State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER VR-209-A

Vapor Systems Technologies, Inc.
Phase II Enhanced Vapor Recovery (EVR) System
with Franklin Fueling Systems Clean Air Separator
Not Including In-Station Diagnostics (ISD)

WHEREAS, the California Air Resources Board (ARB) has established, pursuant to California Health and Safety Code sections 25290.1.2, 39600, 39601 and 41954, certification procedures for systems designed for the control of gasoline vapor emissions during motor vehicle fueling operations (Phase II EVR vapor recovery systems) in its CP-201, ***Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities*** (Certification Procedure) as last amended May 25, 2006, incorporated by reference in title 17, California Code of Regulations, section 94011;

WHEREAS, ARB has established, pursuant to California Health and Safety Code sections 39600, 39601, 39607, and 41954, test procedures for determining the compliance of Phase II vapor recovery systems with emission standards;

WHEREAS, Vapor Systems Technologies, Inc. (VST) has applied for certification of the Franklin Fueling Systems, Inc. (FFS) Clean Air Separator (CAS) as an alternate component for tank pressure management on the VST Phase II Enhanced Vapor Recovery (EVR) System Not Including In-Station Diagnostics (ISD) previously certified in Executive Order VR-203;

WHEREAS, the Certification Procedure provides that the ARB Executive Officer shall issue an Executive Order if he or she determines that the vapor recovery system conforms to all of the applicable requirements set forth in the Certification Procedure;

WHEREAS, G-01-032 delegates to the Chief of the Monitoring and Laboratory Division the authority to certify or approve modifications to certified Phase I and Phase II vapor recovery systems for gasoline dispensing facilities;

WHEREAS, I, Cynthia L. Castronovo, Acting Chief of the Monitoring and Laboratory Division, find that the VST Phase II EVR System conforms with all requirements set forth in the Certification Procedure, including compatibility when fueling vehicles equipped with onboard refueling vapor recovery systems, and results in a vapor recovery system which is at least 95 percent efficient and shall not exceed 0.38 pounds of hydrocarbons per 1,000 gallons of gasoline transferred when tested pursuant to TP-201.2, ***Efficiency and Emission Factor for Phase II Systems*** (October 8, 2003);

NOW, THEREFORE, IT IS HEREBY ORDERED that the VST Phase II EVR System with CAS is certified to be at least 95 percent efficient and does not exceed 0.38 pounds of hydrocarbon per 1,000 gallons of gasoline transferred in attended and/or self-service mode

when used with an ARB-certified Phase I vapor recovery system and installed, operated, and maintained as specified herein and in the following exhibits. Exhibit 1 contains a list of the equipment certified for use with the VST Phase II EVR System with CAS. Exhibit 2 contains the performance standards, specifications, and typical installation drawings applicable to the VST Phase II EVR System with CAS as installed in a gasoline dispensing facility (GDF). Exhibit 3 contains the manufacturing performance standards and specifications. Exhibit 4 is the test procedure for verifying performance of the FFS Clean Air Separator. Exhibit 5 is the liquid removal test procedure. Exhibit 6 provides items required in conducting TP-201.4. Exhibit 7 is the nozzle bag test procedure. Exhibit 8 provides items required in conducting TP-201.3. Exhibit 9 is the VST and FFS Warranties.

IT IS FURTHER ORDERED that compliance with the applicable certification requirements, rules, and regulations of the Division of Measurement Standards of the Department of Food and Agriculture, the Office of the State Fire Marshal of the Department of Forestry and Fire Protection, the Division of Occupational Safety and Health of the Department of Industrial Relations, and the Division of Water Quality of the State Water Resources Control Board are made conditions of this certification.

IT IS FURTHER ORDERED that VST and FFS shall provide a warranty for the vapor recovery system and components to the initial purchaser. The warranty shall be passed on to each subsequent purchaser within the warranty period. The manufacturer of components listed in Exhibit 1 not manufactured by VST or FFS shall provide a warranty for each of their components certified herein. The warranty shall include the ongoing compliance with all applicable performance standards and specifications and shall comply with all warranty requirements in Section 16.5 of the Certification Procedure. VST, FFS, or other manufacturers may specify that the warranty is contingent upon the use of trained installers.

IT IS FURTHER ORDERED that every certified component manufactured by VST and FFS shall be performance tested by the manufacturer as provided in Exhibit 3.

IT IS FURTHER ORDERED that the certified VST Phase II EVR System with CAS shall be installed, operated, and maintained in accordance with the ***ARB Approved Installation, Operation, and Maintenance Manual***. A copy of this Executive Order and the ***ARB Approved Installation, Operation and Maintenance Manual*** shall be maintained at each GDF where the certified VST Phase II EVR System and CAS are installed.

IT IS FURTHER ORDERED that equipment listed in Exhibit 1, unless exempted, shall be clearly identified by a permanent identification showing the manufacturer's name, model number, and serial number.

IT IS FURTHER ORDERED that any alteration in the equipment parts, design, installation, or operation of the system certified hereby is prohibited and deemed inconsistent with this certification, unless the alteration has been submitted in writing and approved in writing by the Executive Officer or Executive Officer delegate.

IT IS FURTHER ORDERED that the following requirements are made a condition of certification. The owner or operator of the VST Phase II EVR System with CAS shall

conduct and pass the following tests no later than 60 days after startup and at least once in each twelve month period, using the following test procedures and protocols:

- TP-201.3, ***Determination of 2 Inch WC Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities*** (March 17, 1999);
- TP-201.4, ***Dynamic Back Pressure*** (July 3, 2002) in accordance with the condition listed in item 1 of the Vapor Collection section of Exhibit 2;
- Exhibit 4, ***Determination of Static Pressure Performance of the Healy Clean Air Separator***;
- Exhibit 5, ***Liquid Removal Test Procedure***;
- Exhibit 6, ***Required Items in Conducting TP-201.4***; and
- Exhibit 8, ***Required Items in Conducting TP-201.3.***

Local district at their option may specify the testing frequency and related sequencing of the above tests. Notification of testing, and submittal of test results, shall be done in accordance with local district requirements and pursuant to policies established by that district. Local districts may require the use of alternate test form(s), provided they include the same minimum parameters identified in the datasheet referenced in the test procedure(s). Alternative test procedures, including most recent versions of the test procedures listed above, may be used if determined by the ARB Executive Officer or Executive Officer delegate, in writing, to yield equivalent results.

IT IS FURTHER ORDERED that the following requirements are made a condition of certification. The owner or operator of the VST Phase II EVR System with CAS shall conduct, and pass, the following test no later than 60 days after startup using the following test procedure: Exhibit 7, ***Nozzle Bag Test Procedure***. Notification of testing, and submittal of test results, shall be done in accordance with local district requirements and pursuant to the policies established by that district. Alternative test procedures, including most recent versions of the test procedures listed above, may be used if determined by the ARB Executive Officer or Executive Officer delegate, in writing, to yield equivalent results.

IT IS FURTHER ORDERED that, except as provided above, local districts at their option will specify the testing, related sequencing, and testing frequency of the nozzle vapor valves and CAS. If the district requires the nozzle vapor valve be tested, the test shall be conducted in accordance with Exhibit 7, ***Nozzle Bag Test Procedure***.

IT IS FURTHER ORDERED that the VST Phase II EVR System with CAS shall be compatible with gasoline in common use in California at the time of certification. The VST Phase II EVR System with CAS is not compatible with gasoline that has methanol content greater than 5 percent, ethanol content greater than 10 percent, or methyl tertiary butyl ether (MTBE) content greater than 15 percent. Any modifications to comply with future California gasoline requirements shall be approved in writing by the Executive Officer or Executive Officer delegate.

IT IS FURTHER ORDERED that the certification of the VST Phase II EVR System with CAS is valid through April 1, 2012.

IT IS FURTHER ORDERED that this Executive Order shall apply to new installations or major modification of Phase II Systems with a throughput of less than or equal to 600,000 gallons per year. Use of this Executive Order for new installations or major modifications at a GDF with a throughput of more than 600,000 gallons per year is not authorized.

Executed at Sacramento, California, this 4 day of November 2009.

Cynthia L. Castronovo, Acting Chief
Monitoring and Laboratory Division

Attachments:

| | |
|---|---|
| Exhibit 1 | Equipment List |
| Exhibit 2 | System Specifications |
| Exhibit 3 | Performance Standards and Specifications |
| Exhibit 4 | Determination of Static Pressure Performance of the Healy Clean Air Separator |
| Exhibit 5 | Liquid Removal Test Procedure |
| Exhibit 6 | Required Items in Conducting TP-201.4 |
| Exhibit 7 | Nozzle Bag Test Procedure |
| Exhibit 8 | Required Items in Conducting TP-201.3 |
| Exhibit 9 | Warranty |

**Executive Order VR-209-A**

**VST Phase II EVR System with Clean Air Separator**

**Exhibit 1**
**Equipment List**

| **Component** | **Manufacturer/ Model** |
|---|---|
| **Nozzle** | VST Model VST-EVR-NB<br>(Figure 1A-1)<br>VST Model VST-EVR-NB-R (Rebuilt) |
| **Coaxial Curb Hose** | VST Model VDV-EVR Series<br>(Figure 1A-2) |
| **Coaxial Whip Hose** | VST Model VSTA-EVR Series<br>(Figure 1A-2) |
| **Breakaway Coupling** | VST Model VSTA-EVR-SBK<br>(Figure 1A-2) |
| **Hanging Hardware with Liquid Removal Device** | (Figure 1A-3) |
| **Clean Air Separator** | Healy Model 9961 Clean Air Separator<br>(Figures 1A-4 and 1A-5)<br>Healy Model 9961H Clean Air Separator<br>(Figures 1A-6 and 1A-7) |

**Figure 1A-1**
**Model VST-EVR- NB Nozzle**

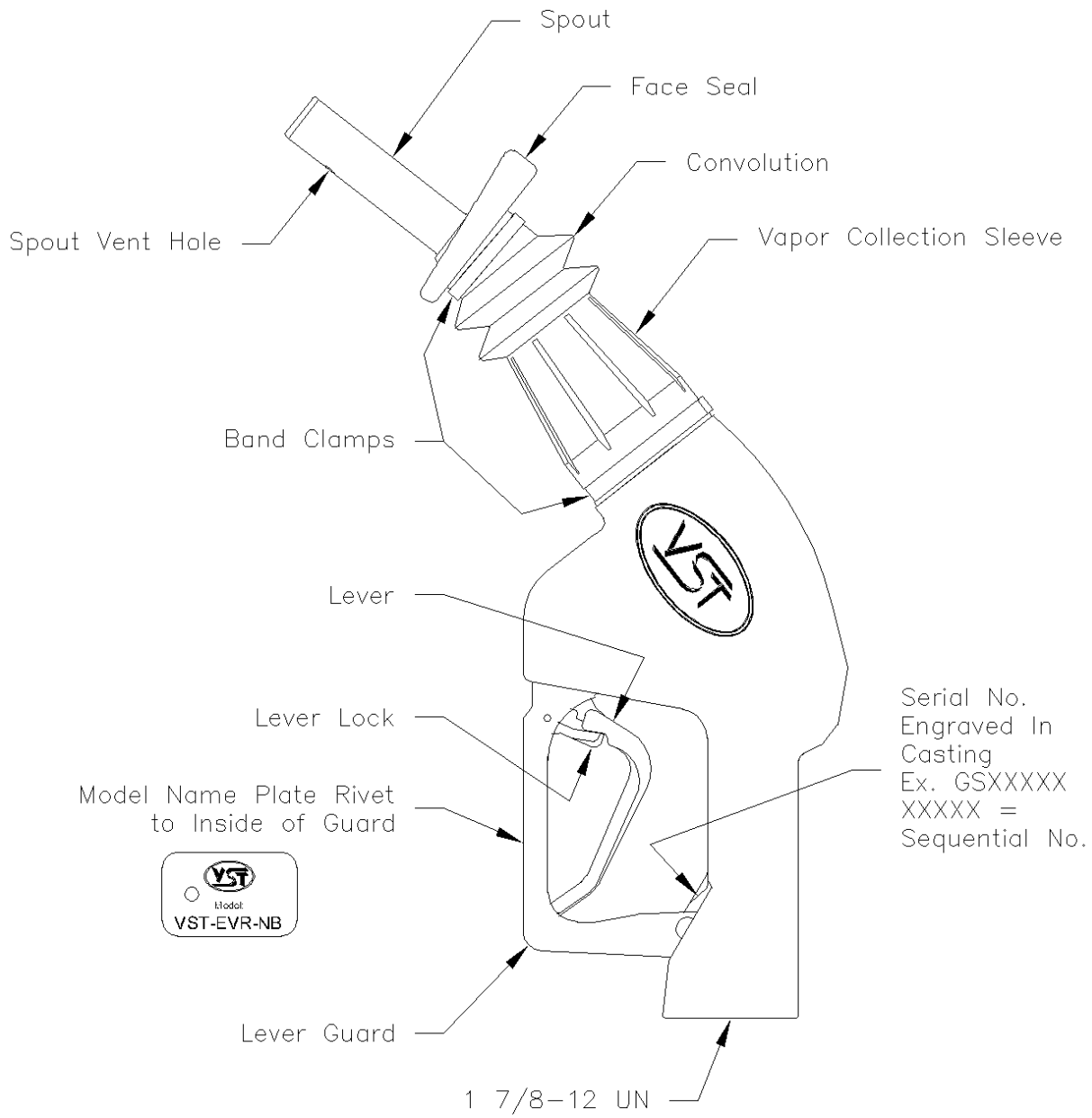

**Figure 1A-2**
**VST Hanging Hardware**
**(Nozzle, Coaxial Curb Hose, Breakaway, and Coaxial Whip Hose)**

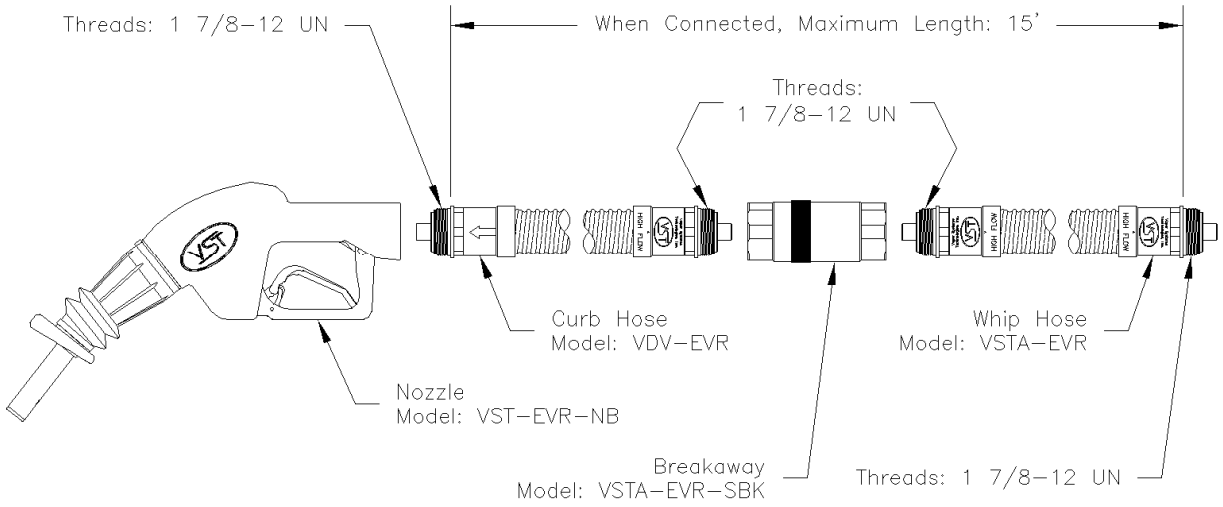

**Figure 1A-2 (continued)**
**VST Hanging Hardware**
(Nozzle, Coaxial Curb Hose, Breakaway, and Coaxial Whip Hose)

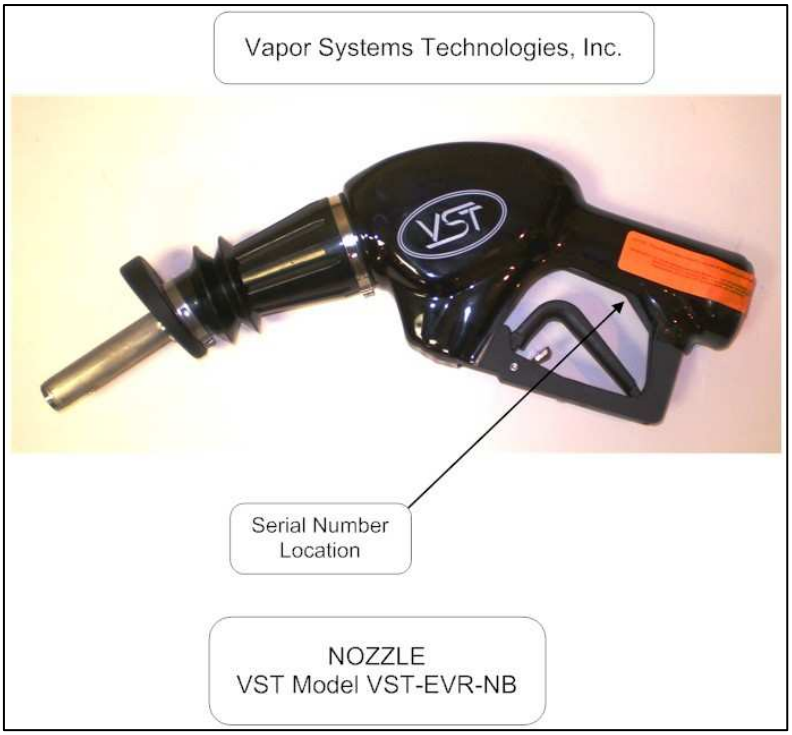




**Figure 1A-3**
**Typical VST Hanging Hardware with Liquid Removal Device**

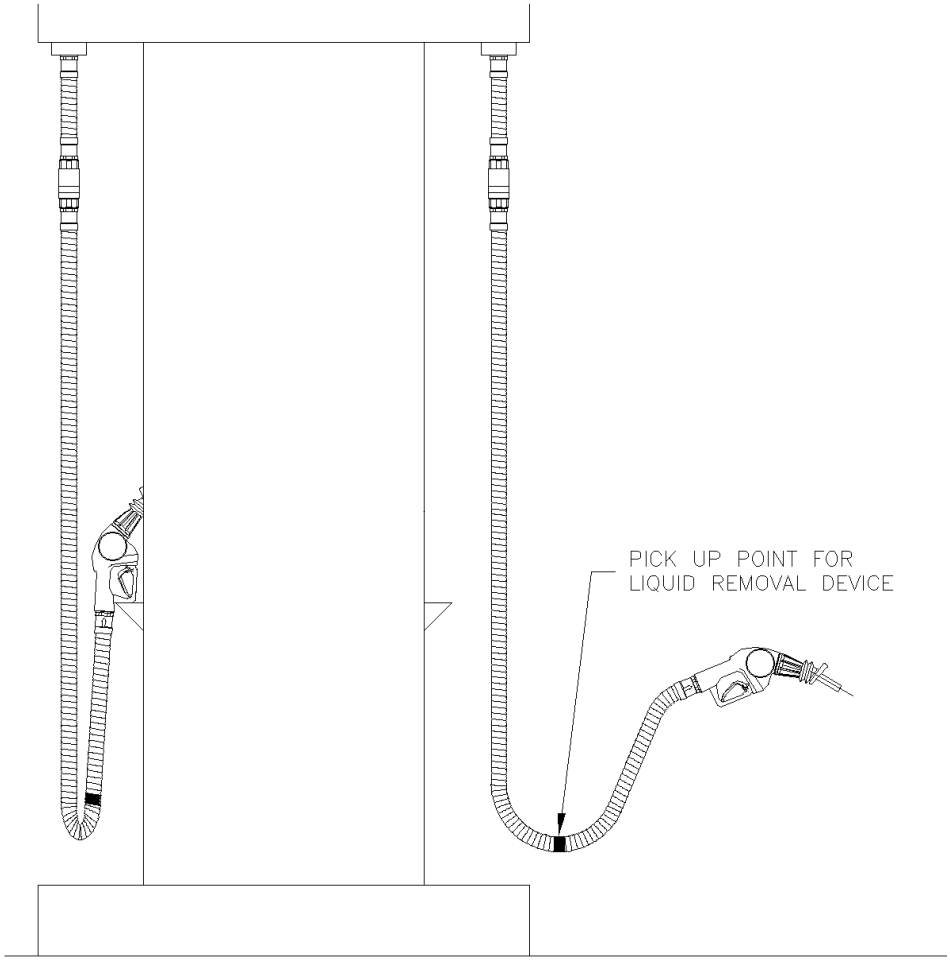

**Figure 1A-4**
**Healy Model 9961 Clean Air Separator**

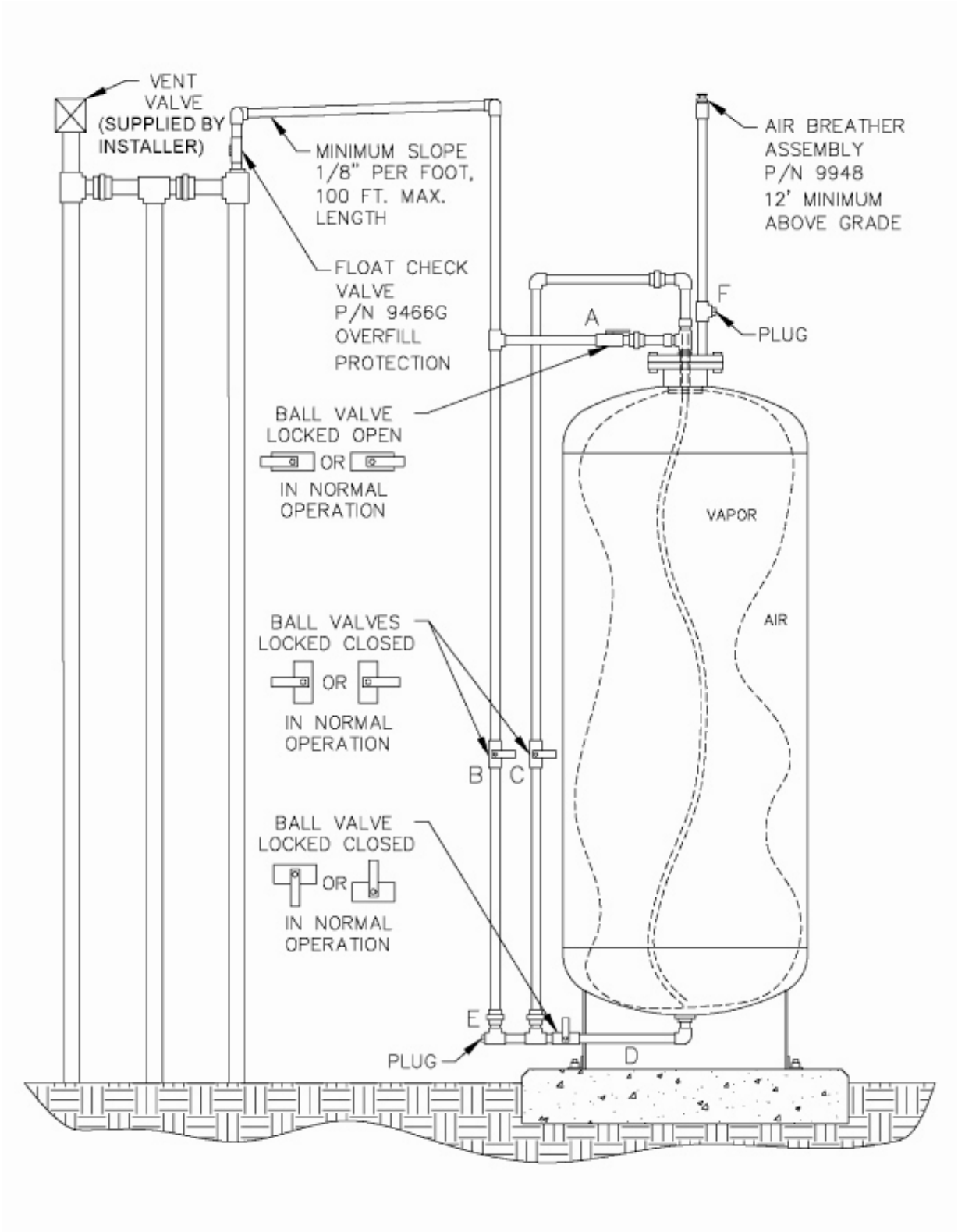

**Figure 1A-5**
**Healy Model 9961 Clean Air Separator**

**Figure 1A-6**
**Healy Model 9961H Clean Air Separator**

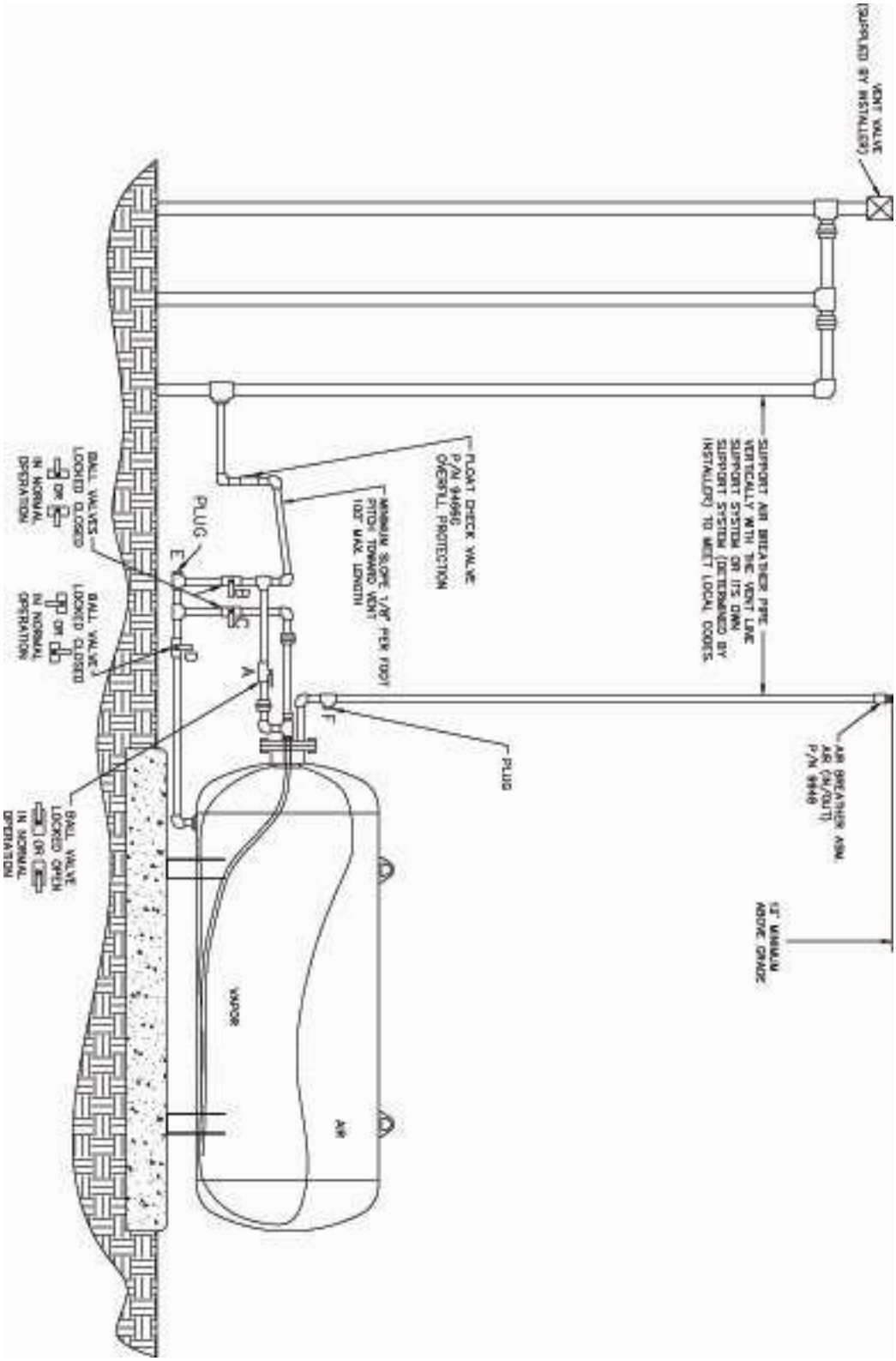

**Figure 1A-7**
**Healy Model 9961H Clean Air Separator**

**Executive Order VR-209-A**
**VST Phase II EVR System with Clean Air Separator**

**Exhibit 2**
**System Specifications**

This exhibit contains the installation, maintenance and compliance standards and specifications that apply to the VST Phase II EVR and the Franklin Fueling Systems Clean Air Separator System installed at a gasoline dispensing facility (GDF). All components must be installed, maintained, and operated in accordance with the specifications in the **ARB Approved Installation, Operation and Maintenance Manual** (IOM). Installation, maintenance and repair of system components, including removal and installation of such components in the course of any required tests, shall be performed by technicians certified by the appropriate manufacturer. Additional certifications may be required in accordance with local district requirements. Provided that there are no other local district requirements, a GDF owner/operator can remove and install nozzles, curb hoses, breakaways, and whip hoses without a manufacturer certification.

## Nozzle

1. A vapor collection sleeve shall be installed on the nozzle at the base of the spout, as shown in **Figure 2B-1**.

2. The VST Models VST–EVR-NB and VST-EVR-NB-R nozzles have an integral vapor valve which prevents the loss of vapor from the underground storage tanks, ensures proper operation of the system and prevents the ingestion of air into the system. The performance of the nozzle vapor valve can be determined by items 2.1 or 2.2.

    2.1. The maximum allowable leak rate for the nozzle vapor path, as determined by TP-201.2B, shall not exceed 0.07 cubic feet per hour (CFH) at a pressure of two inches water column (2.00” WC)

    2.2. Verification of the integrity of the vapor valve can be performed on installed nozzles using the nozzle bag test procedure in Exhibit 7.

3. The gasoline flow rate of the nozzle shall be between six (6.0) and ten (10.0) gallons per minute as determined by the applicable provisions of section 6 or 7 of Exhibit 5 or by direct observation for 30 seconds minimum at the maximum hand held position.

## Vapor Collection

1. The system pressure drop from the nozzle to the UST, as determined by TP-201.4 (Methodology 1) and Exhibit 6, shall not exceed the following:

    0.35 inches WC at a flow rate of 60 CFH of Nitrogen; and
    0.62 inches WC at a flow rate of 80 CFH of Nitrogen.

**Coaxial Hoses**

1. The maximum length of the curb hose, breakaway, and whip hose combined shall not exceed fifteen feet as measured from the base of the nozzle to the end of dispenser adapter or dispenser, as appropriate (reference Exhibit 1, Figure 1A-2).

2. The liquid removal rate shall not be less than five milliliters per gallon (5 ml/gal) as determined by Exhibit 5 when tested with a gasoline flow rate between six (6.0) and ten (10.0) gallons per minute. Liquid removal requirement is applicable to all grades of gasoline.

3. All hoses shall have a permanent marking indicating the liquid pick-up location.

4. Any hose configuration is allowed when installed in accordance with the IOM section titled "Phase II Coaxial EVR Balance Fuel Hose".

**Breakaway Couplings**

1. The VST breakaway couplings are non-reconnecting and shall be replaced following a drive-off.

**Flow Limiter**

1. No flow limiter is allowed for this system.

**Clean Air Separator Pressure Management System**

1. The Clean Air Separator (CAS) is a passive gasoline storage tank ullage pressure management system, with no electrical requirements. The Clean Air Separator vapor integrity shall be evaluated using the test procedure outlined in Exhibit 4 of the Executive Order.

2. The Clean Air Separator shall be installed within 100 feet from the vent line(s), and the associated piping shall be sloped 1/8" per foot minimum toward the vent line(s).

**Pressure/Vacuum Vent Valves for Storage Tank Vents**

1. All P/V vent valves shall be an ARB certified P/V valve for a Phase I system.

2. At least one pressure/vacuum (P/V) vent valve shall be installed on each tank vent. The maximum number of P/V vent valves allowed and P/V vent valve performance specifications are listed in the applicable Phase I EVR Executive Order. Vent lines may be manifold to minimize the number of P/V vent valves and potential leak sources, provided the manifold conforms to all applicable fire regulations. At least one P/V vent valve shall be installed on vents if a manifold is incorporated. **Figure 2B-3** or **2B-3H** shows a typical manifold configuration for a single P/V vent valve with the Clean Air Separator. If two or more P/V vent valves are desired, they shall be installed in parallel, so that each valve can

serve as a backup to the other if one should fail to open properly. **Figure 2B-4** or **2B-4H** shows a typical manifold configuration for two P/V vent valves installed in parallel with the Clean Air Separator. **Figure 2B-5** or **2B-5H** shows a typical manifold configuration for three P/V vent valves installed in parallel with the Clean Air Separator. **Figure 2B-6** or **2B-6H** shows a typical configuration for a P/V vent valve mounted on a single 3" vent line with the Clean Air Separator. Figures 2B-3, 2B-4, 2B-5 and 2B-6 apply to vertical CAS installations. Figures 2B-3H, 2B-4H, 2B-5H and 2B-6H apply to horizontal CAS installations.

**Vapor Recovery Piping Configurations**

**NOTE: Vapor Return Piping shall meet the requirements specified in section 4.11 of CP-201.**

1. Vapor Return and Vent Lines

   For facilities installed on or after April 1, 2003, all vapor return and vent lines shall be a minimum nominal internal diameter of 2 inches from the dispensers or the vent stacks to the first manifold. All lines after the first manifold and back to the underground storage tank shall have a minimum nominal internal diameter of 3 inches.

   Note: Facilities permitted by a local district prior to April 1, 2003 shall be required to meet the three inch diameter standard only upon facility modification which involves the addition, replacement, or removal of 50 percent or more of the buried vapor piping.

2. All vapor return lines shall have a minimum slope of 1/8 inch per foot from the dispenser riser to the riser of the UST. A slope of 1/4 inch or more per foot is recommended wherever feasible.

3. The dispenser shall be connected to the riser with either flexible or rigid material that is listed for use with gasoline. The dispenser-to-riser connection shall be installed so that any liquid in the lines will drain toward the storage tank. The internal diameter of the connector, including all fittings, shall not be less than one inch (1").

   Note: The dispenser-to-riser connection is defined as the piping connection between the dispenser piping and the inlet of the dispenser riser. A vapor shear valve may also be part of the riser connection.

4. There is no length restriction for the vapor return piping of the system as long as the system complies with the maximum pressure drop requirement, item 1 of the Vapor Collection section.

5. No product shall be dispensed from any fueling point at a GDF installed with the VST Phase II EVR System if there is a vapor line that is disconnected and open to the atmosphere.

6. No liquid condensate traps or bulk loading operations are allowed with this system.

**Dispensers**

1. The dispenser vapor piping must be sized adequately to meet the maximum pressure drop requirement, item 1 of the Vapor Collection section.

2. Dispenser vapor piping shall be installed so that any liquid in the lines will drain toward the dispenser riser.

**Phase I System**

1. The Phase I system shall be an ARB-certified system that demonstrates compliance with the static pressure decay test criteria contained in TP-201.3 and Exhibit 8.

**Maintenance Records**

1. Each GDF operator owner shall keep records of alarms and maintenance performed at the facility. Such records shall be maintained on site in accordance with district requirements or policies. The records shall include alarm date and time, nature of the alarm, troubleshooting, maintenance or repair performed to validate and/or correct alarms, component, or system failures, date when maintenance or repair was conducted, name and Certified Technician Identification Number of individual conducting maintenance or test, affiliation, and telephone number. Additional information may be required in accordance with local district requirements. An example of a GDF maintenance and alarm record is shown in Figure 2B-7.

2. Maintenance shall be conducted in accordance with the Scheduled Maintenance section of the ARB Approved Installation, Operation, and Maintenance Manual.

**Vapor Recovery Equipment Defects**

The following is deemed a defect for the affected fueling point(s) or system.

1. The fueling point shall be removed from service when more than 30% of a nozzle face seal is missing (e.g., a triangular or similar shape in which greater than 2.5 inches of the faceplate circumference is missing (accumulated)).

2. The fueling point shall be removed from service when more than 0.375 square inches of a nozzle vapor collection sleeve is missing (e.g., a rectangular shape of greater than nine/sixteenth (9/16) inches or more on each side, a circular shape of eleven/sixteenth (11/16) inches or more in diameter, or a triangular shape of seven/eighth (7/8) inches on the side.

3. The fueling point shall be removed from service when the total slit length in the convolutions exceeds 18 inches as determined by direct measurements.

4. The fueling point shall be removed from service when a hose is found to have greater than 175 ml of gasoline in the vapor side as determined by sections 6.1 to 6.5 of Exhibit 5. Note: Prior to draining gasoline from the vapor side of the VST hose, use VST tool

P/N VST-STP-100 and plug the fuel spout. **Do not activate dispenser when draining gasoline from the vapor side of the VST hose.**

5. The fueling point shall be removed from service when VST system pressure drops exceeding the following conditions as determined by Methodology 1 of TP-201.4 and Exhibit 6:

   5.00 inches WC at a flow rate of 60 CFH of Nitrogen; and
   8.00 inches WC at a flow rate of 80 CFH of Nitrogen.

6. The fueling point shall be removed from service when the dispensing rate is greater than ten (10) gallons per minute (gpm) or less than five (5) gpm as determined by the applicable provisions of section 6 or 7 of Exhibit 5 or by direct observation for 30 seconds minimum at the maximum hand held position.

7. The fueling point shall be removed from service when any hose has a visible opening as determined by direct observation.

8. The fueling point shall be removed from service when the insertion interlock mechanism allows dispensing when the bellow is uncompressed as determined by direct observation or GDF-09 (see Vapor Recovery Defects List).

9. The fueling point shall be removed from service when the nozzle automatic liquid shut-off mechanisms malfunction in any manner as determined by EPO No. 26-F (See Vapor Recovery Defects List) or direct observation.

10. The fueling point shall be removed from service when any nozzle has a defective vapor valve as determined by Exhibit 7 or when the vapor valve has a leak rate that exceeds 0.07 cubic feet per minute at a pressure of two (2) inches WC as determined by TP-201.2B.

11. The fueling point or system shall be removed from service when any component required by this Executive Order is absent, installed improperly or disconnected as determined by direct observation.

12. A Clean Air Separator that fails the leak decay test outlined in Exhibit 4 shall be considered a defect.

13. Unless there is maintenance or testing being conducted on the Clean Air Separator, the four ball valves shall be locked in the positions shown in **Figure 2B-2** or **2B-2H** for normal Clean Air Separator operation. Figure 2B-2 applies to vertical CAS installations and Figure 2B-2H applies to horizontal CAS installations. A Clean Air Separator that is not in the proper operating configuration shall be considered a defect.

**Figure 2B-1**
**Model VST-EVR- NB Nozzle**

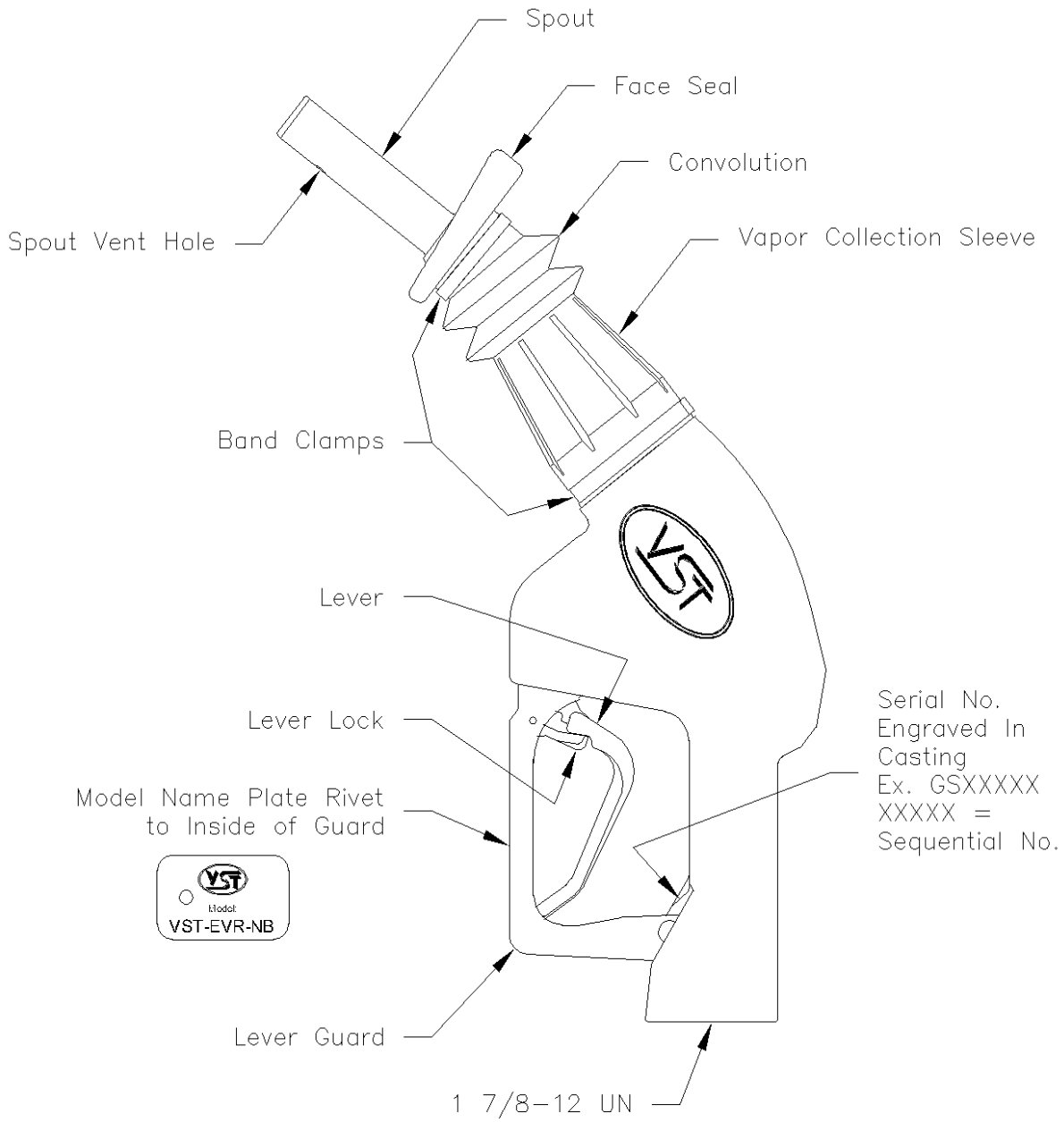

**Figure 2B-2**
**Clean Air Separator Normal Operation Configuration**

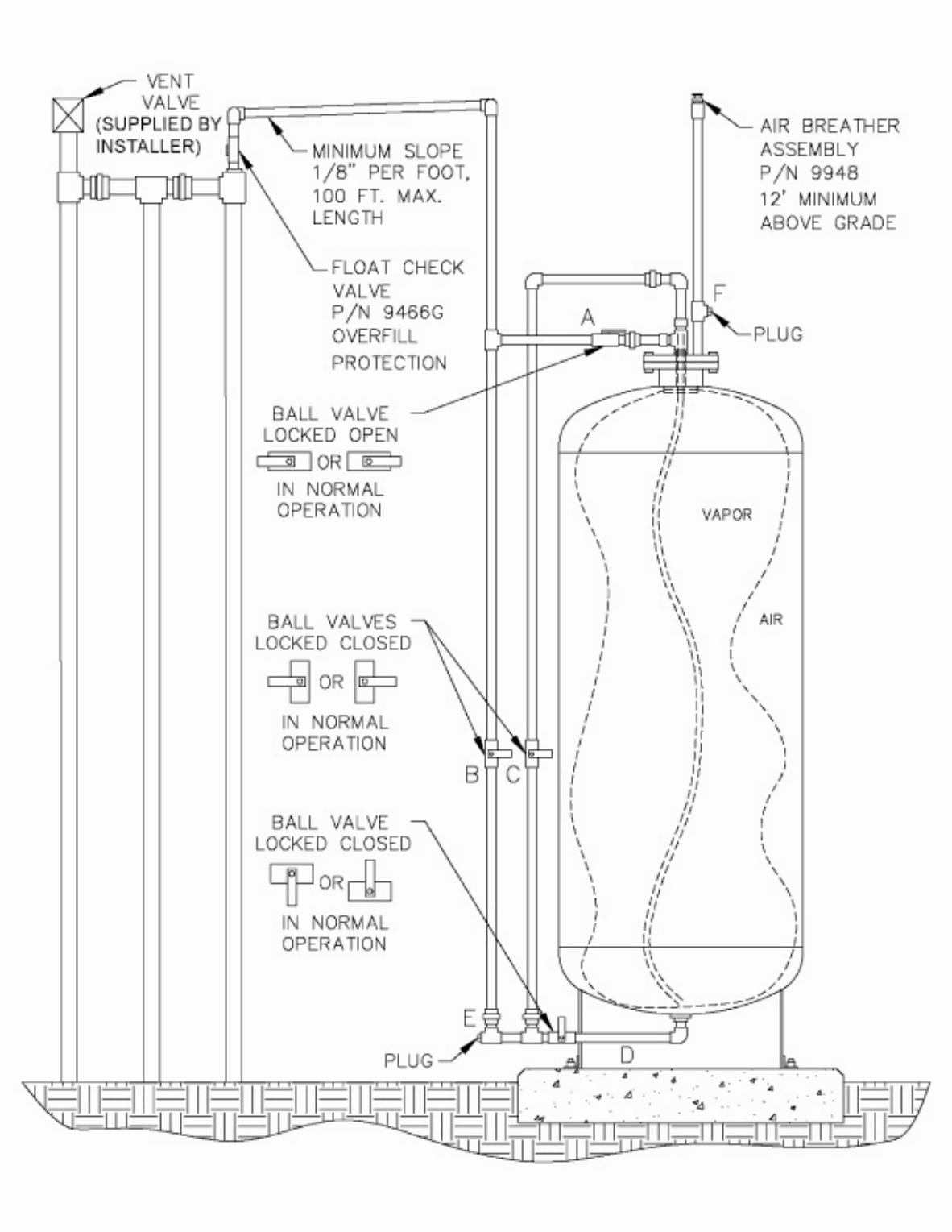

**Figure 2B-2H**
**Clean Air Separator Normal Operation Configuration**

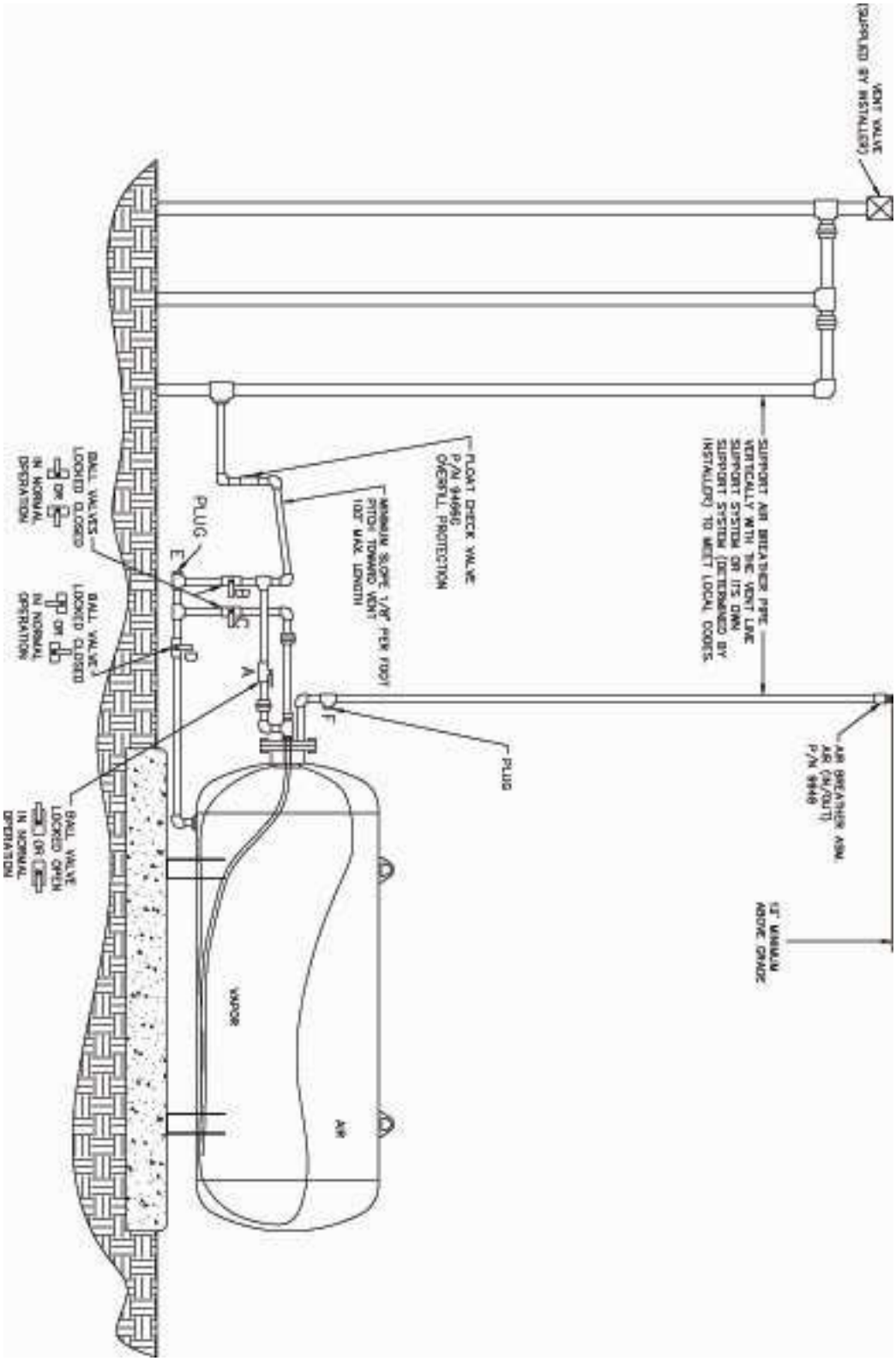

**Figure 2B-3**
**Typical Installation of a Single P/V Vent Valve Manifold**
**with Healy Clean Air Separator**

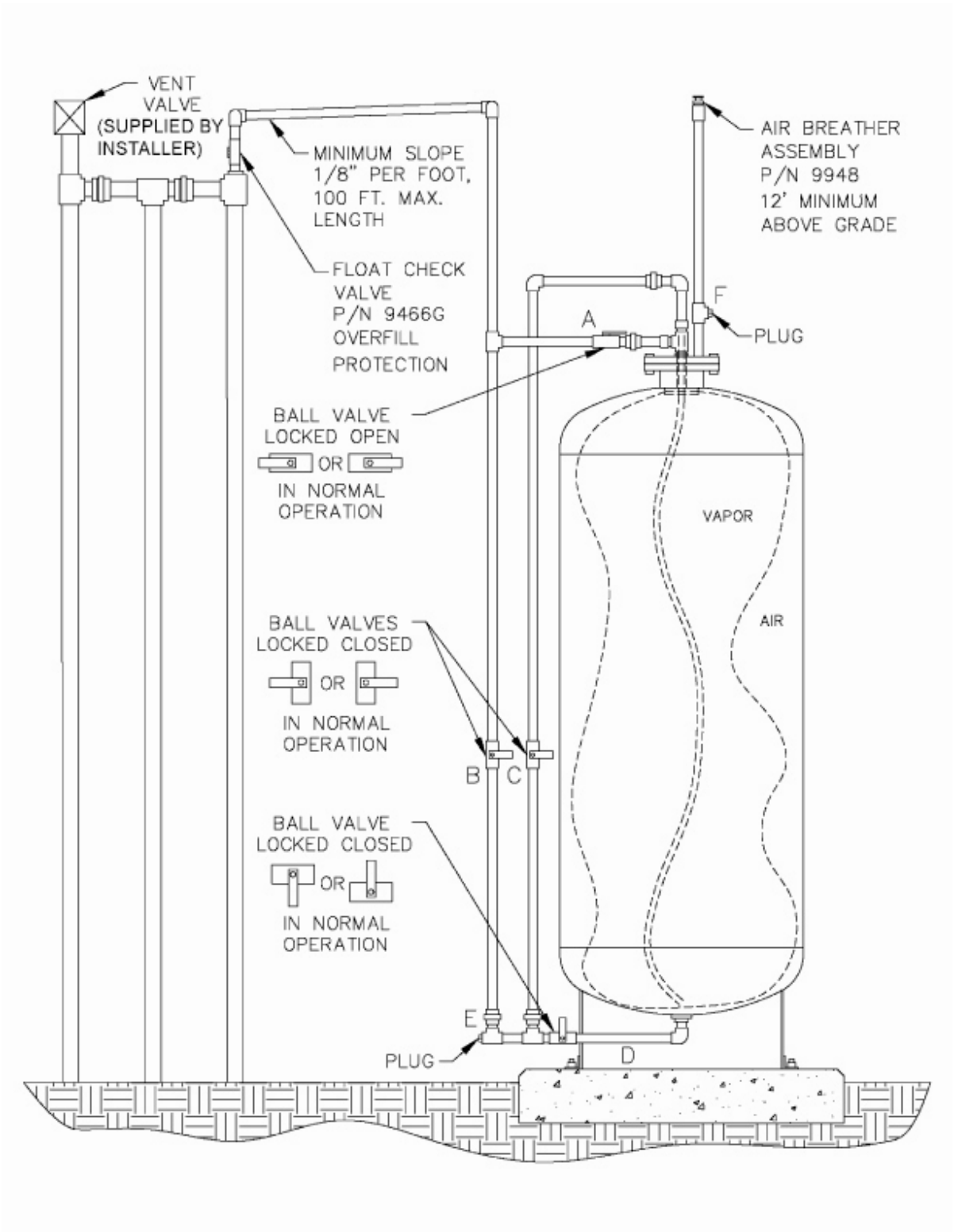

**Figure 2B-3H**
**Typical Installation of a Single P/V Vent Valve Manifold**
**with Healy Clean Air Separator**

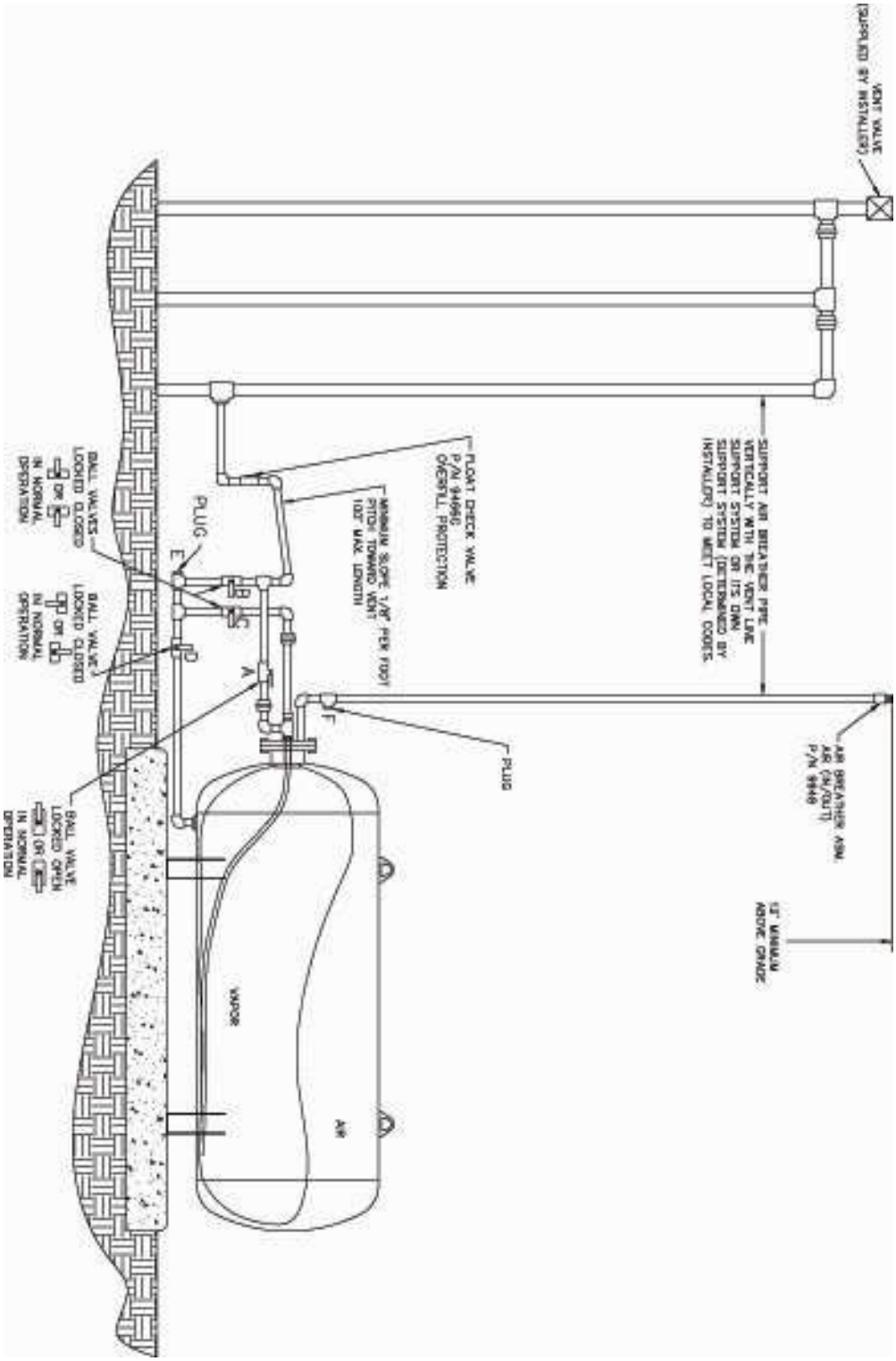

**Figure 2B-4**
**Typical Installation of a Two P/V Vent Valve Parallel Manifold with Healy Clean Air Separator**

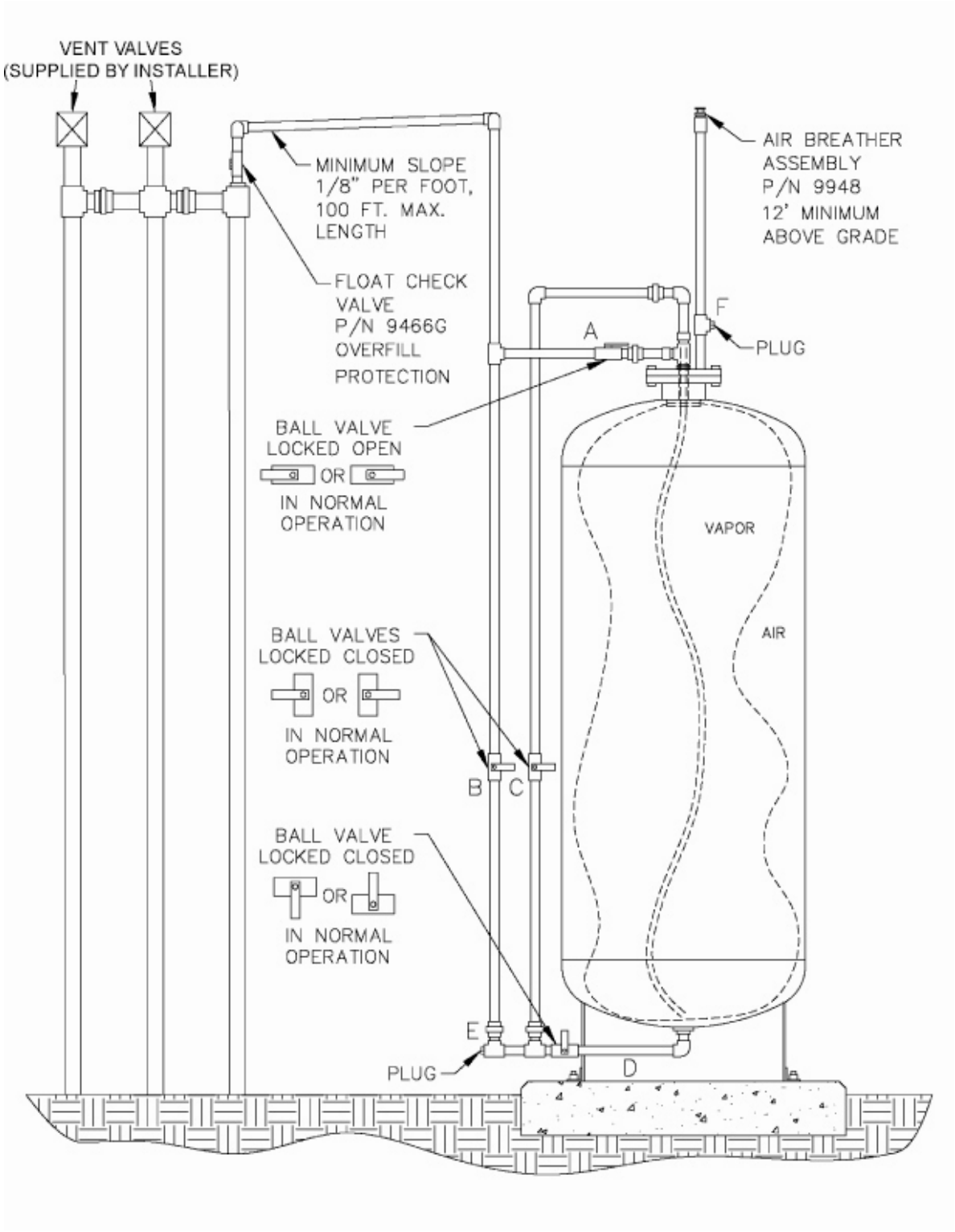

**Figure 2B-4H**
**Typical Installation of a Two P/V Vent Valve Parallel Manifold with Healy Clean Air Separator**

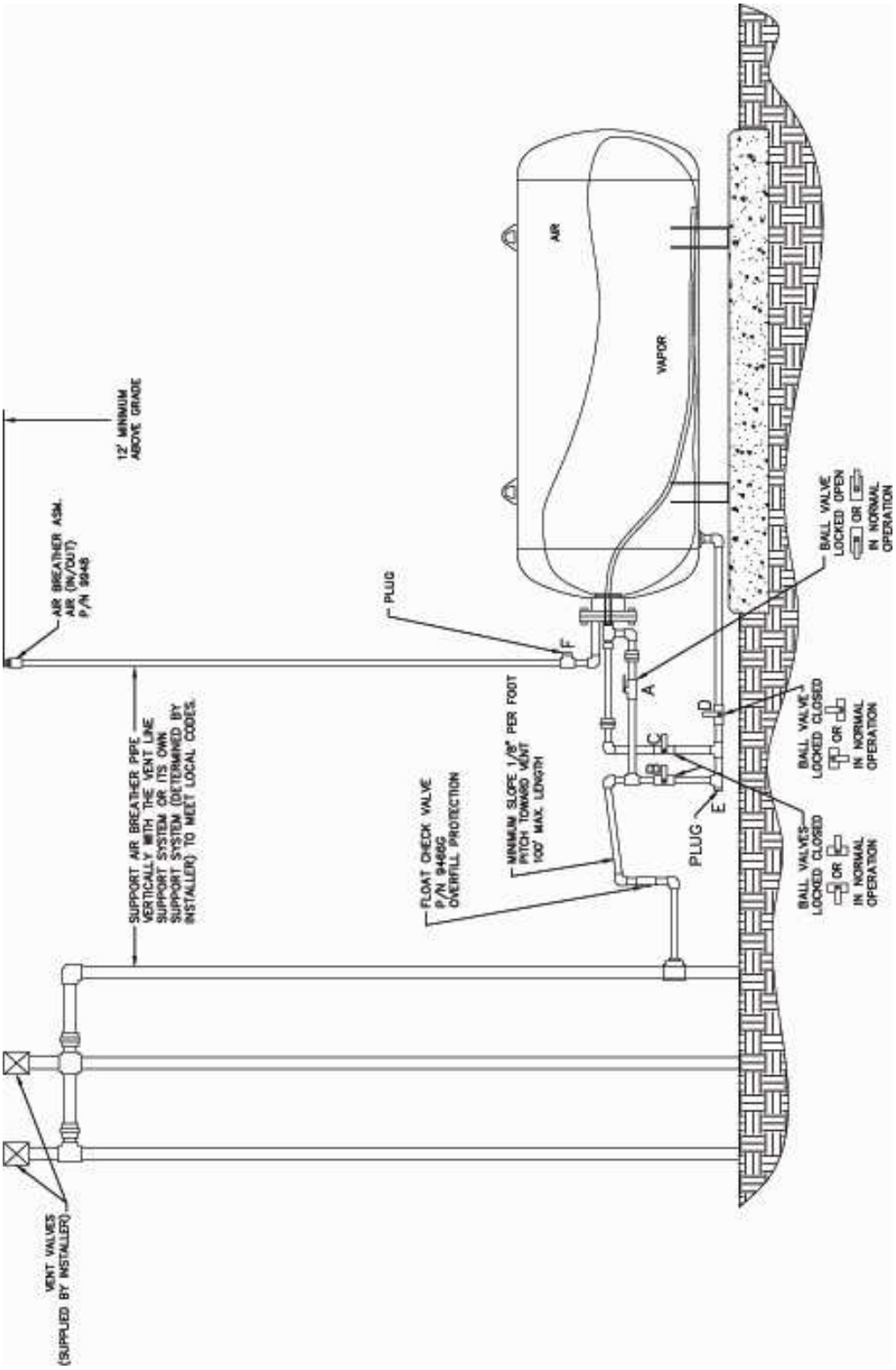

**Figure 2B-5**
**Typical Installation of a Three P/V Vent Valve Parallel Manifold with Healy Clean Air Separator**

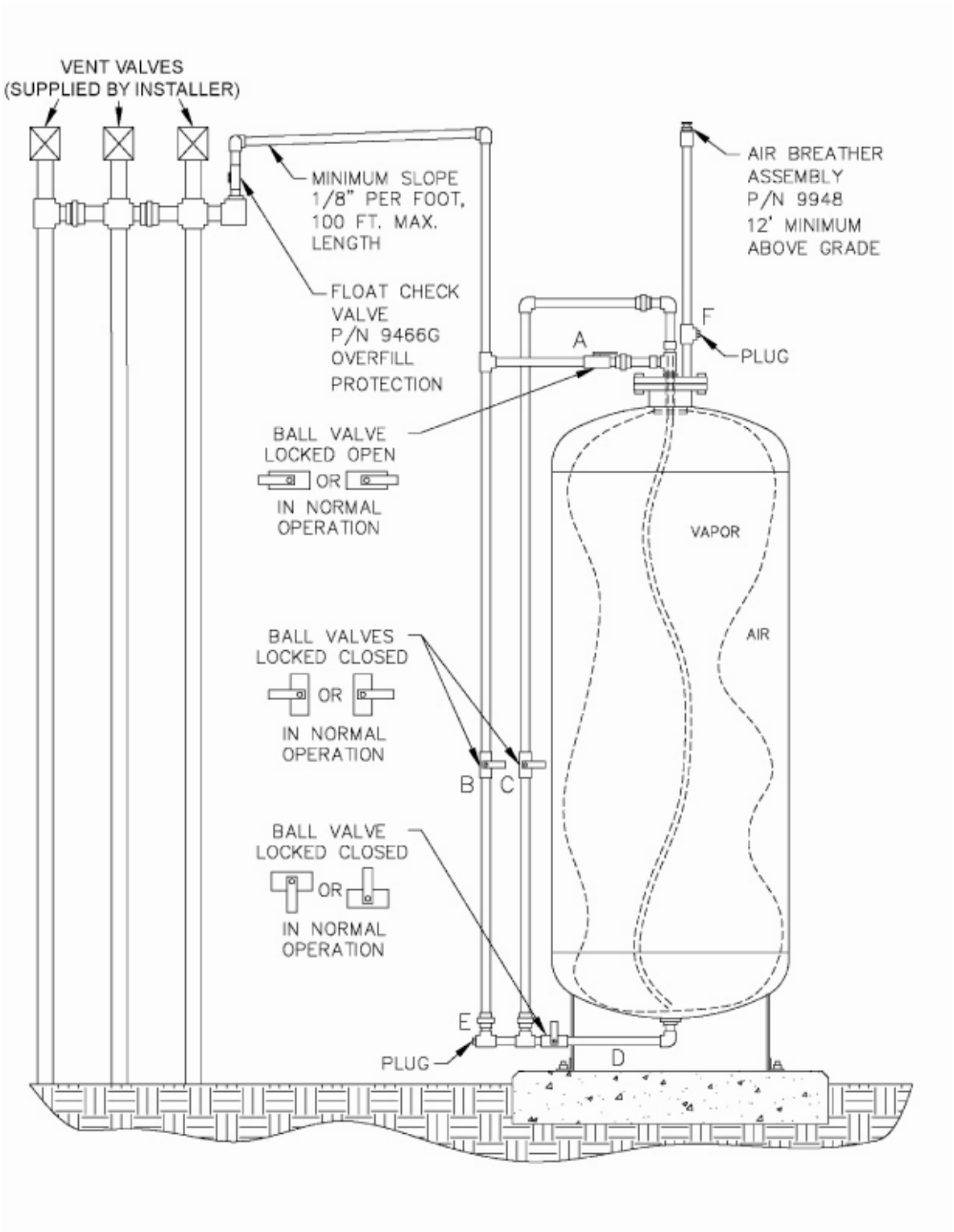

**Figure 2B-5H**
**Typical Installation of a Three P/V Vent Valve Parallel Manifold with Healy Clean Air Separator**

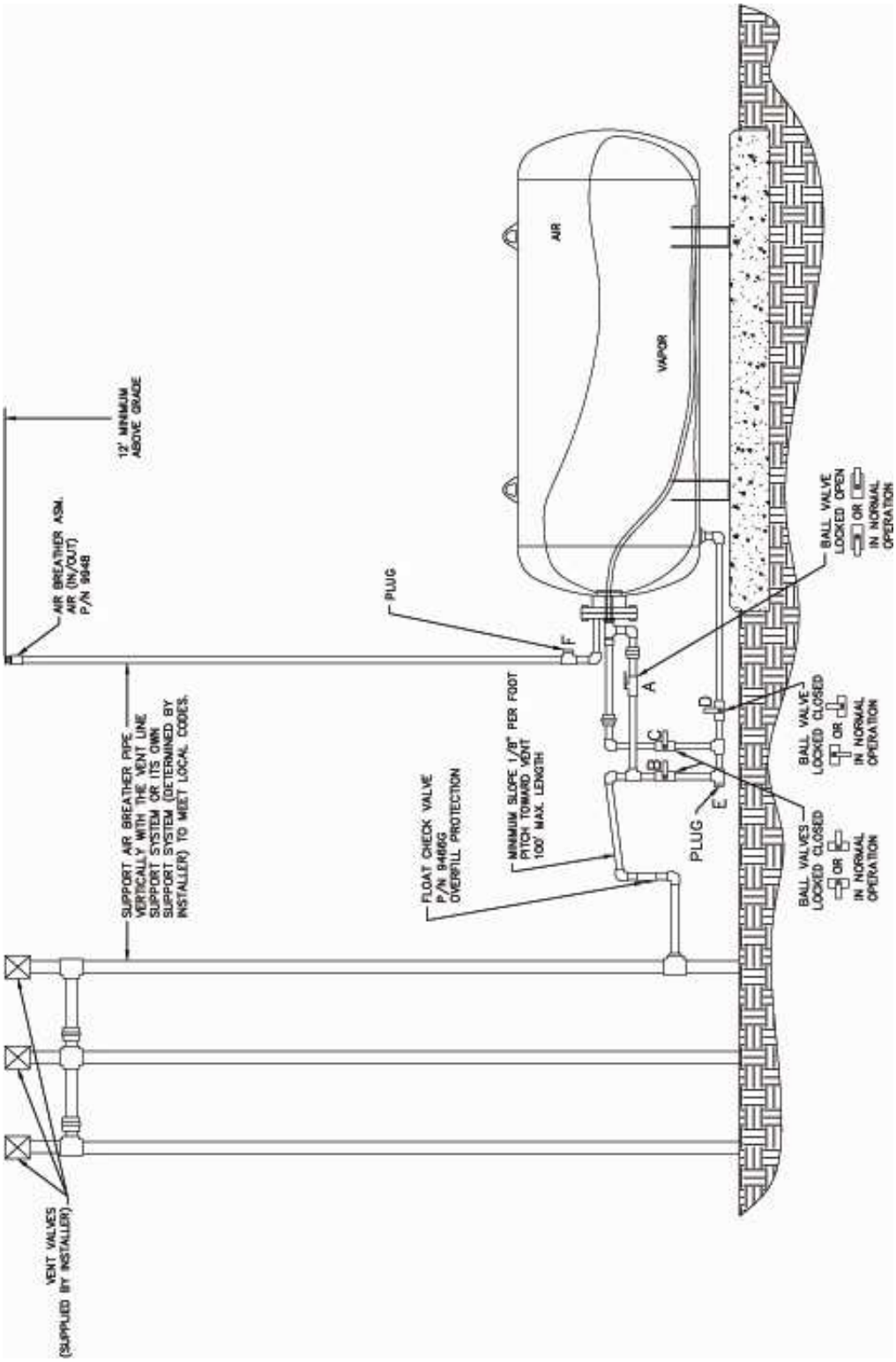

**Figure 2B-6**
**Typical Configuration of a P/V Vent Valve Mounted on a Single 3" Vent Line with the Healy Clean Air Separator**

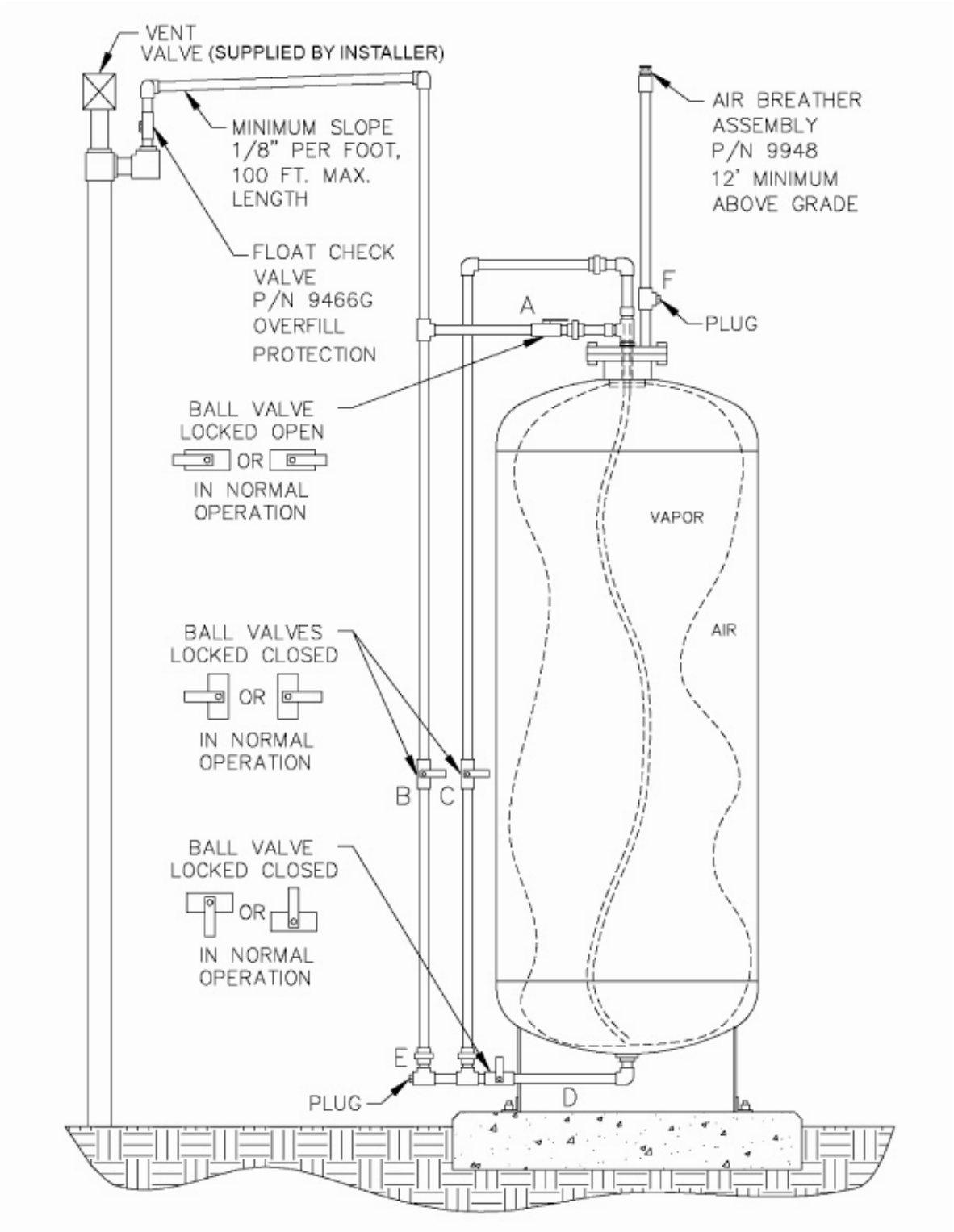

**Figure 2B-6H**
**Typical Configuration of a P/V Vent Valve Mounted on a Single 3" Vent Line with the Healy Clean Air Separator**

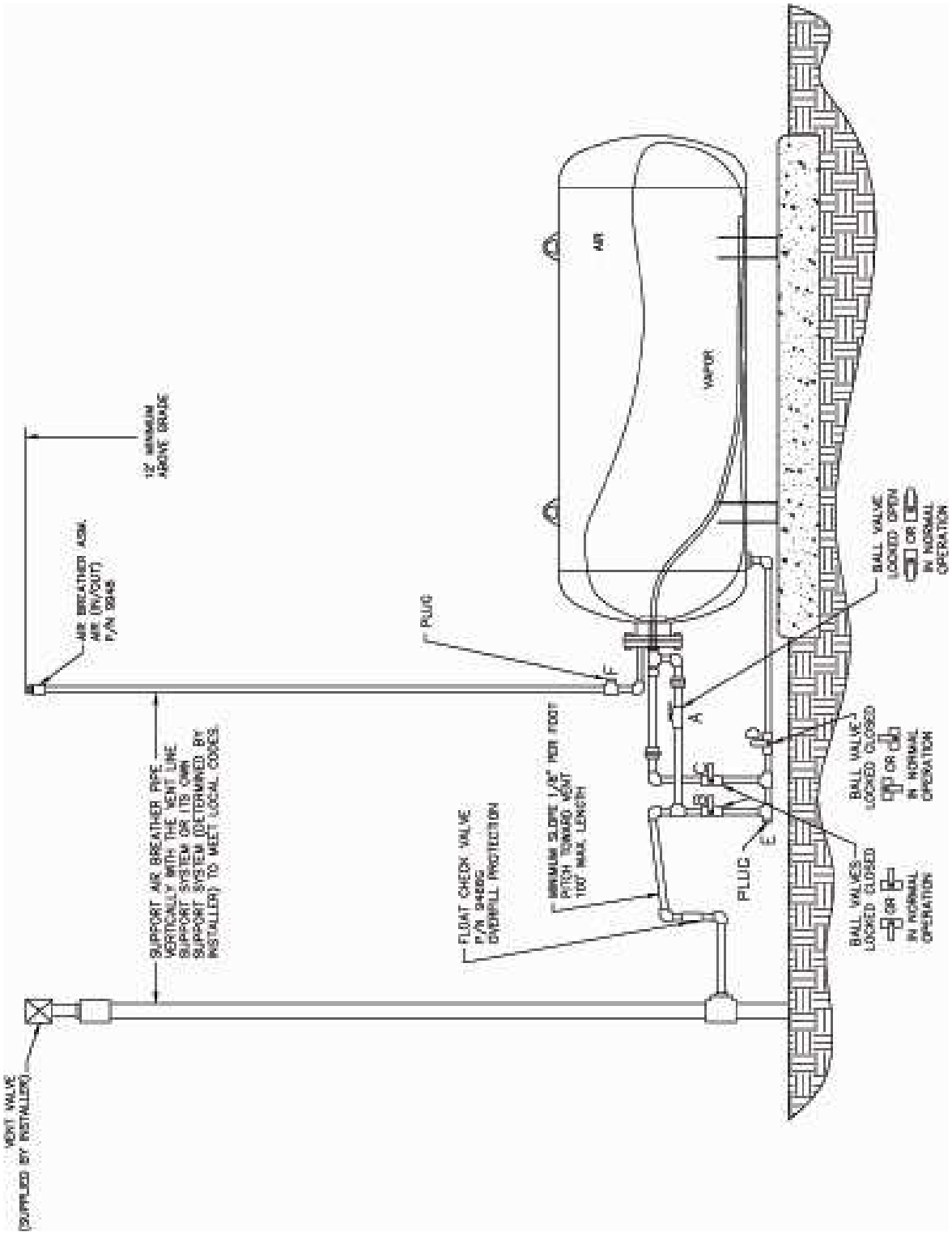

**Figure 2B-7**
**Example of a GDF Maintenance Record and Alarm History Record**

| Date of Maintenance/ Test/Inspection/Failure/ alarm history (including date and time of maintenance call) | Repair Date To Correct Test Failure | Maintenance/Test/Inspection Performed and Outcome/Action Taken in Response to Alarm | Affiliation | Name and Technician ID Number of Individual Conducting Maintenance or Test | Telephone Number |
|---|---|---|---|---|---|
| | | | | | |
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**Executive Order VR-209-A**
**VST Phase II EVR System with Clean Air Separator**

**Exhibit 3**
**Performance Standards and Specifications**

## Part I - VST Manufacturing Performance Standards and Specifications

The VST Phase II EVR System and all components shall be manufactured in compliance with the performance standards and specifications in CP-201 (amended May 25, 2006), as well as the requirements specified in this Executive Order. All components (Exhibit 1) shall be manufactured as certified; no change to the equipment, parts, design, materials or manufacturing process shall be made unless approved in writing by the Executive Officer or Executive Officer delegate. Unless specified in Exhibit 2 or in the ***ARB Approved Installation, Operation and Maintenance Manual***, the requirements of this section apply to the manufacturing process and are not appropriate for determining the compliance status of a gasoline dispensing facility.

### 1. NOZZLES

Every nozzle shall be tested at the factory. Every nozzle shall have affixed to it a card or label stating the performance specifications listed below, and a statement that the nozzle was tested to, and met, the following specifications.

a. The nozzle vapor valve leak rate shall not exceed 0.07 cubic feet per hour (CFH) at a pressure of +2 inches water column (WC) when tested in accordance with the latest version of TP-201.2B.

b. The nozzle automatic shut off feature is tested at all service clip settings as well as handheld in accordance with Underwriters Laboratories (UL) Standard 842.

c. The nozzle's primary and secondary shut-off mechanism shall be identical to the design that passed the California Department of Food and Agriculture Division of Measurement Standards Article 2 (DMS 6-6-97).

d. The nozzle is manufactured to the specifications that passed all tests conducted during the ARB certification for the following:

| | |
|---|---|
| TP-201.2C | - Spillage from Phase II Systems |
| TP-201.2D | - Post Fueling Drips from Nozzles |
| TP-201.2E | - Gasoline Liquid Retention and Spitting in Nozzles and Hoses |
| TP-201.2J | - Nozzle Pressure Drop |

e. The nozzle vapor collection boot is manufactured such that the force necessary to compress the nozzle bellows 0.5 inches is in the range of 10-16 pounds force.

f. The terminal end of each nozzle shall be manufactured in accordance with the specifications referenced in Section 4.7.3 of CP-201.

## 2. COAXIAL HOSES

a. Every coaxial hose is tested for continuity and pressure tests in accordance with UL Standard 330.

b. Every coaxial hose is manufactured to the standards and specifications that passed all tests conducted during the ARB certification for the following:

Exhibit 5 - Liquid Removal Test Procedure (for curb hoses)
TP-201.2J - Hose Pressure Drop (for curb and whip hoses)

## 3. BREAKAWAY COUPLINGS

a. Every breakaway coupling is tested for continuity and pressure tests in accordance with UL Standard 567.

b. Every breakaway coupling is manufactured to the standard that passed all tests conducted during the ARB certification for the following:

TP-201.2J - Breakaway Pressure Drop

## 4. TANK PRESSURE MANAGEMENT SYSTEM

a. The Clean Air Separator tank is designed, constructed, tested, inspected and stamped per the American Society of Mechanical Engineers (ASME) Code Section VIII, Division 1, 2001 Edition, 2003 Addendum.

b. Every Clean Air Separator bladder is performance and pressure tested using the **Clean Air Separator Performance Test** to ensure its integrity.

## Exhibit 4

## Determination of Static Pressure Performance of the Healy Clean Air Separator

(Executive Order VR-209-A)

### 1 APPLICABILITY

Definitions common to all certification and test procedures are in:

**D-200 Definitions for Vapor Recovery Procedures**

For the purpose of this procedure, the term “ARB” refers to the 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 the Healy Clean Air Separator (CAS) pressure management system installed as part of a gasoline dispensing facility (GDF) under Executive Order VR-209-A.

### 2 PRINCIPLE AND SUMMARY OF TEST PROCEDURE

2.1 The Clean Air Separator, while isolated from the vapor recovery system, is evaluated for vapor integrity using a vacuum decay procedure. The vacuum decay after 5 minutes is compared with an allowable value. The allowable value is based upon the initial vacuum level when conducting the test using the table provided in this test procedure.

2.2 A positive pressure decay procedure is included that conducts the same evaluation as the vacuum decay but with positive pressure. This test is conducted if there is insufficient vacuum (not greater than – 2.00” wc) to conduct the vacuum decay. Districts have the authority to specify in the permit conditions that this positive pressure test is to be conducted even if the vacuum test has been conducted.

### 3 RANGE

3.1 The full-scale range of the electronic measuring device shall not exceed 0-20.00” wc with a minimum accuracy of not less than 0.25 percent of full-scale.

### 4 INTERFERENCES

4.1 Leaks in the piping for the Clean Air Separator could bias the test results toward non-compliance.

4.2 Introduction of gaseous nitrogen into the system at flow rates exceeding 4 CFM (240 CFH) may bias the results of the test toward non-compliance. Only gaseous nitrogen shall be used to conduct this test.

4.3 Pressurizing the Clean Air Separator bladder greater than 14.00” wc could damage the bladder, biasing the test toward non-compliance.

4.4 Thermal Bias for Electronic Manometers

Electronic manometers shall have a warm-up period of at least 15 minutes followed by a drift check of 5 minutes. If the drift exceeds 0.01” wc, the instrument should not be used.

## 5 APPARATUS

5.1 Nitrogen

Use commercial grade gaseous nitrogen in a high pressure cylinder, equipped with a two-stage pressure regulator.

5.2 Pressure Measurement Device

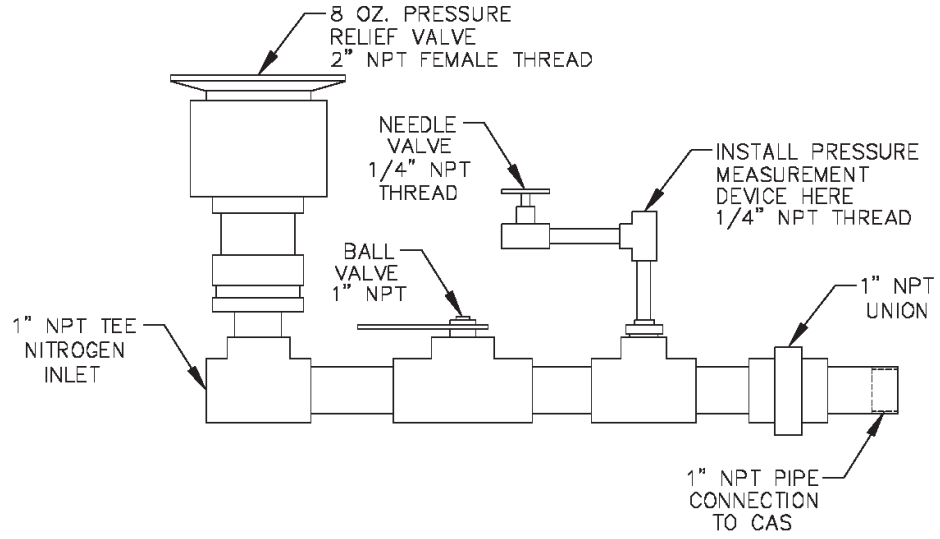
Use an electronic pressure measurement device to monitor the pressure decay in the Clean Air Separator. The pressure measurement device shall, at a minimum, be readable to the nearest 0.01” wc.

5.3 Test Port Assembly

Use a test port assembly constructed similar to the one in Figure A. The assembly should have an 8 oz. Pressure Relief valve, to ensure that the Clean Air Separator is not over pressurized. The Model 9968 Clean Air Separator Test Port Assembly can be purchased from Healy Systems, Inc.

Figure A

Clean Air Separator Test Port Assembly



5.4 Stopwatch

Use a stopwatch accurate to within 0.2 seconds.

5.5 Flow Meter

Use a flow meter 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 flow rate is between 2.0 CFM (120 CFH) and 4.0 CFM (240 CFH).

5.6 Leak Detection Solution

Any liquid solution designed to detect vapor leaks may be used to verify the pressure integrity of the test equipment prior to conducting the test.

5.7 Condensate Collection Vessel

A container approved for use with gasoline that can hold at least a half gallon of material.

5.8 Graduated Cylinder

A graduated cylinder suitable for use with gasoline capable of measuring to the nearest ounce or mL.

## 6 PRE-TEST PROCEDURES

6.1 The following safety precautions shall be followed:

6.1.1 Only gaseous nitrogen shall be used to pressurize the system.

6.1.2 An 8 oz. pressure relieve valve shall be installed on the Test Port Assembly to prevent the possible over-pressurizing of the Clean Air Separator.

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

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

6.3 All pressure measuring device(s) shall be bench calibrated using a reference standard. 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 180 days. Calibration documentation shall be maintained with the equipment at all times.

6.4 Use the flow meter to determine the nitrogen regulator delivery pressures that correspond to nitrogen flow rates of 2.0 CFM (120 CFH) and 4.0 CFM (240 CFH). These pressures define the allowable range of delivery pressures acceptable for this test procedure. The flow meter shall be connected in-line between the nitrogen supply regulator and the Test Port Assembly during pressurization. The flow meter may be connected in-line between the nitrogen supply regulator and the Test Port Assembly during the test.

6.5 The electronic pressure measurement device shall be subject to warm-up and drift check before use; see Section 4.5.

6.6 The four ball valves used in the installation of the Clean Air Separator are lockable and shall be locked in the position shown in Figure 2B-2 or 2B-2H of Exhibit 2 and in Figure 1 or Figure 1H of this Exhibit during normal operation. Figure 1 and 2B-2 apply to vertical CAS installations and Figure 1H and 2B-2H apply to horizontal CAS installations. The four padlocks provided by Healy Systems, Inc. in their installation kit are keyed the same. However, it is possible that one or more of the padlocks on the Clean Air Separator could have been replaced (seizing, damage, broken key, etc.). Conducting this test will require a set of keys necessary to unlock all padlocks.

6.7 Verify that the Clean Air Separator is in its normal operating configuration by confirming that all components are as indicated (See Figure 1 or Figure 1H):

Valve “A” - Open
Valve “B, C and D” - Closed
Pipe End “E” - Plugged
Tee Branch “F” - Plugged

Figure 1

Normal Clean Air Separator Operating Configuration

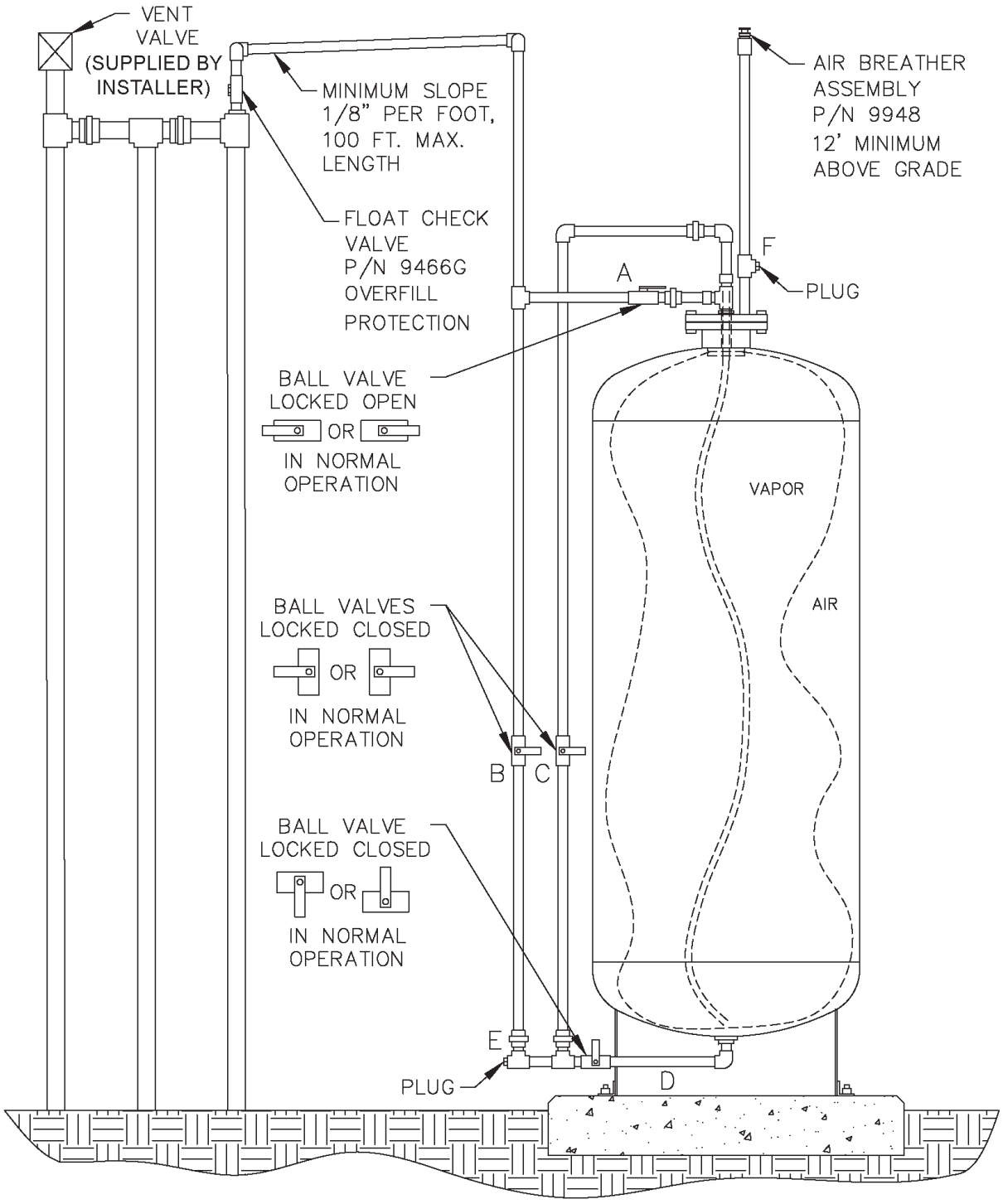
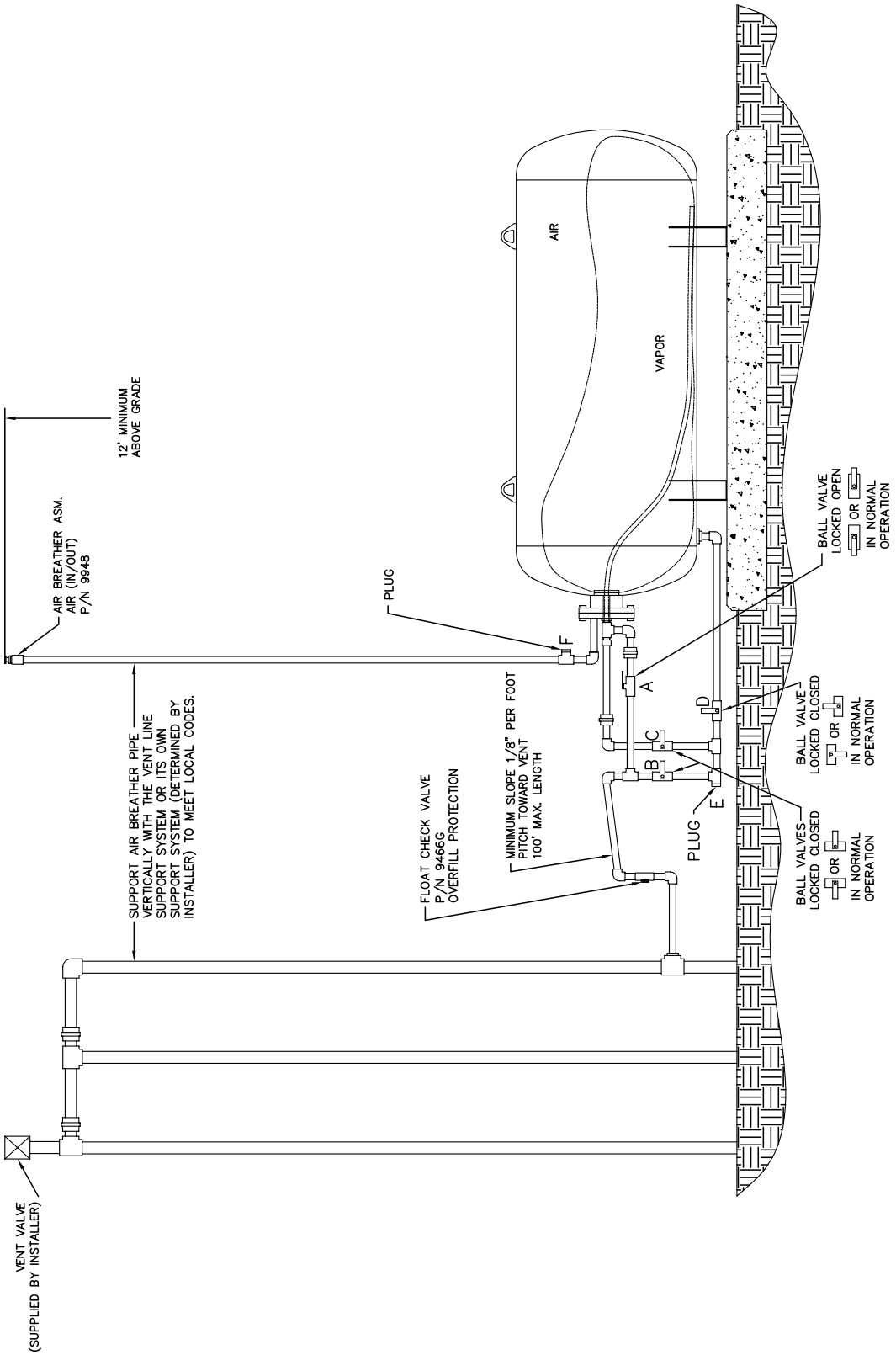


Figure 1H

Normal Clean Air Separator Operating Configuration



6.8 Installing the Test Port Assembly

6.8.1 Open the ball valve marked “B”, shown in Figure 1 or Figure 1H. This ensures that if there is any condensate in the primary connection line to the Clean Air Separator it will drop down into the lower section of the piping configuration, so that it can be measured. Close the valve after approximately 30 seconds.

6.8.2 Position the condensate collection vessel below plug “E” prior to removing it. Remove the 1” plugs from locations “E” and “F” from Figure 1 or Figure 1H. Transfer the collected condensate into the graduated cylinder. If there is more than 16 oz. (473 mL) of liquid condensate, the bladder and vapor processor vessel must be drained. Conduct the bladder and vessel draining procedures from the Clean Air Separator section of the ***ARB Approved Installation, Operation and Maintenance Manual***.

Note: Depending upon the size of the graduated cylinder and the amount of condensate, it may take multiple transfers from the condensate collection vessel to get the total condensate measurement.

6.8.3 Install the Test Port Assembly to the Clean Air Separator at location “E”. See Figure 2 or Figure 2H. Figure 2 applies to vertical CAS installations and Figure 2H applies to horizontal CAS installations.

6.8.4 Connect the gaseous nitrogen supply to the Test Port Assembly. See Figure 2 or Figure 2H.

6.8.5 Check the test equipment and piping isolated from normal Clean Air Separator operation by the ball valves “B, C and D” by pressurizing with nitrogen to a pressure of 4” wc ± 1” wc and closing the ball valve on the Test Port Assembly. Use leak detection solution. Tighten as necessary. The test equipment shall have no leaks.

6.8.6 Open the needle valve on the Test Port Assembly to bleed the pressure off the equipment. Keep ball valve on Test Port Assembly closed.

Figure 2

Clean Air Separator in Configuration to Conduct Test

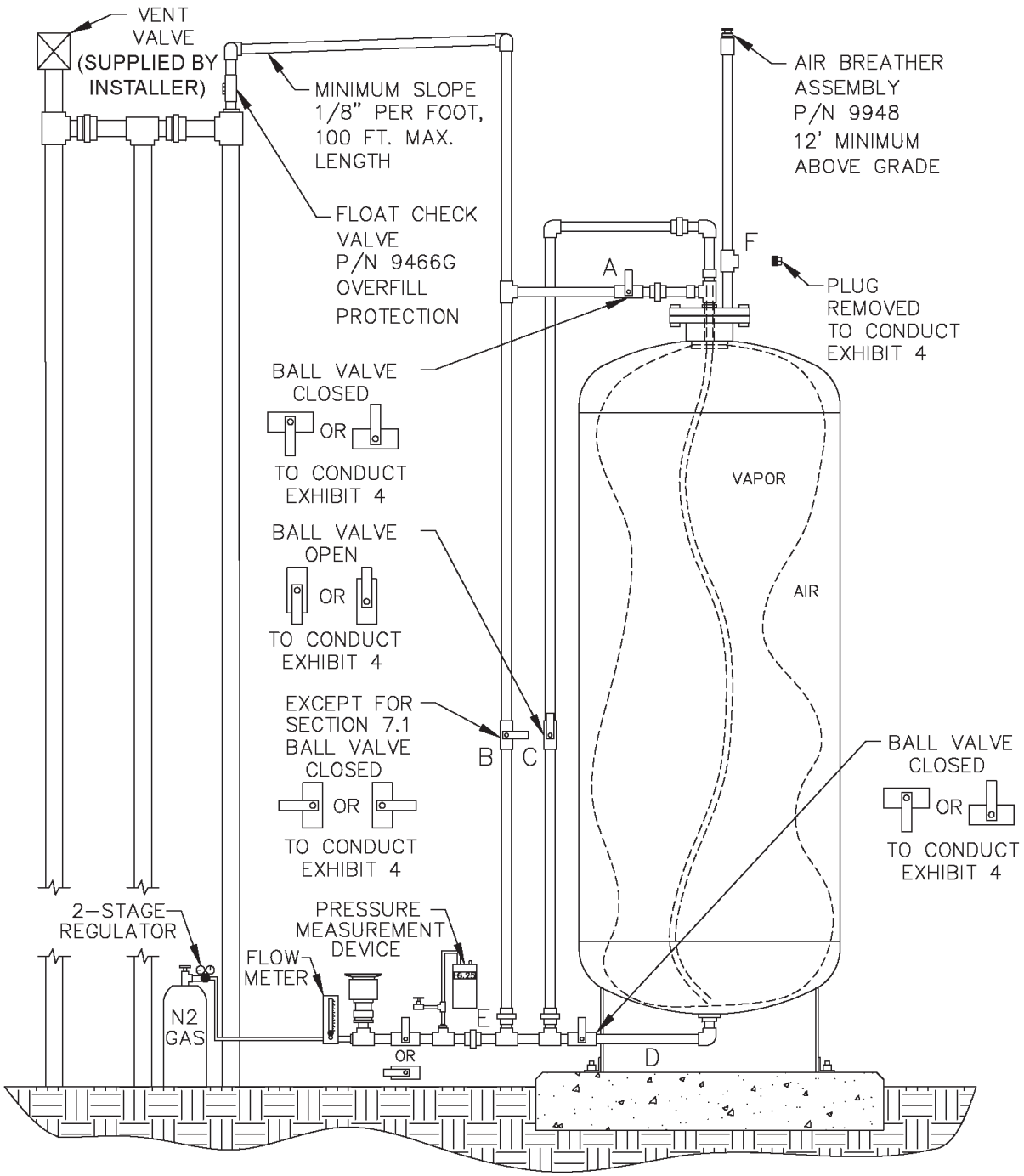
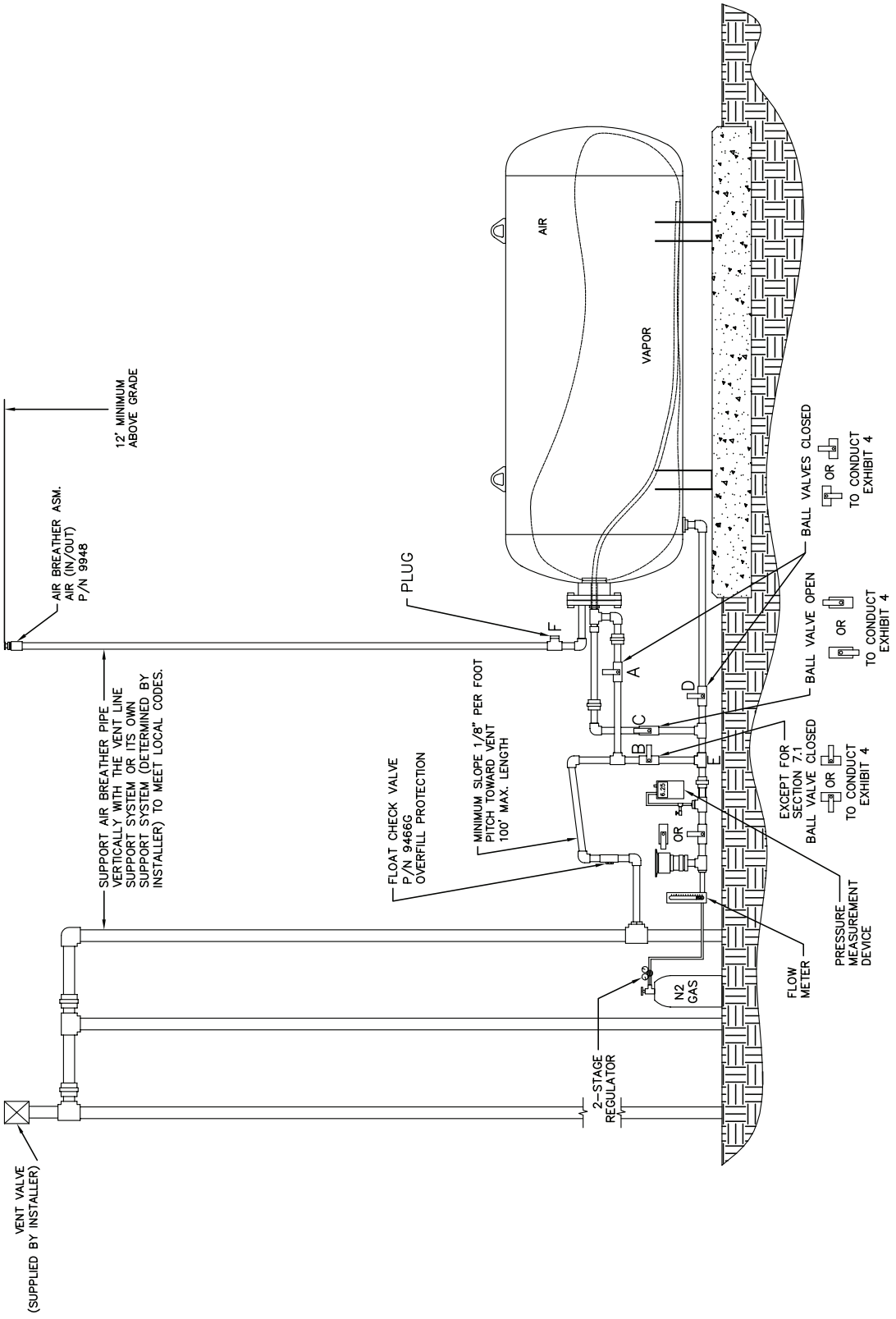


Figure 2H

Clean Air Separator in Configuration to Conduct Test



## 7 TESTING

7.1 Open the ball valve marked “B” from Figure 2 or Figure 2H. The pressure measurement device installed on the Test Port Assembly should now be reading UST and Clean Air Separator ullage pressure (or vacuum).

7.2 If the station vacuum is greater than (more negative) than -2.00” wc, then proceed to Section 7.2.1. If less than –2.00” wc, then proceed to Section 7.3:

7.2.1 Close the ball valves marked “A” and “B” from Figure 2.

7.2.2 Open the ball valve marked “C” from Figure 2 and wait one minute.

7.2.3 If necessary, use the needle valve on the Test Port Assembly to bleed air into the bladder until the vacuum level reaches as close to a whole number on the pressure measurement device as the accuracy of the device will provide (ie. -2.00, -3.00, -4.00, -5.00, -6.00, -7.00, -8.00). Make sure the needle valve is closed. Record this vacuum and start the stop watch to begin a 5 minute decay.

7.2.4 Record the vacuum at one-minute increments up to 5 minutes.

7.2.5 Using the information from Table 1, verify that the vacuum after 5 minutes is equal to or greater than the allowable minimum for the initial vacuum recorded from Section 7.2.3.

7.2.6 If the vacuum is greater than the allowable minimum, the Clean Air Separator passed the test.

7.2.7 If the vacuum is less than the allowable minimum, the Clean Air Separator failed the test.

TABLE 1
Allowable 5 Minute Vacuum Decay for Clean Air Separator

| Vacuum at Start of Test (inches wc) | Allowable Minimum Vacuum after 5 min. (inches wc) |
|---|---|
| 8.0 | 5.5 |
| 7.0 | 4.7 |
| 6.0 | 3.8 |
| 5.0 | 3.0 |
| 4.0 | 2.2 |
| 3.0 | 1.5 |
| 2.0 | 0.8 |

7.3 If the station vacuum is less than –2.00” wc (from Section 7.2), or at the direction of district (refer to Section 2.2), conduct the following:

7.3.1 Close the ball valves marked “A” and “B” from Figure 2.

7.3.2 Open the ball valve marked “C” from Figure 2.

7.3.3 Open the ball valve of the Test Port Assembly and flow nitrogen into the Clean Air Separator bladder at a flow rate between 2 and 4 CFM until the pressure in the bladder reaches 2.20” wc.

7.3.3.1 Depending upon the nitrogen flow rate used, the bladder could take up to 30 minutes to fill completely.

7.3.3.2 Because of the close proximity of the pressure measurement device to the nitrogen inlet of the Test Port Assembly, the pressure measurement device may read a higher pressure when nitrogen is flowing. The pressure measurement device is usually steady, but will start to increase rapidly when the bladder is getting full.

7.3.3.3 Periodically stopping nitrogen flow will provide an accurate reading of the pressure in the bladder.

7.3.4 Once the pressure reaches 2.20” wc, shut off the flow of nitrogen to the Clean Air Separator bladder and close the ball valve of the Test Port Assembly.

7.3.5 Wait 5 minutes or until pressure stabilizes above 2.00” wc. If the pressure does not stabilize, repeat steps 7.3.3 and 7.3.4.

7.3.6 Use the needle valve on the Test Port Assembly to bleed off the nitrogen until the pressure reaches 2.00” wc. Make sure the needle valve is closed. Record the pressure.

7.3.7 Start the stop watch to begin a 5 minute decay.

7.3.8 Record the pressure in one-minute increments up to 5 minutes.

7.3.9 If the pressure in the bladder is greater than 1.77” wc at the end of 5 minutes, then the Clean Air Separator passed the test.

7.3.10 If the pressure in the bladder is less than 1.77” wc at the end of 5 minutes, then the Clean Air Separator failed the test.

7.4 If the bladder was evaluated using the vacuum procedure (Section 7.2), close the ball valve “C” to keep it in a vacuum condition. If the bladder was evaluated using the pressure procedure (Section 7.3), open the needle valve on the Test Port Assembly to bleed off all pressure from the bladder.

7.5 Close the ball valve marked “C”, if not already done.

7.6 Remove the Test Port Assembly from location “E” and install the 1” pipe plug. Use a pipe sealant approved for use with gasoline on the threads and tighten to 60 ft-lbs.

7.7 Install the 1” pipe plug to location “F”. Use a pipe sealant approved for use with gasoline on the threads and tighten to 60 ft-lbs.

7.8 Open the ball valve marked “A”. Lock all ball valves using the padlocks.

7.9 The Clean Air Separator should now be in normal operation configuration. Verify this by using the outline from Section 6.7 and Figure 1 or Figure 1H.

## 8 REPORTING

8.1 Record test data on the form shown in Figure 3. Districts may require the use of an alternate form, provided that the alternate form includes the same minimum parameters as in Figure 3.

**Figure 3**

**Data Form for Determination of Static Pressure Performance of the Healy Clean Air Separator for Executive Order VR-209-A**

| SOURCE INFORMATION | |
|---|---|
| GDF Name and address<br><br>_____<br><br>_____<br><br>_____ | GDF Represenative and title<br><br>_____<br><br>_____<br><br>GDF Phone No.<br><br>_____ |
| Date and Time of Last Fuel Drop to GDF:<br>_____<br>Date of Last Calibration of Pressure Measurement Device: _____ | P/O #: _____<br>A/C#: _____<br>District Test Witness:<br>_____ |

| VACUUM TEST (Section 7.1 through 7.2.7) | |
|---|---|
| Vacuum at start of test, inches water column (7.2.3) | _____ |
| Vacuum at one minute, inches water column | _____ |
| Vacuum at two minutes, inches water column | _____ |
| Vacuum at three minutes, inches water column | _____ |
| Vacuum at four minutes, inches water column | _____ |
| Final vacuum at five minutes, inches water column | _____ |
| Allowable minimum vacuum, inches water column (from Table 1) | _____ |

| POSITIVE PRESSURE TEST (Section 7.3 through 7.3.9) | |
|---|---|
| Pressure at start of test, inches water column (7.3.6) | _____ |
| Pressure at one minute, inches water column | _____ |
| Pressure at two minutes, inches water column | _____ |
| Pressure at three minutes, inches water column | _____ |
| Pressure at four minutes, inches water column | _____ |
| Final pressure at five minutes, inches water column | _____ |
| Allowable final pressure, inches water column (7.3.9) | 1.77 |

| Healy Certified Technician Name, Certification Number and Expiration Date | Test Company | Date Test Conducted |
|---|---|---|
| | | |

**Executive Order VR-209-A**
**VST Phase II EVR System with Clean Air Separator**

**Exhibit 5**
**Liquid Removal Test Procedure**

Definitions common to all certification and test procedures are in:

**D-200 Definitions for Vapor Recovery Procedures**

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

## 1. PURPOSE AND APPLICABILITY

**1.1** This procedure is used to quantify the removal rate of liquid from the vapor passage of a Phase II balance system hose equipped with a liquid removal device. This procedure provides a method to determine compliance with the liquid removal requirements specified in ARB Executive Orders VR-203 and VR-204 and any subsequent amendments or revisions.

## 2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

**2.1** This test procedure provides two options to determine the compliance of liquid removal devices. Under option 1 (short version), liquid in the vapor path of a coaxial hose is drained and measured. If the volume of liquid drained equals or exceeds 25 ml, a liquid removal test is conducted. For those hoses with less than 25 ml drained, no further testing is required. Under option 2 (long version), all hoses are evaluated regardless of the volume of liquid drained. Option 2 includes a prewetting and wall adhesion step. Both options test the liquid removal device by introducing gasoline into the vapor path of the coaxial hose through the nozzle bellows. After 7.5 gallons of gasoline is dispensed, the amount of gasoline remaining in the hose is measured and the liquid removal rate is determined. The district shall specify which testing option is to be used.

**Caution: When draining liquid from the vapor side of the hose, make sure the dispenser is not activated. The nozzle vapor valve is on the same stem as the fuel valve. To drain gasoline from the vapor side of the hose, the fuel lever must be engaged. If the dispenser is activated, gasoline in the fuel hose may be pressurized when engaging the fuel lever.**

## 3. BIASES AND INTERFERENCES

**3.1.** Slits or tears in the hose or nozzle vapor path may bias the results towards compliance.

**3.2.** This test shall not be conducted on any fueling point where the hanging hardware is defective as identified in Exhibit 2.

**3.3.** Any spillage of gasoline invalidates the test for any volumes that are required to be measured or recorded.

**3.4.** A breach of the inner product hose may introduce additional gasoline into the outer vapor path resulting in a larger volume drained than introduced.

**3.5.** Not having the liquid extraction device (indicated by the mark on the outside of the house) at the bottom of the hose loop during liquid removal testing, as shown in Figure 1, will bias the results towards failure.

**3.6.** The test procedure requires the use of VST's nozzle spout plug, P/N VST-STP-100 as shown in Figure 2. This tool is used to plug the spout when draining liquid from the vapor side of the hose. Not plugging the spout may bias the results towards failure. Nicks, cuts, or tears in the plug o-rings will bias the results towards failure.

**3.7.** Dispensing rates not between 6.0 and 10.0 gallons per minute (GPM) invalidates the test.

## 4. SENSITIVITY, RANGE, AND PRECISION

**4.1** The range of measurement of the liquid removal rate is dependent upon the range of the graduated cylinder used for testing.

**4.2** To ensure precision, graduated cylinder readings shall be measured at the liquid level meniscus.

## 5. EQUIPMENT

**5.1.** Nozzle Spout Plug: Use VST's spout plug, P/N VST-STP-100 (Figure 2).

**5.2.** Stopwatch. Use a stopwatch accurate to within 0.2 seconds.

**5.3.** Funnels. Large and small gasoline compatible, non-breakable, funnels with dimensions similar to those as shown in Figure 3, or equivalent.

**5.4.** Graduated Cylinders. Gasoline compatible, non-breakable 0-25ml, 0-100ml, 0-250 ml, and 0-500 ml graduated cylinders with stable base plates. The 25ml cylinder may be necessary to quantify volumes of liquid less than 20 ml.

**5.5.** Gasoline Test Tank. (Optional) A portable tank, meeting fire safety requirements for use with gasoline, may be used to receive the gasoline dispensed during testing. The tank shall have sufficient volume so that at least 10.0 gallons may be dispensed prior to activating the primary shutoff mechanism of the nozzle. **When using a gasoline test tank, ensure that a ground strap is used and that it is properly connected to an acceptable ground.** To minimize testing-related emissions, vehicle refueling events should be used for this procedure whenever feasible.

**5.6.** Traffic Cones. Use traffic cones to encircle the area where testing is conducted.

**5.7.** Field Data Sheet. Use the appropriate data sheet to record liquid removal test information. Forms 1 and 2 serve as examples; districts may require modified versions.

**5.8.** Gasoline Container. Use a portable fuel container equipped with a tight fitting cap, of at least 1.0 gallon capacity.

NOTE: THIS TEST PROCEDURE PROVIDES TWO OPTIONS TO DETERMINE COMPLIANCE OF LIQUID REMOVAL DEVICES. THE DISTRICT SHALL SPECIFY WHICH TESTING OPTION IS TO BE USED

## 6. OPTION 1 (SHORT VERSION)

PRE-TEST PROCEDURE

**6.1** Verify that the 500 ml graduated cylinder is empty. Position the large funnel into the graduated cylinder.

**6.2** Remove the nozzle from the dispenser. **Do not activate dispenser!** Install VST's spout plug, P/N VST-STP-100 in the tip of the spout (Figure 2). Carefully tilt the spout into the funnel/graduated cylinder assembly.

**6.3** Lower the nozzle and funnel/graduated cylinder assembly as close to the ground as possible. "Walk out" the hose while keeping the nozzle lowered and hose fully extended. The hose shall slope downward from the dispenser toward the nozzle.

**6.4** **Do not activate dispenser!** Open the nozzle's vapor check valve by compressing the bellows and engaging the fuel lever. Allow 20 seconds for all liquid to drain. Use caution to avoid spillage.

**6.5** Remove VST's spout plug and return the nozzle to the dispenser and measure the volume of liquid drained. If the volume drained is less than 200 ml, transfer the liquid into an appropriately sized graduated cylinder. For example, if 40 ml of liquid was drained, use the 100 ml graduated cylinder to take the measurement.

**6.6** Record the amount of liquid drained on Form 1 ("PRE-TEST").

**6.7** If the volume drained is greater than or equal to 25 ml, proceed to Section 6.8 of the procedure. Hoses with greater than 25 ml drained are considered to be pre-wetted. If the amount drained is less than 25 ml, proceed to the next nozzle/hose to be evaluated and repeat Section 6.1-6.6

TEST PROCEDURE (FOR HOSES WITH GREATER THAN 25 ML DRAINED)

**6.8** Pour 150 ml to 175 ml of gasoline into the 250 ml graduated cylinder. Measure and record this volume on Form 1 (VI).

**6.9** Remove the nozzle from the dispenser and position the nozzle upright so that the

spout is in a vertical position. **Do not activate dispenser!**

**6.10** Open the nozzle's vapor check valve by compressing the bellows and engaging the fuel lever. Carefully insert the stem of the small funnel between the bellows and nozzle spout.

**6.11** Pour the measured volume into the vapor path of the hose. Use caution not to spill the gasoline. Remove the small funnel after the gasoline has been introduced.

**6.12** Insert the nozzle into a vehicle or test tank fill pipe.

**6.13** Find the mark on the outside of the hose which indicates the location of the liquid pick-up device. Ensure the mark is at the bottom of the hose loop when dispensing as shown in Figure 1. This can be accomplished by lifting up the back of the hose, adjusting nozzle position, or adjusting the test tank position.

**6.14** Dispense 7.5 (±0.5) gallons at the highest possible flow rate by holding the nozzle lever in the maximum handheld position. Use a stopwatch to measure the time elapsed while dispensing. Record the volume of fuel dispensed (G) and the elapsed time (T) on Form 1. Return nozzle to the dispenser.

**6.15** Calculate the dispensing rate using the equation below. If the dispensing rate is not between 6.0 and 10.0 gallons per minute (GPM), the test results are invalid.

$$GPM = 60 \times \left( \frac{G}{T} \right)$$

Where:

| | | |
|---|---|---|
| GPM | = | dispensing rate (in gallons per minute) |
| G | = | gallons of fuel dispensed |
| T | = | number of seconds required to dispense |

**6.16** Using the 250 ml graduated cylinder and large funnel, carefully drain the remaining liquid from the vapor path of the hose as described in Section 6.1 through 6.5 **(make sure dispenser is not activated and spout plug is installed before draining liquid!)**. Record this quantity on Form 1 (VF).

**6.17** Use Equation 9.1 to calculate the liquid removal rate for all the applicable hoses tested.

**6.18** If the liquid removal rate is less than 5.0 ml/gallon, but greater than or equal to 4.5 ml/gallon, repeat the test two additional times and average the three results.

## 7. OPTION 2 (LONG VERSION)

PRETEST PROCEDURE

**7.1** Carefully pour 150 ml of gasoline into the 250 ml graduated cylinder.

**7.2** Remove the nozzle from the dispenser. **Do not activate dispenser!** Install VST's spout plug, P/N VST-STP-100 in the tip of the spout as shown in Figure 2. Position the nozzle upright so that the spout is in a vertical position.

**7.3** Open the nozzle's vapor check valve by compressing the bellows and engaging the fuel lever. Carefully insert the stem of the small funnel between the bellows and nozzle spout.

**7.4** Pour the gasoline from the 250 ml graduated cylinder into the vapor path of the hose. Use caution not to spill the gasoline. Remove the small funnel after the gasoline has been introduced.

**7.5** Verify that the 500 ml graduated cylinder is empty. Position the large funnel into the graduated cylinder.

**7.6** Carefully tilt the spout into the funnel/graduated cylinder assembly. **Make sure VST's spout plug is installed and the dispenser is deactivated.**

**7.7** Lower the nozzle and funnel/graduated cylinder assembly as close to the ground as possible. "Walk out" the hose while keeping the nozzle lowered and hose fully extended. The hose shall slope downward from the dispenser toward the nozzle.

**7.8** Open the nozzle's vapor check valve by compressing the bellows and engaging the fuel lever. Allow 20 seconds for all liquid to drain. Use caution to avoid spillage. If necessary, drain full graduated cylinders into a portable gas can until the hose is empty.

**7.9** Remove VST's spout plug and return the nozzle to the dispenser.

TEST PROCEDURE

**7.10** Pour 150 ml to 175 ml of gasoline into the 250 ml graduated cylinder. Measure and record this volume on Form 2 (VI).

**7.11** Remove the nozzle from the dispenser. **Do not activate dispenser!** Position the nozzle upright so that the spout is in a vertical position.

**7.12** Open the nozzle's vapor check valve by compressing the bellows and engaging the fuel lever. Carefully insert the stem of the small funnel between the bellows and nozzle spout.

**7.13** Pour the measured volume into the vapor path of the hose. Use caution not to spill the gasoline. Remove the small funnel after the gasoline has been introduced.

**7.14** Insert the nozzle into a vehicle or test tank fill pipe.

**7.15** Find the mark on the outside of the hose which indicates the location of the liquid pick-up device. Ensure the mark is at the bottom of the hose loop when dispensing

as shown in Figure 1. This can be accomplished by lifting up the back of the hose, adjusting nozzle position, or adjusting the test tank position.

**7.16** Dispense 7.5 (±0.5) gallons at the highest possible flow rate by holding the nozzle lever in the maximum handheld position. Use a stopwatch to measure the time elapsed while dispensing. Record the volume of fuel dispensed (G) and the elapsed time (T) on Form 2. Return nozzle to the dispenser.

**7.17** Calculate the dispensing rate using the equation below. If the dispensing rate is not between 6.0 and 10.0 gallons per minute (GPM), the test results are invalid.

$$GPM = 60 \times \left( \frac{G}{T} \right)$$

Where:

| | | |
|---|---|---|
| GPM | = | dispensing rate (in gallons per minute) |
| G | = | gallons of fuel dispensed |
| T | = | number of seconds required to dispense |

**7.18** Using the 250 ml graduated cylinder and large funnel, carefully drain the remaining liquid from the vapor path of the hose as described in Section 7.5 through 7.8 **(make sure dispenser is deactivated and spout plug is installed before draining liquid!)**. Record this quantity on Form 2 (VF).

**7.19** Open the nozzle's vapor check valve by compressing the bellows and engaging the fuel lever. **Do not activate dispenser!** Carefully insert the stem of the small funnel between the bellows and nozzle spout

**7.20** Use the 250 ml graduated cylinder and small funnel to pour 150 ml of gasoline into the vapor passage of the hose. Dispense no gasoline.

**7.21** Using the 250 ml graduated cylinder and large funnel, completely drain the gasoline from the vapor passage back into the graduated cylinder as described in Section 7.5 through 7.9 **(make sure dispenser is deactivated and spout plug is installed before draining liquid!)**.

**7.22** Subtract the volume drained (value from Section 7.21) from the volume added (value from Section 7.20). This value represents the volume of gasoline lost due to wall adhesion. The purpose of the wall adhesion value is to quantify the amount of gasoline lost to evaporation from transfer to and from the graduated cylinders and adhesion of liquid to vapor passage surfaces in previous measurements. Record this quantity on Form 2 (VW).

**7.23** Use Equation 9.2 to calculate the liquid removal rate for all the applicable hoses tested.

**7.24** If the liquid removal rate is less than 5.0 ml/gallon, but greater than or equal to 4.5 ml/gallon, repeat the test two additional times and average the three results.

## 8. POST TEST PROCEDURES

**8.1.** Empty all containers and return any excess gasoline to the underground storage tank.

**8.2.** Remove the traffic cones from the testing area.

## 9. CALCULATING RESULTS

**9.1** If using OPTION 1(short version), the liquid removal rate shall be calculated as follows:

$$VR = \frac{VI - VF}{G}$$

Where:

| | | |
|---|---|---|
| VR | = | Gasoline removed per gallon dispensed, milliliters/gallon |
| VI | = | Total initial volume poured into hose vapor passage, milliliters |
| VF | = | Volume of gasoline remaining in the hose vapor passage after dispensing, milliliters |
| G | = | Total dispensed, gallons |

**9.2** If using OPTION 2 (long version), the liquid removal rate shall be calculated as follows:

$$VR = \frac{(VI - VW) - VF}{G}$$

Where:

| | | |
|---|---|---|
| VR | = | Gasoline removed per gallon dispensed, milliliters/gallon |
| VI | = | Total initial volume poured into hose vapor passage, milliliters |
| VW | = | Volume of liquid lost due to wall adhesion, milliliters |
| VF | = | Volume of gasoline remaining in the hose vapor passage after dispensing, milliliters |
| G | = | Total dispensed, gallons |

## 10. REPORTING RESULTS

**10.1.** Record all applicable liquid removal rate information on the appropriate form as shown in Form 1 and 2. Districts may require the use of alternate forms provided that the alternate forms include the same parameters as identified in Forms 1 and 2.

**10.2.** If the calculated liquid removal rate is greater than or equal to 5 milliliters/gallon, the liquid removal device has demonstrated compliance.

**10.3.** If the calculated liquid removal rate is less than 5 milliliters/gallon, the liquid removal device is not in compliance.

## 11. ALTERNATIVE TEST PROCEDURES

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

**FIGURE 1**
**Position of Liquid Removal Device**
**When Conducting Liquid Removal Testing**

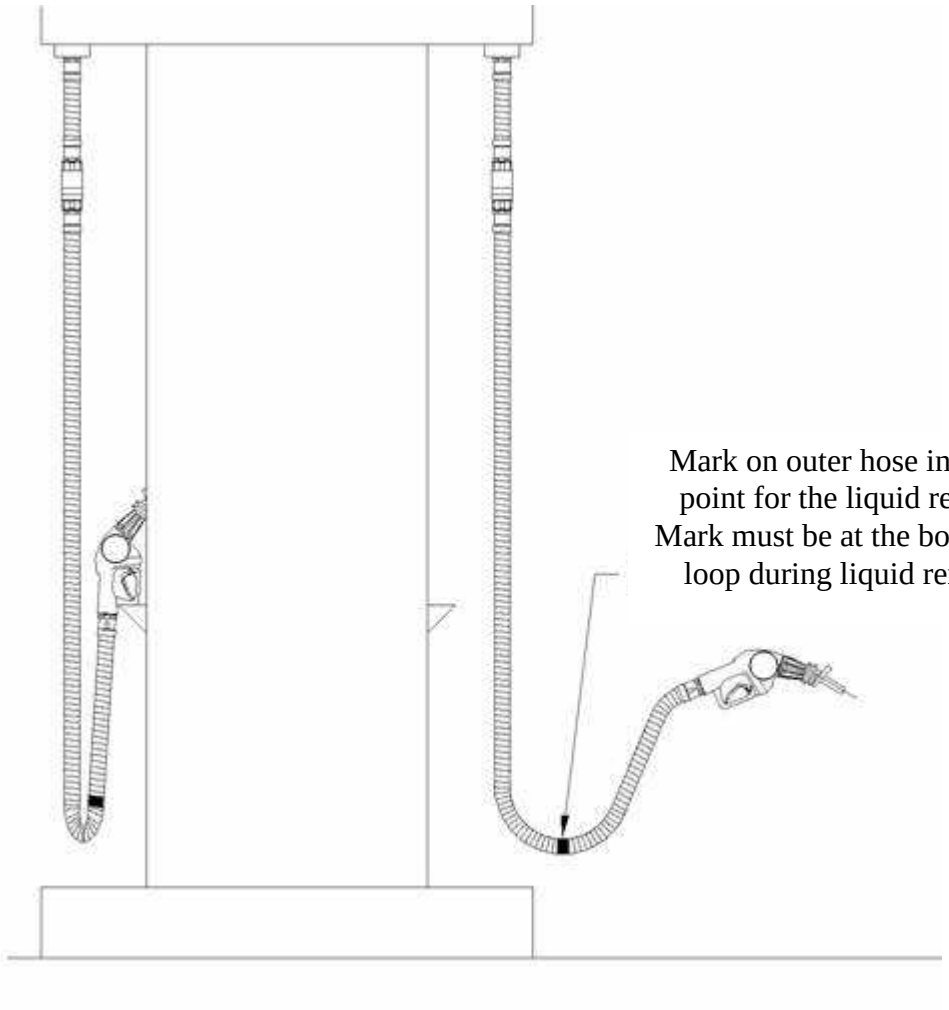
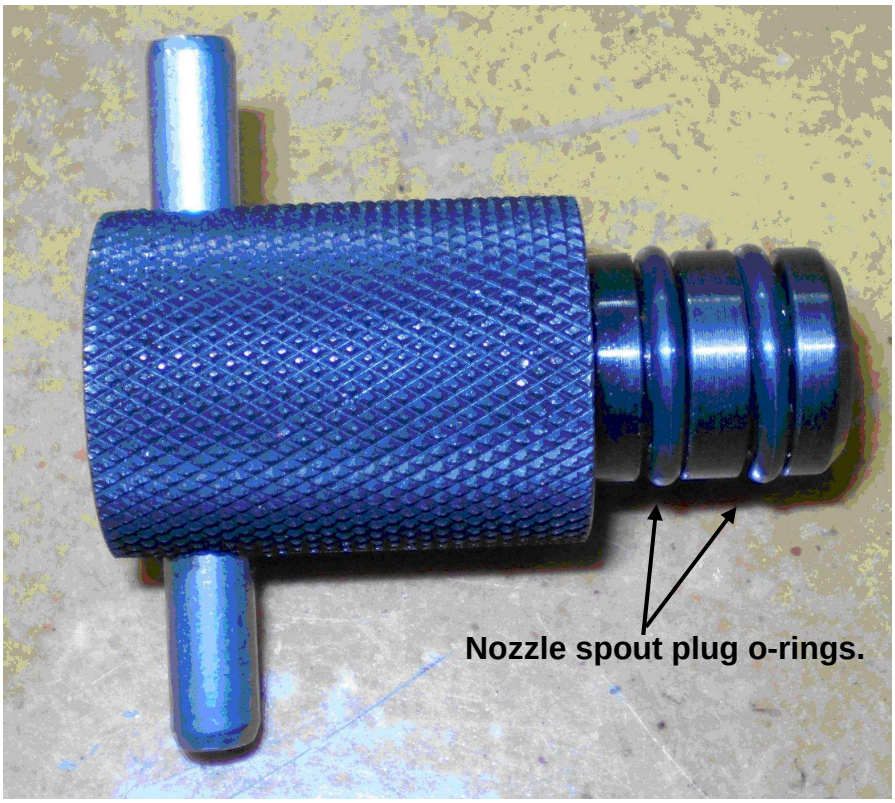
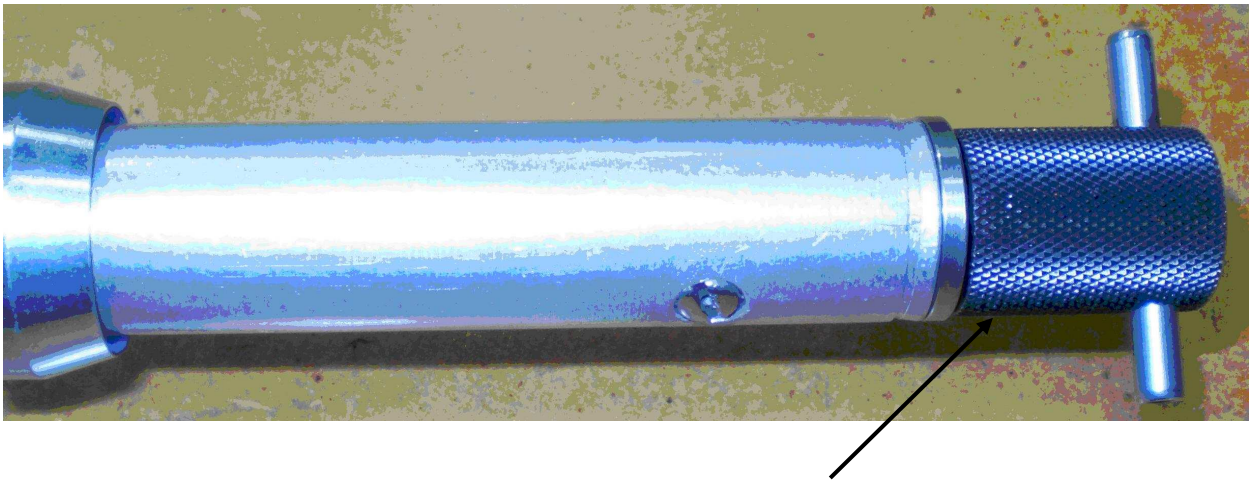


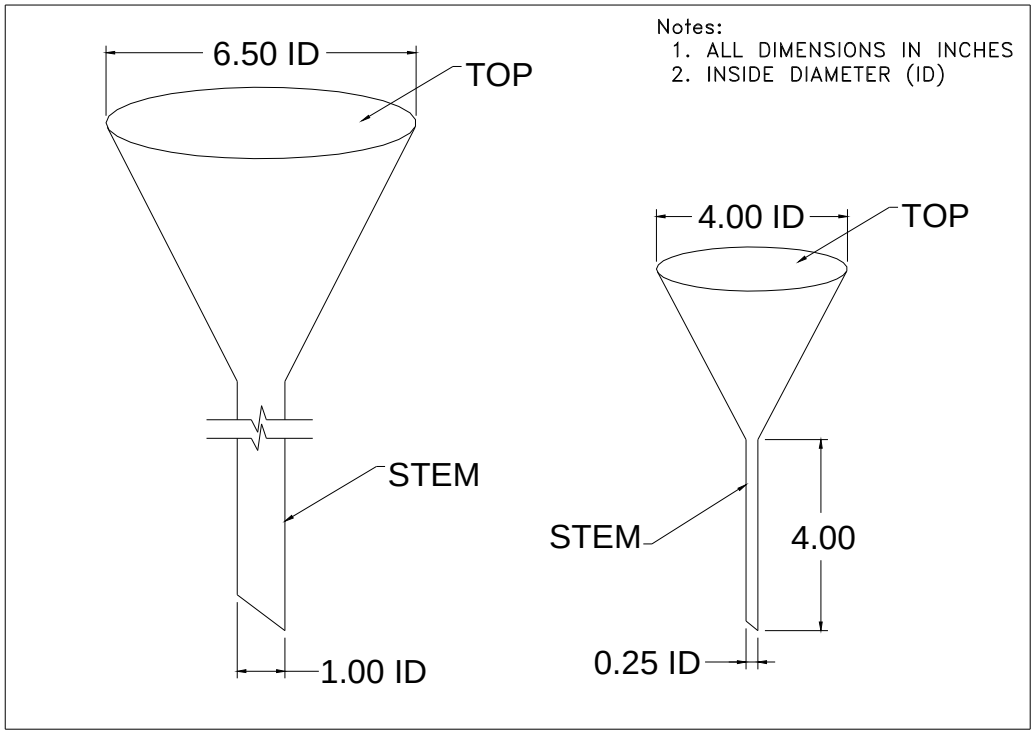
**FIGURE 2**
**VST Nozzle Spout Plug P/N VST-STP-100**



**Plug properly inserted into nozzle spout.**
**Both plug o-rings seated into nozzle spout.**

**FIGURE 3**
**Recommended FUNNEL SPECIFICATIONS**



# FORM 1: LIQUID REMOVAL TEST DATA SHEET (OPTION 1)

| Facility Name & Address | Facility Representative & Title |
|---|---|
| | |
| | |
| | |
| | |
| | Phone No. |
| | |

Test Date _____
A/C or Permit No. _____
Testing Company _____
Tester Name _____
VST Training Cert # (if applicable) _____
Inspector Name _____

| GENERAL INFORMATION | | | | PRE-TEST | TEST RUN | | | | | VR=(VI-VF)/G |
|---|---|---|---|---|---|---|---|---|---|---|
| Dispenser Number | Product Grade | Make & Model of Hose | Serial Number of Hose | Volume Drained From Hose in mL | Volume Poured Into Hose in mL (VI) | Gallons Dispensed (G) | Seconds to Dispense (T) | Dispensing Rate (60*(G/T)) | Volume Remaining in mL (VF) | Liquid Removal Rate (mL/gal) |
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# FORM 2: LIQUID REMOVAL TEST DATA SHEET (OPTION 2)

| Facility Name & Address | Facility Representative & Title |
|---|---|
| | |
| | |
| | |
| | Phone No. |
| | |

Test Date _____
A/C or Permit No. _____
Testing Company _____
Tester Name _____
VST Training Cert # (if applicable) _____
Inspector Name _____

| GENERAL INFORMATION | | | | PRE-TEST | TEST RUN | | | | | VR=((VI-VW)-VF)/G |
|---|---|---|---|---|---|---|---|---|---|---|
| Dispenser Number | Product Grade | Make & Model of Hose | Serial Number of Hose | Volume Poured into Hose in mL (VI) | Gallons Dispensed (G) | Seconds to Dispense (T) | Dispensing Rate (60*(G/T)) | Volume Remaining in mL (VF) | Volume Lost to Wall Adhension in mL (VW) | Liquid Removal Rate (mL/gal) |
| | | | | | | | | | | |
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**Executive Order VR-209-A**
**VST Phase II EVR System with Clean Air Separator**

**Exhibit 6**
**Required Items in Conducting TP-201.4**

The instructions below are required when conducting TP-201.4 for the VST Phase II EVR system. The tester shall document that each step was followed as indicated below and shall include this page of the Exhibit with the submission of TP-201.4 test results. Note that districts may require use of an alternate form to meet these requirements, provided the alternate form includes the same minimum parameters.

The VST Model VST-EVR-NB nozzle incorporates a lever-actuated vapor valve. The vapor valve is on the same stem as the fuel valve. When conducting TP-201.4, the nozzle lever must be actuated to open the vapor valve and allow vapor to flow from the nozzle to the underground storage tank. The following steps must be taken when conducting Methodology 1 of TP-201.4:

1. The dispenser shall not be activated. If the dispenser is activated, gasoline in the fuel hose may be pressurized when engaging the fuel lever.

2. Prior to inserting the VST EVR nozzle into the fillpipe of the Dynamic Back Pressure Test Unit in step 7.1 of TP-201.4, completely drain any gasoline in the nozzle and vapor path of the hose. The dispenser must be deactivated and the nozzle lever and bellows shall be fully engaged.

3. When flowing nitrogen per step 7.1.2, fully engage the nozzle lever to allow vapor flow from the nozzle to the UST.

| Required Steps | Verification (please circle) |
|---|---|
| 1. Were all dispensers deactivated? | Yes No |
| 2. Were all nozzles and hoses completely drained of gasoline prior to inserting nozzle into Dynamic Back Pressure Unit? | Yes No |
| 3. Were all nozzle levers fully engaged when conducting flow test? | Yes No |

Test Company: _____ Facility Name:_____

_____
Print Name (Technician) Signature Date

_____
Technician Certification Number and Expiration Date
(ICC or District Training Certification, as applicable)

**Executive Order VR-209-A**
**VST Phase II EVR System with Clean Air Separator**

**Exhibit 7**
**Nozzle Bag Test Procedure**

Verification of the integrity of the VST nozzle vapor valve shall be performed on installed nozzles by use of the following test.

1. Seal nozzle(s) at the gasoline dispensing facility (GDF) in a plastic bag, using tape or other means to secure the bag around the base of the nozzle (see Figure 1). Any plastic bag large enough to enclose the nozzle and having a thickness of no greater than 2 mils can be used.

2. Observe the bagged nozzle(s) for 30 seconds.

3. Any nozzle where the bag can be seen visually expanding or collapsing has a defective vapor valve and is not in compliance with Exhibit 2.

4. Record the test results on the "Nozzle Bag Test Results" form provided in this Exhibit. Districts may require use of an alternate form, provided that the alternate form includes the same minimum parameters.

5. Remove the bags from all the nozzles and return the nozzles to the dispenser holsters.

Figure 1
Example of Bagged Nozzle

## NOZZLE BAG TEST RESULTS

| SOURCE INFORMATION | | TEST COMPANY INFORMATION | |
|---|---|---|---|
| Facility (DBA)/Site Address: | Facility Representative/Title: | Test Company Name | # of Nozzles:_____<br># Nozzles Tested:<br>_____<br># Nozzles Passed:<br>_____<br># Nozzles Failed:<br>_____<br># Nozzles not Tested:<br>_____ |
| Print Name | Print Name | Print Name of Tester | |
| Street Address | Title<br>( ) | Street Address | |
| City Zip | Phone No. | City Zip | |
| District Inspector: | ☐ P/O ☐ S/A ☐ A/C<br>Number: | Date of Test: | Time of Test: |

| Dispenser | Gas Grade | Nozzle Type | Bag Expanded or Collapsed after 30 Seconds |
|---|---|---|---|
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |
| | | | ☐ Yes ☐ No |

**Executive Order VR-209-A**
**VST Phase II EVR System with Clean Air Separator**

**Exhibit 8**
**Required Items in Conducting TP-201.3[1]**

The instructions below are required when conducting TP-201.3 for the VST Phase II EVR system with Clean Air Separator (CAS). The tester shall document that each step was followed as indicated below and shall include this page of the Exhibit with the submission of TP-201.3 test results. **See footnote regarding testing of the P/V vent valve.** Note that districts may require use of an alternate form to meet these requirements, provided the alternate form includes the same minimum parameters.

1. Prior to conducting TP-201.3, all four ball valves on the CAS shall be closed, as shown in Figure 1 or Figure 1H, to isolate it from the UST system to permit the pressurization of the UST system.

2. After conducting TP-201.3, the four ball valves on the Healy Clean Air Separator (CAS) shall be locked in their normal operating positions as shown in Figure 2B-2 or Figure 2B-2H, Exhibit 2 of Executive Order VR-209-A.

| Required Steps | Verification (please circle) |
|---|---|
| 1. All four CAS ball valves closed before conducting TP-201.3 | Yes No |
| 2. All four CAS ball valves in normal operating positions after conducting TP-201.3. | Yes No |

Test Company: _____ Facility Name:_____

_____
Print Name (Technician) Signature Date

_____
Technician Certification Number and Expiration Date
(If required to meet the requirements of the local district)

[1] **Note: If the P/V vent valve is required to be tested by the local District, then the P/V vent valve shall be tested prior to conducting Exhibit 8.**

Figure 1

Configuration of Healy Clean Air Separator to Conduct TP-201.3

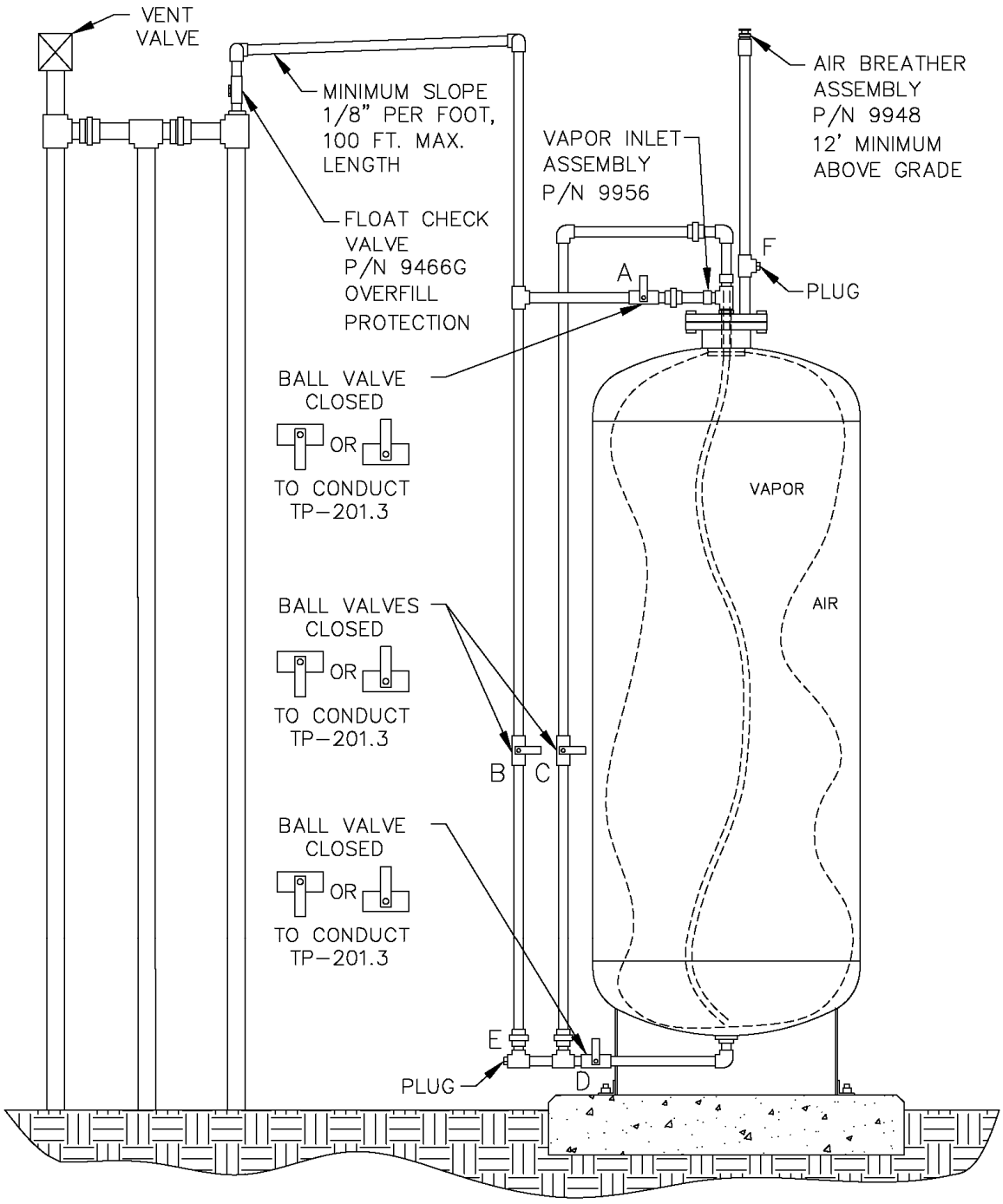
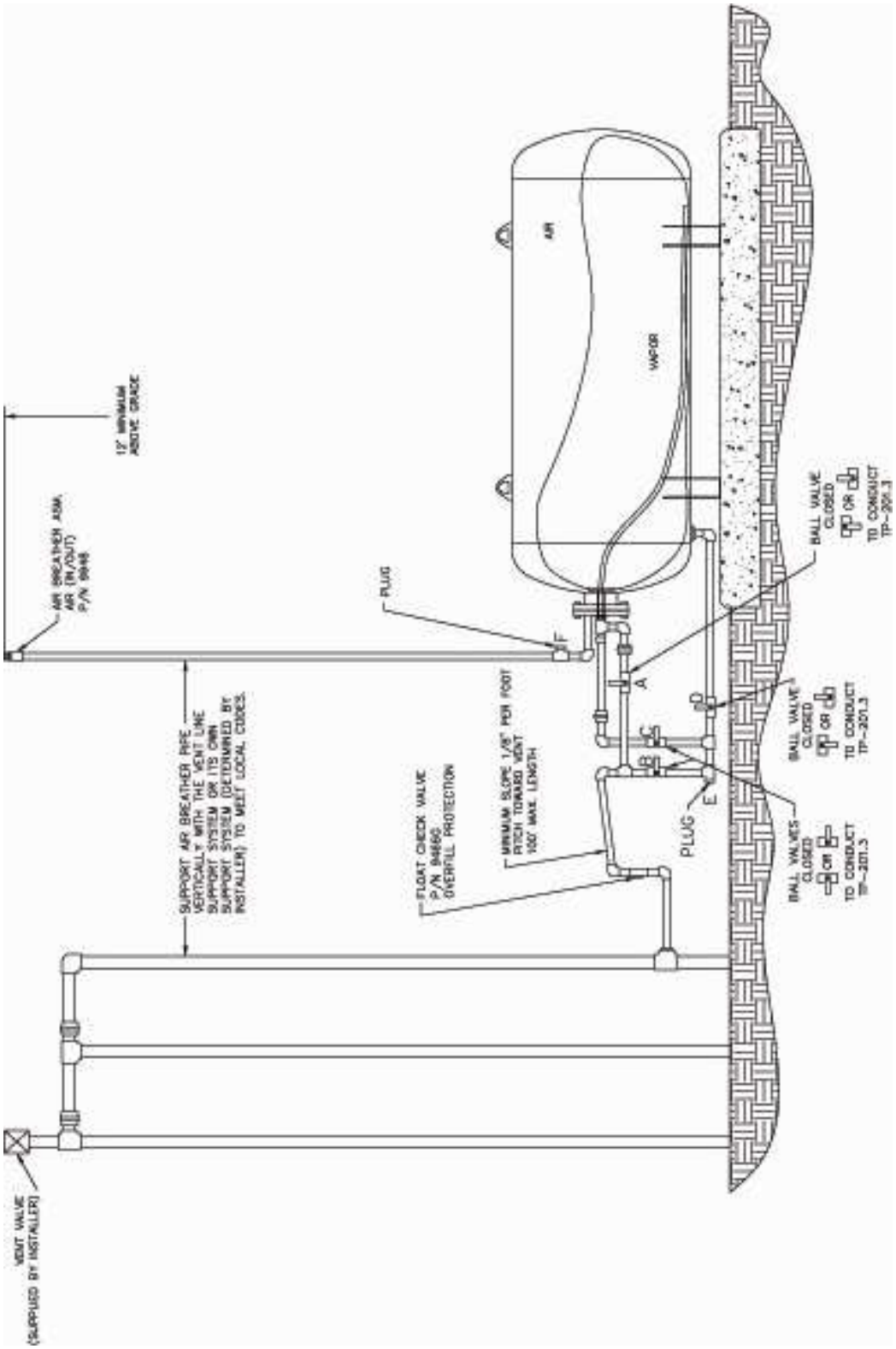


Figure 1H

Configuration of Healy Clean Air Separator to Conduct TP-201.3



## Executive Order VR-209-A
## VST Phase II EVR System with Clean Air Separator

## Exhibit 9
## Warranty

**VST PHASE II EVR SYSTEM WARRANTY**

This limited warranty is given by Vapor Systems Technologies, Inc. (hereinafter VST) to the purchaser of systems or products manufactured by it. VST products are warranted to be free from defect in material and workmanship and to comply with all applicable California Air Resources Board performance standards and specifications under normal use, service, proper installation, and maintenance practices per manufacturer specifications.

VST warrants the materials and workmanship to be free from defects in accordance with the following provisions:

- This warranty will not apply to any products or systems that have:
  - been subject to misuse, abuse, tampering, negligence, accident, or drive off;
  - been misapplied, improperly installed, or not installed per VST's instructions or specifications;
  - been modified, altered, rebuilt or repaired by unauthorized persons or outside the criteria of VST specifications;
  - not been properly maintained in accordance with the system's or product's periodic maintenance schedule; or
  - been subject to damage resulting from acts of God.
- Use of VST products on non-UL systems or use that falls outside intended field of use voids any stated or implied warranty.
- The warranty for the material and workmanship of the systems or products extends to the purchaser and subsequent purchaser and the duration of this warranty is TWELVE (12) MONTHS from the time of installation up to a maximum of EIGHTEEN (18) MONTHS from date of shipment, provided the Product Warranty Card is returned to VST. If the Product Warranty Card is not returned to VST, the warranty period is TWELVE (12) MONTHS from the date of shipment.
- VST warrants the material and workmanship of spare and/or replacements parts for NINETY (90) DAYS from the date of shipment.
- In the event of a warranty claim, the purchaser/distributor must obtain a copy of a Return Goods Authorization (RGA) from VST prior to returning product so as to insure proper processing. All warranty claim returns must be shipped freight prepaid by the purchaser/distributor.
- Warranty status will be determined upon inspection at VST's facility within THIRTY (30) DAYS of receipt of the warranted products. All returned merchandise deemed *Not Under Warranty*; will be held by VST for SEVEN (7) BUSINESS DAYS prior to disposal. Return of this product to the purchaser/distributor will require purchaser/distributor to issue a call tag within SEVEN (7) BUSINESS DAYS of notification.
- Repair or replacement of the warranted product is the **EXCLUSIVE REMEDY** under the terms of this warranty.
- This warranty does not cover any components exposed to contact with fuels containing greater than 5% methanol, 10% ethanol, or 15% MTBE by volume or any exposure to M85/E85 fuel.

- This warranty does not cover and VST is not liable for, incidental, consequential and/or indirect damages or loss including, but not limited to, personal injury, death, property damage, environmental damage, cost of labor, clean-up, downtime, installation and removal, product damage, and loss of product, revenue or profits.
- VST is not liable for any claims or lawsuits against the purchaser/distributor.
- VST is not responsible for labor or materials necessary to disconnect or connect the warranted product for return to VST.
- Use of non-VST replacement parts, the unauthorized addition of non-VST items to equipment, and the unauthorized alteration of equipment and/or systems voids this warranty.
- VST, as to each defect, shall be relieved of all obligations and liabilities under this Limited Warranty if the vapor recovery system(s) or components have been operated with any accessory, equipment, or a part not specifically approved by VST, and not manufactured by VST to VST design and specification, or parts not specifically approved by CARB to be used with VST products.

**THIS LIMITED WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ALL OTHER WARRANTIES.**

**VST MAKES NO OTHER WARRANTIES (WHETHER WRITTEN OR ORAL), EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE, AND ANY OTHER SUCH WARRANTIES ARE HEREBY DISCLAIMED.**

**VST NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON OR ENTITY TO ASSUME FOR IT OR BIND IT TO ANY OTHER LIABILITY OR OBLIGATION RELATED TO OR IN CONNECTION WITH THIS LIMITED WARRANTY.**

VST products should be used in compliance with applicable federal, state, and local laws and regulations.

VST reserves the right to make changes at any time to prices and designs, or make additions or improvements with respect to its products, without incurring any obligation to modify or install same on previously manufactured products.


Warranty and Testing Stickers for Balance EVR Products

- VST will continue to use individual tracking serial numbers on every product shipped (nozzle, hose, safety breakaway, and membrane processor).
- VST will continue to include a warranty card with every product shipped.
- VST will attach additional **NOTICE** stickers to the EVR balance-style products.

***Nozzle***

- A florescent colored sticker will be placed over the threaded area of the nozzle where the hose is to be attached.
- This sticker will include the following text:

**NOTICE:** The nozzle was factory tested to and met all applicable performance standards & specifications to which it was certified: Reference all applicable CARB Executive Orders, CARB Test procedures, Exhibits, and UL Standard 842.

**WARRANTY:** 12-month warranty becomes effective at time of installation upon VST receipt of warranty card. If the warranty card is not returned to VST, the warranty becomes effective from VST's shipment date. The maximum warranty life is 18 months from date of shipment. Please call VST if this product is being used as a replacement. Replacement with a non-VST product voids any warranty.

### *Safety Breakaway*

- A florescent colored sticker will be placed over one of the threaded ports of the breakaway.
- This sticker will include the following text:

**NOTICE:** This breakaway was factory tested to and met all applicable performance standards & specifications to which it was certified: Reference all applicable CARB Executive Orders, CARB Test procedures, Exhibits, and UL Standard 567.

**WARRANTY:** 12-month warranty becomes effective at time of installation upon VST receipt of warranty card. If the warranty card is not returned to VST, the warranty becomes effective from VST's shipment date. The maximum warranty life is 18 months from date of shipment. Please call VST if this product is being used as a replacement. Replacement with a non-VST product voids any warranty.

### *Hose*

- A florescent colored sticker will be placed on the hose.
- This sticker will include the following text:

**NOTICE:** This hose was factory tested to and met applicable performance standards & specifications to which it was certified: Reference all applicable CARB Executive Orders, CARB Test procedures, Exhibits, and UL Standard 330.

**WARRANTY:** 12-month warranty becomes effective at time of installation upon VST receipt of warranty card. If the warranty card is not returned to VST, the warranty becomes effective from VST's shipment date. The maximum warranty life is 18 months from date of shipment. Please call VST if this product is being used as a replacement. Replacement with a non-VST product voids any warranty.

**FRANKLIN FUELING SYSTEMS LIMITED WARRANTY POLICY FOR CLEAN AIR SEPARATOR (CAS)**

Franklin Fueling Systems ("FFS") warrants that its products are free from defects in materials and workmanship that exist at the time of sale by FFS and which occur or exist within the applicable warranty period. Additionally, FFS warrants that its EVR products installed in California will conform to the warranty terms and conditions required by the Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities (CP-201) with respect to (a) transferability of warranties, (b) design changes to the EVR product, (c) performance specifications of the EVR products, and (d) duration of the warranty period. **However, in order to qualify for coverage under this warranty, the products must be installed according to the ARB Approved Installation, Operation, and Maintenance manual.**

**APPLICABLE WARRANTY PERIODS:**

Clean Air Separator: FFS warrants that the workmanship and materials are free of defects and will comply with the performance standards of California ARB CP-201 for a period one (1) year from the date of installation or 18 months from the date of manufacture. **This warranty is void if the Clean Air Separator fails to meet the performance standards as a result of damage to the tank due to corrosion.**

Lockable ball valves, Locks, Master key, Float check valve, and Breather Assembly shipped with installation kit: FFS warrants that the workmanship and materials are free of defects for a period of one (1) year from the date of installation or eighteen (18) months from the date of manufacture.

**INSTRUCTIONS AND LIMITATIONS APPLICABLE TO THIS POLICY:**

1. All warranty claims must be submitted in writing to FFS or applicable FFS subsidiary promptly after discovery of a defect. In no event may any warranty claim be submitted more than 30 days after the end of the applicable warranty period.

2. All warranty claims must have a written “Returned Goods Authorization” (RGA) from FFS and the RGA number must be affixed to the returned product. All returned products must be shipped freight prepaid with the RGA number affixed to the following address for inspection:

   Healy Products:
   Franklin Fueling Systems, Inc.
   ATTN: Warranty Department
   3760 Marsh Road
   Madison, WI 53718 USA

3. This warranty policy does not cover any labor or shipping charges. FFS shall not be liable for any costs or charges attributable to any product testing, maintenance, installation, repair or removal, or for any tools, supplies, or equipment needed to install, repair, or remove any product.

4. A Healy Certified Technician qualified to perform service on the defective equipment must perform warranty service. Only Healy Certified Technicians are allowed to perform warranty service. **Use of service personnel other than qualified Healy Certified Technicians without prior written approval by FFS will void the warranty.**

5. FFS, will, at its option, repair or replace defective parts returned to its factory. Repaired or replaced parts will be returned freight prepaid by FFS.

**THIS WARRANTY DOES NOT APPLY TO THE FOLLOWING:**

1. Any product not installed, applied, maintained and used in accordance with FFS’s published instructions and with generally accepted industry standards.

2. Any product that has been subject to misuse, misapplication, neglect, alteration, acts of God, acts of terrorism, acts of war, fire, improper installation or use, improper maintenance or repair, damage or casualty.

3. Any product that is operated with any accessory, equipment, component, or part not specifically approved by FFS.

4. Any product that has been in contact with fuels containing greater than 15% methanol, 15% ethanol, or 15% MTBE by volume, including but not limited to, M85/E85 fuel (or other alcohol-rich fuel).

5. Use of replacement parts not sold by FFS, the unauthorized addition of non-FFS products to other FFS products, and the unauthorized alteration of FFS products.

FFS reserves the unrestricted right at any time and from time to time to make changes in the design of and/or improvements upon its product without thereby imposing any obligation upon itself to make corresponding changes or improvements in or upon its products already manufactured. FFS further reserves the right to substitute parts or components of substantially equal quality in any warranty service required by operation of this Limited Warranty.

This written Limited Warranty is the entire warranty authorized and offered by FFS. There are no warranties or representations beyond those expressed in this written document. This written Limited Warranty cannot be amended by any dealer, sales person or agent.

**THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY SPECIFICALLY DISCLAIMED. CORRECTION OF NON-CONFORMITIES, IN THE MANNER AND FOR THE PERIOD OF TIME AS SET FORTH ABOVE, SHALL CONSTITUTE FULFILLMENT OF ALL LIABILITIES OF FFS TO THE PURCHASER WHETHER BASED ON CONTRACT, NEGLIGENCE, OR OTHERWISE.**

**FFS SHALL NOT, UNDER ANY CIRCUMSTANCES, BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES SUCH AS, BUT NOT LIMITED TO:**

**DAMAGE TO OR LOSS OF OTHER PROPERTY OR EQUIPMENT, LOSS OF USE OF EQUIPMENT, FACILITIES OR SERVICE, LOSS OF PROFIT OR SALES, COST OF PURCHASES OR REPLACEMENT GOODS, CLAIMS OF CUSTOMERS OF THE PURCHASER, FAILURE TO WARN AND/OR INSTRUCT, LOSS OF FUEL OR OTHER PRODUCTS, OR COSTS OF ENVIRONMENTAL REMEDIATION, OR DIMINUTION IN PROPERTY VALUE. THE REMEDIES OF THE PURCHASER SET FORTH HEREIN ARE EXCLUSIVE, AND THE LIABILITY OF FFS SHALL NOT, EXCEPT AS EXPRESSLY PROVIDED HEREIN, EXCEED THE PRICE OF THE PRODUCTS UPON WHICH SUCH LIABILITY IS BASED.**

This Limited Warranty gives you specific legal rights. You may have other rights, which vary from state to state. Where any term of this warranty is prohibited by such laws, it shall be null and void, but the remainder of this warranty shall remain in full force and effect.

**ANY LITIGATION RELATED TO THIS LIMITED WARRANTY POLICY OR THE FFS PRODUCT MUST BE MAINTAINED IN EITHER THE FEDERAL DISTRICT COURT FOR THE NORTHERN DISTRICT OF INDIANA, FORT WAYNE DIVISION (OR ANY SUCCESSOR JURISDICTION) OR IN A STATE COURT SITTING IN ALLEN COUNTY, INDIANA. YOU HEREBY IRREVOCABLY CONSENT AND SUBMIT TO THE EXCLUSIVE JURISDICTION OF THE APPLICABLE FEDERAL OR STATE COURTS SPECIFIED HEREIN AND IRREVOCABLY WAIVE ANY OBJECTION YOU MAY HAVE HAD BASED UPON IMPROPER VENUE, FORUM NON CONVENIENS, OR OTHER SIMILAR DOCTRINES OR RULES. THE INTERNAL LAWS OF THE STATE OF INDIANA SHALL GOVERN THE INTERPRETATION OF, OR ANY DISPUTE ARISING UNDER OR RELATING TO, THIS LIMITED WARRANTY POLICY.**