J.

Table 2-1
Gasoline Dispensing Facility Compliance Standards and Specifications

Component/System	Test Method	Standard or Specification
Rotatable Phase I Adaptors	TP-201.1B	Minimum, 360-degree rotation Maximum, 108 pound-inch average static torque
Overfill Prevention Device	TP-201.1D	Leak rate $\leq$ 0.17 CFH at 2.0 inches H_2O
Spill Container Drain Valve	TP-201.1C or TP-201.1D	$\leq$ 0.17 CFH at 2.0 inches H_2O
P/V Vent Valve	TP-201.1E	Positive pressure setting: 2.5 to 6.0 inches H_2O Negative pressure setting: 6.0 to 100 inches H_2O Positive Leak rate: 0.05 CFH at 2.0 inches H_2O Negative Leak rate: 0.21 CFH at -4.0 inches H_2O
Gasoline Dispensing Facility	TP-201.3	As specified in TP-201.3 and/or CP-201
All connections and fittings certified without an allowable leak rate	Leak Detection Solution or bagging	No Leaks

Table 2-2
Maintenance Intervals for System Components[2]

Manufacturer	Component	Maintenance Interval
OPW	Pressure/Vacuum Vent Valve	Annual
Husky	Pressure/Vacuum Vent Valve	Annual
FFS	Pressure/Vacuum Vent Valve	Annual
CNI Manufacturing	Tank Gauge Port Components	Annual Inspection
CNI Manufacturing	Dust Caps	Annual Inspection
CompX	Dust Caps	Annual Inspection
OPW	Dust Caps	Annual Inspection
CNI Manufacturing	Drop Tube	24 month Test
EMCO Wheaton Retail	Drop Tube Overfill Prevention Valve	24 month Tests
EMCO Wheaton Retail	Rotatable Phase I Product and Vapor Adaptors	24 month Tests
CNI Manufacturing	Spill Container Drain Valve	18 Months
CNI Manufacturing	Spill Containment	Annual Inspection

[2] Maintenance must be conducted within the interval specified from the date of installation and at least within the specified interval thereafter.

Figure 2J
Example of a GDF Maintenance Record

Date of Maintenance/ Test/Inspection/ Failure (including date and time of maintenance call)	Repair Date To Correct Test Failure	Maintenance/Test/Inspection Performed and Outcome	Affiliation	Name of Individual Conducting Maintenance or Test	Telephone Number

State of Oregon
Department of
Environmental
Quality

Equipment and Components

CARB Executive Order

VR-105-J

EMCO Wheaton Retail
Stage I Enhanced Vapor Recovery System

Exhibit 1

EMCO Wheaton Stage I Vapor Recovery System Equipment List

Equipment	Manufacturer/Model Number
Pressure/Vacuum Vent Valve	FFS PV-Zero Husky 5885 (Gas/E-85) OPW Model 723V
Spill Container[1]	EMCO Model A1004EVR-X Series Multi-port and Direct Burial Configurations Single and Double Wall Multi-Port X= 237, 242 or 248 Direct Burial (5 gallon) X= 003, 004, 005, 006, 010, 011, 012, 013, 210A, 210AB, 210S, 210SB, 211A, 211AB, 211S, 211SB, 316A, 316S, 317A, 317AS, 317S, 317SS Direct Burial (15 gallon) X= 215A, 215AB, 215S, 215SB, 216A, 216AB, 216S, 216SB
Drain Valve[2]	EMCO Model 494118
Drop Tube[3]	EMCO Model A0020EVR-X EMCO Model A0020EVRC-X X= 004, 005, 007 or 008
Straight Drop Tube with Overfill Prevention Device	EMCO Model A1100EVR-X X= 055, 056, 057 or 058 EMCO Model A1100EVR-X (anodize tube & collar) X= 055CF, 056CF, 057CF or 058CF
Riser Seal	EMCO Model 494096
Product Adaptor	EMCO Model A0030-124S
Vapor Adaptor	EMCO Model A0076-124S

[1] Drain Valves are an optional component for Product Spill Containers. Customers can install what is traditionally considered a Vapor Spill Container (Drain Valve Port Factory Plugged) in lieu of the Product Spill Container with a drain valve.

[2] For Product Spill Containers that contain a drain valve, only this component and model number specified above shall be installed or used.

[3] The A0020EVR has a sealing surface made by machine rolling the metal of the drop tube. The A0020EVRC has a machined collar that is installed on the drop tube.

Dust Caps	EMCO Model A0097-005 (product) EMCO Model A0099-X (vapor) X = 002 (no chain) or 003 (with chain) EMCO Model A0097-004LP (product) EMCO Model A0099-004LP (vapor) CompX CSP1-634LPC (product) CompX CSP3-1711LPC (vapor) CompX CSP2-634LPC (product) CompX CSP4-1711LPC (vapor) OPW 634LPC (product) OPW 1711LPC (vapor)
Tank Gauge Port Components	EMCO Model A0097-010 (Cap) EMCO Model A0030-014 (Adaptor)
Fuel Lock[4]	McGard FL1 – Stick Only Fuel Lock (125007) (Gas) McGard FL2 – Stick/Sampling Fuel Lock (125008) (Gas)
Bladder Plug	McGard PSI104 (Gas)
Emergency Vent	Exhibit 5 (for below-grade vaulted tank configuration)

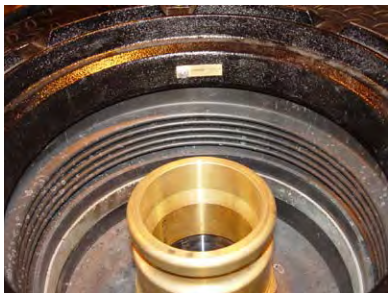
Table 1
Components Exempt from Identification Requirements

Component Name	Manufacturer	Model Number
Riser Seal	EMCO	494096
Drop Tube	EMCO	A0020EVR, A0020EVRC
Sump / Sump Lids / Spill Container Covers	Varies	Varies
Fuel Lock	McGard	FL1, FL2
Bladder Plug	McGard	PSI104

[4] If these components are installed, only those components and model numbers specified above shall be installed or used.

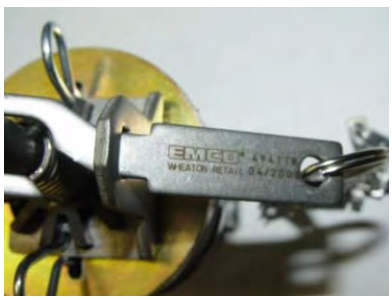
EMCO Wheaton Retail Corp.
Stage I EVR System Components
Permanent ID Information

Spill Containment



ID and Serial Number Tags for Model A1004EVR-X Series Multi-Port and Direct Burial Configurations

Drain Valve



Model 494118 Drain Valve

EMCO Wheaton Retail Corp.
Stage I EVR System Components
Permanent ID Information

Spill Containment

ID and Serial Number Tags for Model A1004EVR-X Series
Direct Burial Configuration with Stainless Steel Primary

Model A1004EVR-X Series Direct Burial Configuration with Stainless Steel Primary

EMCO Wheaton Retail Corp.
Stage I EVR System Components
Permanent ID Information

Rotatable Product Adapter

Model A0030-124S Swivel Fill Adapter

Rotatable Vapor Adapter

Model A0076-124S Swivel Vapor Adapter

Tank Gauge Port Adapter

Model A0030-014 ATG Probe Adapter

EMCO Wheaton Retail Corp.
Stage I EVR System Components
Permanent ID Information

Drop Tube w/ Overfill Prevention Valve

Model A1100EVR-X Series Overfill Prevention Valve

Upper Drop Tube and Collar Assembly

Non-Anodized

Anodized

Riser Seal

Model 494096 Riser Seal, Cast Iron

Model 494096 Real Seal, Stainless Steel

EMCO Wheaton Retail Corp.
Stage I EVR System Components
Permanent ID Information

Dust Caps

Model A0097-005 Fill Adapter Cap

Model A0099-002 and -003 Vapor Adapter Caps

Tank Gauge Port Cap

Model A0097-010 ATG Probe Adapter Cap

EMCO Wheaton Retail Corp.
Stage I EVR System Components
Permanent ID Information

Dust Caps

Model A0097-005 Fill Adapter Cap

Model A0099-002 and -003 Vapor Adapter Caps

Tank Gauge Port Cap

Model A0097-010 ATG Probe Adapter Cap

EMCO Wheaton Retail Corp.
Stage I EVR System Components
Permanent ID Information

Dust Caps

Model A0097-005 Fill Adapter Cap

Model A0099-002 and -003 Vapor Adapter Caps

Tank Gauge Port Cap

Model A0097-010 ATG Probe Adapter Cap

EMCO Wheaton Retail Corp.
Stage I EVR System Components
Permanent ID Information

Dust Caps

Model A0097-004LP Low Profile Fill Adapter Cap

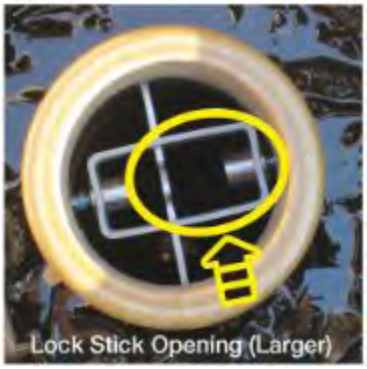
Model A0099-004LP Low Profile Vapor Adapter Caps

EMCO Wheaton Retail
Stage I EVR System Components
Permanent ID Information

OPW 634LPC Product Dust

OPW 1711LPC Vapor Dust

EMCO Wheaton Retail
Stage I EVR System Components
Permanent ID Information



McGard Fuel Lock Installation Position[5]

McGard Fuel Lock (FL1 on Left, FL2 on Right)

[5] Optional component, but if installed this picture shows the correct installation location in the pipe just below the Product Rotatable Adaptor in the drop tube.

EMCO Wheaton Retail
Stage I EVR System Components
Permanent ID Information

CompX CSP1-634LPC Product Dust Cap

CompX CSP3-1711LPC Vapor Dust Cap

CompX Tank Commander Lid
Locks onto CSP1-634LPC and CSP3-1711LPC Dust Caps

EMCO Wheaton Retail
Stage I EVR System Components
Permanent ID Information

CompX CSP2-634LPC Product Dust Cap

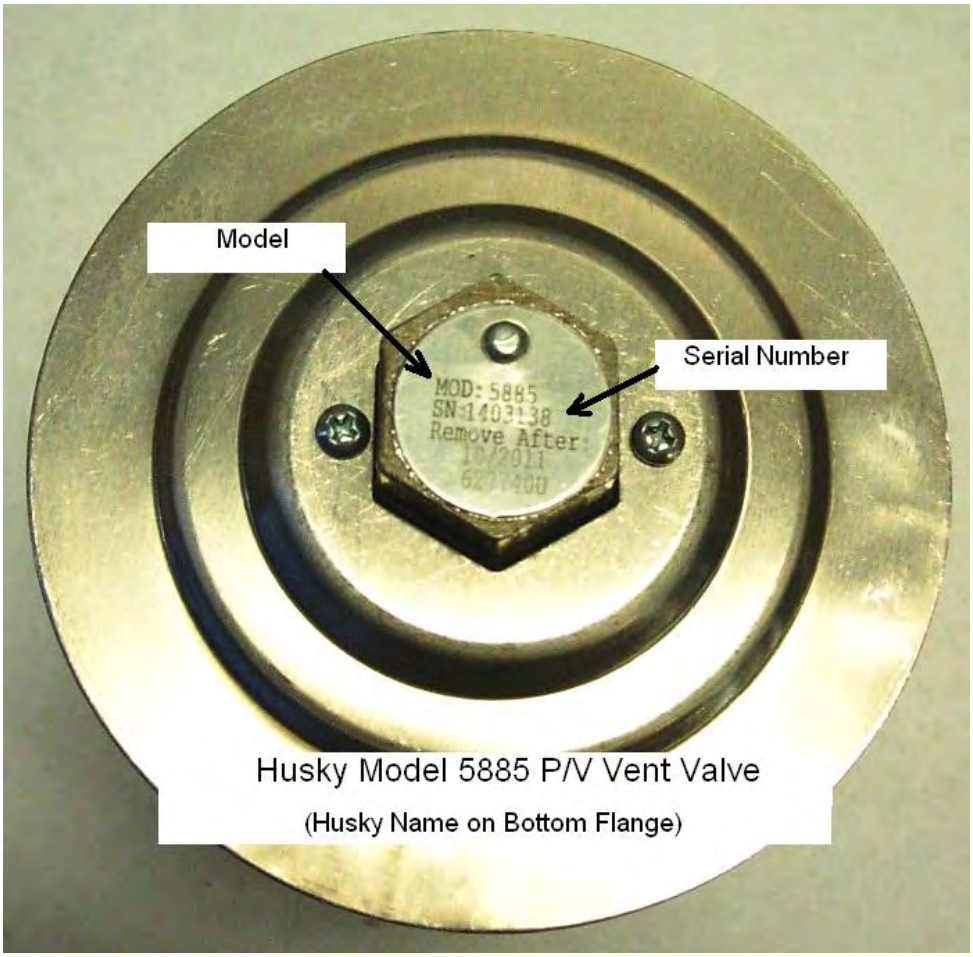
CompX CSP4-1711LPC Vapor Dust Cap

CompX Tank Commander Lid
Locks onto CSP2-634LPC and CSP4-1711LPC Dust Caps

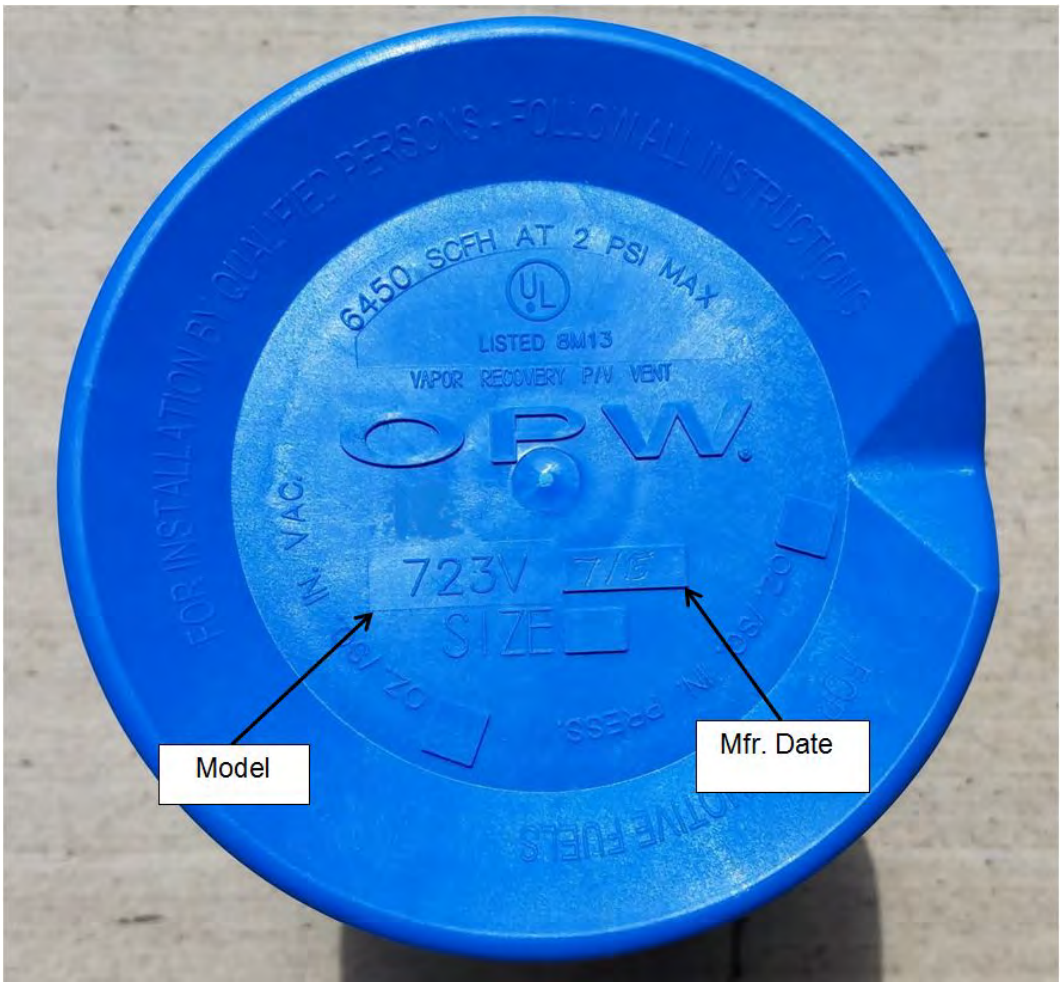
EMCO Wheaton Retail
Stage I EVR System Components
Permanent ID Information

FFS PV-Zero P/V Vent Valve
(Model and Serial Number on White Tag)

EMCO Wheaton Retail
Stage I EVR System Components
Permanent ID Information



EMCO Wheaton Retail
Stage I EVR System Components
Permanent ID Information



OPW Model 723V P/V Vent Valve

Exhibit 2

Installation, Maintenance, and Compliance Specifications

This exhibit contains the installation, maintenance and compliance standards and specifications applicable to an EMCO Wheaton Stage I Enhanced Vapor Recovery system installed in a gasoline dispensing facility (GDF).

General Specifications

1. Typical installations of the EMCO Wheaton Stage I EVR system are shown in Figures 2A, 2B, 2C and 2D of the full CARB Executive Order.

2. The EMCO Wheaton Stage I EVR system shall be installed, operated and maintained in accordance with this attachment, applicable Oregon Administrative Rules, and manufacturer's specifications.

3. Any repair or replacement of system components shall be done in accordance with this attachment, applicable Oregon Administrative Rules, and manufacturer's specifications.

4. The EMCO Wheaton Stage I EVR system shall comply with the applicable performance standards and performance specifications in CP-201.

5. Maintenance and repair of system components, including removal and installation of such components in the course of any required tests, shall be performed in accordance with this attachment, applicable Oregon Administrative Rules, and manufacturer's specifications.

Pressure/Vacuum Vent Valves For Storage Tank Vent Pipes

1. No more than three certified pressure/vacuum vent valves (P/V Valves) listed in Exhibit 1 shall be installed on any GDF underground storage tank system.

2. Compliance determination of the following P/V valve performance specifications shall be one of the following:

    a. The leak rate of each P/V valve shall not exceed 0.05 cubic feet per hour (CFH) at 2.0 inches of H_2O positive pressure and 0.21 CFH at -4.0 inches negative pressure as determined by TP-201.1E, Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves (October 8, 2003).

    b. The positive pressure setting is 2.5 to 6.0 inches of H_2O and the negative pressure setting is 6.0 to 10.0 inches of H_2O as determined by TP-201.1E, Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves (October 8, 2003).

3. Compliance determination of the P/V valve performance specifications in items 2a and 2b for the FFS PV-Zero P/V vent valve shall be conducted with the valve remaining in its installed position on the vent line(s). The PV-Zero section of this attachment outlines the equipment needed to test the valve in its installed position.

4. A manifold may be installed on the vent pipes to reduce the number of potential leak sources and P/V valves installed. Vent pipe manifolds shall be constructed of steel pipe or an equivalent material that has been listed for use with gasoline. If a material other than steel is used, the GDF operator shall make available information demonstrating that the material is compatible for use with gasoline. A tee may be located in a different position, or fewer vent pipes may be connected, or more than one P/V valve may be installed on the manifold.

5. Each P/V valve shall have permanently affixed to it a yellow, gold, or white colored label with black lettering stating the positive and negative cracking pressures and leak rates.

Positive pressure setting: 2.5 to 6.0 inches H_2O
Negative pressure setting: 6.0 to 10.0 inches H_2O
Positive Leak rate: 0.05 CFH at 2.0 inches H_2O
Negative Leak rate: 0.21 CFH at –4.0 inches H_2O

Rotatable Product and Vapor Recovery Adaptors

1. Rotatable product and vapor recovery adaptors shall be capable of at least 360-degree rotation and have an average static torque not to exceed 108 pound-inch (9 pound-foot). Use EMCO Wheaton Torque Test Tool Part Number 494240 or any torque test tool stated in TP-201.1B. Compliance with this requirement shall be demonstrated in accordance with TP-201.1B, Static Torque of Rotatable Stage I Adaptors (October 8, 2003).

2. The vapor adaptor poppet shall not leak when closed. Compliance with this requirement shall be verified by the use of commercial liquid leak detection solution, or by bagging, when the vapor containment space of the underground storage tank is subjected to a non-zero gauge pressure. (Note: leak detection solution will detect leaks only when positive gauge pressure exists.)

Vapor Recovery and Product Adaptor Dust Caps

Dust caps with intact gaskets shall be installed on all Stage I tank adaptors.

Product Spill Container Drain Valve

The spill container drain valve is configured to drain liquid directly into the drop tube and is isolated from the underground storage tank ullage space. The leak rate of the drain valve shall not exceed 0.17 CFH at 2.00 inches H_2O. Depending on the presence of the drop tube overfill prevention device, compliance with this requirement shall be demonstrated in accordance with either TP-201.1C, Leak Rate of Drop Tube/Drain Valve Assembly (October 8, 2003), or TP-201.1D, Leak Rate of Drop Tube Overfill Prevention Devices and Spill Container Drain Valves (October 8, 2003).

Product Spill Container Factor Installed Drain Plug (Optional)

The factory installed spill container plug in the drain valve port shall not leak. The absence of vapor leaks shall be verified with the use of commercial liquid leak detection solution (LDS) when the vapor space of the fill pipe is subjected to a positive gauge pressure.

Stage I Drop-Tubes with Overfill Prevention Devices

1. The Drop Tube Overfill Prevention Device (overfill device) is designed to restrict the flow of gasoline delivered to the underground storage when liquid levels exceed a specified capacity. The drop tube overfill device is not a required component of the vapor recovery system, but maybe installed as an optional component of the system. Other requirements may apply.

2. The leak rate of Stage I drop-tube overfill prevention devices shall not exceed 0.17 CFH at 2.0 inches H_2O). The leak rate shall be determined in accordance with TP-201.1D, Leak Rate of Drop Tube Overfill Prevention Devices and Spill Container Drain Valves (October 8, 2003).

3. The discharge opening of the fill-pipe must be entirely submerged when the liquid level is six inches above the bottom of the tank.

Stage I Drop-Tubes without Overfill Prevention Devices

1. Drop tubes that do not have an overfill prevention device shall not leak and shall be tested in accordance with TP-201.1C, Leak Rate of Drop Tube/Drain Valve Assembly (October 8, 2003).

2. The discharge opening of the fill-pipe must be entirely submerged when the liquid level is six inches above the bottom of the tank.

Vapor Recovery Riser Offset

1. The vapor recovery tank riser may be offset from the tank connection to the vapor recovery Spill Container provided that the maximum horizontal distance (offset

distance) does not exceed twenty (20) inches.

2. The vapor recovery riser may be offset up to 20 inches horizontal distance with use of commercially available, four (4) inch diameter steel pipe fittings.

Tank Gauge Port Components

The tank gauge adaptor and cap are paired. Therefore, an adaptor manufactured by one company shall be used only with a cap manufactured by the same company. Figure 2E of the full CARB Executive Order shows a typical installation of tank gauge port components.

Connections and Fittings

All connections and fittings not specifically certified with an allowable leak rate shall not leak. The absence of vapor leaks shall be verified with the use of commercial liquid leak detection solution, or by bagging, when the vapor containment space of the underground storage tank is subjected to a non-zero gauge pressure. (Note: leak detection solution will detect leaks only when positive gauge pressure exists.)

Maintenance Records

Each GDF operator/owner shall keep records of maintenance performed at the facility. Such record shall be maintained on site or otherwise readily available for review during the course of an on-site inspection. Additional information may be required in accordance with permit or OAR requirements. The records shall include the maintenance or test date, repair date to correct test failure, maintenance or test performed, affiliation, telephone number, and the name of the individual conducting maintenance or test. An example of a Stage I Maintenance Record is shown in Figure 2H.

Table 2-1
Gasoline Dispensing Facility Compliance Standards and Specifications

Component / System	Test Method	Standard or Specification
Rotatable Phase I Adaptors	TP-201.1B	Minimum, 360-degree rotation Maximum, 108 pound-inch average static torque
Overfill Prevention Device	TP-201.1D	Leak rate ≤ 0.17 CFH at 2.00 inches H_2O
Spill Container Drain Valve	TP-201.1D	Leak rate ≤ 0.17 CFH at 2.00 inches H_2O
P/V Vent Valve	TP-201.1E	Positive pressure setting: 2.5 to 6.0 inches H_2O Negative pressure setting: 6.0 to 10.0 inches H_2O Positive Leak rate: 0.05 CFH at 2.0 inches H_2O Negative Leak rate: 0.21 CFH at -4.0 inches H_2O
Vapor Recovery System	TP-201.3	As specified in TP-201.3 and/or CP-201
All connections and fittings certified without an allowable leak rate	Leak Detection Solution or bagging	No Leaks

Table 2-2
Maintenance Intervals for System Components[2]

Manufacturer	Component	Maintenance Interval
Husky	Pressure/Vacuum Vent Valve	Annual
FFS	Pressure/Vacuum Vent Valve	Annual
OPW	Pressure/Vacuum Vent Valve	Annual
EMCO Wheaton	Tank Gauge Port Components	Annual
EMCO Wheaton	Dust Caps	Annual
CompX Security Products	Dust Caps	Annual
OPW	Dust Caps	Annual
EMCO Wheaton	Overfill Prevention Device	Annual
EMCO Wheaton	Rotatable Phase I Product and Vapor Adaptors	Annual
EMCO Wheaton	Spill Container Drain Valve	Quarterly
EMCO Wheaton	Spill Container	Quarterly and After Each Delivery

[2] Maintenance must be conducted within the interval specified from the date of installation and at least within the specified interval thereafter. Maintenance requirements can be found in the CARB-Approved IOM.

Figure 2H

Example of a GDF Maintenance Record

Date of Maintenance/ Test/Inspection/Failure	Repair Date To Correct Test Failure	Maintenance/Test/Inspection Performed and Outcome	Affiliation	Name of Individual Conducting Maintenance or Test	Telephone Number

State of Oregon
Department of
Environmental
Quality

Installation, Operation and Maintenance Manual

For Executive Order

VR-105-J
EMCO Wheaton Retail
Stage I Enhanced Vapor Recovery System

NOTICE:

This Installation, Operation and Maintenance Manual for the EMCO Wheaton Retail Stage I EVR System describes the tools and methods required to install and maintain the EMCO Stage I EVR System. While Oregon DEQ does not require specific certification or training to install, maintain, or repair stage I EVR systems, owners or operators may elect to contract with certified technicians.

Note: CARB requires that only technicians trained and certified by EMCO (i.e. EMCO Certified Technicians) are able to perform installation, maintenance or repairs of components manufactured by EMCO or the warranty will be void. A list of EMCO certified technicians can be viewed on EMCO Wheaton Retail's website at www.emcoretail.com.

To schedule a training class, EMCO can be contacted at the following:

Jose E. Rodriguez
Director of Technical Services,
CARB Liaison, West Coast Sales & Marketing
EMCO Wheaton Retail Corporation
Phone: 619-846-9882
Email: jerodriguezsd@aol.com

Note: CARB requires that only technicians trained and certified by FFS (i.e. FFS Certified Technicians) are able to perform installation, maintenance or repairs of the PV-Zero, manufactured by FFS, or the warranty will be void. A list of FFS Certified Technicians can be viewed at http://www.franklinfueling.com/service/

To schedule a training class, FFS can be contacted at the following:

John Covington Allan Busch, or Steve Langlie
Enhanced Vapor Recovery Systems
Franklin Fueling Systems
Phone: 800-225-9787

Email: covington@franklinfueling.com
busch@franklinfueling.com
langlie@franklinfueling.com

Note: CARB requires that only technicians trained and certified by OPW (i.e. OPW Certified Technicians) are able to perform installation, maintenance or repairs of components manufactured by OPW or the warranty will be void. A list of OPW Certified Technicians can be viewed at http://www.opw-fc.com.

To schedule a training class, OPW can be contacted at the following:

OPW Fueling Components
Phone: 800-422-2525
Web: www.opw-fc.com

It is the responsibility of each service provider or technician to be familiar with the current requirements of state, federal and local codes for installation and repair of gasoline dispensing equipment. It is also the responsibility of the service provider or technician to be aware of all necessary safety precautions and site safety requirements to assure a safe and trouble free installation.

Any hazardous waste generated from installation, maintenance and/or cleaning activities must be disposed of properly.

Summary of Guidelines for Maintenance Activities Required of the EMCO Wheaton Retail Stage I EVR System[1]

Component — **Interval**

Pressure/Vacuum Vent Valve: Annually
FFS Model PV-Zero

1.) Visually inspect the housing, pipe, fittings and rain cap for obvious signs of damage, missing parts or fluid leaks.
2.) Visually inspect the rain cap from ground level for signs of bird's nests or insect activity.
3.) Every year drain and inspect fill fluid per the **Fluid Inspection Procedures**.

Pressure/Vacuum Vent Valve:
Husky Model 5885 Annually

1.) Remove the screws that hold the top cover on.
2.) Remove any debris that might be sitting inside the lower cover.
3.) Check the drain holes in the lower cover for blockage.
4.) The two (2) screens should not be removed.
5.) Reinstall the top cover and retaining screws.
6.) Tighten the screws firmly.

OPW Model 723V Annually

Remove and inspect filter screens – clean or replace as necessary. Test as necessary.

Upper Screen Maintenance:
See instructions on page 138 of the CARB EO IOM.

Lower Screen Maintenance:
See instructions on page 139 of the CARB EO IOM

Spill Containment: Quarterly &
EMCO A1004EVR-X Single or Double Wall After Each Delivery

1.) Quarterly verify that the inside of the A1004EVR Spill Containment bucket is free of all dirt, gravel, debris, etc. Should cleaning be required, wipe the inside wall and bottom of the A1004EVR Spill Containment bucket using soapy water and a disposable towel.
2.) After each delivery, the station operator must remove any standing gasoline from the inside of the A1004EVR Spill Containment.
    a. For spill containment buckets that do not contain a drain valve, the fuel must be removed manually. Any components that become contaminated with gasoline must be disposed of properly.
    b. For spill containment buckets that contain the #494118 Drain Valve, if the gasoline does not drain, refer to the #494118 drain valve preventive maintenance instructions.

Drain Valve Assembly (if equipped): Quarterly
EMCO 494118

1.) Quarterly test the operation of the drain valve assembly by pulling up on the chain located inside the A1004EVR Spill Containment bucket.
2.) If gasoline does not drain when actuating the drain valve assembly perform steps (a) through (d) below:
    a. Remove the filter from the drain valve. Using a pair of needle nose pliers, remove both cotter pins and disassemble the linkage from the top of the drain valve. Soak the filter in soapy water and use

[1] **These maintenance requirements shall not circumvent use of the manufacturer's maintenance instructions. Maintenance contractors or owner/operators shall refer to the manufacturers complete installation and maintenance instructions for the EMCO Wheaton Retail System to ensure that all maintenance and torque requirements are met.**

Component **Interval**

Drain Valve Assembly (if equipped): **Quarterly**
EMCO 494118 (Continued)

high pressure air to clean and remove all debris. Replace the filter #569131 only if the screen is damaged.

b. Using the Emco Wheaton Retail #493820 Drain Wrench unscrew the drain valve and remove from the bottom of the A1004EVR Spill Containment bucket. Soak the drain valve in soapy water and use high pressure air to clean and remove all debris. Replace the flat gasket #567108 before re-installing.
c. To re-install the drain valve assembly, refer to installation instruction steps 3 through 5. Verify leak tightness integrity of the drain valve assembly by performing CARB test procedure TP-201.1D.
d. If the drain valve assembly fails to pass CARB test procedure TP-201.1D, replace with new and refer to installation instructions steps 1 through 5.

Dust Caps:
EMCO A0097-005 Product
EMCO A0097-004LP Product **Annually**

1.) Annually verify that the gasket seal is installed and properly secured and is free of tears. If cap fails to comply, replace with new cap.

EMCO A0099-X Vapor: **Annually**
X=002, No Chain or 003, With Chain
EMCO A0099-004LP Vapor

1.) Annually verify that the gasket seal is installed and properly secured and is free of tears. If cap fails to comply, replace with new cap.

All "non-EMCO" Dust Caps: **Annually**

1.) Visually inspect the seal in cap and replace if damaged or missing.

Product Adaptor:
EMCO A0030-124S **Every 2 years**

Static Torque Test:

1.) Using the EMCO Wheaton Retail #494240 Swivel Adaptor Torque Wrench, every 24 months verify the static torque of the swivel adaptor by performing CARB test procedure TP-201.1B.
2.) If the swivel adaptor fails to meet the static torque test requirements, replace both O-rings with the EMCO Wheaton O-ring kit #494301.

Leak Tightness Integrity Test:

1.) Every 24 months verify leak tightness integrity of the swivel adaptor by performing CARB test procedure TP-201.1D. 2.) If the swivel adaptor fails to meet the leak tightness integrity test requirements, replace both O-rings with the EMCO Wheaton O-ring kit #494301 and/or gasket #568793.

Vapor Adaptor:
EMCO A0076-124S **Every 2 years**

Static Torque Test:

1.) Using the EMCO Wheaton Retail #494240 Swivel Adaptor Torque Wrench, every 24 months verify the static torque of the swivel adaptor by performing CARB test procedure TP-201.1B.

Component	**Interval**

Vapor Adaptor:
EMCO A0076-124S (continued) **Every 2 years**

2.) If the swivel adaptor fails to meet the static torque test requirements, replace both O-rings with the EMCO Wheaton O-ring kit #494301.

Leak Tightness Integrity Test:

1.) Every 24 months verify leak tightness integrity of the swivel adaptor by performing CARB test procedure TP-201.1D. 2.) If the swivel adaptor fails to meet the leak tightness integrity test requirements, replace both O-rings with the EMCO Wheaton O-ring kit #494301 and/or gasket #568793.

Extractor Assembly:
EMCO A0079-X **None Required**
X=043, 044, 050, 051, 052, 150 or 152

1.) No preventative maintenance is required for this product.

Extractor Cage:
EMCO A0179-002 **None Required**

1.) No preventative maintenance is required for this product.

Ball Float Valve:
EMCO A0075-X **None Required**
X=001, 002, 004, 006, 010, 013, 015 or 017

1.) No preventative maintenance is required for this product.

Riser Seal:
EMCO 494096 **Every 2 years**

1.) Every 2 years verify leak tightness integrity of the riser seal by performing CARB test procedure TP-201.1D. 2.) If the riser fails to meet the leak tightness integrity test requirements, replace the bottom O-ring with the EMCO Wheaton O-ring kit #494242.

Drop Tube Overfill Prevention Device:
EMCO A1100EVR **Annually**

1.) Annually, conduct a visual inspection of the flapper valve assembly located inside the A1100EVR Overfill Prevention Valve. Begin by removing the spill containment lid and fill adaptor cap, looking down over the fill opening, verify that the flapper valve assembly is open and free of any foreign objects that can block or restrict the flow of gasoline into the underground storage tank during a fuel delivery.

2.) Every 2 years, verify leak tightness integrity of the A1100EVR Overfill Prevention Valve by performing CARB test procedure TP-201.1D.

Straight Drop Tube:
EMCO A0020EVR Flared Collar & A0020EVRC Machined Collar **Every 2 years**

1.) Every 2 years, verify leak tightness integrity of the A0020EVR or A0020EVRC Straight Drop Tube by performing CARB test procedure TP-201.1D.

2.) If the A0020EVR or A0020EVRC Straight Drop Tube fails to meet the leak tightness integrity test requirements, replace the drop tube O-ring with the EMCO Wheaton O-ring kit #569461.

Component	**Interval**
Tank Gauge Port Components:	
EMCO A0097-010 Cap	**Annually**

1.) Annually verify that the gasket seal is installed and properly secured and is free of tears. If cap fails to comply, replace with new cap.

EMCO A0030-014 Adaptor **Every 2 years**

Leak Tightness Integrity Test:

1.) Every 2 years verify leak tightness integrity of the probe adaptor by performing CARB test procedure TP-201.3. 2.) If the probe fails to meet the leak tightness integrity test requirements, replace the gasket #568793.

Summary of Component Torque Values of the EMCO Wheaton Retail Stage I EVR System

Component	Tool Required	Torque Value
Pressure/Vacuum Vent Valve:		
Husky Model 5885, 2-inch threaded	Standard Wrench and Socket	20 to 50 ft-lbs
FFS Model PV-Zero, 3-inch threaded	Chain/Strap Wrench	See Page 4 of the PV-Zero IOM Document for Specific Instructions
OPW Model 723V, 2-inch threaded	Standard Wrench	35 to 55 ft-lbs
Spill Containment:		
EMCO A1004EVR Single or Double Wall	EMCO #494241 Spill Containment Wrench	100 to 150 ft-lbs
Drain Valve Assembly:		
EMCO 494118	EMCO #493820 Drain Wrench	13 to 15 ft-lbs
Dust Caps:		
EMCO A0097-005 Product	None Required	None Required
EMCO A0097-004LP Product	None Required	None Required
EMCO A0099-004LP Vapor	None Required	None Required
EMCO A0099-X Vapor (all models)	None Required	None Required
All Non-EMCO Dust Caps	None Required	None Required
Product Adaptor:		
EMCO A0030-124S	EMCO #A0081-001C Adaptor Wrench	60 to 75 ft-lbs
Base Screws (Part of A0030-124S)	Standard Wrench and Socket	20 in-lbs
Vapor Adaptor:		
EMCO A0076-124S	EMCO #A0081-001C Adaptor Wrench	60 to 75 ft-lbs
Base Screws (Part of A0076-124S)	Standard Wrench and Socket	20 in-lbs
Extractor Assembly:		
EMCO A0079-X (all models)	Standard Chain Wrench with a ½ inch Off-Set	100 to 150 ft-lbs
Extractor Cage:		
EMCO A0179-002	EMCO #A0560-003 Extractor Wrench	25 to 35 ft-lbs
Ball Float Valve:		
EMCO A0075-X (all models)	Strap Wrench with a ½ inch Off-Set	15 to 25 ft-lbs
Riser Seal:		
EMCO Wheaton Retail #494096	EMCO #A0081-001C Adaptor Wrench	80 ft-lbs
Center Insert (Part of #494096)	EMCO #494120 Riser Seal Wrench	35 to 45 ft-lbs
Drop Tube Overfill Prevention Device:		
EMCO A1100EVR	None Required	None Required
Straight Drop Tube:		
EMCO A0020EVR Flared Collar	None Required	None Required
EMCO A0020EVRC Machined Collar	None Required	None Required
Tank Gauge Port Components:		
EMCO A0097-010 Cap	None Required	None Required
EMCO A0030-014 Adaptor		60 to 75 ft-lbs

Base Screws (Part of A0030-014)	EMCO #A0081-001C Adaptor Wrench Standard Wrench and Socket	20 in-lbs

EMCO Wheaton Retail Stage I EVR Equipment Installation Checklist for Installing Components per CARB Executive Order VR-105

Date:_____ Signature:_____

Site Location and Name:	Installing Contractor:
Street Address:	Business Address:
City/State/Zip:	City/State/Zip:
Contact/Phone:	Contact/Phone:
Installing Technician (name):	Technician Certification Number:

Tank Number:_____ Product Grade:_____ Capacity (Gal):_____

Tank Number:_____ Product Grade:_____ Capacity (Gal):_____

Tank Number:_____ Product Grade:_____ Capacity (Gal):_____

Tank Number:_____ Product Grade:_____ Capacity (Gal):_____

Note: Because this checklist serves a dual purpose as and installation and retrofit checklist, there are some items that will be non-applicable (e.g. cut riser pipe). The technician should note "**N/A**" for Non-Applicable in the "Yes/No" box in those instances.

Yes/No	Initials	
		1. Is all the installed equipment for the Stage I EVR listed in CARB Executive Order VR-105? **Note: All Phase I EVR installed equipment must be listed in an Executive Order (E.O.) If not VR-105, specify in this checklist which component was installed. .**
Yes/No	Initials	
		2. **A1004EVR Spill Containment Single or Double Wall Configurations**
Yes/No	Initials	
		2a. Before installing the fill and vapor spill containment buckets verify that the 4 inch diameter riser pipes have been properly sized and threads cut to either NPT or BSP standards.
Yes/No	Initials	
		2b. Before installing the fill and vapor spill containment buckets verify that the top edges of the 4 inch diameter riser pipes have been filed flat and square with threads free of all debris to insure a proper sealing surface.
Yes/No	Initials	
		2c. Using a non-hardening, gasoline resistant pipe thread seal compound, manually install the fill and vapor spill containment buckets on to the 4 inch diameter riser pipes and torque between 100 – 150 ft-lbs.
Note: For installations of the EMCO A0020EVR or A0020EVRC Straight Drop Tube, proceed to Step 4.		
Yes/No	Initials	
		3. **A1100EVR Overfill Prevention Valve (OPV)** **IMPORTANT: Do not apply a 45° miter cut to the very bottom of the lower drop tube.**
Yes/No	Initials	3a. Has the A1100EVR OPV been properly sized for the required tank burial depth and tank riser

		pipe length?

EMCO Wheaton Retail Stage I EVR Equipment Installation Checklist for Installing Components per CARB Executive Order VR-105 (Continued)

Note: If the underground storage tank is also equipped with a ball float vent valve, the ball float vent valve cannot extend below the shut-off point of the EMCO A1100EVR overfill prevention valve.		
Yes/No	Initials	3b. Has the A1100EVR collar and lower drop tube been properly assembled?
Yes/No	Initials	3c. Once completely assembled, has the A1100EVR OPV sealant cured for a minimum of 24 hours before installing into the underground storage tank (UST)?
Yes/No	Initials	A1100 EVR OPV Sealant Applied Date: Time: _____
Yes/No	Initials	A1100 EVR OPV Installed into UST Date: Time: _____
Yes/No	Initials	3d. Once completely assembled, has the A1100EVR OPV passed the leak tightness integrity test (≤ 0.17 cfh @ 2.00" wc) before installing into the UST?
Yes/No	Initials	3e. Before installing the A1100EVR OPV into the tank fill riser pipe, verify that the sealing O-ring is Installed and properly secured. Proceed to step 5.
Note: When installing the EMCO A0020EVR or A0020EVRC Straight Drop Tube, a Ball Float Valve must be installed to serve as an overfill prevention device.		
Yes/No	Initials	**4. A0020EVR Flared Collar or A0020EVRC Machined Collar Straight Drop Tube IMPORTANT: Do not apply a 45° miter cut to the very bottom of the lower drop tube.**
Yes/No	Initials	4a. Has the A0020EVR or A0020EVRC been properly sized for the required tank burial depth and tank riser pipe length?
Yes/No	Initials	4b. Before installing the A0020EVR or A0020EVRC into the tank fill riser pipe, verify that the sealing O-ring is installed and properly secured.
Yes/No	Initials	**5. 494096 Riser Seal**
Yes/No	Initials	5a. Before installing the 494096 into the fill side spill containment bucket, verify that the sealing O-ring is installed and properly secured. Torque to 80 ft-lbs.
Yes/No	Initials	5b. Has the center insert of the 494096 been manually installed and torqued between 35 – 45 ft-lbs.?
Yes/No	Initials	**6. A0076-124S Vapor and A0030-124S Product Rotatable Adaptors**
Yes/No	Initials	6a. Before installing the A0076-124S, verify that the top edge of the top containment nipple has

		been filed flat and square with threads free of all debris to insure a proper sealing surface.

EMCO Wheaton Retail Stage I EVR Equipment Installation Checklist for Installing Components per CARB Executive Order VR-105 (Continued)

Yes/No	Initials	
		6b. Before installing the A0076-124S and A0030-124S onto the vapor and fill spill buckets, verify that the flat gaskets for each are installed and properly secured.
Yes/No	Initials	
		6c. **IMPORTANT: Do not use pipe thread sealant compound when installing the rotatable adaptors.**
Yes/No	Initials	
		6d. Have the A0076-124S and A0030-124S set screws been installed with lock-tite model #222MS threadlocker and torqued to 20 in-lbs?
Yes/No	Initials	
		7. A0097-004LP or A0097-005 Product and A0099-004LP or A0099-002,003 Vapor Dust Caps (if using caps from a different manufacturer, write in NO and skip to section 8).
Yes/No	Initials	
		7a. Before installing the A0097-004LP or A0097-005 and A0099-004LP or A0099-002,003 caps onto the appropriate rotatable adaptors, verify that the gasket seals are free of tears and installed and properly secured. If a cap fails to comply, replace with new cap. Proceed to step 9.
Yes/No	Initials	
		8. All "non-EMCO" Product and Vapor Dust Caps (if EMCO caps are used, write in NO and skip to section 9).
Yes/No	Initials	
		8a. Provide the manufacturer name and model number for the product and vapor dust caps used. Refer to the appropriate section of the Installation, Operation and Maintenance Manual (IOM) for proper installation instructions.
Yes/No	Initials	
		Product Cap Manufacturer:_____ Model #:_____
Yes/No	Initials	
		Vapor Cap Manufacturer:_____ Model #:_____
Yes/No	Initials	
		9. A0030-014 ATG Probe Adaptor
Yes/No	Initials	
		9a. Before installing the A0030-014, verify that the top edge of the tank riser pipe has been filed flat and square with threads free of all debris to insure a proper sealing surface.
Yes/No	Initials	
		9b. Before installing the A0030-014 onto the riser pipe, verify that the flat gasket is installed and properly secured. Torque between 60 – 75 ft-lbs.
Yes/No	Initials	
		9c. **IMPORTANT: Do not use pipe thread sealant compound when installing the ATG probe adaptor.**
Yes/No	Initials	
		9d. Has the A0030-014 set screws been installed with lock-tite model #222MS threadlocker and torqued to 20 in-lbs.?
Yes/No	Initials	
		10. A0097-010 ATG Probe Adaptor Cap

EMCO Wheaton Retail Stage I EVR Equipment Installation Checklist for Installing Components per CARB Executive Order VR-105 (Continued)

Yes/No	Initials	
		10a. Before installing the A0097-010 onto the appropriate ATG probe adaptor, verify that the gasket seal is installed and properly secured and is free of tears.
Yes/No	Initials	
		10b. Has the ATG probe signal cable been properly installed and secured by manually tightening the leak tight connector nut?
Yes/No	Initials	
		11. A0079 Extractor Assembly (optional)
Yes/No	Initials	
		11a. Has the A0079 been manually installed onto the tank bung collar using a non-hardening, gasoline resistant pipe seal compound and torqued between 100 – 150 ft-lbs.?
Yes/No	Initials	
		12. Pressure/Vacuum Vent (P/V) Valve
Yes/No	Initials	
		12a. Provide the manufacturer name, model number and quantity of the P/V valve(s) installed. Refer to the appropriate section of the full CARB IOM for proper installation instructions.
Yes/No	Initials	
		P/V Vent Manufacturer:_____ Model:_____ Quantity: _____

FFS Model PV-Zero Pressure/Vacuum Vent Valve

Franklin Fueling Systems

PV-ZERO™
Liquid-Filled Pressure/Vacuum Vent Valve

FFS P/N 407215901

Installation, Testing and Maintenance Manual

Franklin Fueling Systems • 3760 Marsh Rd. • Madison, WI 53718 USA
Tel: +1 608 838 8786 • 800 225 9787 • Fax: +1 608 838 6433 • www.franklinfueling.com

Description of the FFS PV-ZERO Liquid Filled P/V Vent Valve

The PV-ZERO operates using a similar concept to a common P-Trap used in plumbing drain applications to create a liquid air seal. The liquid seals the UST ullage vapors from the atmosphere while still maintaining the proper differential pressure set-points. After the differential pressure has been exceeded, air or vapor bubbles through the liquid media until the pressure returns to the operational pressure settings. Figures 1-3 illustrate the operation of the PV-ZERO.

The PV-ZERO has no moving parts and the only maintenance required is periodic inspection of the liquid.

Because the PV-ZERO does not use seals or gaskets to seal off the UST ullage from atmosphere, the unit will not allow vapor or air to pass through at pressure less than the cracking set-point. As long as the valve is filled with 1.6 liters (54 ozs) of PV-ZERO fluid, the stainless steel valve housing is not damaged, and the pipe fittings are correctly installed, the unit should be leak free.

The liquid used for the PV-ZERO unit is silicone-based and has an very low vapor pressure and low toxicity.

The PV-ZERO can be mounted either at the top of the vent rack or in-line (mid-mount at working level). To avoid the risk of climbing a ladder and to maximize the simplicity of inspection and service, the preferred installation of the PV-ZERO is to be mounted in-line. It can be mounted on a single riser pipe or many riser pipes manifolded to a single line. The PV-ZERO is designed to mount on 3" riser piping, but can also be installed on 2" riser piping.

See drawings on pages 9-11 for mounting options.

*** Refer to CARB EVR documents regarding equipment rules for manifold systems.***

A support frame should be used for mounting all vent riser piping and must be used to stabilize the piping above the PV-ZERO if it is to be mounted in-line.

If the PV-ZERO is to be top mounted, the support frame must stabilize the piping below the unit (and the unit itself). Check local agencies for support frame requirements and consult a licensed structural engineer if in doubt of the structural integrity of the vent rack support system.

Note: Do not mount the PV-ZERO unit on a free standing vent piping system without a support frame!

Figure 1: No Differential

Figure 2: Positive Cracking

Figure 3: Negative Cracking

Installation

Note: Use a thread sealant that is approved for gasoline and gasoline-ethanol blends such as Gasoila Soft Set or Jomar Heavy Weight for all threaded pipe fittings and plugs. The 3" side tee and 1" bottom drain plug are factory installed. Tighten all fittings per recognized industry installation standards.

1. Thread the bottom of the 3" side tee onto the vent riser piping. The PV-ZERO may be mounted mid-line or top mounted on a single riser or a manifolded system (see drawings, pages 9 &10). For 2" riser piping systems, use a 3x2" NPT reducing coupling with a 3" pipe nipple at least 6" long (see drawing, page 11).
2. Make sure the PV-ZERO unit is plumb within ±3° and not set at an angle. Failure to set in the vertical position may cause improper operation.
3. For mid-line mounting installations, install and secure the rest of the 3" discharge piping on the vent rack (refer to NFPA 30 for specific fuel system vent piping requirements). **Be sure to use a pipe wrench to counteract the tightening force to the valve!**
4. Fill the PV-ZERO unit through the side port with 1.6 liters (54 oz.) of PV-ZERO fluid (FFS p/n 407220001) provided with the unit. It may also be filled through the discharge outlet fitting (top). **Do not pour into the 3" side tee fitting!**

Note: To fill the fluid in the PV-ZERO, the UST (Underground Storage Tank) must be open to the atmosphere OR the inflatable test plug needs to be installed to reach the correct level. If the tank is under pressure or vacuum, the correct fill level cannot be obtained.

5. Install the side plug.
6. Perform the **Field Testing Procedure**.
7. Install the 3" pipe plug on top of the tee.
8. Attach the 3" upward-venting rain cap provided. Attach to the top of the vent pipe (mid-mount installation) or directly to the top of the PV-ZERO (top mount) **Keep the rain cap installed to minimize water intrusion, and to ensure proper operation.**

The PV-ZERO may be painted, however, do not paint over or cover the nameplate placards decals.

Field Testing

Note: Compliance testing of the PV-ZERO, if required by the local air quality district, shall be conducted in accordance with California Air Resources Board (CARB) test procedure TP-201.1E and Exhibit 2 of the Executive Order. This test shall be conducted using the PV-ZERO test cap assembly (FFS p/n 407225901) with the valve in its installed condition. The PV-ZERO can be tested without removing the unit from the vent rack.

There are (3) ports on the PV-ZERO test cap assembly (see page 8):

- 1 – Schrader valve connection for the inflatable plug
- 1 – 1/4" hose barb (for pressure/vacuum supply)
- 1 – 1/8" hose barb (for manometer)

1. Remove 3" pipe plug from top of tee (if necessary).
2. Install the test cap assembly through the top of the 3" tee, allowing the inflatable plug to extend into the vent riser pipe - tighten fully.
3. Inflate the inflatable plug to 35 PSI.
4. Test per CARB TP-201.1E
5. Deflate the inflatable plug.
6. Remove test cap assembly from 3" tee.

Recommended Maintenance Intervals

- **Every year**: Visually inspect the housing, pipe, fittings, and rain cap for obvious signs of damage, missing parts, or fluid leaks.
- **Every year**: Visually inspect the rain cap, from ground level, for signs of bird nests or insect activity.
- **Every year**: Drain and inspect the fill fluid per the ***Fluid Inspection Procedure.***

Fluid Handling

The PV-ZERO is filled with a silicone based fluid, p/n 407220001 (contact FFS for MSDS sheet). The PV-ZERO fill fluid is resistant to UV exposure, does not support bioactivity and is resistant to oxidation.

Since the PV-ZERO is exposed to tank ullage vapors, used PV-ZERO fill fluid may contain trace amounts of ethanol and gasoline. The maintenance technician servicing the PV-ZERO should wear appropriate eye protection and nitrile gloves when inspecting or servicing the fill fluid. Check with local and state regulations regarding handling, transportation, recycling and disposal of silicone based fluids.

Fluid Inspection Procedure

1. Remove the 3" NPT plug from the top of the side tee.
2. Remove the 3/8" NPT side plug.
3. Remove the 1" NPT bottom plug and drain the fluid into a clean, transparent container.
4. Visually inspect the fill fluid for debris or water contamination. Since the specific gravity of the fluid is slightly less than water, any water in the fluid will settle to the bottom. The fluid can be reused indefinitely as long as it is free of sediment and water.

Note: Clean fluid can be refilled into the valve and topped off with new fluid, or it can be completely replaced with new fluid.

5. Reinstall the 1" NPT bottom plug.
6. Refill the PV-ZERO valve with fluid through the side-port until it spills out of the port. This is the correct fill level of 1.6 liters (54 oz.).
7. Reinstall the 3/8" NPT side plug.
8. Perform the ***Field Testing Procedure***
9. Reinstall the 3" NPT plug in the top of the side tee.

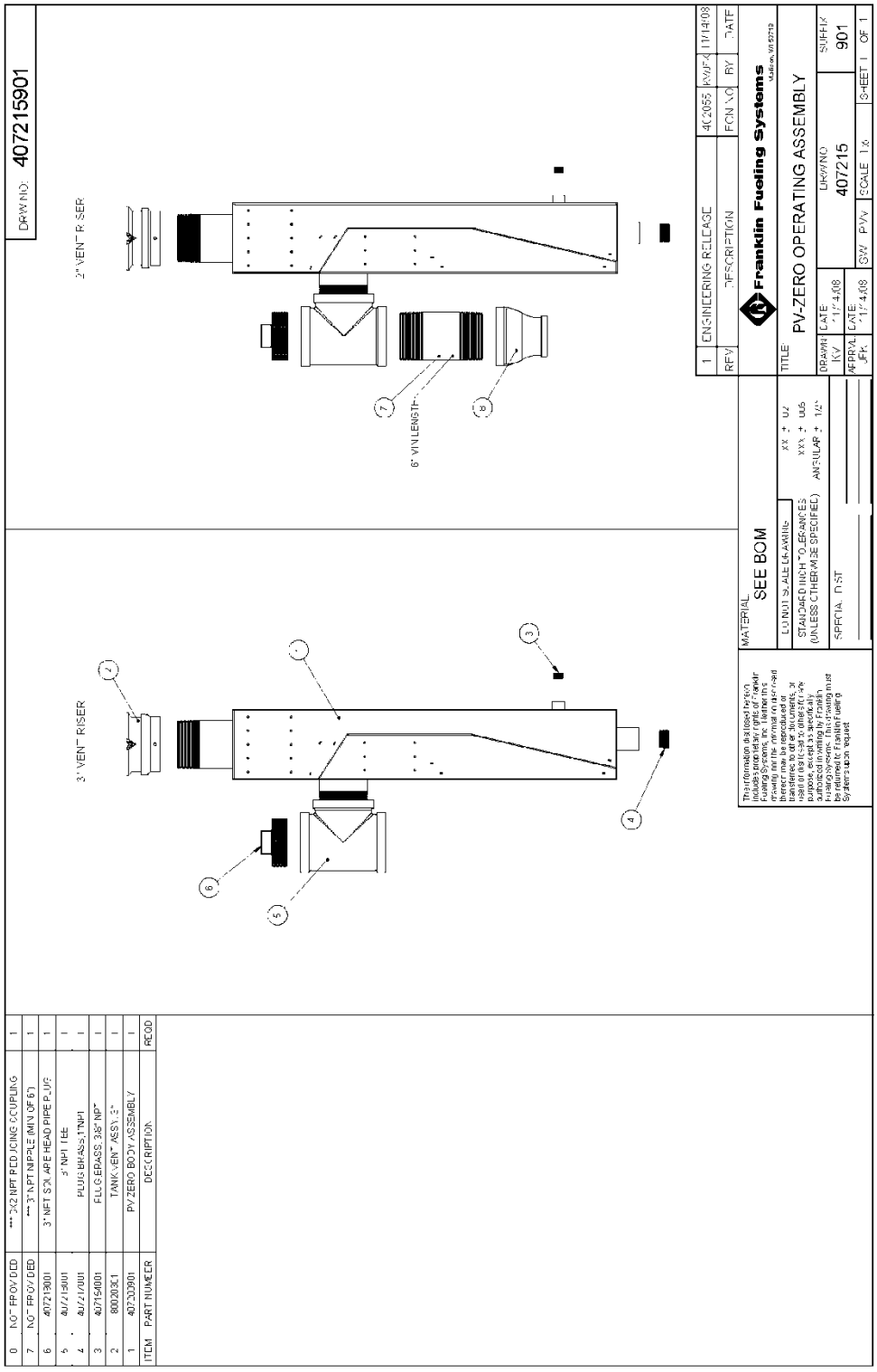
Only use the approved PV-ZERO fluid (P/N 407220001). Substitution of other fluids voids the warranty and can cause vapor leaks!

PV-ZERO Specifications

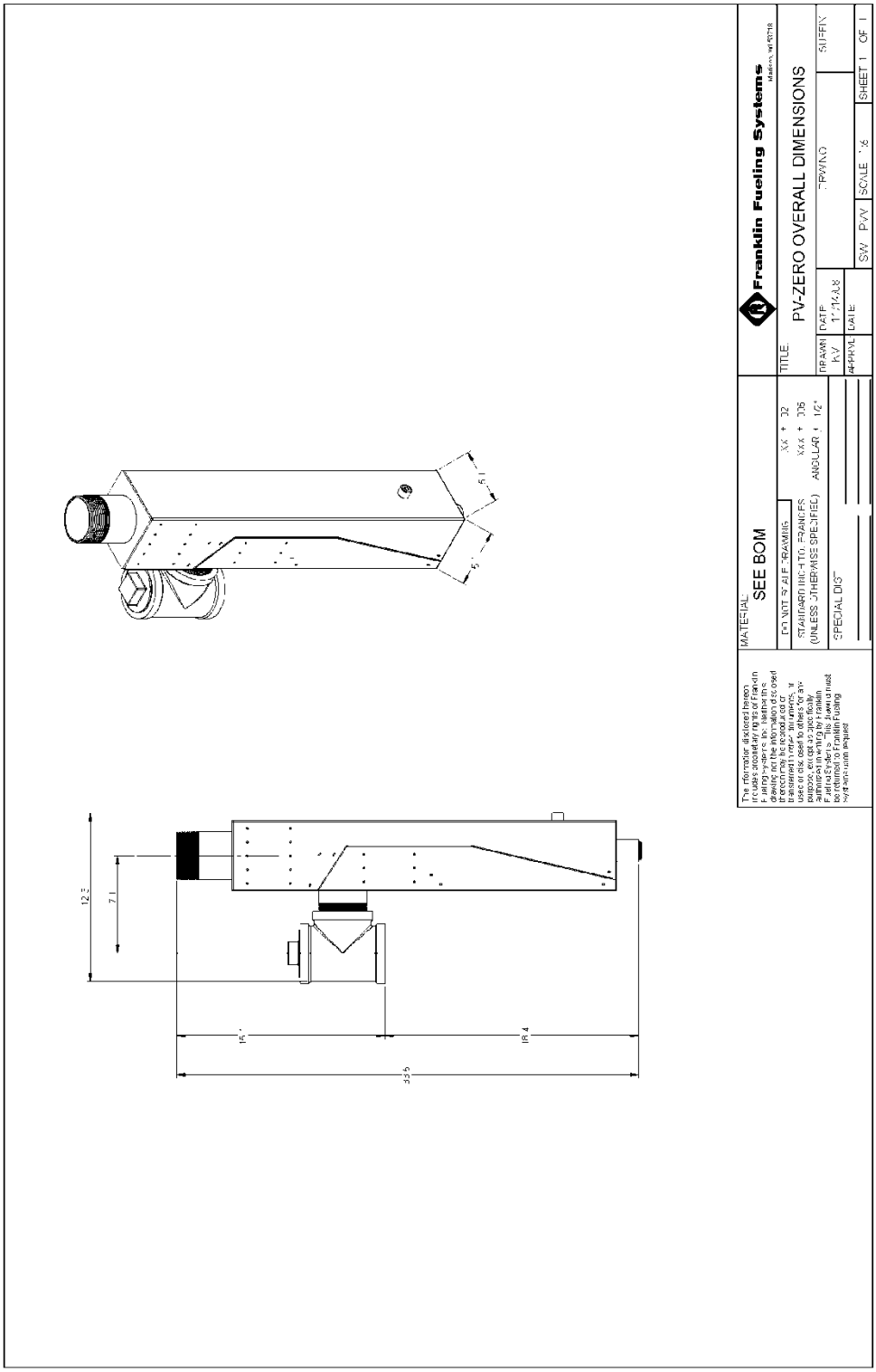
Height:	33.5"
Width:	5.0"
Length:	12.3"
Dry weight:	20#
Inlet piping connection	3" NPT
Discharge piping connection	3" NPT
Fill port	3/8" NPT
Drain port	1" NPT
Construction material	304 stainless steel
Fuel Compatibility	Gas & E85
Pressure leak rate	<< 0.05CFH at +2.0 W.C.
Vacuum leak rate	<< 0.21 CFH at -4.0 W.C.
Pressure drop at 60 cfm flow rate with tank positive pressure	14" W.C.
Pressure drop at 90 cfm flow rate with tank positive pressure	28" W.C.
Minimum operating temperature	-40°F (-40°C)
Maximum operating temperature	130°F (54°C)
Maximum test pressure	5 PSI
Maximum mounting angle deviation from vertical	3°

Drawing List:

The drawings are on the following pages.


DRW NO: 407215901
3" VENT RISER
6" VIN LENGTH
3" VENT RISER
Franklin Fueling Systems
PV-ZERO OPERATING ASSEMBLY
SEE BOM
DRW NO 407215
SIZE 901
SHEET 1 OF 1
ITEM PART NUMBER DESCRIPTION REQD
0 NOT PROVIDED 3/2 NPT RDCG COUPLING 1
7 NOT PROVIDED 3" NPT NIPPLE (MIN OF 6") 1
6 407213001 3" NPT SCH 40 PIPE PLUG 1
5 4072134001 3" NPT TEE 1
4 4072131001 PLUG BRASS, 1" NPT 1
3 4071540001 FLG CERAMIC 3/8" NPT 1
2 8002030C1 TANK VENT ASSY, 3" 1
1 407203901 PV ZERO BODY ASSEMBLY 1

6


Franklin Fueling Systems
PV-ZERO OVERALL DIMENSIONS
SEE BOM
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(UNLESS OTHERWISE SPECIFIED)
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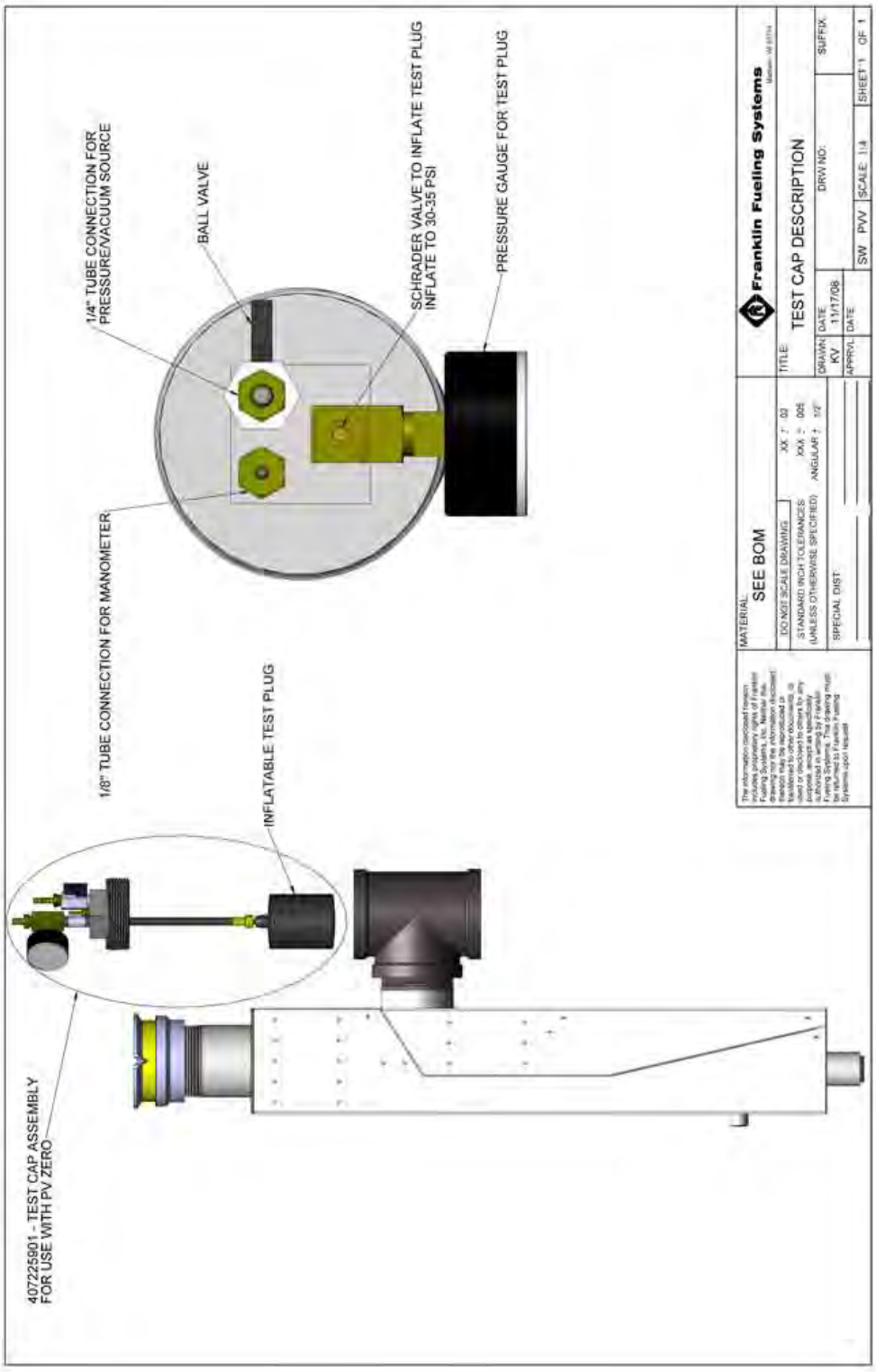
SHEET 1 OF 1
12.3
7.1
5.1
5.1
18.1
18.4
355


1/4" TUBE CONNECTION FOR PRESSURE/VACUUM SOURCE
BALL VALVE
SCHRADER VALVE TO INFLATE TEST PLUG INFLATE TO 30-35 PSI
PRESSURE GAUGE FOR TEST PLUG
1/8" TUBE CONNECTION FOR MANOMETER
INFLATABLE TEST PLUG
407225901 - TEST CAP ASSEMBLY FOR USE WITH PV ZERO
MATERIAL:
SEE BOM
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STANDARD INCH TOLERANCES (UNLESS OTHERWISE SPECIFIED)
SPECIAL DIST
Franklin Fueling Systems
TITLE:
TEST CAP DESCRIPTION
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KV
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11/17/08
APPRVL
DATE
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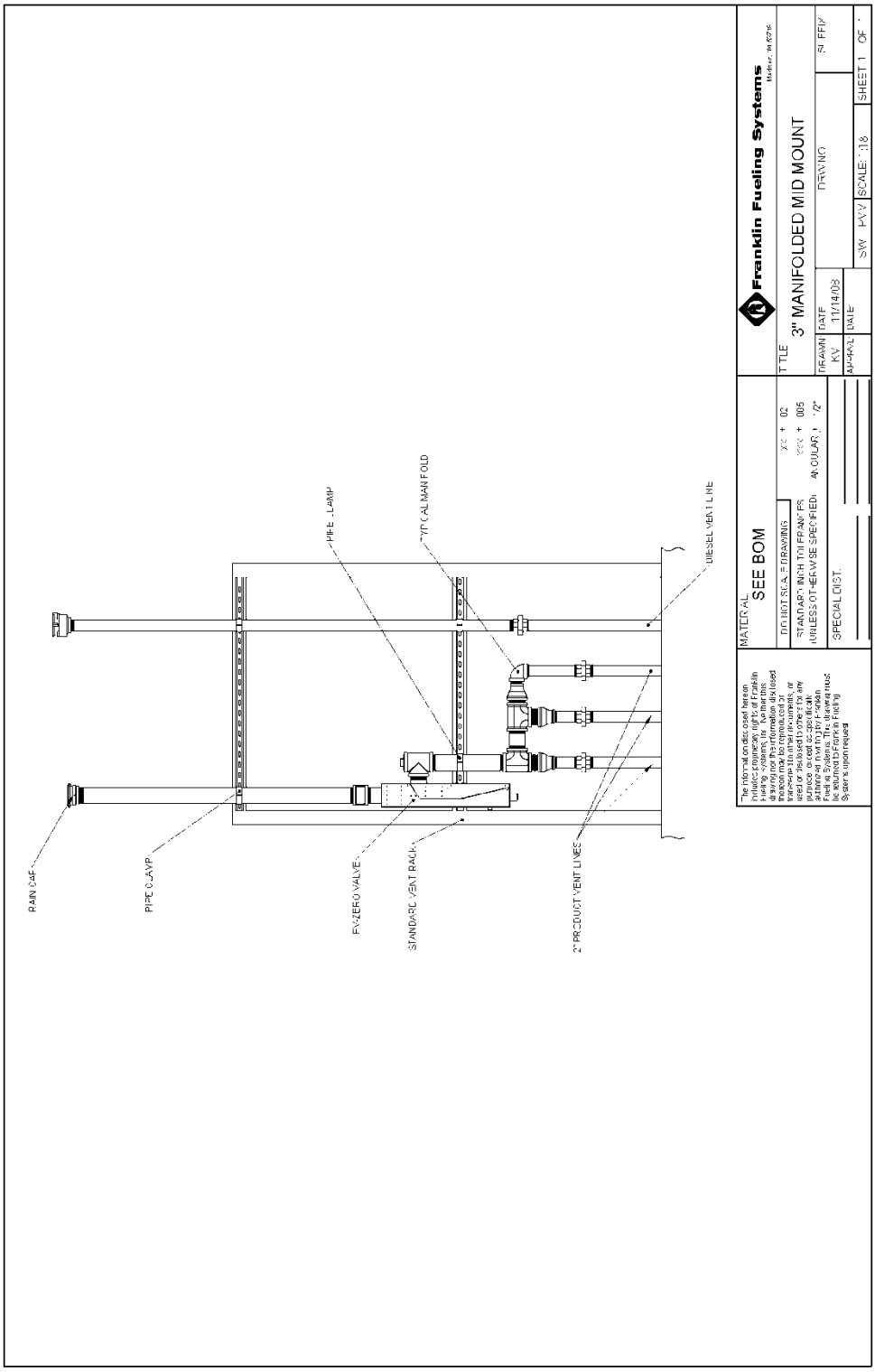
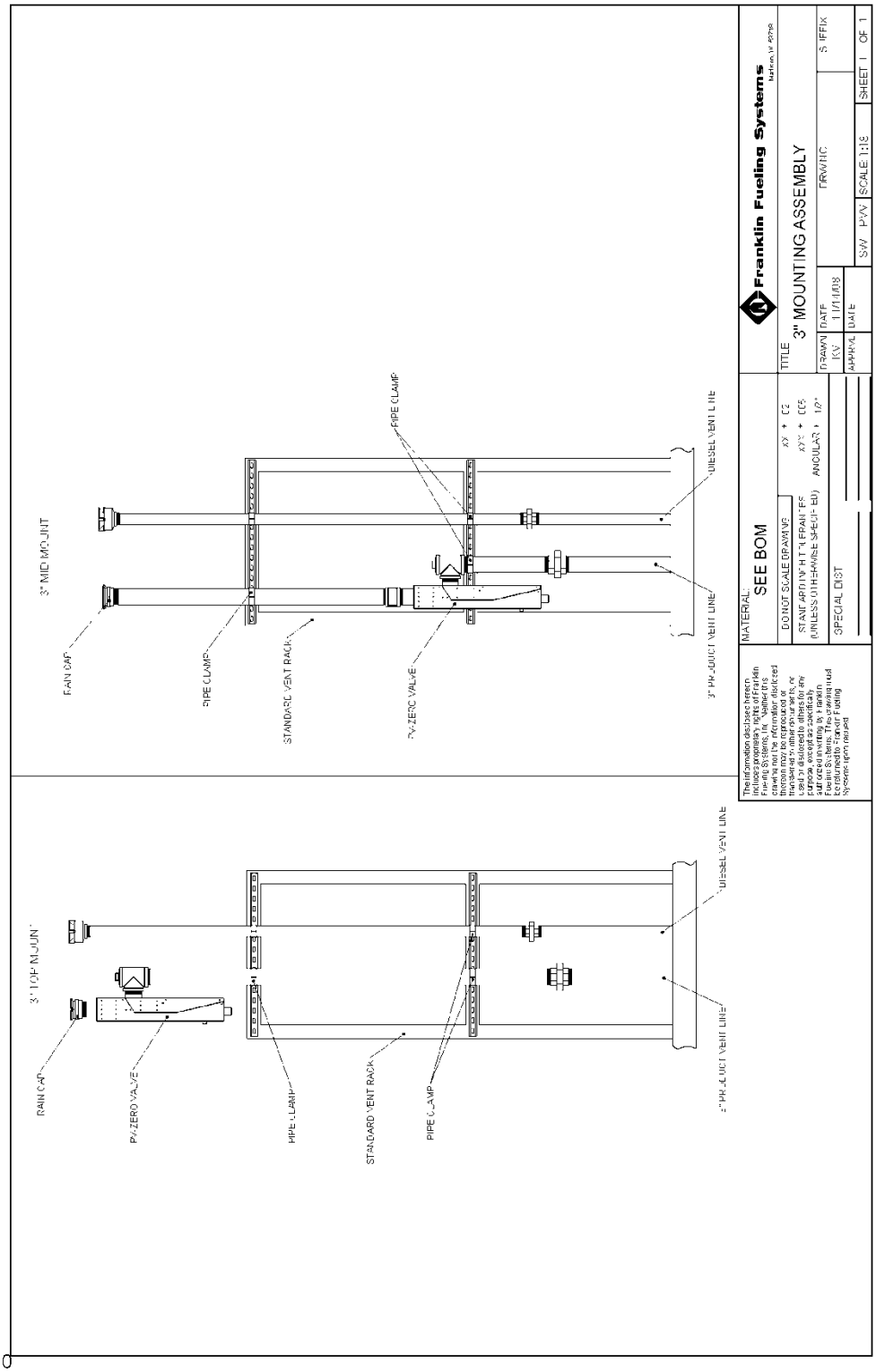
SUFFIX
SW PVV
SCALE: 1/4
SHEET 1 OF 1

8


RAIN CAP
PIPE CLAMP
FLEXIBLE VALVE
STANDARD VENT RACK
2" PRODUCT VENT LINES
PIPE CLAMP
TYPICAL MANIFOLD
DIESEL VENT LINE
Franklin Fueling Systems
3" MANIFOLDED MID MOUNT
SEE BOM
SPECIAL DIST
DRAWN
DATE
11/14/03
SCALE: 1/8
SHEET 1 OF 1


3" MID MOUNT
RAIN CAP
PIPE CLAMP
STANDARD VENT RACK
PV ZERO VALVE
PIPE CLAMP
DIESEL VENT LINE
3" PW-DUCT VENT LINE
3" TOP MOUNT
RAIN CAP
PV ZERO VALVE
PIPE CLAMP
STANDARD VENT RACK
PIPE CLAMP
DIESEL VENT LINE
3" PW-DUCT VENT LINE
MATERIAL
SEE BOM
DO NOT SCALE DRAWING
STANDARD TOLERANCES
(UNLESS OTHERWISE SPECIFIED)
SPECIAL DIST
Franklin Fueling Systems
TITLE
3" MOUNTING ASSEMBLY
DRAWN
KV
DATE
11/11/08
APPROV
DATE
SW P-VV
DRAWING
SCALE 1:18
SHEET 1 OF 1

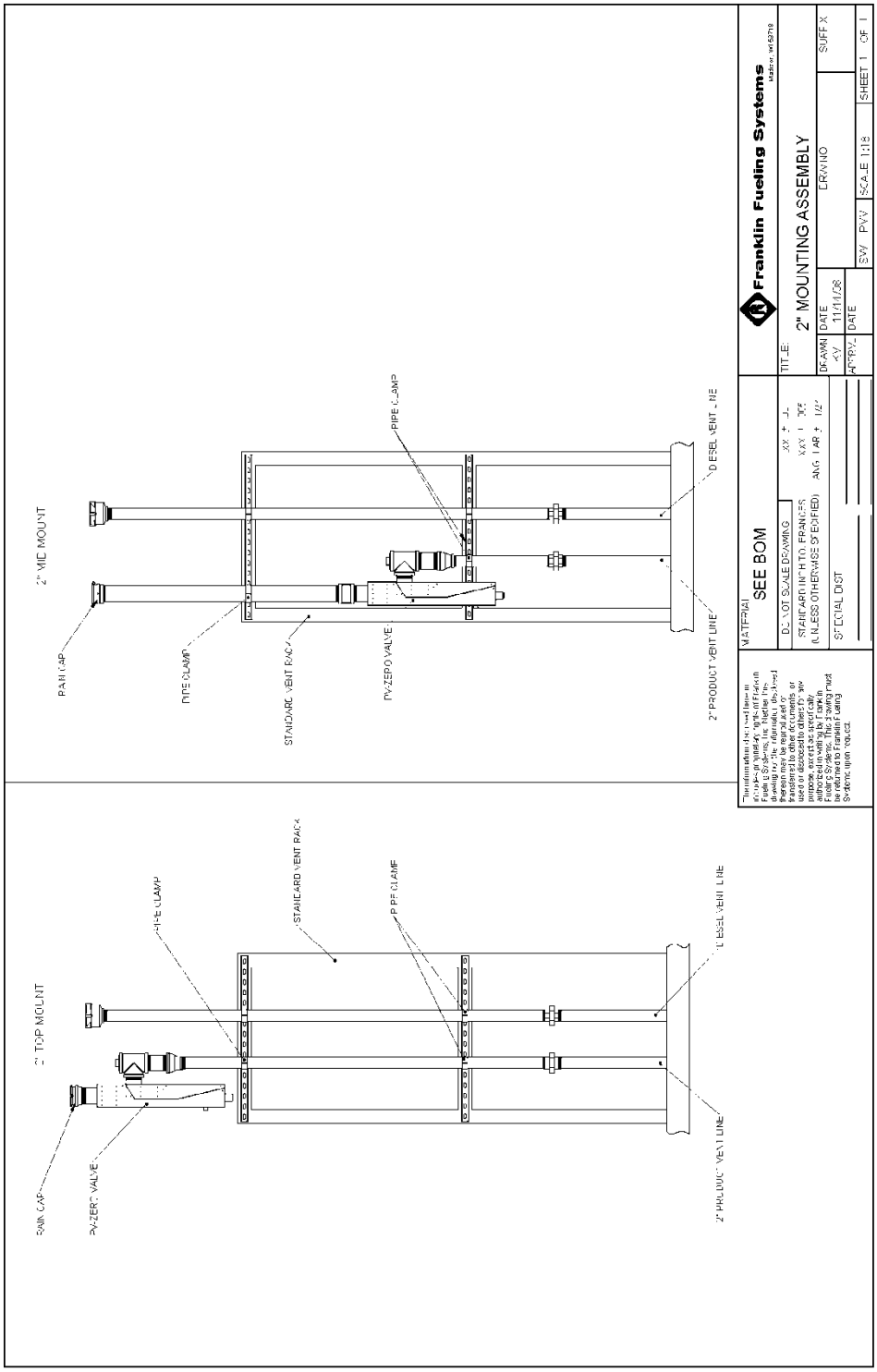

2" MID MOUNT
PAN CAP
PIPE CLAMP
STANDARD VENT RACK
PV-ZERO VALVE
PIPE CLAMP
2" DIESEL VENT LINE
2" PRODUCT VENT LINE
2" TOP MOUNT
PAN CAP
PV-ZERO VALVE
PIPE CLAMP
STANDARD VENT RACK
PIPE CLAMP
2" DIESEL VENT LINE
2" PRODUCT VENT LINE
MATERIAL
SEE BOM
DO NOT SCALE DRAWING
STANDARD INCH TO FRANCTION
(UNLESS OTHERWISE SPECIFIED)
SPECIAL DIST
Franklin Fueling Systems
TITLE:
2" MOUNTING ASSEMBLY
DRAWN
DATE
11/11/08
APPRV
DATE
DRWG NO
SUFF X
SW PVV
SCALE 1:18
SHEET 1 OF 1

Exhibit 3

VAULTED ABOVEGROUND STORAGE TANK CONFIGURATION *(Optional)*

This exhibit allows an alternate tank storage configuration for the stage I EVR system. A vaulted aboveground storage tank (AST) may be installed in substitute for a conventional underground storage tank (UST). The figures in this exhibit provide examples of typical vaulted AST configurations.

General Specifications

Alternate typical vaulted AST configurations for the stage I EVR Systems are shown in Figures 5-1, 5-2, 5-3, and 5-4.

Unless otherwise specified in this attachment, the vaulted AST configuration shall comply with the applicable performance standards and performance specifications in CP-201. The emergency vent shall be a certified vent listed in this attachment for ASTs and shall be installed, operated, maintained and meet any performance requirements specified in the applicable AST CARB Executive Order.

Figure 5-1: Front Sectional Views of Typical Vaulted AST

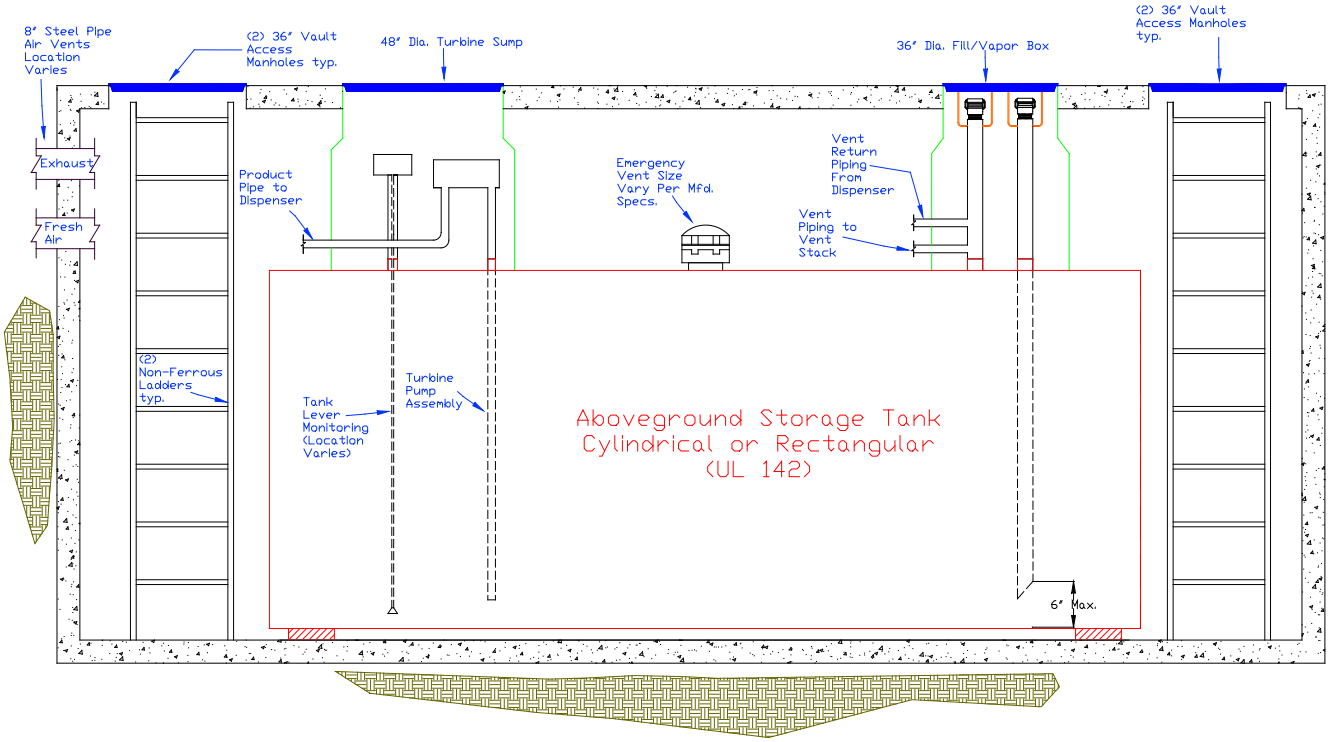


Figure 5-2: Top Sectional View of Typical Vaulted AST

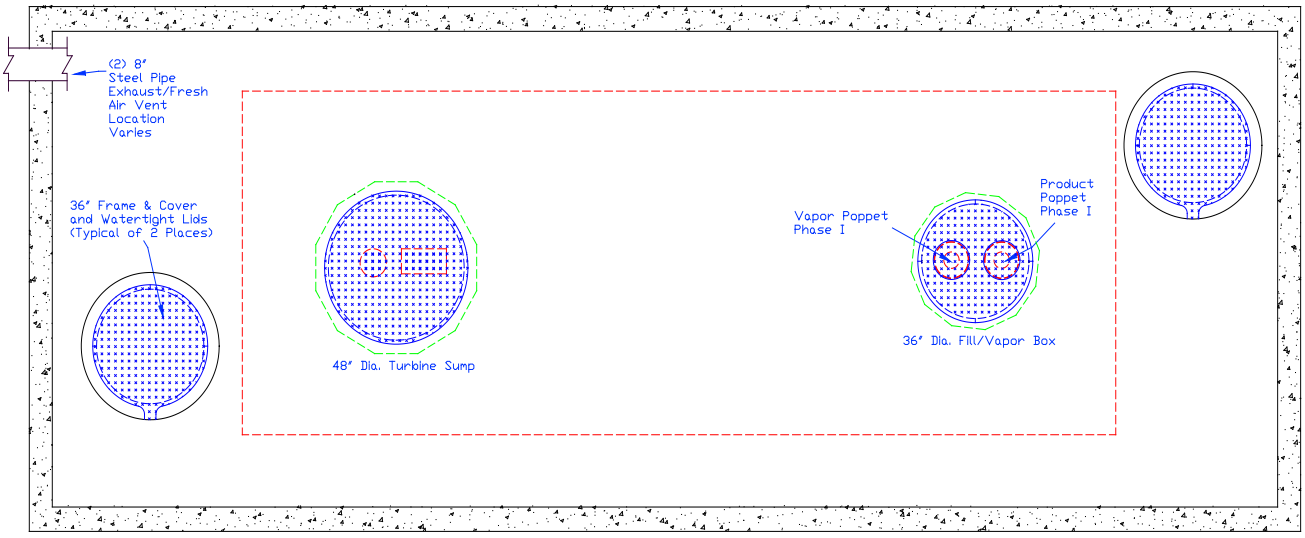


Figure 5-3: End Sectional View of Typical Vaulted AST

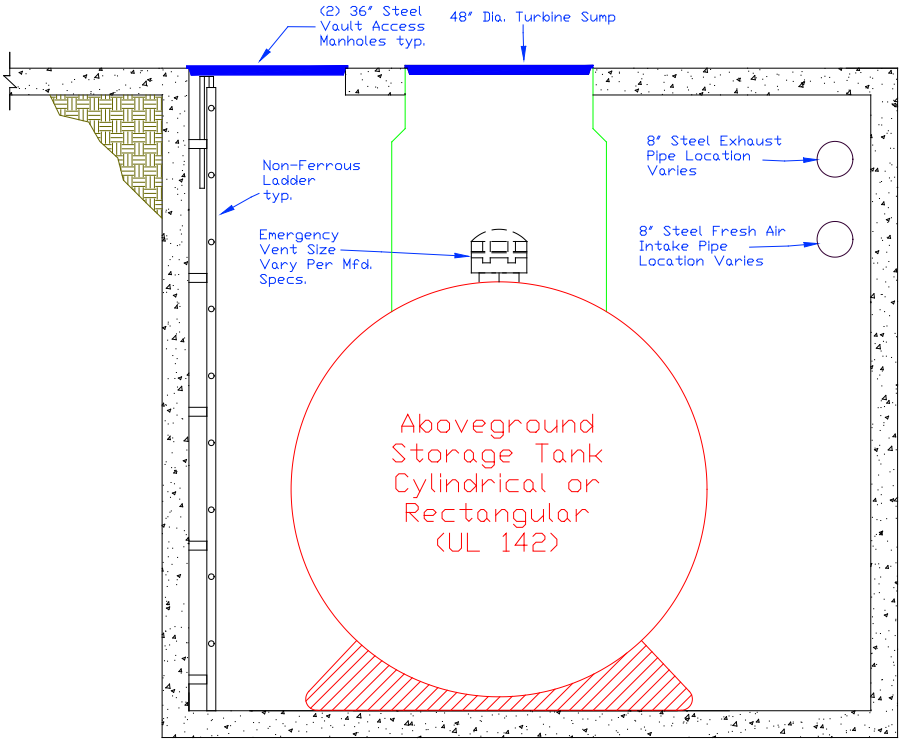


Figure 5-4: Sectional Views of Typical Vaulted AST (Ventilation)

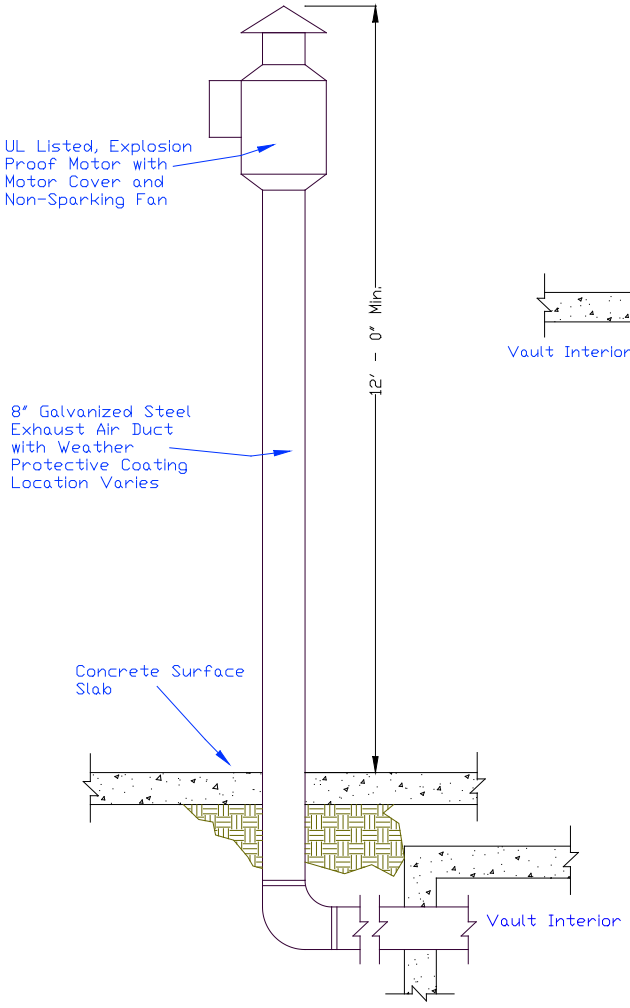


Figure 5-4a: Typical Exhaust

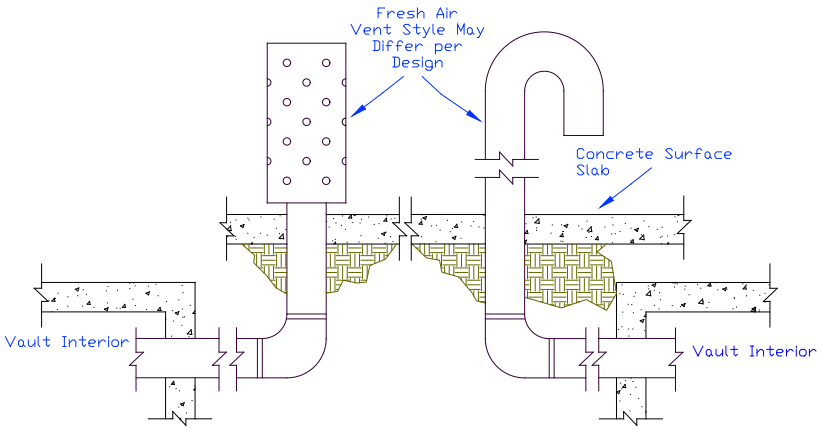


Figure 5-4b: Typical Fresh Air Intake

State of Oregon Department of Environmental Quality

OAR 340-244-0249 Attachments

Gasoline Dispensing Facility Test Methods

California Environmental Protection Agency

Air Resources Board

Vapor Recovery Test Procedure

TP-201.1E

Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves

Adopted: October 8, 2003

California Environmental Protection Agency
Air Resources Board

Vapor Recovery Test Procedure

TP-201.1E

Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves

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

1. PURPOSE AND APPLICABILITY

The purpose of this procedure is to determine the pressure and vacuum at which a Pressure-/Vacuum Vent Valve (P/V Valve) actuates, and to determine the volumetric leak rate at a given pressure as specified in CP-201, Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities. This procedure is applicable for certification and compliance testing of P/V Valves.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

The volumetric leak rate of a P/V Valve is determined by measuring the positive and negative flow rates at corresponding pressures. The positive and negative cracking pressures of the valve are determined by measuring the pressure at which the P/V Valve opens to atmospheric pressure. With the exception of certification testing performed by the Executive Officer, these measurements are determined by removing the P/V Valve and conducting the test on a test stand. A flow metering device is used to introduce flow while measuring pressure.

3. BIASES AND INTERFERENCES

3.1 Installing a P/V Valve onto the test stand in a manner that is not in accordance with the manufacturer's recommended installation instructions can produce erroneous results.

3.2 Leaks in the test stand or test equipment can produce erroneous results.

4. SENSITIVITY, RANGE, AND PRECISION

4.1 Electronic Pressure Measuring Device. Minimum sensitivity shall be 0.01 inches H_2O with a maximum full-scale range of 20 inches H_2O and minimum accuracy of plus or minus 0.50 percent full-scale range.

4.2 Flow Meter. The measurable leak rate is dependent upon the sensitivity, range and precision of the flow meter used for testing. For electronic flow metering devices, the minimum sensitivity shall be 1.0 ml/min (0.0021 CFH) with a minimum full-scale accuracy of ±1.0 percent. For rotameters, the flow meter minimum sensitivity shall be 12.5 ml/min (.026 CFH) with minimum accuracy of ± 5 percent full-scale. The device scale shall be 150mm (5.91 inches) tall to provide a sufficient number of graduations for readability.

5. EQUIPMENT

5.1 Nitrogen. Use commercial grade gaseous nitrogen in a high-pressure cylinder equipped with a pressure regulator and one (1.00) psig pressure relief valve. As an alternative, compressed air may be used to pressurize to the minimum working pressure required by the Flow Metering device.

5.2 Ballast Tank. If required, use a commercially available tank (2 gallon minimum), capable of being pressurized or evacuated (placed under vacuum) to the minimum working pressure required by the flow-metering device(s).

5.3 Vacuum Pump or Vacuum Generating Device. Use a commercially available vacuum pump or equivalent, capable of evacuating the ballast tank or test stand to the minimum working pressure required by the flow-metering device.

5.4 Electronic Pressure Gauge. Use an electronic pressure gauge or digital manometer that conforms to the minimum requirements listed in section 4 to measure the pressure inside of the test stand.

5.5 Flow Metering Device(s). Use either an electronic flow-metering device or Rotameter as described below to measure or introduce a volumetric flow rate. Although the use of either type of instrument is allowed, electronic flow metering devices provide higher accuracy and precision. For the purpose of certification testing, only electronic flow metering devices shall be used.

5.5.1 Electronic Flow Metering Device. Use a Mass Flow Meter that conforms to the minimum requirements listed in section 4 to introduce nitrogen or compressed air into the test stand. The Mass Flow Meter shall be equipped with a high precision needle valve to accurately adjust the flow settings. The meter may be used for both positive and negative flow rates by reconfiguring the pressure or vacuum lines.

5.5.2 Rotameters. Two (2) devices required. Use two Flow Meters with minimum specifications described in Section 4 to measure or introduce flow rates. One meter shall use a needle valve oriented for introducing positive flow and the other using an inverted needle valve for introducing vacuum.

5.6 Test Stand. If a bench test arrangement is used, use a test stand as shown in Figure 1, or equivalent, equipped with a 2-inch NPT threaded pipe on at least one end for attaching the P/V Valve in an upright position. If other than 2-inch NPT is required, use an adaptor to reduce or enlarge the 2 inch pipe. The test stand shall be equipped with at least two (2) ports used for introducing flow and measuring

pressure. Use a bypass valve to enable the tester to set the required flow without pressurizing the P/V Valve. Once the required flow rate is set, the bypass valve shall be closed to route the flow into the stand and pressurize the P/V Valve to check cracking pressure. Test stands may be constructed of various materials or dimensions. For certification testing conducted by Executive Officer only, the P/V valve may be isolated and tested in place at the facility.

6. PRE-TEST PROCEDURES

6.1 All pressure measuring device(s) shall be bench calibrated using a reference gauge, incline manometer or NIST traceable standard at least once every six (6) months. Calibration shall be performed at 20, 50, and 80 percent of full scale. Accuracy shall be within five (5) percent at each of these calibration points.

6.2 Electronic pressure measuring devices shall be calibrated immediately prior to testing using the zero gauge pressure adjustment knob located on the instrument.

6.3 The Flow Metering device(s) shall be calibrated using a reference meter or NIST traceable standard. Calibrations shall be performed at 20, 50, and 80 percent of full-scale range and shall take place at a minimum of once every six (6) months.

6.4 Leak check the test stand or test assembly prior to installing the P/V Valve.

(a) Install a 2-inch cap onto the NPT threads in place of the P/V Valve using pipe sealant or Teflon tape.

(b) Check all fittings for tightness and proper assembly.

(c) Slowly establish a stable gauge pressure in the test stand between 18.00 and 20.00 inches water column and allow pressure to stabilize.

(d) Check for leaks by applying a leak detection solution around all fittings and joints and by observing the pressure for pressure changes that may identify a leak. If no bubbles form, the test stand is leak tight.

(e) If soap bubbles form or the test stand pressure will not stabilize, repeat (a) through (d); it may be necessary to place the test apparatus in an environment that is free from the effects of wind or sunlight.

7. TEST PROCEDURE

7.1 Install the P/V Valve in an upright position following the installation instructions provided by the manufacturer. Incorrectly installing the valve will invalidate any pressure versus flow rate measurement.

7.2 Positive Leak Rate. Slowly open the control valve on the Positive Flow Metering device until the pressure stabilizes at the positive leak rate pressure described in CP-201 section 3. Maintain steady state pressure by using the control valve for at least ten (10) seconds. Steady state flow is indicated by a pressure change of no more than 0.05 inches H_2O on the pressure gauge. Record the final flow rate on the data sheet and close the control valve.

7.3 Positive Cracking Pressure. Open the bypass valve to route the flow outside of the test assembly. Open the control valve on the Positive Flow Metering device to establish a flow rate of 120 ml/min. Once flow is stabilized, close the bypass valve to route the flow into the test assembly. Observe the pressure. The P/V Valve should "crack" at a pressure within the range of positive cracking pressure as described in CP-201 section 3. This is marked by a sudden drop in pressure. Record the cracking pressure (highest pressure achieved***)*** on the data sheet and close the control valve.

7.4 Negative Leak Rate. Open the control valve on the Negative Flow Metering device until the pressure stabilizes at the negative leak rate pressure described in CP-201 section. Maintain steady state pressure by using the control valve for at least ten (10) seconds. Steady state flow is indicated by a pressure change of no more than 0.05 inches H_2O on the pressure gauge. Record the final flow rate on the data sheet and close the control valve.

7.5 Negative Cracking Pressure. Open the bypass valve to route the flow outside of the test assembly. Open the control valve on the Negative Flow Metering device to establish a negative flow rate of 200 ml/min. Once flow is stabilized, close the bypass valve to route the flow into the test assembly. Observe the pressure. The P/V Valve should "crack" at a pressure within the range of negative cracking pressure as described in CP-201 section 3. This is marked by a sudden drop in vacuum. Record the cracking pressure (highest vacuum achieved) on the data sheet and close the control valve.

8. POST-TEST PROCEDURES

8.1 Remove the P/V Valve from the test assembly.

8.2 Disassemble the pressure regulator from the compressed nitrogen cylinder (if used) and place the safety cap back on the cylinder.

8.3 Disassemble all remaining test equipment and store in a protected location.

9. CALCULATING RESULTS

9.1 Commonly used flow rate conversions:

1 CFH = 471.95 ml/min

Example: Convert 0.17 CFH to ml/min***:***

0.17 CFH (471.95) = 80 ml/min

1 ml/min = 0.00212 CFH

Example: Convert 100 ml/min to CFH:

100 ml/min (0.00212) = 0.21 CFH

10. REPORTING RESULTS

10.1 Record the station or location name, address and tester information on Form 1.

10.2 Record the P/V Valve manufacturer's name and model number on Form 1.

10.3 Record the results of the test(s) on Form 1. Use additional copies of Form 1 if needed to record additional P/V Valve tests.

10.4 Alternate data sheets or Forms may be used provided they contain the same parameters as identified on Form 1.

10.5 Use the formulas and example equation provided in Section 9 to convert the flow measurements into units of cubic feet per hour (CFH).

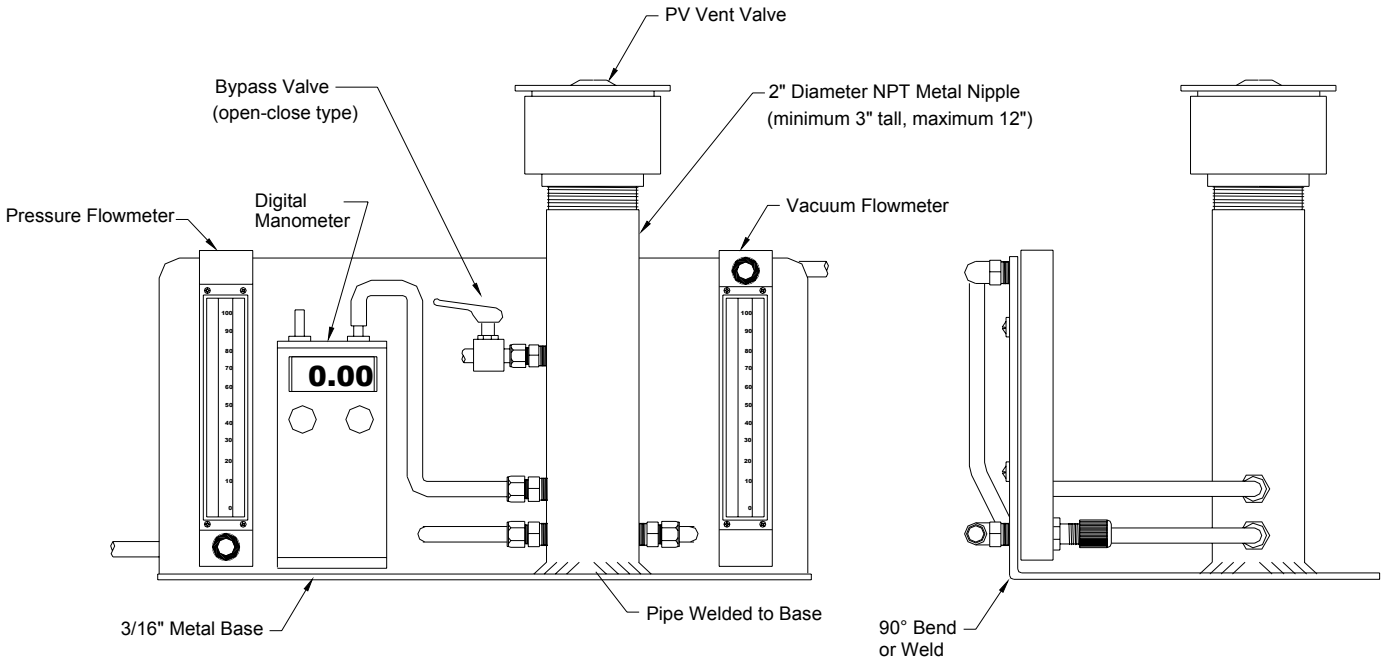
10.6 For certification testing, compare results to the performance standards listed in Table 3-1 of CP-201. For compliance testing, compare the results to the manufacturer's specifications listed on the P/V Valve for both leak rate and cracking pressure. For volumetric leak rates less than the manufacturers specified leakrate and cracking pressures within the manufacturers specified range, circle Pass on the data sheet where provided. If either the volumetric leak rate or cracking pressure exceeds the manufacturers specifications, circle Fail on the data sheet where provided.

11. ALTERNATIVE TEST PROCEDURES

This procedure shall be conducted as specified. Any modifications to this test procedure shall not be used unless prior written approval has been obtained from the Executive Officer pursuant to section 14 of CP-201.

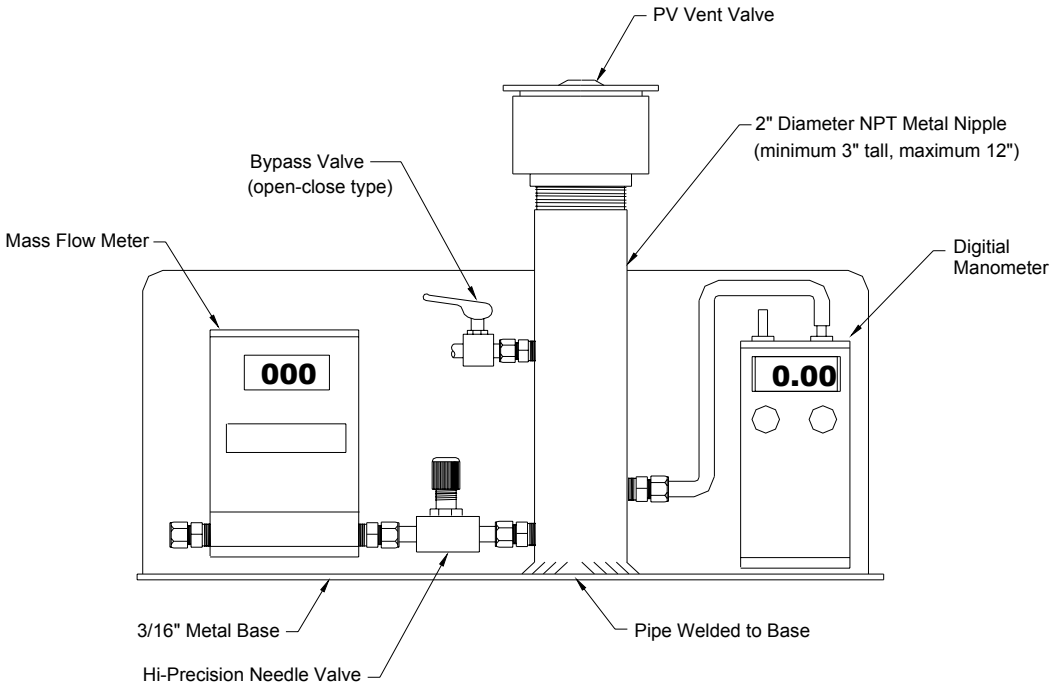
Figure 1

Example of Test Stand



FLOW METER CONFIGURATION

SIDE VIEW



MASS FLOW METER CONFIGURATION

Form 1

Pressure/Vacuum (P/V) Vent Valve Data Sheet

Facility Name:	Test Date:
Address:	Test Company:
City :	Tester Name:

P/V Valve Manufacturer: **Model Number:**	**Pass Fail**
Manufacturers Specified Positive Leak Rate (CFH):	**Manufacturers Specified Negative Leak Rate (CFH):**
Measured Positive Leak Rate (CFH):	Measured Negative Leak Rate (CFH):
Positive Cracking Pressure (in. H_2O):	Negative Cracking Pressure (in. H_2O):

P/V Valve Manufacturer: **Model Number:**	**Pass Fail**
Manufacturers Specified Positive Leak Rate (CFH):	**Manufacturers Specified Negative Leak Rate (CFH):**
Measured Positive Leak Rate (CFH):	Measured Negative Leak Rate (CFH):
Positive Cracking Pressure (in. H_2O):	Negative Cracking Pressure (in. H_2O):

P/V Valve Manufacturer: **Model Number:**	**Pass Fail**
Manufacturers Specified Positive Leak Rate (CFH):	**Manufacturers Specified Negative Leak Rate (CFH):**
Measured Positive Leak Rate (CFH):	Measured Negative Leak Rate (CFH):
Positive Cracking Pressure (in. H_2O):	Negative Cracking Pressure (in. H_2O):

P/V Valve Manufacturer: **Model Number:**	**Pass Fail**
Manufacturers Specified Positive Leak Rate (CFH):	**Manufacturers Specified Negative Leak Rate (CFH):**
Measured Positive Leak Rate (CFH):	Measured Negative Leak Rate (CFH):
Positive Cracking Pressure (in. H_2O):	Negative Cracking Pressure (in. H_2O):

California Environmental Protection Agency

Air Resources Board

Vapor Recovery Test Procedure

TP-201.3

Determination of 2 Inch WC Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities

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

California Environmental Protection Agency
Air Resources Board
Vapor Recovery Test Procedure

TP-201.3

Determination of 2 Inch WC Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities

1 APPLICABILITY

Definitions common to all certification and test procedures are in:

D-200 Definitions for Certification Procedures and Test Procedures for Vapor Recovery Systems

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

1.1 This test procedure is used to quantify the vapor tightness of vapor recovery systems installed at gasoline dispensing facilities (GDF) equipped with pressure/vacuum (P/V) valves, provided that the designed pressure setting of the P/V valves is a minimum of 2.5 inches of water column (inches H_2O).

1.2 Systems equipped with a P/V valve(s) allowed to have a designed cracking pressure less than 2.5 inches H_2O shall be bagged to eliminate any flow contribution through the valve assembly from the test results. The valve/vent pipe connection, however, shall remain unobstructed during this test.

1.3 At facilities not required to be equipped with a P/V valve(s), the vent pipe(s) shall be capped. For those installations, the test may be conducted at the vent pipe(s).

2 PRINCIPLE AND SUMMARY OF TEST PROCEDURE

2.1 The entire vapor recovery system is pressurized with nitrogen to two (2.0) inches H_2O. The system pressure is then allowed to decay and the pressure after five (5) minutes is compared with an allowable value. The minimum allowable five-minute final pressure is based on the system ullage and pressure decay equations. For the purpose of compliance

determination, this test shall be conducted after all back-filling, paving, and installation of all Phase I and Phase II components, including P/V valves, has been completed.

2.2 For GDF equipped with a coaxial Phase I system, this test shall be conducted at a Phase II vapor riser. For GDF which utilize a two-point Phase I system, this test may be conducted at either a Phase II riser or a Phase I vapor coupler provided that the criteria set forth in Section 6.7 have been met. If the integrity criteria for two-point systems specified in Section 6.7 are met, it is recommended that this test be conducted at the Phase I vapor coupler.

3 RANGE

3.1 If mechanical pressure gauges are employed, the full-scale range of pressure gauges shall be 0-2.0, 0-1.0, and 0-0.50 inches H_2O column. Maximum incremental graduations of the pressure gauge shall be 0.05 inches H_2O and the minimum accuracy of the gauge shall be three percent of full scale. The minimum diameter of the pressure gauge face shall be 4 inches.

3.2 If an electronic pressure measuring device is used, the full-scale range of the device shall not exceed 0-10 inches H_2O with a minimum accuracy of 0.5 percent of full-scale. A 0-20 inches H_2O device may be used, provided the equivalent accuracy is not less than 0.25 percent of full-scale.

3.3 The minimum total ullage, for each individual tank, shall be 1,000 gallons or 25% of the tank capacity, whichever is less. The maximum total ullage, for all manifolded tanks, shall not exceed 25,000 gallons. These values are exclusive of all vapor piping volumes.

3.4 The minimum and maximum nitrogen feed-rates, into the system, shall be one (1) and five (5) CFM, respectively.

4 INTERFERENCES

4.1 Introduction of nitrogen into the system at flowrates exceeding five (5) CFM may bias the results of the test toward non-compliance. Only gaseous nitrogen shall be used to conduct this test. Air, liquefied nitrogen, helium, or any gas other than nitrogen shall not be used for this test procedure.

4.2 For vacuum-assist Phase II systems which utilize an incinerator, power to the collection unit and the processor shall be turned off during testing.

4.3 For vacuum-assist systems, with positive displacement vacuum pumps, which locate the vacuum producing device in-line between the Phase II vapor riser and the storage tank, the following requirements shall apply:

4.3.1 A valve shall be installed at the vacuum producing device. When closed, this valve shall isolate the vapor passage downstream of the vacuum producing device.

4.3.2 The storage tank side of the vacuum producing device shall be tested in accordance with the procedures outlined in Section 7 of this method. Compliance shall be determined by comparing the final five-minute pressure with the allowable minimum five-minute final pressure from the first column (1-6 affected nozzles) in Table IB or use the corresponding equation in Section 9.2.

4.3.3 The upstream vapor passage (nozzle to vacuum producing device) shall also be tested. Methodology for this test shall be submitted to the California Air Resources Board (CARB) for approval prior to submission of test results or shall be conducted in accordance with the procedures set forth in the applicable CARB Executive Order.

4.4 The results of this static pressure integrity test shall not be used to verify compliance if an Air to Liquid Volumetric Ratio Test (TP-201.5 or equivalent) was conducted within 24 hours prior to this test.

4.5 Thermal Bias for Electronic Manometers

Electronic manometers shall have a warm-up period of at least 15 minutes followed by a five minute drift check. If the drift exceeds 0.01 inches water column, the instrument should not be used.

5 APPARATUS

5.1 Nitrogen

Use commercial grade nitrogen in a high pressure cylinder, equipped with a two-stage pressure regulator and a one psig pressure relief valve.

5.2 Pressure Measuring Device

Use 0-2.0, 0-1.0, and 0-0.50 inches H_2O pressure gauges connected in parallel, a 0-2 inches H_2O manometer, or an electronic pressure measuring device to monitor the pressure decay in the vapor recovery system. The pressure measuring device shall, at a minimum, be readable to the nearest 0.05 inches H_2O.

5.3 "T" Connector Assembly

See Figure 1 for example.

5.4 Vapor Coupler Integrity Assembly

Assemble OPW 633-A, 633-B, and 634-A adapters, or equivalent, as shown in Figure 2. If the test is to be conducted at the storage tank Phase I vapor coupler, this assembly shall

be used prior to conducting the static leak test in order to verify the pressure integrity of the vapor poppet. The internal volume of this assembly shall not exceed 0.1 cubic feet.

5.5 Vapor Coupler Test Assembly

Use a compatible OPW 634-B cap, or equivalent, equipped with a center probe to open the poppet, a pressure measuring device to monitor the pressure decay, and a connection for the introduction of nitrogen into the system. See Figure 3 for an example.

5.6 Stopwatch

Use a stopwatch accurate to within 0.2 seconds.

5.7 Flow Meter

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 is between 1.0 and 5.0 CFM.

5.8 Combustible Gas Detector

A Bacharach Instrument Company, Model 0023-7356, or equivalent, may be used to verify the pressure integrity of system components during this test.

5.9 Leak Detection Solution

Any liquid solution designed to detect vapor leaks may be used to verify the pressure integrity of system components during this test.

6 PRE-TEST PROCEDURES

6.1 The following safety precautions shall be followed:

6.1.1 Only nitrogen shall be used to pressurize the system.

6.1.2 A one psig relief valve shall be installed to prevent the possible over-pressurizing of the storage tank.

6.1.3 A ground strap should be employed during the introduction of nitrogen into the system.

6.2 Failure to adhere to any or all of the following time and activity restrictions shall invalidate the test results:

6.2.1 There shall be no Phase I bulk product deliveries into or out of the storage tank(s) within the three (3) hours prior to the test or during performance of this test procedure.

6.2.2 There shall be no product dispensing within thirty (30) minutes prior to the test or during performance of this test procedure.

6.2.3 Upon commencement of the thirty minute "no dispensing" portion of this procedure, the headspace pressure in the tank shall be measured. If the pressure exceeds 0.50 inches H_2O, the pressure shall be carefully relieved in accordance with all applicable safety requirements. After the thirty minute "no dispensing" portion of this procedure, and prior to introduction of nitrogen, the headspace pressure shall again be lowered, if necessary, to less than 0.50 inches H_2O.

6.2.4 There shall be no Air to Liquid Volumetric Ratio Test (TP-201.5 or equivalent) conducted within the twenty-four (24) hour period immediately prior to this test.

6.2.5 The test shall be conducted with the station in normal operating mode. This includes all nozzles properly hung up in the dispenser boots and all dispenser cabinet covers in place. The exception to normal operating mode is that dispensing is disallowed as specified.

6.3 Measure the gallons of gasoline present in each underground storage tank and determine the actual capacity of each storage tank from facility records. Calculate the ullage space for each tank by subtracting the gasoline gallonage present from the actual tank capacity. The minimum ullage during the test, for all manifolded tanks, shall be 1,000 gallons or 25 percent of the tank capacity, whichever is less. The total ullage, for all manifolded tanks, shall not exceed 25,000 gallons.

6.4 For two-point Phase I systems, this test shall be conducted with the dust cap removed from both the product and the vapor coupler. This is necessary to determine the vapor tightness of the Phase I vapor poppet. See Section 6.7 if this test is to be conducted at the Phase I vapor coupler.

6.4.1 For coaxial Phase I systems, this test shall be conducted with the dust cap removed from the Phase I coupler. This is necessary to insure the vapor tightness of the Phase I vapor poppet.

6.4.2 Verify that the liquid level in the storage tank is at least four (4) inches above the highest opening at the bottom of the submerged drop tube.

6.5 If the Phase I containment box is equipped with a drain valve, this test shall be conducted with the drain valve installed and the manhole cover removed. If the drain valve is cover-

actuated, the test shall be done once with the cover removed and repeated with the cover installed.

6.6 If the test is to conducted at a Phase II vapor riser, disconnect the dispenser end of one vapor recovery hose and install the "T" connector assembly (see Figure 1). Connect the nitrogen gas supply (do not use air) and the pressure measuring device to the "T" connector.

6.6.1 For those Phase II vapor systems utilizing a dispenser mounted remote vapor check valve, the "T" connector assembly shall be installed on the vapor riser side of the check valve.

6.7 If this test is to be conducted at the Phase I vapor coupler on a two-point Phase I system, the procedures set forth in subsections 6.7.1 and 6.7.2 shall be successfully completed prior to testing. The static pressure integrity test shall not be conducted at the Phase I coupler at facilities equipped with coaxial Phase I systems.

6.7.1 Connect the Vapor Coupler Integrity Assembly to the Phase I vapor coupler. Connect the Vapor Coupler Test Assembly. Connect the nitrogen supply to the assembly and carefully pressurize the internal volume of the assembly to two (2.0) inches H_2O. Start the stopwatch. Record the final pressure after one minute.

6.7.2 If the pressure after one minute is less than 0.25 inches H_2O, the leak rate through the Phase I vapor poppet precludes conducting the static leak test at this location. If the pressure after one minute is greater than or equal to 0.25 inches H_2O, the static leak test may be conducted at this location. This criteria assures a maximum leak rate through the Phase I vapor poppet of less than 0.0004 cubic feet per minute.

6.7.3 Disconnect the Vapor Coupler Integrity Assembly to the Phase I vapor coupler. If the requirements of subsection 6.7.2 were met, connect the Vapor Coupler Test Assembly to the Phase I vapor coupler.

6.7.4 Product may be poured onto the Phase I vapor coupler to check for leaks. This diagnostic procedure shall not be substituted for the procedures set forth in subsections 6.7.1 and 6.7.2.

6.8 All pressure measuring device(s) shall be bench calibrated using either a reference gauge or incline manometer. Calibration shall be performed at 20, 50, and 80 percent of full scale. Accuracy shall be within two percent at each of these calibration points. Calibrations shall be conducted on a frequency not to exceed 90 days.

6.9 Use the flowmeter to determine the nitrogen regulator delivery pressures which correspond to nitrogen flowrates of 1.0 and 5.0 CFM. These pressures define the

allowable range of delivery pressures acceptable for this test procedure. Also record the regulator delivery pressure setting, and the corresponding nitrogen flowrate that will be used during the test. As an alternative, the flowmeter may be connected, in-line between the nitrogen supply regulator and Vapor Coupler Test Assembly, during the test.

6.10 Use Equation 9.3 to calculate the approximate time required to pressurize the system ullage to the initial starting pressure of two (2.0) inches H_2O. This will allow the tester to minimize the quantity of nitrogen introduced into those systems which cannot comply with the static leak standards.

6.11 Attach the Vapor Coupler Test assembly to the Phase I poppet or the "T" connector assembly to the Phase II vapor riser. Read the initial pressure of the storage tank and underground piping. If the initial pressure is greater than 0.5 inches H_2O, carefully bleed off the pressure, in accordance with all applicable safety procedures, in the storage tank and underground piping to less than 0.5 inches H_2O column.

6.12 Any electronic manometers shall be subject to warm-up and drift check before use; see Section 4.5.

7 TESTING

7.1 Open the nitrogen gas supply valve and set the regulator delivery pressure within the allowable range determined in Section 6.9, and start the stopwatch. Pressurize the vapor system (or subsystem for individual vapor return line systems) to **at least 2.2 inches H_2O** initial pressure. It is critical to maintain the nitrogen flow until the pressure stabilizes, indicating temperature and vapor pressure stabilization in the tanks. Check the test equipment using leak detecting solution or a combustible gas detector to verify that all test equipment is leak tight. Note: if a combustible gas detector is used to search for leaks, components which were certified with an allowable leak rate, such as 0.38 CFH at a pressure of two (2) inches, cannot be determined to be faulty solely on the basis of the concentration registered on the instrument.

7.1.1 If the time required to achieve the initial pressure of two (2.0) inches H_2O exceeds twice the time derived from Equation 9.3, stop the test and use liquid leak detector, or a combustible gas detector, to find leak(s) in the system. Failure to achieve the initial starting pressure within twice the time derived from Equation 9.3 demonstrates the inability of the system to meet the performance criteria. Repair or replace the faulty component(s) and restart the test pursuant to Section 7.1.

7.2 Close and disconnect the nitrogen supply. Start the stopwatch when the pressure has decreased to the initial starting pressure of two (2.0) inches H_2O.

7.3 At one-minute intervals during the test, record the system pressure. After five minutes, record the final system pressure. See the applicable of Tables 1A (or Equation 9.1) or 1B (or equation 9.2) to determine the acceptability of the final system static pressure results. For intermediate values of ullage in Tables 1A and 1B, linear interpolation may be employed.

7.4 If the system failed to meet the criteria set forth in Table 1A or 1B (or the appropriate equation in Section 9), repressurize the system and check all accessible vapor connections using leak detector solution or a combustible gas detector. If vapor leaks in the system are encountered, repair or replace the defective component and repeat the test. Potential sources of leaks include nozzle check valves, nozzle vapor paths, pressure/vacuum relief valves, containment box drain valve assemblies, and plumbing connections at the risers.

7.4.1 If the facility fails to comply with the static leak test standards and the two point Phase I system utilizes overfill prevention devices in the drop tubes which were installed before July 1, 1993, and which are unable to pass the test with the dust caps removed from the product and vapor couplers (see Sec. 6.4), the test may be conducted with the caps on the couplers, as an exception.

This exception is not intended to allow bleed holes in drop tubes.

This exception expires on January 1, 2002, after which date all testing shall be conducted with the fill and vapor caps removed from two point systems. Under no circumstances may the test be conducted with the caps on coaxial Phase I couplers.

7.5 After the remaining system pressure has been relieved, remove the "T" connector assembly and reconnect the vapor recovery hose, if applicable.

7.6 If the vapor recovery system utilizes individual vapor return lines, repeat the leak test for each gasoline grade. Avoid leaving any vapor return line open longer than is necessary to install or remove the "T" connector assembly.

7.7 If the applicable CARB Executive Order requires the test to be conducted with and without the containment box cover in place, repeat the test with the cover in place. In these cases clearly specify, on Form 1, which results represent the pressure integrity with and without the cover in place.

8 POST-TEST PROCEDURES

8.1 Use the applicable of Table 1A or 1B, or the applicable of Equations 9.1 or 9.2, to determine the compliance status of the facility by comparing the final five-minute pressure with the minimum allowable final pressure.

8.1.1 For balance Phase II systems use Table 1A or the applicable of Equation 9.1 to determine compliance.

8.1.2 For vacuum-assist Phase II systems use Table 1B or the applicable of Equation 9.2 to determine compliance.

9 CALCULATIONS

9.1 For Phase II Balance Systems, the minimum allowable five-minute final pressure, with an initial pressure of two (2.0) inches H_2O, shall be calculated as follows:

$$P_f = 2e^{\left(\frac{-760.490}{V}\right)} \quad \text{if } N = 1-6 \qquad \text{[Equation 9-1]}$$

$$P_f = 2e^{\left(\frac{-792.196}{V}\right)} \quad \text{if } N = 7-12$$

$$P_f = 2e^{\left(\frac{-824.023}{V}\right)} \quad \text{if } N = 13-18$$

$$P_f = 2e^{\left(\frac{-855.974}{V}\right)} \quad \text{if } N = 19-24$$

$$P_f = 2e^{\left(\frac{-888.047}{V}\right)} \quad \text{if } N > 24$$

where:

N = The number of affected nozzles. For manifolded systems, N equals the total number of nozzles. For dedicated plumbing configurations, N equals the number of nozzles serviced by the tank being tested.

P_f = The minimum allowable five-minute pressure, inches H_2O

V = The total ullage affected by the test, gallons

e = A dimensionless constant approximately equal to 2.718

2 = The initial starting pressure, inches H_2O

9.2 For Phase II Vacuum Assist Systems, the minimum allowable five-minute final pressure, with an initial pressure of two (2.0) inches H_2O, shall be calculated as follows:

$$P_f = 2e^{\left(\frac{-500.887}{V}\right)} \quad \text{if } N = 1-6 \qquad \text{[Equation 9-2]}$$

$$P_f = 2e^{\left(\frac{-531.614}{V}\right)} \quad \text{if } N = 7-12$$

$$P_f = 2e^{\left(\frac{-562.455}{V}\right)} \quad \text{if } N = 13-18$$

$$P_f = 2e^{\left(\frac{-593.412}{V}\right)} \quad \text{if } N = 19-24$$

$$P_f = 2e^{\left(\frac{-624.483}{V}\right)} \quad \text{if } N > 24$$

where:

N = The number of affected nozzles. For manifolded systems, N equals the number of nozzles. For dedicated plumbing configurations, N equals the number of nozzles serviced by the tank being tested.

P_f = The minimum allowable five-minute final pressure, inches H_2O

V = The total ullage affected by the test, gallons

e = A dimensionless constant approximately equal to 2.718

2 = The initial starting pressure, inches H_2O

9.3 The minimum time required to pressurize the system ullage from zero (0) to two (2.0) inches H_2O gauge pressure shall be calculated as follows:

$$t_2 = \frac{V}{[1980]\ F} \qquad \text{[Equation 9-3]}$$

where:

t_2 = The minimum time to pressurize the ullage to two inches H_2O, minutes

V = The total ullage affected by the test, gallons

F = The nitrogen flowrate into the system, CFM

1980 = The conversion factor for pressure and gallons

9.4 If the policy of the local District requires an allowable tolerance for testing error, the minimum allowable five-minute final pressure, including testing error, shall be calculated as follows:

$$P_{f-E} = 2 - \left[1 + \left(\frac{E}{100}\right)\right](408.9 - (P_f + 406.9)) \qquad \text{[Equation 9-4]}$$

where:

P_{f-E} = The minimum allowable five-minute final pressure including allowable testing error, inches H_2O

E = The allowable testing error, percent

P_f = The minimum allowable five-minute final pressure calculated in Equations 9-1 or 9-2, inches H_2O

2 = The initial starting pressure, inches H_2O

408.9 = Atmospheric pressure plus the initial starting pressure, inches H_2O

406.9 = Atmospheric pressure, inches H_2O

10 REPORTING

10.1 The calculated ullage and system pressures for each five-minute vapor recovery system test shall be reported as shown in Form 1. Be sure to include the Phase I system type (two-point or coaxial), the Phase II system type, whether the system is manifolded, and the one-minute pressures during the test.

TABLE 1A

PHASE II **BALANCE** SYSTEMS

PRESSURE DECAY CRITERIA

INITIAL PRESSURE OF 2 INCHES WATER COLUMN (WC)

MINIMUM PRESSURE AFTER 5 MINUTES, INCHES WC

ULLAGE, GALLONS	NUMBER OF AFFECTED NOZZLES				
	01-06	07-12	13-18	19-24	>24
500	0.44	0.41	0.38	0.36	0.34
550	0.50	0.47	0.45	0.42	0.40
600	0.56	0.53	0.51	0.48	0.46
650	0.62	0.59	0.56	0.54	0.51
700	0.67	0.64	0.62	0.59	0.56
750	0.73	0.70	0.67	0.64	0.61
800	0.77	0.74	0.71	0.69	0.66
850	0.82	0.79	0.76	0.73	0.70
900	0.86	0.83	0.80	0.77	0.75
950	0.90	0.87	0.84	0.81	0.79
1,000	0.93	0.91	0.88	0.85	0.82
1,200	1.06	1.03	1.01	0.98	0.95
1,400	1.16	1.14	1.11	1.09	1.06
1,600	1.24	1.22	1.19	1.17	1.15
1,800	1.31	1.29	1.27	1.24	1.22
2,000	1.37	1.35	1.32	1.30	1.28
2,200	1.42	1.40	1.38	1.36	1.34
2,400	1.46	1.44	1.42	1.40	1.38
2,600	1.49	1.47	1.46	1.44	1.42
2,800	1.52	1.51	1.49	1.47	1.46
3,000	1.55	1.54	1.52	1.50	1.49
3,500	1.61	1.59	1.58	1.57	1.55
4,000	1.65	1.64	1.63	1.61	1.60
4,500	1.69	1.68	1.67	1.65	1.64
5,000	1.72	1.71	1.70	1.69	1.67
6,000	1.76	1.75	1.74	1.73	1.72
7,000	1.79	1.79	1.78	1.77	1.76
8,000	1.82	1.81	1.80	1.80	1.79
9,000	1.84	1.83	1.83	1.82	1.81
10,000	1.85	1.85	1.84	1.84	1.83
15,000	1.90	1.90	1.89	1.89	1.89
20,000	1.93	1.91	1.92	1.92	1.91
25,000	1.94	1.94	1.94	1.93	1.93

Note: For manifolded Phase II Balance Systems, the **"Number of Affected Nozzles"** shall be the total of all gasoline nozzles. For dedicated return configurations, the **"Number of Affected Nozzles"** shall be the total of those nozzles served by the tank being tested.

TABLE 1B

PHASE II ASSIST SYSTEMS

PRESSURE DECAY CRITERIA

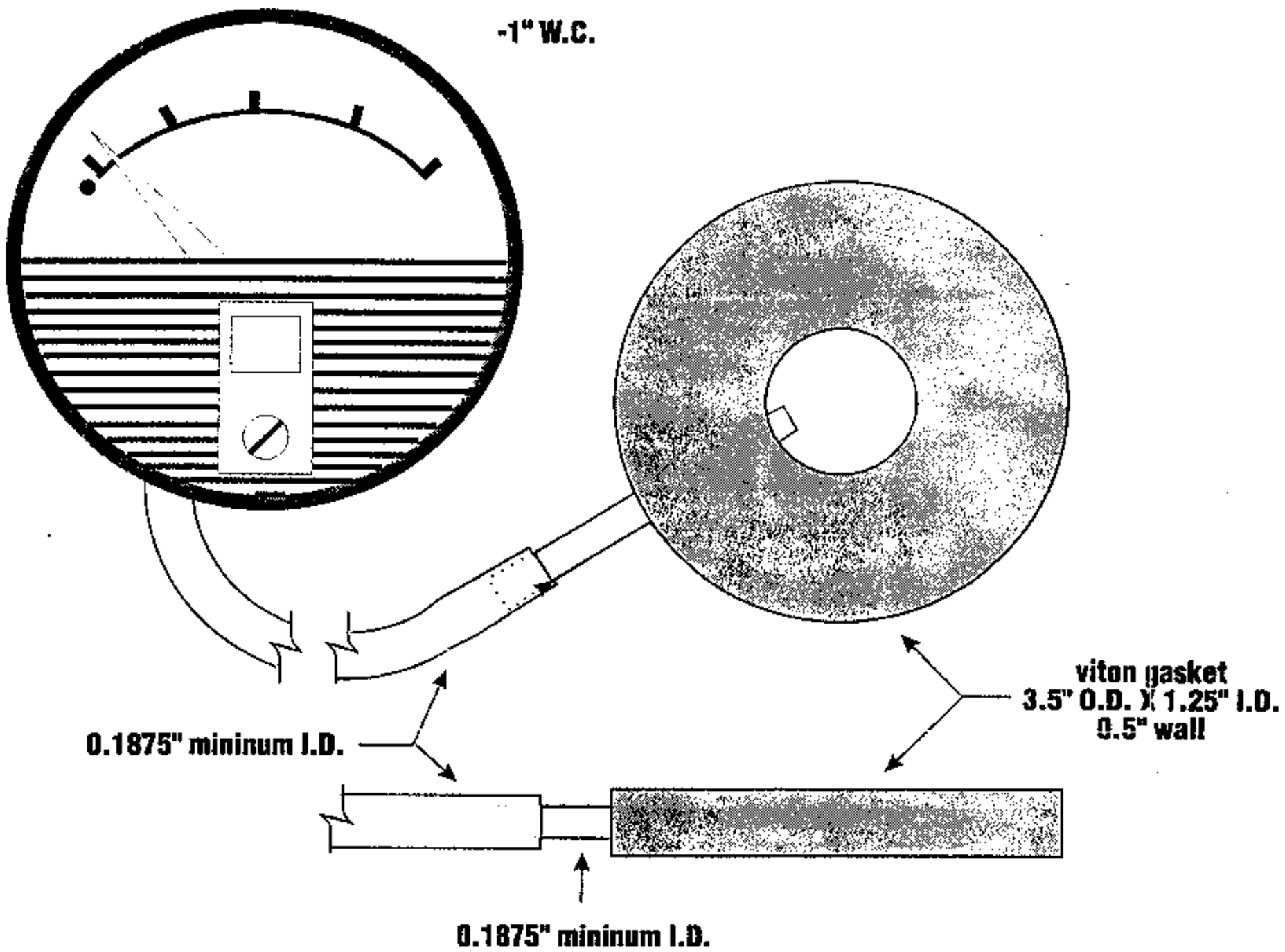
INITIAL PRESSURE OF 2 INCHES WATER COLUMN (WC)

MINIMUM PRESSURE AFTER 5 MINUTES, INCHES WC

ULLAGE, GALLONS	NUMBER OF AFFECTED NOZZLES				
	01-06	07-12	13-18	19-24	>24
500	**0.73**	**0.69**	**0.65**	0.61	0.57
550	0.80	0.76	0.72	0.68	0.64
600	**0.87**	**0.82**	**0.78**	**0.74**	0.71
650	0.93	0.88	0.84	0.80	0.77
700	**0.98**	**0.94**	**0.90**	**0.86**	**0.82**
750	1.03	0.98	0.94	0.91	0.87
800	**1.07**	**1.03**	**0.99**	**0.95**	**0.92**
850	1.11	1.07	1.03	1.00	0.96
900	**1.15**	**1.11**	**1.07**	**1.03**	**1.00**
950	1.18	1.14	1.11	1.07	1.04
1,000	**1.21**	**1.18**	**1.14**	**1.10**	**1.07**
1,200	1.32	1.28	1.25	1.22	1.19
1,400	**1.40**	**1.37**	**1.34**	**1.31**	**1.28**
1,600	1.46	1.43	1.41	1.38	1.35
1,800	**1.51**	**1.49**	**1.46**	**1.44**	**1.41**
2,000	1.56	1.53	1.51	1.49	1.46
2,200	**1.59**	**1.57**	**1.55**	**1.53**	**1.51**
2,400	1.62	1.60	1.58	1.56	1.54
2,600	**1.65**	**1.63**	**1.61**	**1.59**	**1.57**
2,800	1.67	1.65	1.64	1.62	1.60
3,000	**1.69**	**1.68**	**1.66**	**1.64**	**1.62**
3,500	1.73	1.72	1.70	1.69	1.67
4,000	**1.76**	**1.75**	**1.74**	**1.72**	**1.71**
4,500	1.79	1.78	1.77	1.75	1.74
5,000	**1.81**	**1.80**	**1.79**	**1.78**	**1.77**
6,000	1.84	1.83	1.82	1.81	1.80
7,000	**1.86**	**1.85**	**1.85**	**1.84**	**1.83**
8,000	1.88	1.87	1.86	1.86	1.85
9,000	**1.89**	**1.89**	**1.88**	**1.87**	**1.87**
10,000	1.90	1.90	1.89	1.88	1.88
15,000	**1.93**	**1.93**	**1.93**	**1.92**	**1.92**
20,000	1.95	1.95	1.94	1.94	1.94
25,000	**1.96**	**1.96**	**1.96**	**1.95**	**1.95**

Note: For manifolded Phase II Assist Systems, the **"Number of Affected Nozzles"** shall be the total of all gasoline nozzles. For dedicated return configurations, the **"Number of Affected Nozzles"** shall be t he total of those nozzles served by the tank being tested.

FIGURE 2
Torus Pressure Test Assembly



TP 201.4 F.2/ B. CORDOVA '95

Figure 3 – Fixed Volume Pressure Test Assembly

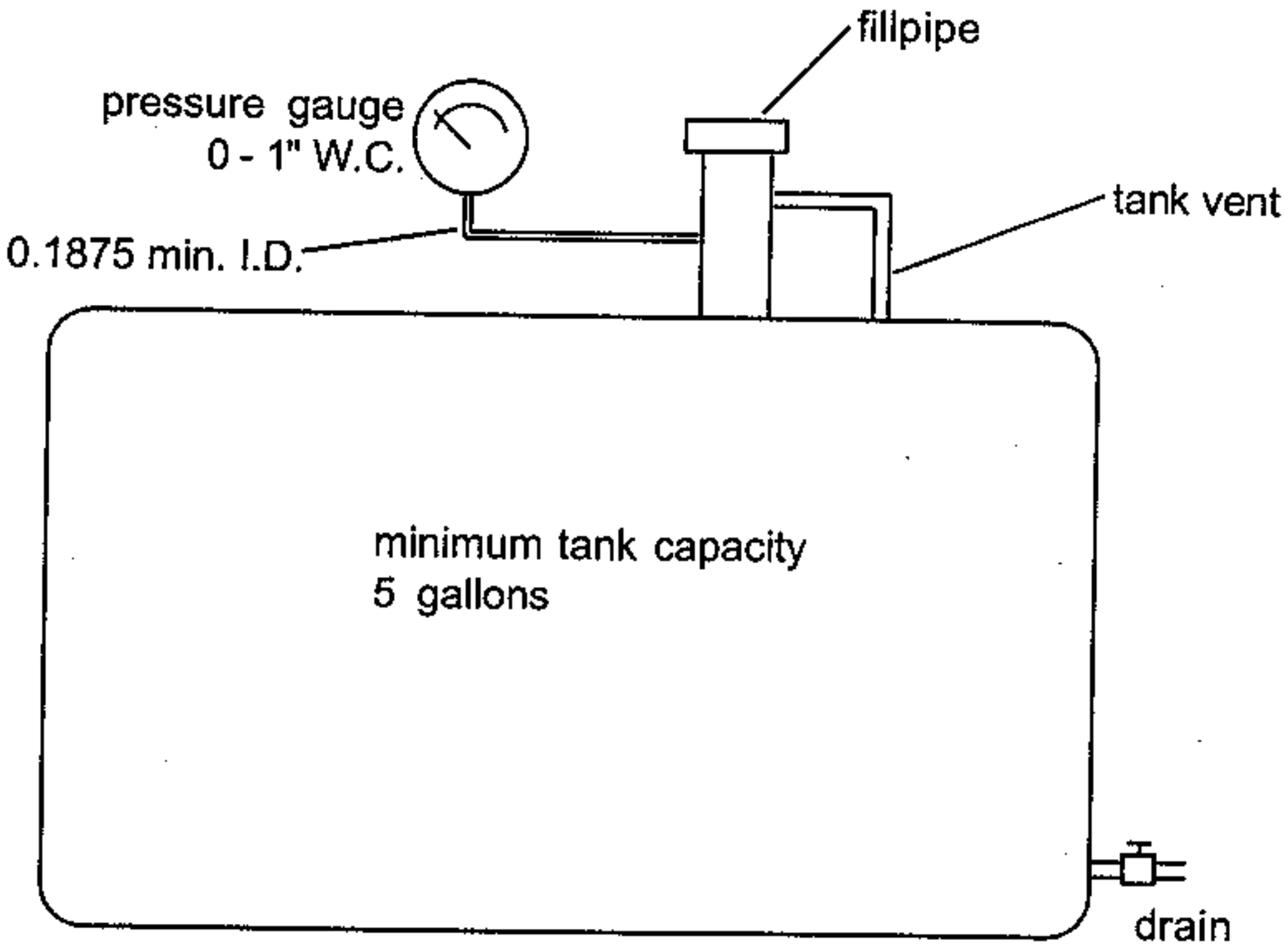


Figure 4 - Field Data Form

Facility Name & Address_____
Inspector_____ Date_____
Vapor Recovery System Type_____
Applicable Air Resources Board Executive Order # _____
Dynamic Pressure Limits from Executive Order: Inches of H_2O CFH Nitrogen

_____ @ _____
_____ @ _____
_____ @ _____

Pump Number	Gasoline Grade	Pressure, Inches of H_2O		Proc. 1 Nitrogen Flow, CFH		Proc. 3 Gallons Dispensed	Proc. 3 Time to Dispense	Proc. 3 Dispensing Rate, CFH

Source Test Procedure ST-30

STATIC PRESSURE INTEGRITY TEST UNDERGROUND STORAGE TANKS

(Adopted November 30, 1983)

REF: Regulation 8-7-301, 302

1. APPLICABILITY

1.1 This test procedure is used to quantify the vapor tightness of vapor recovery systems installed at gasoline dispensing facilities (GDF) equipped with pressure/vacuum (P/V) valves, provided that the designed pressure setting of the P/V valves is a minimum of 2.5 inches of water column (inches H_2O). Excessive leaks in the vapor recovery system will increase the quantity of fugitive hydrocarbon emissions and lower the overall efficiencies of both the Phase I and Phase II vapor recovery systems.

1.2 Systems equipped with a P/V valve(s) allowed to have a designed cracking pressure less than 2.5 inches H_2O shall be bagged to eliminate any flow contribution through the valve assembly from the test results. The valve/vent pipe connection, however, shall remain unobstructed during this test.

1.3 At facilities not required to be equipped with a P/V valve(s), the vent pipe(s) shall be capped. For those installations, the test may be conducted at the vent pipe(s).

2. PRINCIPLE

2.1 The entire vapor recovery system is pressurized with nitrogen to two (2.0) inches H_2O. The system pressure is then allowed to decay and the pressure after five (5) minutes is compared with an allowable value. The minimum allowable five-minute final pressure is based on the system ullage and pressure decay equations. For the purpose of compliance determination, this test shall be conducted after all back-filling, paving, and installation of all Phase I and Phase II components, including P/V valves, has been completed.

2.2 For GDF equipped with a coaxial Phase I system, this test shall be conducted at a Phase II vapor riser. For GDF which utilize a two-point Phase I system, this test may be conducted at either a Phase II riser or a Phase I vapor coupler provided that the criteria set forth in Section 6.7 have been met. If the integrity criteria for two-point systems specified in Section 6.7 are met, it is recommended that this test be conducted at the Phase I vapor coupler.

3. RANGE

3.1 If mechanical pressure gauges are employed, the full-scale range of the pressure gauges shall be 0-2.0, 0-1.0, and 0-0.50 inches H_2O column. Maximum incremental graduations of the pressure gauge shall be 0.05 inches H_2O and the minimum accuracy of the gauge shall be three percent of full scale. The minimum diameter of the pressure gauge face shall be 4 inches.

3.2 If an electronic pressure measuring device is used, the full-scale range of the device shall not exceed 0-10 inches H_2O with a minimum accuracy of 0.5 percent of full-scale. A 0-20 inches H_2O device may be used, provided the equivalent accuracy is not less than 0.25 percent of full scale.

3.3 The minimum and maximum total ullages shall be 500 and 25,000 gallons, respectively. These values are exclusive of all vapor piping volumes.

3.4 The minimum and maximum nitrogen feed-rates, into the system, shall be one (1) and five (5) CFM, respectively.

4. INTERFERENCES

4.1 Introduction of nitrogen into the system at flowrates exceeding five (5) CFM may bias the results of the test toward non-compliance.

4.2 For vacuum-assist Phase II systems which utilize an incinerator, power to the collection unit shall be turned off during testing.

4.3 For vacuum-assist systems which locate the vacuum producing device in-line between the Phase II vapor riser and the storage tank, the following requirements shall apply:

4.3.1 A valve shall be installed at the vacuum producing device. When closed, this valve shall isolate the vapor passage downstream of the vacuum producing device.

4.3.2 The storage tank side of the vacuum producing device shall be tested in accordance with the procedures outlined in Section 7 of this method. Compliance shall be determined by comparing the final five-minute pressure with the allowable minimum five-minute final pressure from the first column (1-6 affected nozzles) in Table 30-IB or use the corresponding equation in Section 9.2.

4.3.3 The upstream vapor passage (nozzle to vacuum producing device) shall also be tested. Methodology for this test shall be submitted to the Source Test Section of the BAAQMD for approval prior to submission of test results or shall be conducted in accordance with the procedures set forth in the applicable California Air Resources Board (CARB) Executive Order.

5. APPARATUS

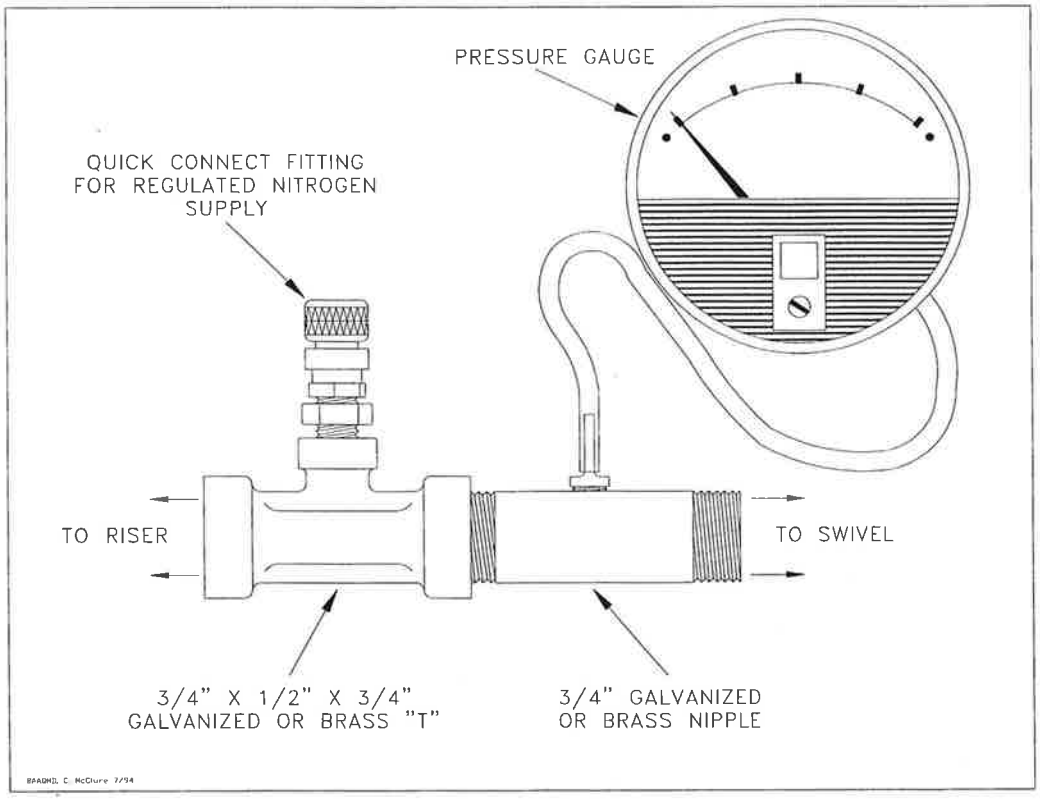
5.1 Nitrogen. Use commercial grade nitrogen in a high pressure cylinder, equipped with a two-stage pressure regulator and a one psig pressure relief valve.

5.2 Pressure Measuring Device. Use 0-2.0, 0-1.0, and 0-0.50 inches H_2O pressure gauges connected in parallel, a 0-2 inches H_2O manometer, or an electronic pressure measuring device to monitor the pressure decay in the vapor recovery system. The pressure measuring device shall, at a minimum, be readable to the nearest 0.05 inches H_2O.

5.3 "T" Connector Assembly. See Figure 30-1 for example.

Figure 30-1

"T" Connector Assembly



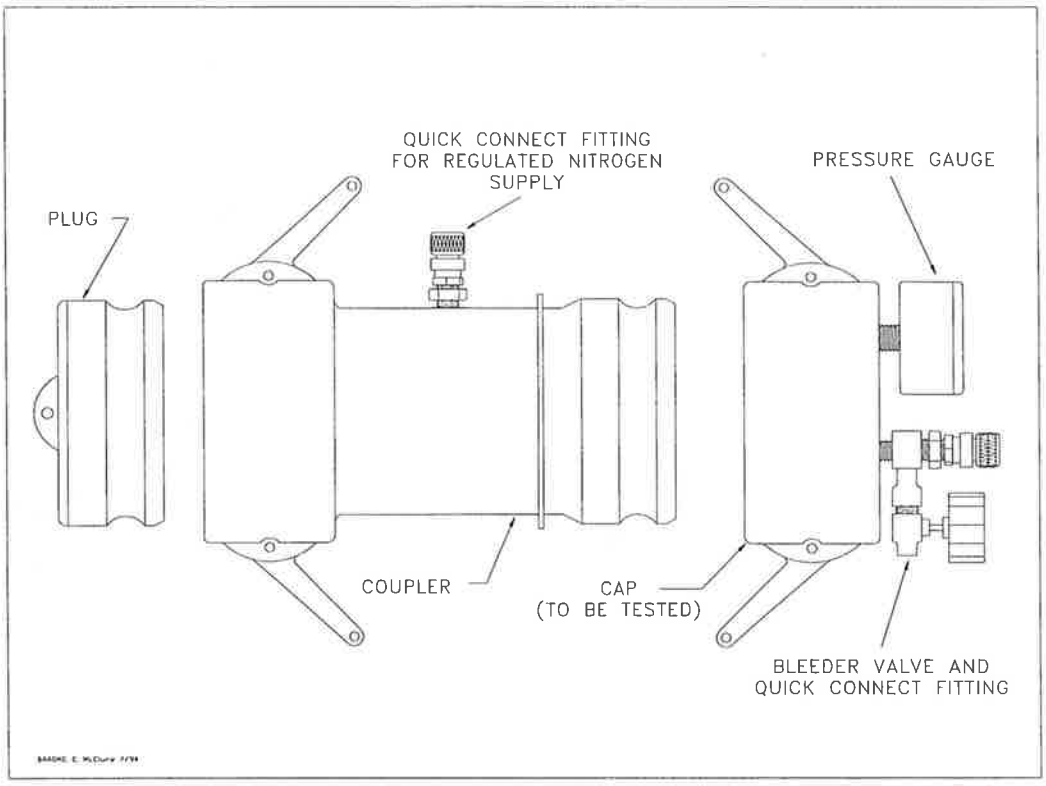
5.4 Vapor Coupler Integrity Assembly. Assemble OPW 633-A, 633-B, and 634-A adapters, or equivalent, as shown in Figure 30-2. If the test is to be conducted at the storage tank Phase I vapor coupler, this assembly shall be used prior to conducting the static leak test in order to verify the pressure integrity of the vapor poppet. The internal volume of this assembly shall not exceed 0.1 cubic feet.

5.5 Vapor Coupler Test Assembly. Use a compatible OPW 634-B cap, or equivalent, equipped with a center probe to open the poppet, a pressure measuring device to monitor the pressure decay, and a connection for the introduction of nitrogen into the system. See Figure 30-3 for an example.

5.6 Stopwatch. Use a stopwatch accurate to within 0.2 seconds.

Figure 30-2

Vapor Coupler Integrity Assembly



5.7 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 is between 1.0 and 5.0 CFM.

5.8 Combustible Gas Detector. A Bacharach Instrument Company, Model 0023-7356, or equivalent, may be used to verify the pressure integrity of system components during this test.

5.9 Leak Detection Solution. Any liquid solution designed to detect vapor leaks may be used to verify the pressure integrity of system components during this test.

6. PRE-TEST PROCEDURES

6.1 The following safety precautions shall be followed:

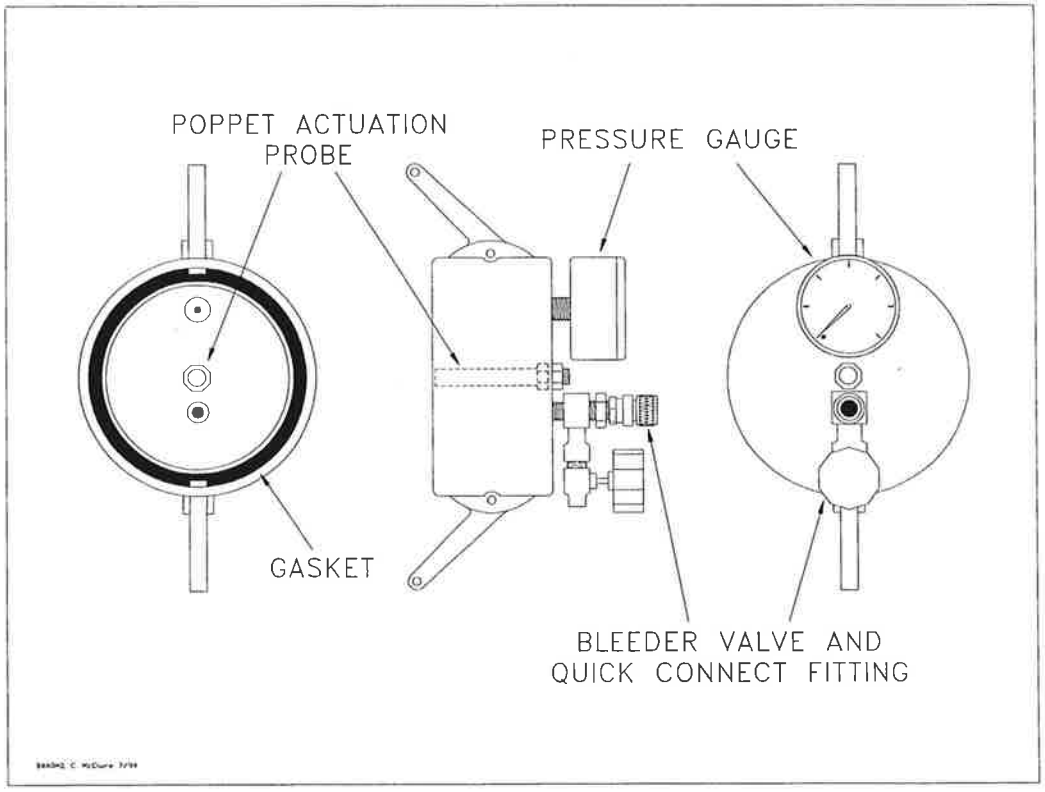
6.1.1 Only nitrogen shall be used to pressurize the system.

6.1.2 A one psig relief valve shall be installed to prevent the possible over-pressurizing of the storage tank.

6.1.3 A ground strap should be employed during the introduction of nitrogen into the system.

Figure 30-3

Vapor Coupler Test Assembly



6.2 Product dispensing shall not occur during the test. There shall have been no Phase I deliveries into or out of the storage tanks within the three hours prior to the test. For vacuum-assist Phase II systems, product dispensing shall not occur during the thirty minutes immediately prior to the test.

6.3 Measure the gallons of gasoline present in each underground storage tank and determine the actual capacity of each storage tank from facility records. Calculate the ullage space for each tank by subtracting the gasoline gallonage present from the actual tank capacity. The minimum ullage during the test shall be 25 percent of the tank capacity or 500 gallons, whichever is greater. The total ullage shall not exceed 25,000 gallons.

6.4 For two-point Phase I systems, this test shall be conducted with the dust cap removed from the vapor coupler. This is necessary to determine the vapor

tightness of the Phase I vapor poppet. See Section 6.7 if this test is to be conducted at the Phase I vapor coupler.

6.4.1 For coaxial Phase I systems, this test shall be conducted with the dust cap removed from the Phase I coupler. This is necessary to insure the vapor tightness of the Phase I vapor poppet.

6.4.2 Verify that the liquid level in the storage tank is at least four (4) inches above the highest opening at the bottom of the submerged drop tube.

6.5 If the Phase I containment box is equipped with a drain valve, the valve assembly may be cleaned and lubricated prior to the test. This test shall, however, be conducted with the drain valve installed and the manhole cover removed. See subsection 7.4.1 for further details regarding containment box drain valves.

6.6 If the test is to be conducted at a Phase II vapor riser, disconnect the dispenser end of one vapor recovery hose and install the "T" connector assembly (see Figure 30-1). Connect the nitrogen gas supply (do not use air) and the pressure measuring device to the "T" connector.

6.6.1 For those Phase II systems utilizing a dispenser mounted remote vapor check valve, the "T" connector assembly shall be installed on the vapor riser side of the check valve.

6.7 If this test is to be conducted at the Phase I vapor coupler on a two-point Phase I system, the procedures set forth in subsections 6.7.1 and 6.7.2 shall be successfully completed prior to testing. The static pressure integrity test shall not be conducted at the Phase I coupler at facilities equipped with coaxial Phase I systems.

6.7.1 Connect the Vapor Coupler Integrity Assembly to the Phase I vapor coupler. Connect the Vapor Coupler Test Assembly. Connect the nitrogen supply to the assembly and carefully pressurize the internal volume of the assembly to two (2.0) inches H_2O. Start the stopwatch. Record the final pressure after one minute.

6.7.2 If the pressure after one minute is less than 0.25 inches H_2O, the leak rate through the Phase I vapor poppet precludes conducting the static leak test at this location. If the pressure after one minute is greater than or equal to 0.25 inches H_2O, the static leak test may be conducted at this location. This criteria assures a maximum leak rate through the Phase I vapor poppet of less than 0.0004 cubic feet per minute.

6.7.3 Disconnect the Vapor Coupler Integrity Assembly from the Phase I vapor coupler. If the requirements of subsection 6.7.2 were met, connect the Vapor Coupler Test Assembly to the Phase I vapor coupler.

6.8 All pressure measuring device(s) shall be bench calibrated using either a reference gauge or incline manometer. Calibration shall be performed at 20, 50, and 80 percent of full scale. Accuracy shall be within two percent at each of these calibration points. Calibrations shall be conducted on a frequency not to exceed 90 days.

6.9 Use the flowmeter to determine the nitrogen regulator delivery pressures which correspond to nitrogen flowrates of 1.0 and 5.0 CFM. These pressures define the allowable range of delivery pressures acceptable for this test procedure. Also record the regulator delivery pressure setting, and the corresponding nitrogen flowrate that will be used during the test. As an alternative, the flowmeter may be connected, in-line between the nitrogen supply regulator and Vapor Coupler Test Assembly, during the test.

6.10 Use Equation 9.3 to calculate the approximate time required to pressurize the system ullage to the initial starting pressure of two (2.0) inches H_2O. This will allow the tester to minimize the quantity of nitrogen introduced into those systems which cannot comply with the static leak standards.

6.11 Attach the Vapor Coupler Test assembly to the Phase I poppet or the "T" connector assembly to the Phase II vapor riser. Read the initial pressure of the storage tank and underground piping. If the initial pressure is greater than 0.5 inches H_2O, carefully bleed off the pressure, in accordance with all applicable safety procedures, in the storage tank and underground piping to less than 0.5 inches H_2O column.

7. TESTING

7.1 Open the nitrogen gas supply valve and set the regulator delivery pressure within the allowable range determined in Section 6.9, and start the stopwatch. Pressurize the vapor system (or subsystem for individual vapor return line systems) to **at least 2.2 inches H_2O** initial pressure. It is critical to maintain the nitrogen flow until the pressure stabilizes, indicating temperature and vapor pressure stabilization in the tanks. Check the test equipment using leak detecting solution or a combustible gas detector to verify that all test equipment is leak tight.

7.1.1 If the time required to achieve the initial pressure of two (2.0) inches H_2O exceeds twice the time derived from Equation 9.3, stop the test and use liquid leak detector, or a combustible gas detector, to find the leak(s) in the system. Failure to achieve the initial starting pressure within twice the time derived from Equation 9.3 demonstrates the inability of the system to meet the performance criteria. Repair or replace the faulty component(s) and restart the test pursuant to Section 7.1.

7.2 Close and disconnect the nitrogen supply. Start the stopwatch when the pressure has decreased to the initial starting pressure of two (2.0) inches H_2O.

7.3 At one-minute intervals during the test, record the system pressure. After five minutes, record the final system pressure. See the applicable of Tables 30-IA (or Equation 9.1) or 30-IB (or Equation 9.2) to determine the acceptability of the final system static pressure results. For intermediate values of ullage in Tables 30-IA and 30-IB, linear interpolation may be employed.

7.4 If the system failed to meet the criteria set forth in Table 30-I (or the appropriate equation in Section 9), repressurize the system and check all accessible vapor connections using leak detector solution or a combustible gas detector. If vapor leaks in the system are encountered, repair or replace the defective component and repeat the test. Potential sources of leaks include nozzle check valves, pressure/vacuum relief valves, containment box drain valve assemblies, and plumbing connections at the risers.

7.4.1 If the facility fails to comply with the static leak test standards and the Phase I system utilizes a non-CARB-certified drain valve equipped containment box, which was installed prior to July 1, 1992, for which a CARB-certified replacement drain valve assembly is not marketed, the following two subsections shall apply:

7.4.1.1 The drain valve may be removed and the port plugged. Reset the system. If the facility complies with the static leak test standards under these conditions, the facility shall be considered complying with the requirements, provided that the manufacturer and model number of the containment box and the date of installation are submitted with the test results.

7.4.1.2 The criteria set forth in subsection 7.4.1.1 shall not apply after July 1, 1996.

7.5 After the remaining system pressure has been relieved, remove the "T" connector assembly and reconnect the vapor recovery hose, if applicable.

7.6 If the vapor recovery system utilizes individual vapor return lines, repeat the leak test for each gasoline grade. Avoid leaving any vapor return line open longer than is necessary to install or remove the "T" connector assembly.

7.7 If the applicable CARB Executive requires the test to be conducted with and without the containment box cover in place, repeat the test with the cover in place. In these cases clearly specify, on Form 30-1, which results represent the pressure integrity with and without the cover in place.

8. POST-TEST PROCEDURES

8.1 Use the applicable of Table 30-IA or 30-IB, or the applicable of Equations 9.1 or 9.2, to determine the compliance status of the facility by comparing the final five-minute pressure with the minimum allowable final pressure.

8.1.1 For balance Phase II systems use Table 30-IA or the applicable of Equation 9.1 to determine compliance.

8.1.2 For vacuum-assist Phase II systems use Table 30-IB or the applicable of Equation 9.2 to determine compliance.

9. CALCULATIONS

9.1 For Phase II Balance Systems, the minimum allowable five-minute final pressure, with an initial pressure of two (2.0) inches H_2O, shall be calculated as follows:

[Equation 9-1]

$$P_f = 2e^{\frac{-760.490}{V}} \quad \text{if N = 1-6}$$

$$P_f = 2e^{\frac{-792.196}{V}} \quad \text{if N = 7-12}$$

$$P_f = 2e^{\frac{-824.023}{V}} \quad \text{if N = 13-18}$$

$$P_f = 2e^{\frac{-855.974}{V}} \quad \text{if N = 19-24}$$

$$P_f = 2e^{\frac{-888.047}{V}} \quad \text{if N > 24}$$

Where:

N = The number of affected nozzles. For manifolded systems, N equals the total number of nozzles. For dedicated plumbing configurations, N equals the number of nozzles serviced by the tank being tested.

P_f = The minimum allowable five-minute final pressure, inches H_2O

V = The total ullage affected by the test, gallons

e = A dimensionless constant approximately equal to 2.718

2 = The initial starting pressure, inches H_2O

9.2 For Phase II Vacuum Assist Systems, the minimum allowable five-minute final pressure, with an initial pressure of two (2.0) inches H_2O, shall be calculated as follows:

[Equation 9-2]

$$P_f = 2e^{\frac{-500.887}{V}} \quad \text{if N = 1-6}$$

$$P_f = 2e^{\frac{-531.614}{V}} \quad \text{if N = 7-12}$$

$$P_f = 2e^{\frac{-562.455}{V}} \quad \text{if N = 13-18}$$

$$P_f = 2e^{\frac{-593.412}{V}} \quad \text{if N = 19-24}$$

$$P_f = 2e^{\frac{-624.483}{V}} \quad \text{if N > 24}$$

Where:

N = The number of affected nozzles. For manifolded systems, N equals the total number of nozzles. For dedicated plumbing configurations, N equals the number of nozzles serviced by the tank being tested.

P_f = The minimum allowable five-minute final pressure, inches H_2O

V = The total ullage affected by the test, gallons

e = A dimensionless constant approximately equal to 2.718

2 = The initial starting pressure, inches H_2O

9.3 The minimum time required to pressurize the system ullage from zero (0) to two (2.0) inches H_2O gauge pressure shall be calculated as follows:

$$t_2 = \frac{V}{[1522]\,F} \qquad \text{[Equation 9-3]}$$

Where:

t_2 = The minimum time to pressurize the ullage to two inches H_2O, minutes

V = The total ullage affected by the test, gallons

F = The nitrogen flowrate into the system, CFM

1522 = The conversion factor for pressure and gallons

9.4 If the policy of the local District requires an allowable tolerance for testing error, the minimum allowable five-minute final pressure, including testing error, shall be calculated as follows:

$$P_{f\text{-}E} = 2 - \left[1 + \left(\frac{E}{100}\right)\right]\left[408.9 - \left(P_f + 406.9\right)\right] \qquad \text{[Equation 9-4]}$$

Where:

$P_{f\text{-}E}$ = The minimum allowable five-minute final pressure including allowable testing error, inches H_2O

E = The allowable testing error, percent

P_f = The minimum allowable five-minute final pressure calculated in Equations 9-1 or 9-2, inches H_2O

2 = The initial starting pressure, inches H_2O

408.9 = Atmospheric pressure plus the initial starting pressure, inches H_2O

406.9 = Atmospheric pressure, inches H_2O

10. REPORTING

10.1 The calculated ullage and system pressures for each five-minute vapor recovery system test shall be reported as shown in Form 30-1. Be sure to include the Phase I system type (two-point or coaxial), the Phase II system type, whether the system is manifolded, and the one-minute pressures during the test.

TABLE 30-1A

PHASE II BALANCE SYSTEMS

PRESSURE DECAY LEAK RATE CRITERIA

INITIAL PRESSURE OF 2 INCHES OF H_2O

MINIMUM PRESSURE AFTER 5 MINUTES, INCHES OF H_2O

ULLAGE, GALLONS	NUMBER OF AFFECTED NOZZLES				
	01-06	07-12	13-18	19-24	> 24
500	**0.44**	**0.41**	**0.38**	**0.36**	**0.34**
550	0.50	0.47	0.45	0.42	0.40
600	**0.56**	**0.53**	**0.51**	**0.48**	**0.46**
650	0.62	0.59	0.56	0.54	0.51
700	**0.67**	**0.64**	**0.62**	**0.59**	**0.56**
750	0.73	0.70	0.67	0.64	0.61
800	**0.77**	**0.74**	**0.71**	**0.69**	**0.66**
850	0.82	0.79	0.76	0.73	0.70
900	**0.86**	**0.83**	**0.80**	**0.77**	**0.75**
950	0.90	0.87	0.84	0.81	0.79
1,000	**0.93**	**0.91**	**0.88**	**0.85**	**0.82**
1,200	1.06	1.03	1.01	0.98	0.95
1,400	**1.16**	**1.14**	**1.11**	**1.09**	**1.06**
1,600	1.24	1.22	1.19	1.17	1.15
1,800	**1.31**	**1.29**	**1.27**	**1.24**	**1.22**
2,000	1.37	1.35	1.32	1.30	1.28
2,200	**1.42**	**1.40**	**1.38**	**1.36**	**1.34**
2,400	1.46	1.44	1.42	1.40	1.38
2,600	**1.49**	**1.47**	**1.46**	**1.44**	**1.42**
2,800	1.52	1.51	1.49	1.47	1.46
3,000	**1.55**	**1.54**	**1.52**	**1.50**	**1.49**
3,500	1.61	1.59	1.58	1.57	1.55
4,000	**1.65**	**1.64**	**1.63**	**1.61**	**1.60**
4,500	1.69	1.68	1.67	1.65	1.64
5,000	**1.72**	**1.71**	**1.70**	**1.69**	**1.67**
6,000	1.76	1.75	1.74	1.73	1.72
7,000	**1.79**	**1.79**	**1.78**	**1.77**	**1.76**
8,000	1.82	1.81	1.80	1.80	1.79
9,000	**1.84**	**1.83**	**1.83**	**1.82**	**1.81**
10,000	1.85	1.85	1.84	1.84	1.83
15,000	**1.90**	**1.90**	**1.89**	**1.89**	**1.89**
20,000	1.93	1.92	1.92	1.92	1.91
25,000	**1.94**	**1.94**	**1.94**	**1.93**	**1.93**

Note: For manifolded Phase II Balance Systems, the **"Number of Affected Nozzles"** shall be the total of all gasoline nozzles. For dedicated return configurations, th **"Number of Affected Nozzles"** shall be the total of those nozzles served by the tank being tested.

TABLE 30-1B

PHASE II ASSIST SYSTEMS

PRESSURE DECAY LEAK RATE CRITERIA

INITIAL PRESSURE OF 2 INCHES OF H_2O

MINIMUM PRESSURE AFTER 5 MINUTES, INCHES OF H_2O

ULLAGE, GALLONS	NUMBER OF AFFECTED NOZZLES				
	01-06	07-12	13-18	19-24	> 24
500	**0.73**	**0.69**	**0.65**	**0.61**	**0.57**
550	0.80	0.76	0.72	0.68	0.64
600	**0.87**	**0.82**	**0.78**	**0.74**	**0.71**
650	0.93	0.88	0.84	0.80	0.77
700	**0.98**	**0.94**	**0.90**	**0.86**	**0.82**
750	1.03	0.98	0.94	0.91	0.87
800	**1.07**	**1.03**	**0.99**	**0.95**	**0.92**
850	1.11	1.07	1.03	1.00	0.96
900	**1.15**	**1.11**	**1.07**	**1.03**	**1.00**
950	1.18	1.14	1.11	1.07	1.04
1,000	**1.21**	**1.18**	**1.14**	**1.10**	**1.07**
1,200	1.32	1.28	1.25	1.22	1.19
1,400	**1.40**	**1.37**	**1.34**	**1.31**	**1.28**
1,600	1.46	1.43	1.41	1.38	1.35
1,800	**1.51**	**1.49**	**1.46**	**1.44**	**1.41**
2,000	1.56	1.53	1.51	1.49	1.46
2,200	**1.59**	**1.57**	**1.55**	**1.53**	**1.51**
2,400	1.62	1.60	1.58	1.56	1.54
2,600	**1.65**	**1.63**	**1.61**	**1.59**	**1.57**
2,800	1.67	1.65	1.64	1.62	1.60
3,000	**1.69**	**1.68**	**1.66**	**1.64**	**1.62**
3,500	1.73	1.72	1.70	1.69	1.67
4,000	**1.76**	**1.75**	**1.74**	**1.72**	**1.71**
4,500	1.79	1.78	1.77	1.75	1.74
5,000	**1.81**	**1.80**	**1.79**	**1.78**	**1.77**
6,000	1.84	1.83	1.82	1.81	1.80
7,000	**1.86**	**1.85**	**1.85**	**1.84**	**1.83**
8,000	1.88	1.87	1.86	1.86	1.85
9,000	**1.89**	**1.89**	**1.88**	**1.87**	**1.87**
10,000	1.90	1.90	1.89	1.88	1.88
15,000	**1.93**	**1.93**	**1.93**	**1.92**	**1.92**
20,000	1.95	1.95	1.94	1.94	1.94
25,000	**1.96**	**1.96**	**1.96**	**1.95**	**1.95**

Note: For manifolded Phase II Assist Systems, the **"Number of Affected Nozzles"** shall be the total of all gasoline nozzles. For dedicated return configurations, the **"Number of Affected Nozzles"** shall be the total of those nozzles served by the tank being tested.

Form 30-1

Distribution:

Firm
Permit Services
Enforcement Services
Technical Services
Planning
Requester
DAPCO

BAY AREA
AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street
San Francisco, California 94109
(415) 771-6000

Summary of Source Test Results

Report No.: _____
Test Date: _____
Test Times:
Run A: _____
Run B: _____
Run C: _____

Source Information

GDF Name and Address

_____
_____
_____
_____

GDF Representative and Title

_____
_____

GDF Phone No. ( )

Source: GDF Vapor Recovery System

BAAQMD GDF # _____

BAAQMD A/C # _____

Permit Conditions

Facility Parameters

PHASE II SYSTEM TYPE (Check One)

Balance ☐
Vapor Assist ☐
Type:
Other ☐
Identify:
Manifolded? **Y** **or** **N**

Operating Parameters:

Number of Nozzles Served by Tank #1 _____
Number of Nozzles Served by Tank #2 _____
Number of Nozzles Served by Tank #3 _____
Total Number of Gas Nozzles at Facility _____

Applicable Regulations: BAAQMD REGULATION 8, RULE 7

FOR OFFICE USE ONLY:

Source Test Results and Comments:

TANK #:	**1**	**2**	**3**	**TOTAL**
1. Product Grade				
2. Actual Tank Capacity, gallons				
3. Gasoline Volume, Gallons				
4. Ullage, gallons (#2 -#3)				
5. Phase I System Type				
6. Initial Test Pressure, Inches H_2O **(2.0)**				
7. Pressure After 1 Minute, Inches H_2O				
8. Pressure After 2 Minutes, Inches H_2O				
9. Pressure After 3 Minutes, Inches H_2O				
10. Pressure After 4 Minutes, Inches H_2O				
11. **Final Pressure After 5 Minutes, Inches H_2O**				
12. Allowable Final Pressure from Table 30-I				
13. Test Status [**Pass** or **Fail**]				

Test Conducted by:

Test Company
Name _____
Address _____
City _____

Date and Time of Test:

California Environmental Protection Agency

Air Resources Board

Vapor Recovery Test Procedure

TP-201.1

Volumetric Efficiency for Phase I Vapor Recovery Systems

Adopted: April 12, 1996
Amended: February 1, 2001
Amended: October 8, 2003

California Environmental Protection Agency
Air Resources Board

Vapor Recovery Test Procedure

TP-201.1

Volumetric Efficiency of Phase I Vapor Recovery Systems

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

1. PURPOSE AND APPLICABILITY

The purpose of this procedure is to quantify the transfer efficiency when a bulk gasoline delivery between a cargo tank and underground storage tank is made. This procedure is used to determine compliance with Phase I performance standard specified in Certification Procedure 201 (CP-201).

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

During a gasoline delivery, the cargo tank and gasoline dispensing facility (GDF) are instrumented with test equipment in order to determine the amount of vapor returned to the cargo tank and the amount of vapor discharged through the GDF vent pipe. From these parameters the Phase I volumetric efficiency is determined. This procedure provides for determining efficiency by way of either direct measurement or calculation.

If a Phase I system fails to meet the volumetric efficiency as required by CP-201, the cargo tank shall be tested for compliance with the daily standards established for cargo tanks as specified in CP-204 to determine if the failure can be attributed to the cargo tank.

3. BIASES AND INTERFERENCES

3.1 Any vapor leaks exceeding 100% of the Lower Explosive Limit (LEL) during the gasoline bulk delivery precludes the use of this method.

3.2 Gasoline cargo tanks exceeding the allowable daily pressure-decay standards as defined in CP-204 preclude the use of this method.

3.3 The presence of vapor leaks in the GDF, greater than the allowable leak decay limits specified in Section 3.2 of CP-201 preclude use of this method.

3.4 Unusually large cargo tank headspace volumes may cause low volumetric efficiency under certain conditions. Conversely, unusually small cargo tank headspace volumes may result in unusually high efficiency. During the Certification Process for a Phase I system, the cargo tank headspace volumes should be between 3.0 and 10.0 percent of the total cargo tank capacity prior to the delivery.

4. SENSITIVITY, PRECISION AND RANGE

4.1 Mechanical Pressure Gauge. The minimum readability shall be 1.00 inches H_2O with a maximum full-scale range of 30 inches H_2O and minimum accuracy of three percent of full scale. Pressure gauges with a higher resolution and higher accuracy may be deemed acceptable with prior approval by the Executive Officer.

4.2 Electronic Pressure Gauge. The maximum full-scale range of the device shall not exceed 20 inches H_2O with minimum sensitivity of 1.00 inches H_2O and minimum accuracy of 0.5 percent of full scale. Electronic pressure gauges shall be calibrated as described in Section 5 of this procedure.

4.3 Volume Meter, Vapor Return. Minimum full-scale range shall be 5,000 CFH with a maximum rated back pressure less than 1.10 in H_2O. The meter shall have an internal diameter of 3 inches, equal to that of a cargo tank vapor return hose.

4.4 Volume Meter, Vent Pipe. Minimum full-scale range shall be 800 CFH with a maximum rated back pressure less than 0.26 in H_2O. The meter shall have an internal diameter of 2 inches, equal to that of a GDF vent pipe.

4.5 Temperature. Maximum range of 0 to 150°F and accurate to within 2°F.

4.6 Barometric Pressure. Minimum accuracy of .08 inches of mercury (1.0 inch H_2O or 2.7 millibar).

5. EQUIPMENT

5.1 Vapor Return Meter(s). Use a volume meter with minimum specifications described in Section 4 to measure the amount of vapor returned to the cargo tank from the underground storage tank. The meter shall be equipped with a pressure gauge and temperature device as described in Section 4 on the inlet side. The meter shall be connected to the GDF in a fashion as to maintain intrinsic safety, see Figure 3.

5.2 Vent Pipe Meter. Use a volume meter with minimum specifications described in Section 4 to measure the amount of vapor discharged through the vent pipe(s). The meter shall be equipped with a pressure gauge and temperature device as described in Section 4 on the inlet side. The meter shall be connected to the GDF in a fashion as to maintain intrinsic safety, see Figure 3.

5.3 Cargo Tank Back Pressure Assembly. When testing Phase I efficiency without the use of volume meters, use OPW® 633-F and 633-D couplers, or equivalent, as shown in Figure 1. The assembly shall be equipped with a pressure gauge capable of measuring up to 30 inches H_2O back pressure at the gasoline cargo tank vapor

coupler. Temperature may be measured at this point as an alternate to, or in addition to 5.1.

5.4 Storage Tank Pressure Assembly. When testing Phase I efficiency with the cargo tank back pressure assembly and the test facility uses a two point Phase I system with storage tanks manifolded underground, use OPW® 634-B cap(s) or equivalent, equipped with a pressure gauge and center probe as shown in Figure 2

5.5 Combustible Gas Detector. Use a Bacharach Instrument Company Model 0023-7356®, or equivalent, to quantify any vapor leaks occurring during the gasoline bulk drop.

5.6 Barometer. Use a mercury, aneroid, or equivalent barometer with minimum specifications described in Section 4 to measure the barometric pressure during testing. The result shall be used to correct the volume of vapor returned or discharged.

5.7 Temperature. Use a minimum of three thermometers, Thermocouples™, or equivalent, to measure the vapor temperature at each meter. The results shall be used to correct the volume of vapor returned or discharged.

5.8 Stopwatch. Use a stopwatch accurate to within 0.1 seconds to time the delivery rate.

6. PRE-TEST PROCEDURES

6.1 The volume meter(s) shall be proofed against a standard reference meter prior to its initial use in the field or at intervals not to exceed 180 days. Calibration shall be performed at a minimum of three flowrates representing 25, 50 and 75 percent of rated capacity. An official statement of proofing is required.

6.2 The GDF shall be pre-tested for leak integrity as described in TP-201.3 at least 24 hours prior, and no longer than 7-days before testing. If a manifold is to be used at the vent pipe, the manifold shall be installed prior to conducting leak integrity testing.

6.3 No product dispensing shall occur for a minimum of 30 minutes prior to testing.

6.4 Taking caution to avoid venting the storage tanks, connect the vent pipe meter(s) to the appropriate storage tank vent pipe(s) with the inlet side attached to the vent pipe. Use a metal ball valve if required to avoid venting. Attach the PV valve(s) to the outlet side of the meter(s) using a threaded nipple or equivalent. A temporary manifold may be constructed of steel where all vent pipes are connected to a single outlet and a single meter is installed.

6.5 Taking caution to avoid venting the storage tanks, connect the vapor return meter(s) to the appropriate Phase I vapor connection(s) using metal fittings in order to maintain intrinsic safety. Use a metal vapor poppet if required to avoid venting. Connect the cargo tank vapor return hose to the outlet side of the meter. The meter will be in line between the Phase I connection and the cargo tank vapor return hose.

6.6 With no product dispensing, record the product grade, tank capacity, tank temperature and ambient conditions on the data sheet where provided.

6.7 If used, connect the Cargo Tank Back Pressure Assembly to the vapor coupler on the cargo tank. This assembly will be in line with the cargo tank vapor recovery hose. If the cargo tank vapor coupler is equipped with a poppet, use a pressure assembly with center probe.

6.8 If the cargo tank back pressure assembly is being used, install a Storage Tank Pressure Assembly on each Phase I vapor connection of those tanks not receiving product. During each bulk drop, record the maximum pressure in those tanks.

6.9 Record the product quantities to be delivered during each bulk drop. Also record the cargo tank CARB decal number and delivery company name on the data sheet where provided.

6.10 Stabilization. Open the corresponding cargo tank internal vapor valve(s) prior to delivering product. Once the vapor valve(s) is opened, wait a period of at least 1-minute to allow for pressure stabilization between the UST and cargo tank.

7. TESTING

7.1 Record the stabilized, vapor return and vent pipe meter reading(s) on the data sheet where provided.

7.2 Start the gasoline bulk drop. Using the stopwatch, time each gasoline drop to determine the delivery rate for each compartment.

7.3 At minimum, record the following parameters for each gasoline bulk drop:

7.3.1 Initial and final meter readings for each vapor return meter

7.3.2 Average vapor return pressure

7.3.3 Average vapor return temperature

7.4 Repeat Sections 7.1 through 7.3 for each gasoline delivery. For deliveries using different Phase I connections (i.e., different storage tanks), relocate the vapor return meter(s) to the appropriate storage as specified in Section 6.7.

7.5 At conclusion of all gasoline deliveries, ensure that each of the cargo tank internal vapor valve is closed prior to disconnecting. Disconnect the vapor return meter(s) from the storage tank(s) taking care to avoid venting pressure. Disconnect the vapor return hose from the outlet side of the vapor return meter.

7.6 Continue to monitor the vent pipe meter for a minimum of 15 minutes. If the UST pressure is less than 1.00 inches H_2O, testing may be concluded. In the event that the station UST pressure is greater than 1.00 inches H_2O, continue to monitor the vent

pipe meter for an additional 45 minutes (1-hour total). These measurements are to be included in the Phase I efficiency calculation.

8. POST TEST PROCEDURES

8.1 At conclusion of the bulk delivery, ensure that each of the cargo tank internal vapor valves is closed prior to removing connections.

8.2 Remove the Cargo Tank Back Pressure Assembly, if used, from the cargo tank vapor return coupler.

8.3 Remove the Storage Tank Pressure Assembly, if used, from each storage tank where installed.

8.4 Remove the temporary manifold (if constructed) and disconnect all instrumentation from the vent pipe area. Replace the PV valve(s) on the vent pipe(s).

8.5 Verify the quantity of gasoline delivered to each storage tank using the facility tank gauge monitor or with use of a tank gauging stick.

9. CALCULATING RESULTS

9.1 The measured volume of vapor passed through the vapor return to the cargo tank and vent pipe shall be corrected to standard conditions as follows:

$$V_{corr} = \frac{(V_{vi})(528)[P_b + \Delta h/13.6]}{(T_{vi})(29.92)} \qquad \textbf{Equation 9.1}$$

Where:

V_{corr} = Volume of vapor, corrected to 68^0F (528^0R) and 29.92" Hg
P_b = Barometric Pressure, inches Hg
V_{vi} = Uncorrected volume of vapor (raw meter reading)
T_{vi} = Average or venting temperature at vent meter, ^{0}R
Δh = Average or venting pressure at vent meter, inches H_2O
13.6 = Inches of water per inch of mercury
528 = Standard ambient temperature, 68^0F converted to degrees Rankine

9.2 If a cargo tank back pressure assembly was used to conduct testing, the volume of vapor returned to the cargo tank shall be calculated to standard conditions as follows:

$$V_t = \left[\frac{(0.1337)(G_t)\left(528\left(P_b + \frac{\Delta h}{13.6}\right)\right)}{(T_t)(29.92)}\right] \qquad \textbf{Equation 9.2}$$

Where:

V_t = Calculated volume of vapor returned to cargo tank corrected to 68^0F (528^0R) and 29.92" Hg
G_t = Volume of gasoline delivered, gallons
Δh = Final gauge pressure at cargo tank, in. H_2O
T_t = Average temperature of vapor returned to cargo tank, ^{o}R
P_b = Barometric pressure, inches Hg
13.6 = Inches of water per inch of mercury
528 = Standard ambient temperature, 68°F converted to degrees Rankine

9.3 The collection efficiency shall be calculated as follows:

$$E = (100)\left[\frac{V_{returned} - V_{vent}}{V_{returned}}\right] \qquad \textbf{Equation 9.3}$$

Where:

E = Phase I Volumetric Efficiency, percent
$V_{returned}$ = Vapor Return: From 9.1(V_{corr}) or 9.2(V_t)
V_{vent} = Corrected Vent Pipe Discharge: From 9.1(V_{corr})

10. REPORTING RESULTS

10.1 Results shall be reported as shown on the data sheets where provided. Districts may require the use of alternate data sheets provided they include, at minimum, the same parameters identified on Form 1.

11. ALTERNATE PROCEDURES

11.1 This 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 ARB Executive Officer, pursuant to Section 14 of Certification Procedure CP-201.

FORM 1
ARB TP-201.1

Test Date: _____ Observations By: _____

Facility Name: _____

Address: _____

System Description: _____

Time: _____ Ambient Temp: _____ deg F Barometric: _____ Hpa

Wind: _____ mph Altitude: _____ ft Other: _____

Cargo Tank Company: _____

Cargo Tank Decal #(s): Truck: _____ Trailer: _____

Compartment #1

Pre-Delivery Observations		Delivery Observations	
		Tank Orientation:	
Initial UST Product Temerature:	deg F	Delivered Product Temperature:	deg F
UST Size:	gal	Avg Vapor Return Pressure:	inWC
Amount To Deliver (BOL):	gal	Avg Vapor Return Temp:	deg F
Grade:	Loading Temp (BOL):	Fuel RVP (BOL):	
Initial Meter Reading:	ft^3	**Final Meter Reading:**	ft^3

Compartment #2

Pre-Delivery Observations		Delivery Observations	
		Tank Orientation:	
Initial UST Product Temerature:	deg F	Delivered Product Temperature:	deg F
UST Size:	gal	Avg Vapor Return Pressure:	inWC
Amount To Deliver (BOL):	gal	Avg Vapor Return Temp:	deg F
Grade:	Loading Temp (BOL):	Fuel RVP (BOL):	
Initial Meter Reading:	ft^3	**Final Meter Reading:**	ft^3

Compartment #3

Pre-Delivery Observations		Delivery Observations	
		Tank Orientation:	
Initial UST Product Temerature:	deg F	Delivered Product Temperature:	deg F
UST Size:	gal	Avg Vapor Return Pressure:	inWC

Compartment #4

Pre-Delivery Observations

Initial UST Product Temerature: _____ deg F

UST Size: _____ gal

Amount To Deliver (BOL): _____ gal

Grade: _____ Loading Temp (BOL): _____

Initial Meter Reading: _____ ft^3

Delivery Observations

Tank Orientation: _____

Delivered Product Temperature: _____ deg F

Avg Vapor Return Pressure: _____ inWC

Avg Vapor Return Temp: _____ deg F

Fuel RVP (BOL): _____

Final Meter Reading: _____ ft^3

Compartment #5

Pre-Delivery Observations

Initial UST Product Temerature: _____ deg F

UST Size: _____ gal

Amount To Deliver (BOL): _____ gal

Grade: _____ Loading Temp (BOL): _____

Initial Meter Reading: _____ ft^3

Delivery Observations

Tank Orientation: _____

Delivered Product Temperature: _____ deg F

Avg Vapor Return Pressure: _____ inWC

Avg Vapor Return Temp: _____ deg F

Fuel RVP (BOL): _____

Final Meter Reading: _____ ft^3

Vent Pipe Discharge

Delivery Observations

Initial Vent Pressure: _____ inWC

Initial Vent Temperature: _____ deg F

Initial Meter Reading: _____ ft^3

Stack Venting Pressure: _____ inWC

Stack Venting Temperature: _____ deg F

Post Delivery Observations

Post Observation Time: _____

Remarks: _____

Final Vent Pressure: _____ inWC

Final Vent Temperature: _____ deg F

Final Meter Reading: _____ ft^3

Figure 1 - Cargo Tank Back Pressure Assembly

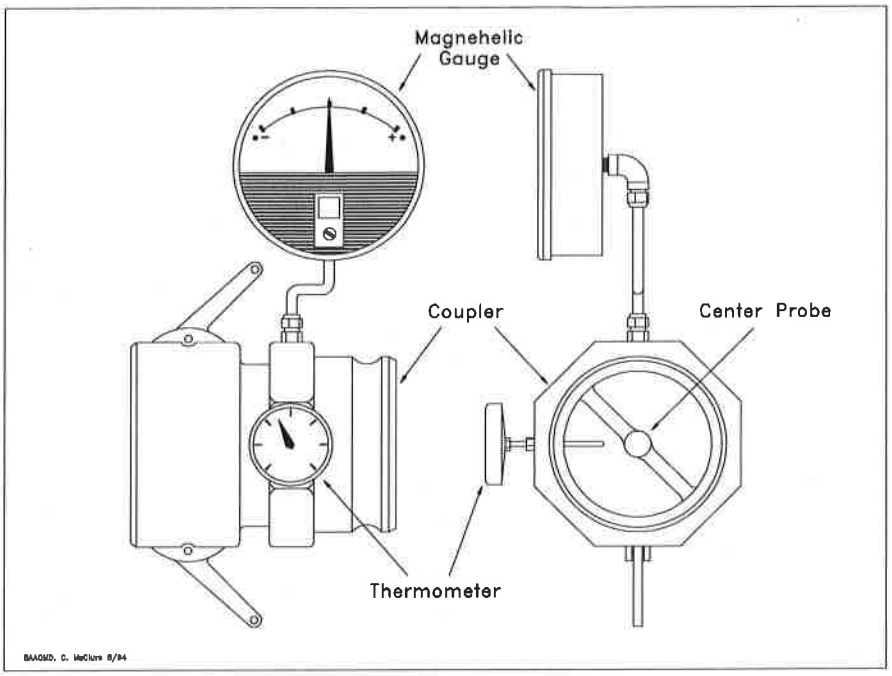


Figure 2 - Storage Tank Pressure Assembly

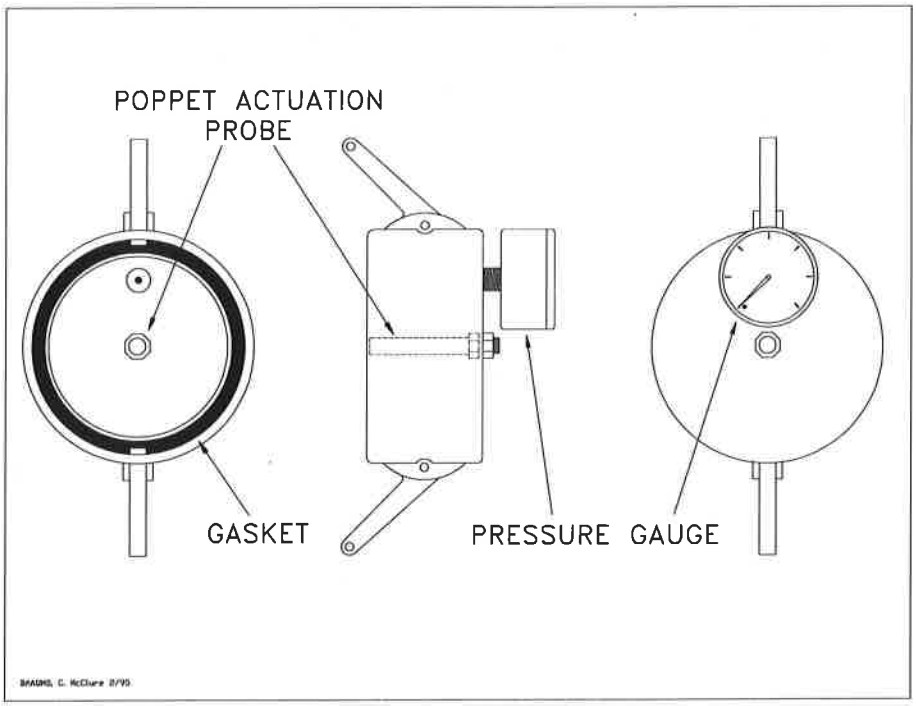


Figure 3 - Vent Pipe and Vapor Return Meter Arrangement

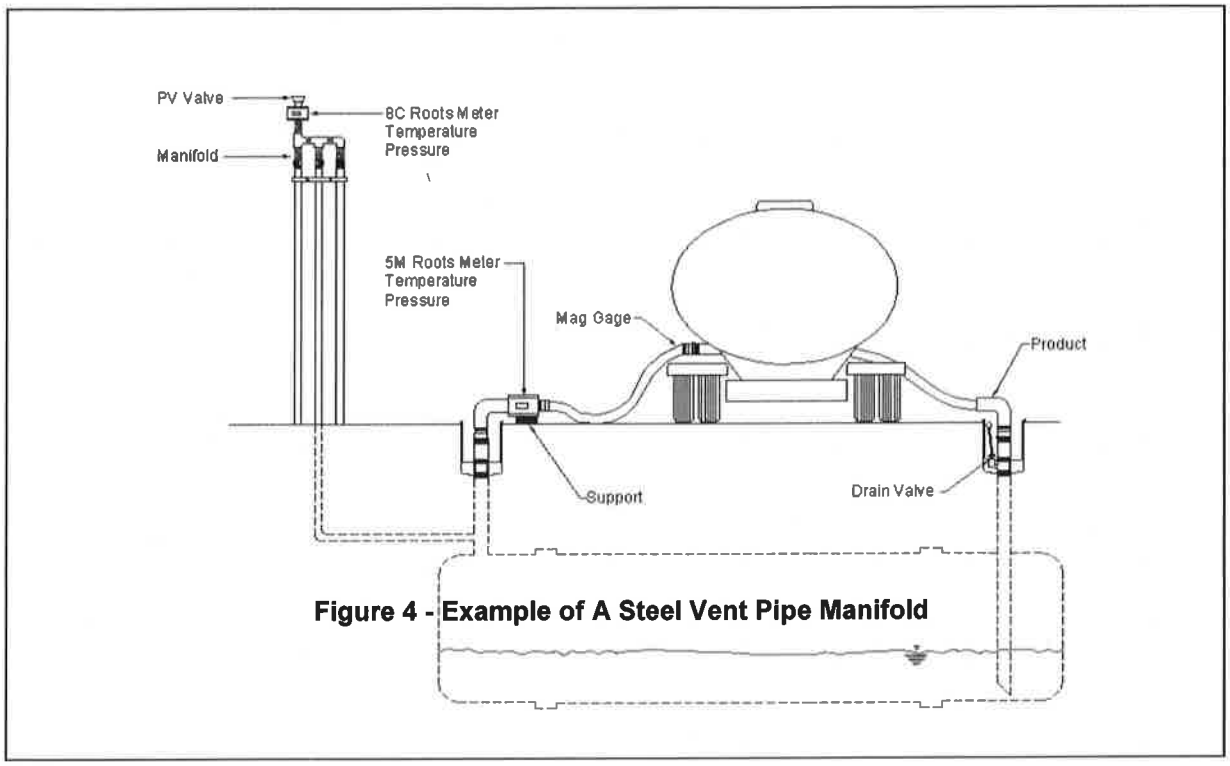


Figure 4 - Example of A Steel Vent Pipe Manifold