

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER VR-208-A

Emco Wheaton Retail Corporation  
Phase II Enhanced Vapor Recovery (EVR) System  
with Hirt VCS 100 Thermal Oxidizer  
Including Franklin Fueling Systems INCON 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, Emco Wheaton Retail Corporation (Emco) has applied for certification of the Emco Phase II Enhanced Vapor Recovery System with the Hirt Combustion Engineers, Inc. (Hirt) VCS 100 Thermal Oxidizer Including Franklin Fueling Systems (FFS) INCON In-Station Diagnostics (Emco Phase II EVR System Including ISD) pursuant to the Certification Procedure;

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, I, James N. Goldstene, California Air Resources Board Executive Officer, find that the Emco Phase II EVR System Including ISD 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** (May 2, 2008);

NOW, THEREFORE, IT IS HEREBY ORDERED that the Emco Phase II EVR System Including ISD 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 Emco Phase II EVR System Including ISD. Exhibit 2 contains the performance standards, specifications, and

typical installation drawings applicable to the Emco Phase II EVR System Including ISD as installed in a gasoline dispensing facility (GDF). Exhibit 3 contains the manufacturing performance standards and specifications. Exhibit 4 provides items required in conducting TP-201.3, **Determination of 2 Inch WC Static Pressure of Vapor Recovery Systems of Dispensing Facilities** (March 17, 1999). Exhibit 5 is the **Liquid Removal Test Procedure**. Exhibit 6 provides items required in conducting TP-201.4, **Dynamic Back Pressure** (July 3, 2002). Exhibit 7 is the **Nozzle Bag Test Procedure**. Exhibit 8 is the **Hirt VCS 100 Processor Operability Test Procedure**. Exhibit 9 is the Emco, Hirt, Goodyear, and FFS INCON ISD Warranties. Exhibit 10 is the **INCON ISD System Vapor Flow Meter Operability Test Procedure**. Exhibit 11 is the **INCON ISD System Vapor Pressure Sensor Verification Test Procedure**.

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 Emco, Hirt, 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 Emco, Hirt, or FFS shall provide a warranty to 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. Emco, Hirt, 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 Emco, Hirt, and FFS shall be performance tested by the manufacturer as provided in Exhibit 3.

IT IS FURTHER ORDERED that the certified Emco Phase II EVR System Including ISD 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 Emco Phase II EVR System Including ISD 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 Emco Phase II EVR System Including ISD 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:

- 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, ***Required Items in Conducting TP-201.3***;
- Exhibit 5, ***Liquid Removal Test Procedure***;
- Exhibit 6, ***Required Items in Conducting TP-201.4***;
- Exhibit 8, ***Hirt VCS 100 Processor with Indicator Panel Operability Test Procedure***;
- Exhibit 10, ***INCON ISD System Vapor Flow Meter Operability Test Procedure***;  
and
- Exhibit 11, ***INCON ISD System Vapor Pressure Sensor Verification Test Procedure***.

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 Emco Phase II EVR System Including ISD 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. If the district requires the nozzle vapor valve be tested, the test shall be conducted in accordance with Exhibit 7, ***Nozzle Bag Test Procedure***.

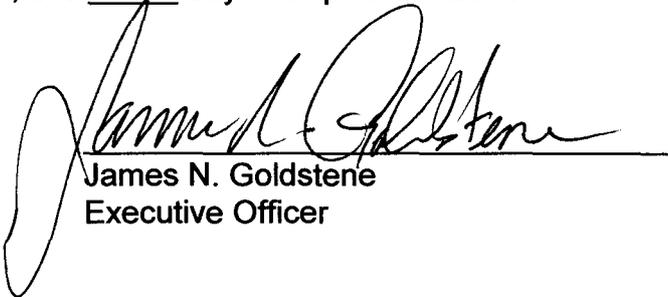
IT IS FURTHER ORDERED that the Emco Phase II EVR System Including ISD shall be compatible with gasoline in common use in California at the time of certification. The Emco Phase II EVR System is not compatible with gasoline that has a methanol content greater than 5 percent, an ethanol content greater than 10 percent, or a methyl tert 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 Emco Phase II EVR System Including ISD is valid through September 15, 2013.

IT IS FURTHER ORDERED that this Executive Order shall apply to new installations or major modification of Phase II Systems with a throughput of more than 600,000 gallons per year. The installation of the FFS INCON ISD System is not authorized on a GDF with a throughput of less than or equal to 600,000 gallons per year.

Executed at Sacramento, California, this 23 day of September 2009.



James N. Goldstene  
Executive Officer

Attachments:

- Exhibit 1      Equipment List
- Exhibit 2      System Specifications
- Exhibit 3      Performance Standards and Specifications
- Exhibit 4      Required Items in Conducting TP-201.3
- Exhibit 5      Liquid Removal Test Procedure
- Exhibit 6      Required Items in Conducting TP-201.4
- Exhibit 7      Nozzle Bag Test Procedure
- Exhibit 8      Hirt VCS 100 Processor with Indicator Panel Operability Test Procedure
- Exhibit 9      Warranty
- Exhibit 10     INCON ISD System Vapor Flow Meter Operability Test Procedure
- Exhibit 11     INCON ISD System Vapor Pressure Sensor Verification Test Procedure



Where:

X represents hardware option

(Example: X can be: 'D' for Display  
'P' for Printer)

Y represents software option

(Example: Y can be: 'T' for Tank Testing)

V represents Vapor Recovery Monitoring Application  
(Figure 1A-5)

Note: 1. All consoles come standard with RS-232  
(COMM1) and Ethernet ports for data access.

**ISD Vapor Recovery Monitoring (VRM) Software**

INCON / TS-VRM Version 1.1.0

**ISD Vapor Flow Meter**

(1 per Dispenser)

INCON TS-VFM

(Figure 1A-6)

**ISD Vapor Pressure Sensor**

(1 per GDF)

INCON TS-VPS

(Figure 1A-7)

**Dispenser Retrofit Kit (Optional)<sup>2</sup>**

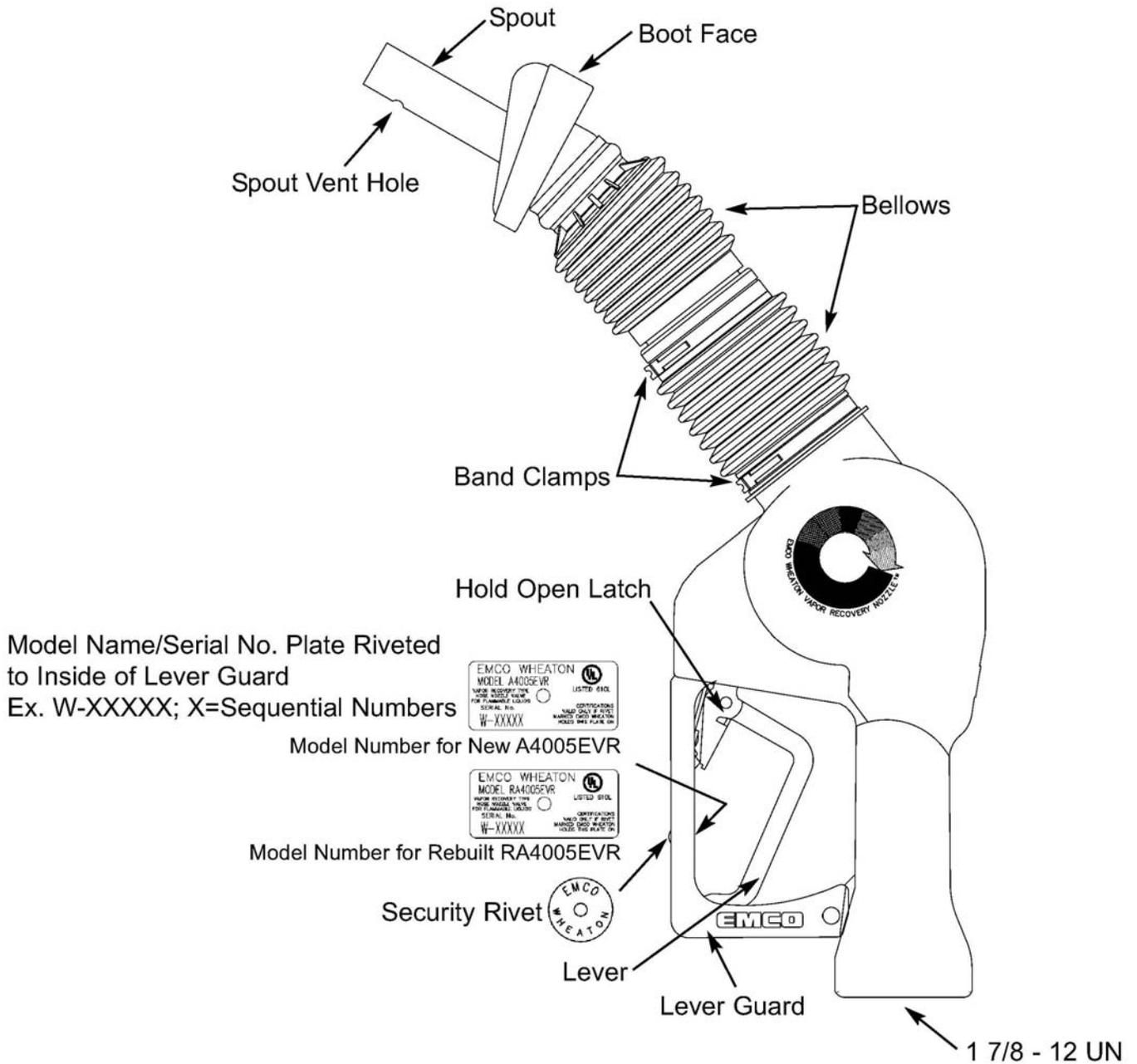
(1 per dispenser)

INCON TS-DRK

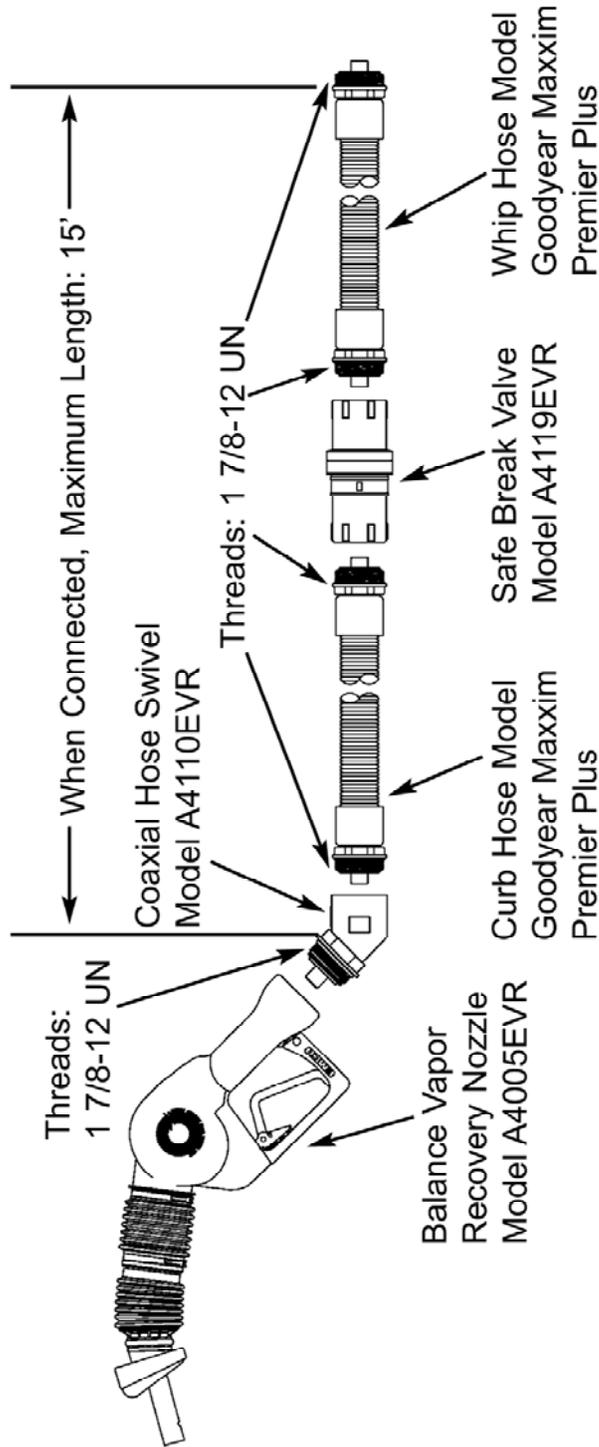
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<sup>2</sup> Optional installation method for the replacement of dedicated wires to VFM and VPS. Refer to the IOM for more information

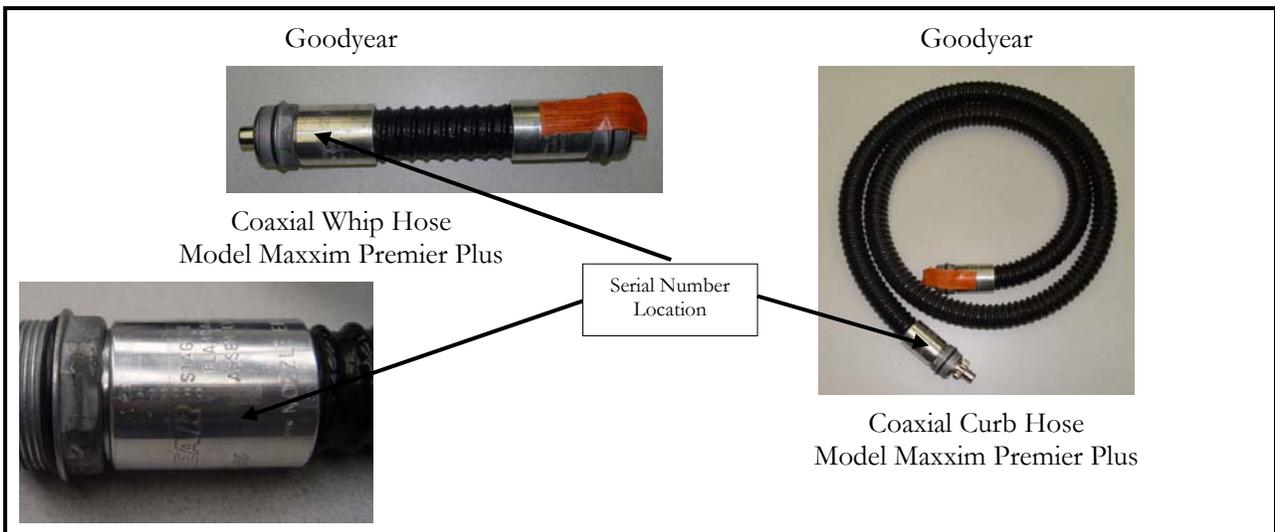
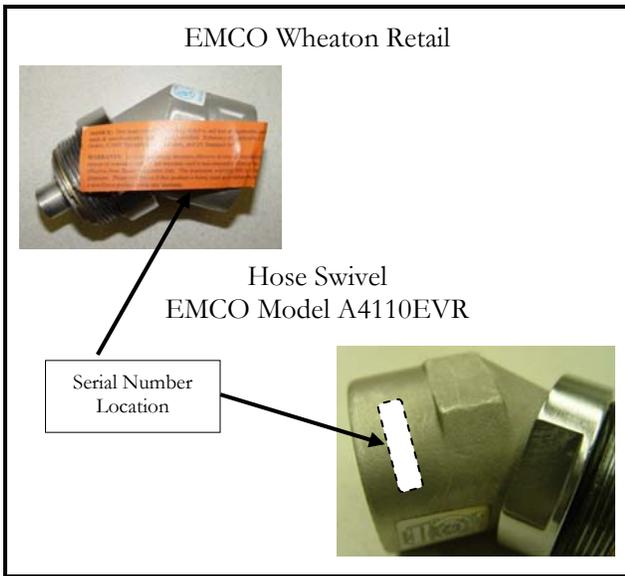
**Figure 1A-1**  
**Emco Model A4005EVR Nozzle**



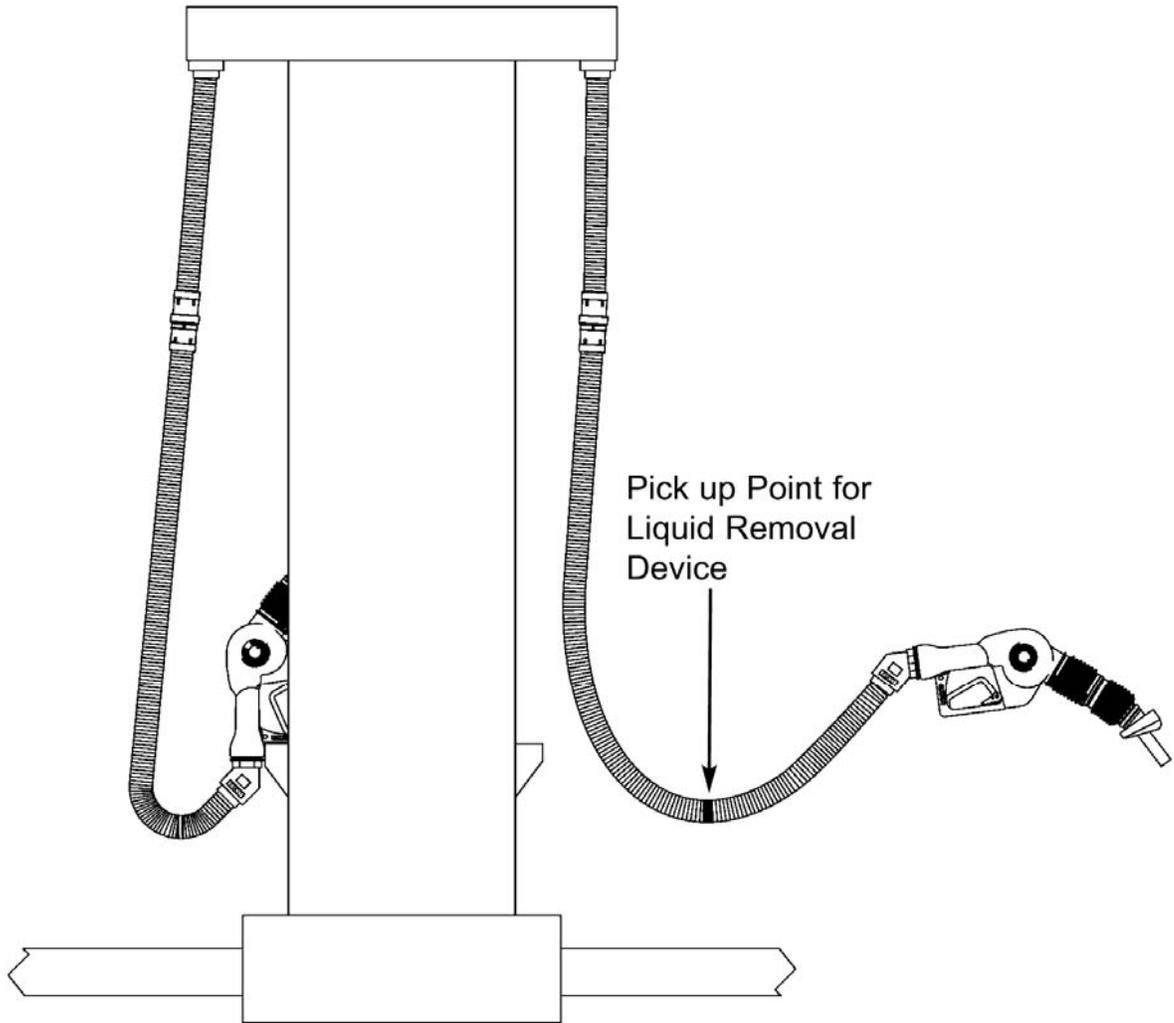
**Figure 1A-2**  
**Emco Hanging Hardware**  
**(Nozzle, Hose Swivel, Coaxial Curb Hose, Safe Break, and Coaxial Whip Hose)**



**Figure 1A-2 (continued)  
Emco Hanging Hardware  
(Nozzle, Hose Swivel, Coaxial Curb Hose, Safe Break, and Coaxial Whip Hose)**

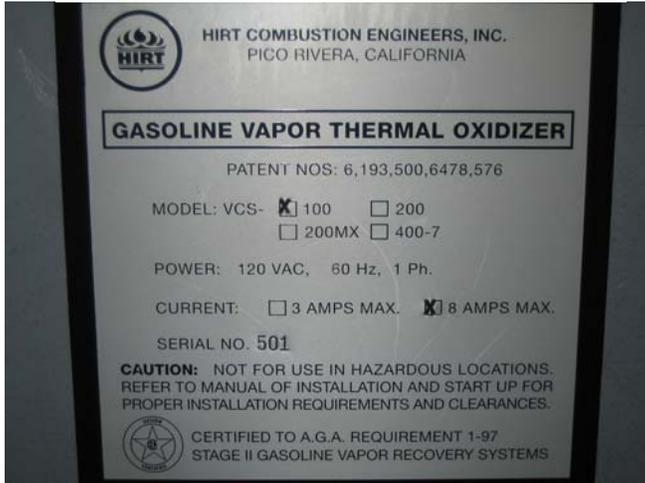


**Figure 1A-3**  
**Typical Emco and Goodyear Hanging Hardware with Liquid Removal Device**

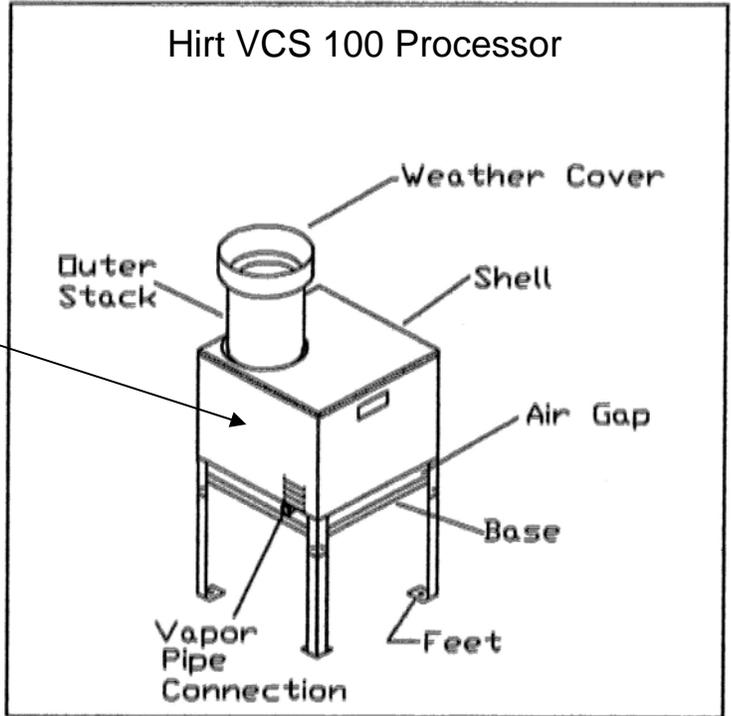


**Figure 1A-4**  
**Hirt VCS 100 Thermal Oxidizer and Indicator Panel**

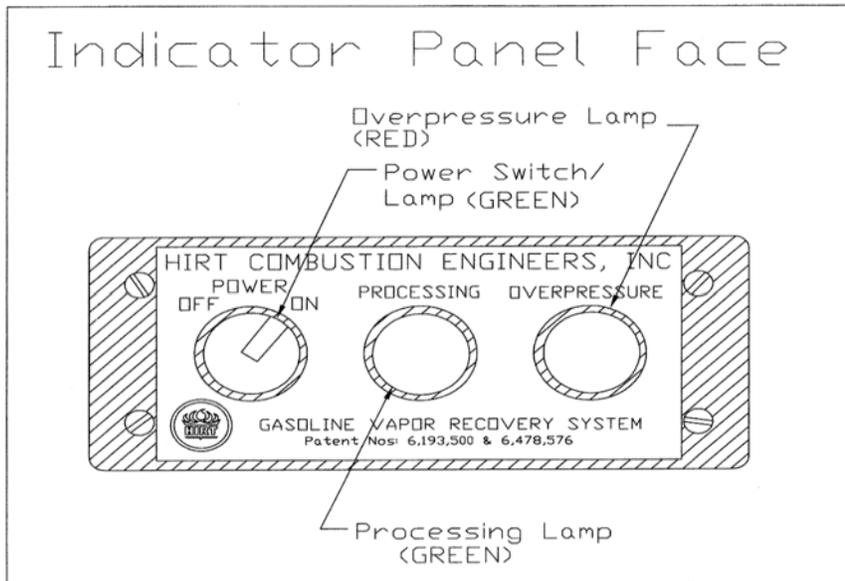
VCS 100 Identification Plate



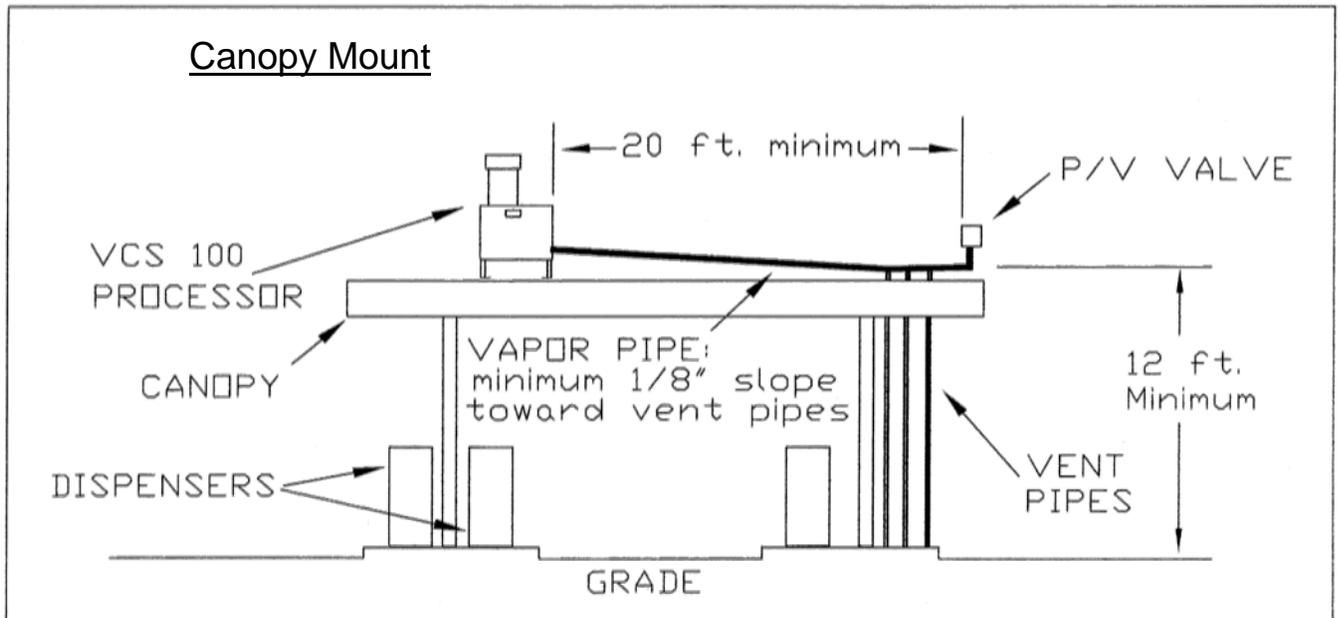
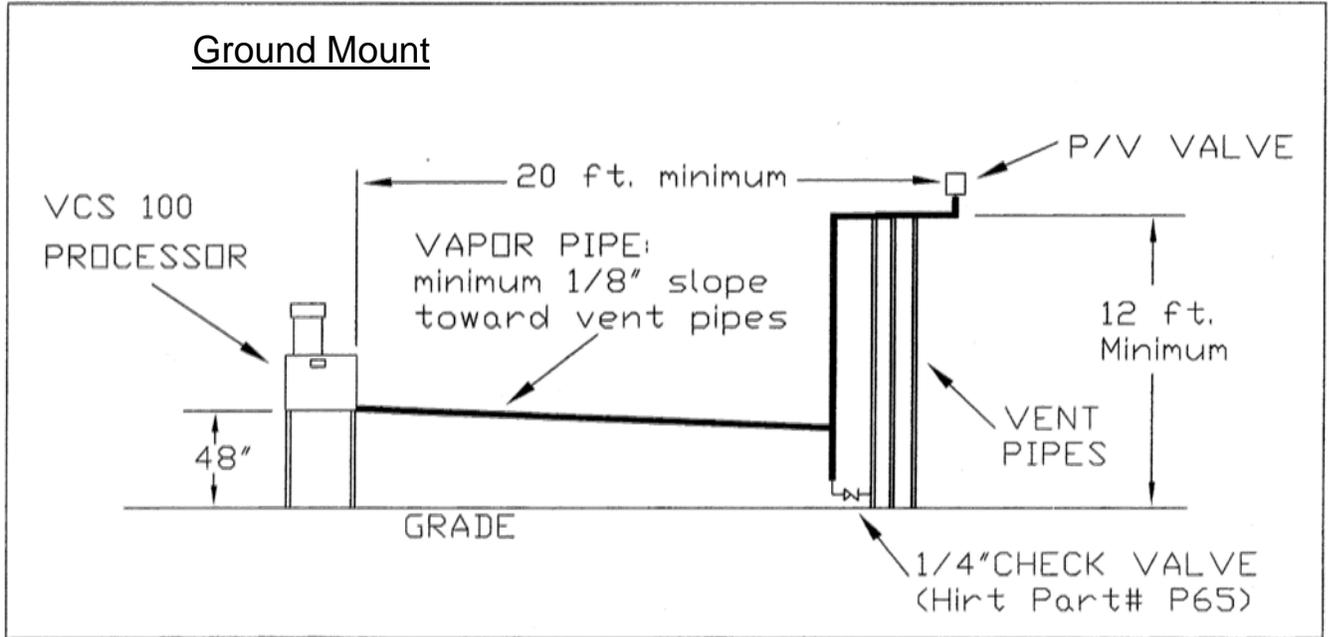
Hirt VCS 100 Processor



Indicator Panel Face

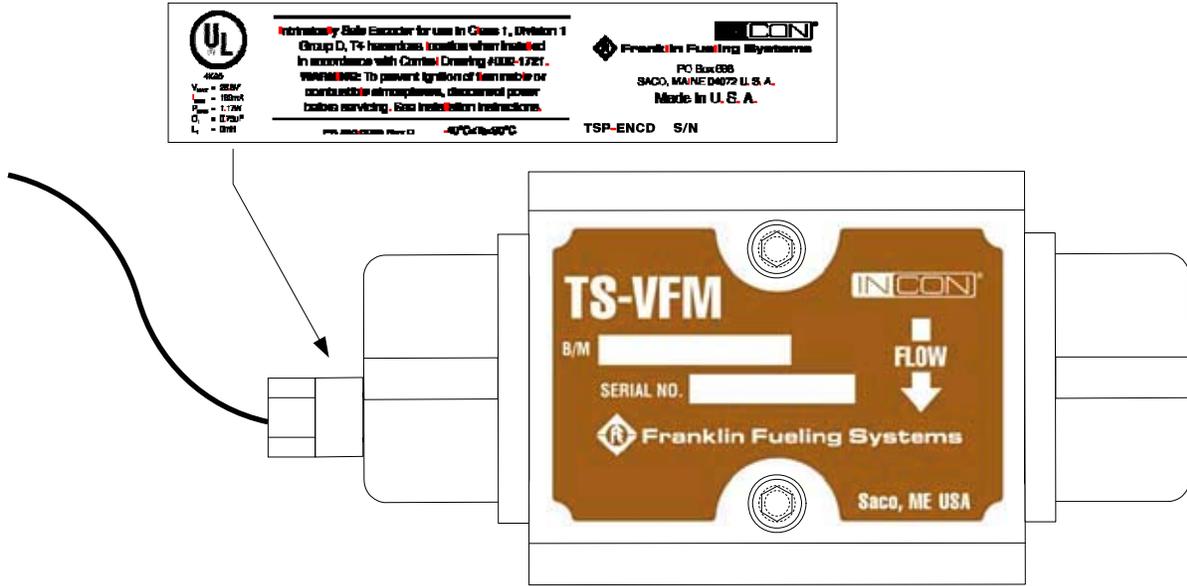


**Figure 1A-4 (continued)**  
**Typical Hirt VCS100 Thermal Oxidizer Processor**

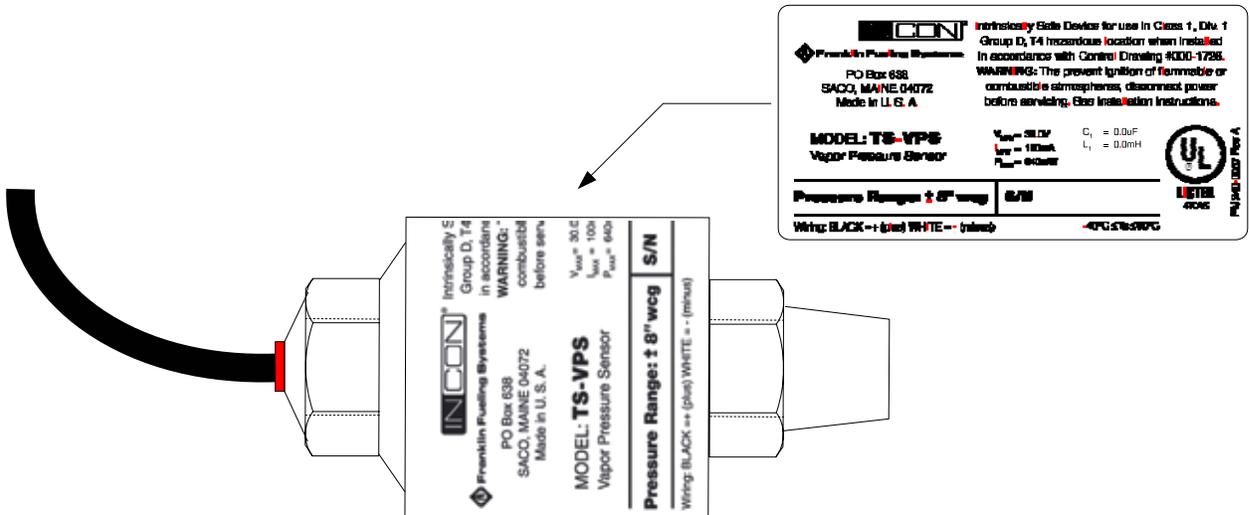




**Figure 1A-6  
INCON TS-VFM  
Vapor Flow Meter**



**Figure 1A-7  
INCON TS-VPS  
Vapor Pressure Sensor**



**Executive Order VR-208-A**  
**Emco Phase II EVR System with Hirt Thermal Oxidizer Including INCON ISD**

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

This exhibit contains the installation, maintenance and compliance standards and specifications that apply to the Emco Phase II EVR System Including ISD 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, hose swivels, curb hoses, safe brakes, and whip hoses without a manufacturer certification.

**Nozzle**

1. A vapor bellows shall be installed on the nozzle at the base of the spout, as shown in **Figure 2B-1**.
2. The Emco Model A4005EVR nozzle has 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, hose swivel, safe break valve, 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 grade 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 "Hoses".

### **Safe Break Valve**

1. The Emco Safe Break Valves are non-reconnecting and shall be replaced following a drive-off.

### **Flow Limiter**

1. No flow limiter is allowed for this system.

### **Hirt VCS 100 Thermal Oxidizer**

1. The processor vapor integrity shall demonstrate compliance with the static pressure decay criteria of TP-201.3 and Exhibit 4.
2. Unless there is maintenance or testing being conducted on the processor, the processor shall be on (power lamp is lit) and in the automatic vapor processor mode. The ball valve on the inlet of the processor shall be locked in the open position shown in **Figure 2B-2** and the 3-Way Valve handle shall be pointing down in the Normal Operating Position (Opened to UST Ullage) shown in Figure 2B-3 during normal processor operation. The handles of the ball valves shall not be removed.
3. Piping to the processor shall be sloped 1/8" per foot minimum toward the vent line(s).
4. The VCS 100 Indicator Panel shall be installed at a location that is most likely to be occupied by the station attendant during normal station operation (i.e., cash register).
5. The processor shall activate when the processor is exposed to an atmospheric pressure input and the Processing lamp at the Indicator Panel shall light within three (3) minutes as determined by Exhibit 8.

6. When the processor is exposed to an atmospheric pressure input, the OVERPRESSURE lamp at the Indicator Panel shall light within sixty two (62) minutes as determined by Exhibit 8.
7. If the OVERPRESSURE lamp lights, the system is not in proper working order. The GDF owner/operator shall immediately take the following actions:
  - a. record the date and time the OVERPRESSURE lamp lit in the station's maintenance and alarm records;
  - b. investigate the cause of the OVERPRESSURE light as provided by section 8 of the Installation, Operations, and Maintenance Manual. Record results of inspections, maintenance, and/or testing conducted in the station's maintenance and alarm records; and if necessary,
  - c. record the date and time when the GDF owner/operator called the maintenance contractor for service.

### **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.

### **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 Emco Phase II EVR System if there is a vapor line that is disconnected and open to the atmosphere.
6. No liquid condensate traps 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.
3. The INCON ISD System software version 1.1.0 does not support multi-hose (six pack) dispenser configurations and is therefore limited for use with unihose dispensers.

### **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 4.

### **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-4.
2. Maintenance shall be conducted in accordance with the Scheduled Maintenance section of the ARB Approved Installation, Operation, and Maintenance Manual.

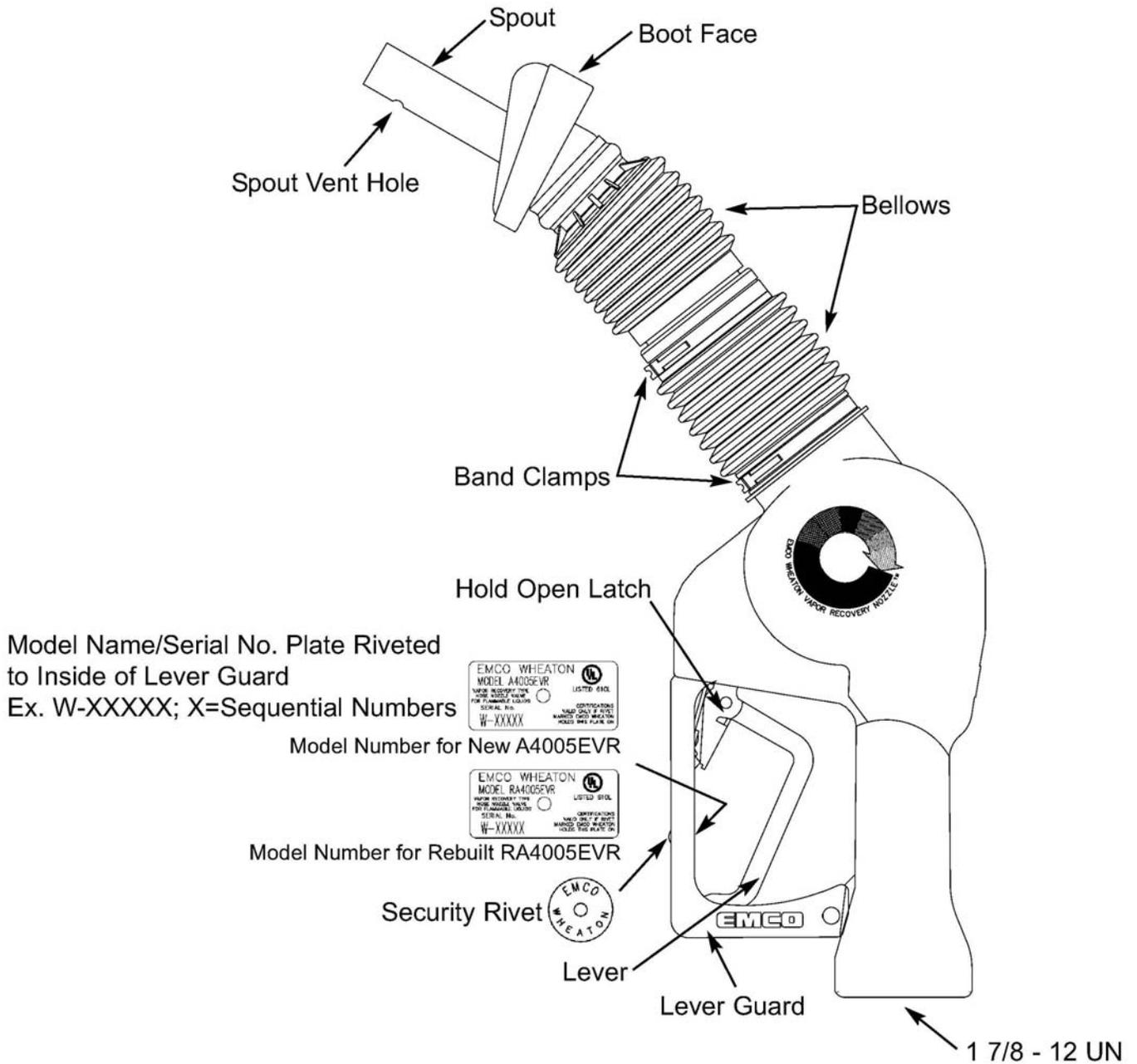
### Vapor Recovery Equipment Defects

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

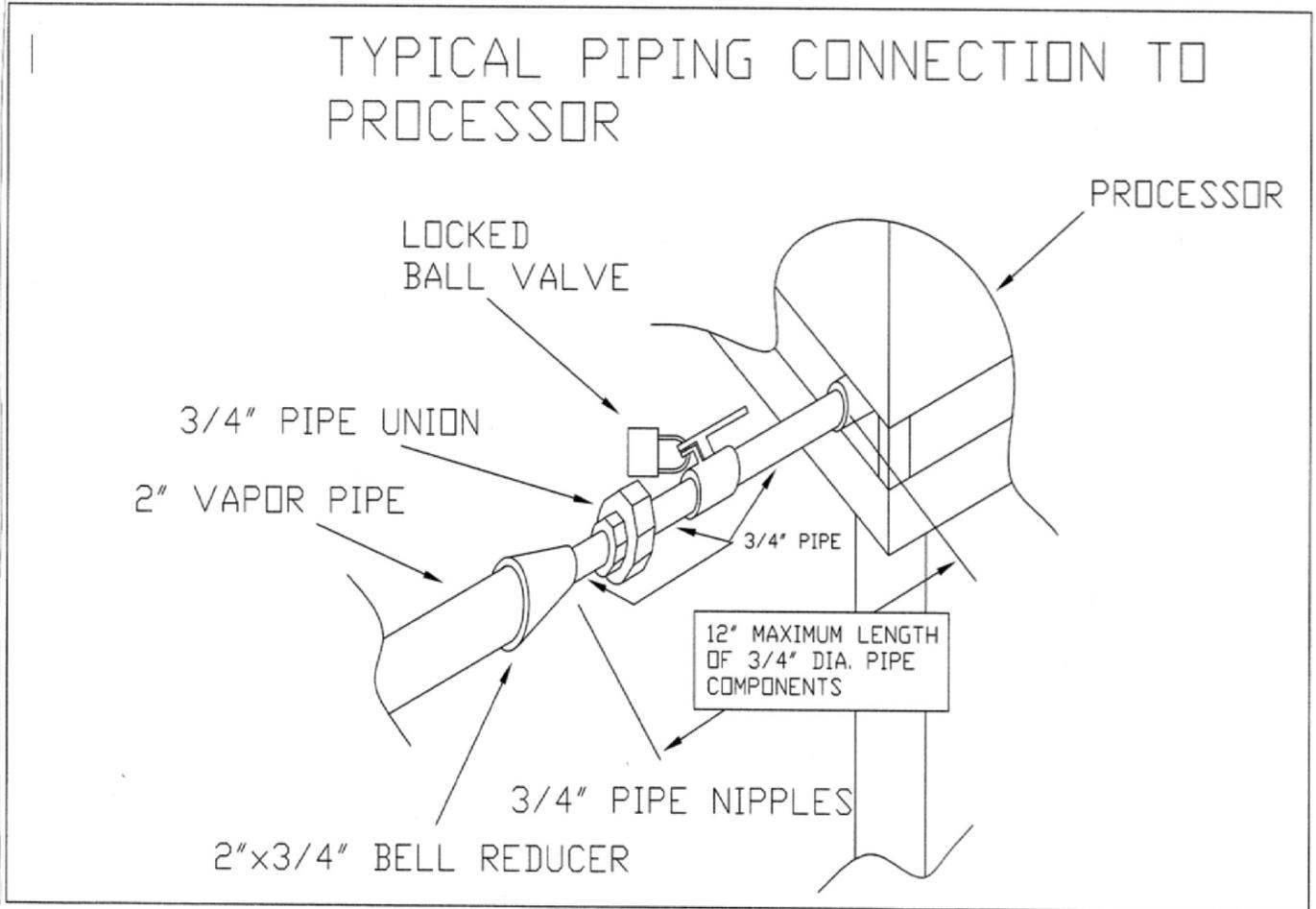
1. The fueling point shall be removed from service when more than 0.38 square inches of a nozzle boot face material is missing (e.g., a triangular or similar shape in which greater than 7/16 inches of the boot face circumference is missing (accumulated)).
2. The fueling point shall be removed from service when there is slit across seven (7) consecutive bellows convolutions as determined by direct measurements.
3. The fueling point shall be removed from service when a hose is found to have greater than 150 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 Goodyear hose, use Emco tool P/N 494635EVR and plug the fuel spout. **Do not activate dispenser when draining gasoline from the vapor side of the Goodyear hose.**
4. The fueling point shall be removed from service when the Emco system pressure drop exceeds the following conditions as determined by Methodology 1 of TP-201.4 and Exhibit 6:  

0.95 inches WC at a flow rate of 60 CFH of Nitrogen; and  
1.52 inches WC at a flow rate of 80 CFH of Nitrogen.
5. 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.
6. The fueling point shall be removed from service when any hose has a visible opening as determined by direct observation.
7. The fueling point shall be removed from service when the insertion interlock mechanism allows dispensing when the bellows is uncompressed as determined by direct observation or GDF-09 (see Vapor Recovery Defects List).
8. 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.
9. 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.
10. 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.

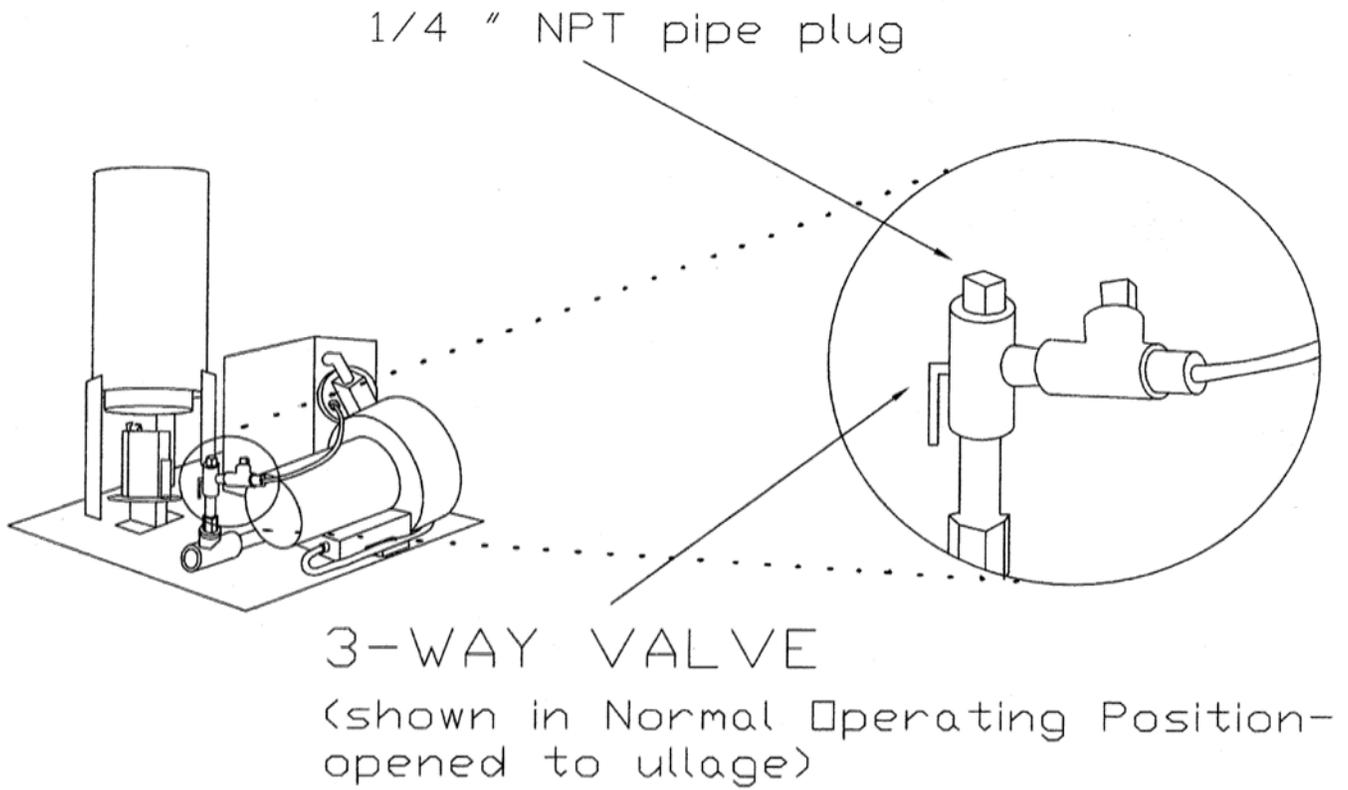
**Figure 2B-1**  
**Emco Model A4005EVR Nozzle**



**Figure 2B-2**  
**Hirt VCS 100 Thermal Oxidizer**  
**(shown in normal operation)**



**Figure 2B-3**  
**Hirt VCS 100 Thermal Oxidizer**  
**(3-Way Valve shown in normal operation)**



**Figure 2B-4**  
**Example of a GDF Maintenance Record and Alarm History Record**

| Date of Maintenance/<br>Test/Inspection/Failure/<br>alarm history (including<br>date and time of<br>maintenance call) | Repair<br>Date To<br>Correct<br>Test<br>Failure | Maintenance/Test/Inspection<br>Performed and Outcome/Action<br>Taken in Response to Alarm | Affiliation | Name and<br>Technician ID<br>Number of Individual<br>Conducting<br>Maintenance or Test | Telephone<br>Number |
|---|---|---|-------------|--|---------------------|
|   |   |   |             |  |                     |
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## **INCON Vapor Recovery Monitoring (VRM) System Specifications**

### **Console & VRM Software Version Number**

The ISD audible alarms shall be installed at a location that is most likely to be heard by the station attendant during normal station operation (e.g., cash register). The console shall be installed in a location that allows the Ethernet or RS232 port (COMM 1) to be easily accessible, and if applicable, per district requirements, for use at anytime. A vacant RS232 serial port (COMM 1) shall always be available to electronically download reports.

The presence of VRM and the VRM software version number can be verified on the Console touchscreen screen by pressing the VRM Icon key or by printing a VRM Daily or Monthly Report. See **Figure 2B-5** for the verification instructions.

The Console must have a printer.

The Console is equipped with password security features which prohibit the ability to make changes to the system. Instructions and passwords shall be maintained on site in accordance with air district requirements and shall be available to the air district upon request.

The INCON ISD System software version 1.1.0 does not support multi-hose (six pack) dispenser configurations and is therefore limited for use with unihose dispensers.

### **Operability Test Procedure**

The INCON VRM operability test procedures are provided in Exhibits 10 and 11, and in the VRM Operability Testing section of the **ARB Approved Installation, Operation and Maintenance Manual**, shall be used at GDF sites to determine the operability of the INCON VRM system to comply with applicable performance standards and performance specification in CP- 201. Testing the VRM equipment in accordance with this procedure will verify the proper selection, setup and operation of the Console sensors and interface modules.

### **Vapor Flow Meter**

The INCON VRM system requires one Vapor Flow Meter per dispenser installed via the ARB Approved Vapor Flow Meter Manual 000-2144, Rev. A. The Vapor Flow Meter shall be installed into dispensers listed in Exhibit 1 of this Executive Order in accordance with the **ARB Approved Installation, Operation and Maintenance Manual**. The Vapor Flow Meter is an intrinsically safe sensor that is wired to the Console Probe Module via a conduit dedicated to low-voltage sensors. **Figure 2B-7** shows the Vapor Flow Meter. **Figure 2B-9** shows the installation configuration.

### **Vapor Pressure Sensor**

The INCON VRM system requires one Vapor Pressure Sensor per GDF installed into one of the dispensers located with the shortest run to the underground storage tanks (If a row of dispensers are equal distance from the tank pad, any dispenser can be used) in

accordance with the **ARB Approved Installation, Operation and Maintenance Manual**. The Vapor Pressure Sensor shall be installed into dispensers listed in Exhibit 1 of this Executive Order. The Vapor Pressure Sensor is an intrinsically safe sensor that is wired to the Console's 4-20mA Module via a conduit dedicated to low-voltage sensors. **Figure 2B-8** shows a Vapor Pressure Sensor illustration. **Figure 2B-10** shows the installation configuration.

### **Dispenser Interface Module (DIM)**

Existing Dispenser Interface Modules or DIM communication cards are used to interface to the dispenser Point of Sale (POS) or controller system to gather fuel transaction data. The ISD Operability Test Procedure provided in Exhibit 11 and in the **ARB Approved Install, Operators, and Maintenance Manual** can be used to verify the proper selection and setup of the Dispenser Interface Module.

### **Tank Inventory Probe Sensor**

Existing Tank Inventory Probe sensors (one per gasoline storage tank) are used to measure the amount of vapor space in the Underground Storage Tanks (USTs). The ISD Operability Test Procedure can be used to verify the proper selection and setup of the Tank Inventory Probes. See **Figure 2B-11** for a typical Tank Inventory Probe Sensor.

### **Shutdown Control**

The Console must be wired per the INCON VRM Install, Operators, and maintenance Manual 000-2058, Rev. C of the **ARB Approved Installation, Operation and Maintenance Manual** such that it shall automatically prohibit the dispensing of fuel through shutdown of individual dispensers during a CP-201 ISD failure alarm.

### **Console Modules**

The VRM Operability Test Procedure in Exhibit 11 and in the INCON VRM Install, Operators, and Maintenance Manual 000-2058, Rev C of the **ARB Approved Installation, Operation, and Maintenance Manual** shall be used to verify the proper selection and setup of the Console Modules.

### **Training Program**

All INCON contractors must successfully complete the applicable Franklin Fueling Systems training program before they can install, startup, and service INCON Console equipment. Contractors must have up-to-date Level 1 & 2 certifications to install and startup the TS Console. Contractors must have an up-to-date Level 5 certification to install, startup and service the VRM system. The schedule, fee and registration information for the Authorized Service Contractor (ASC) training program can be found at <http://www.franklinfueling.com>.

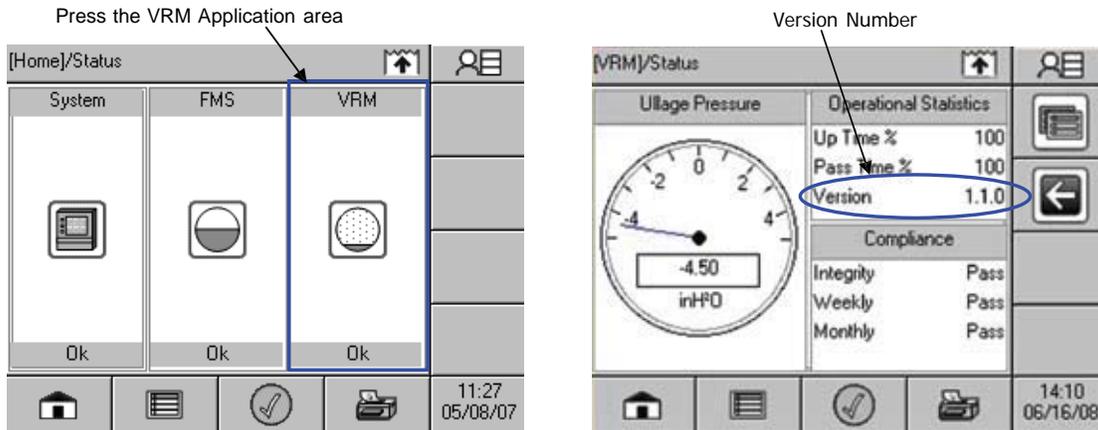
A list of certified contractors with current console and VRM training will be available at the Franklin Fueling web page, [www.franklinfueling.com](http://www.franklinfueling.com).

## Maintenance

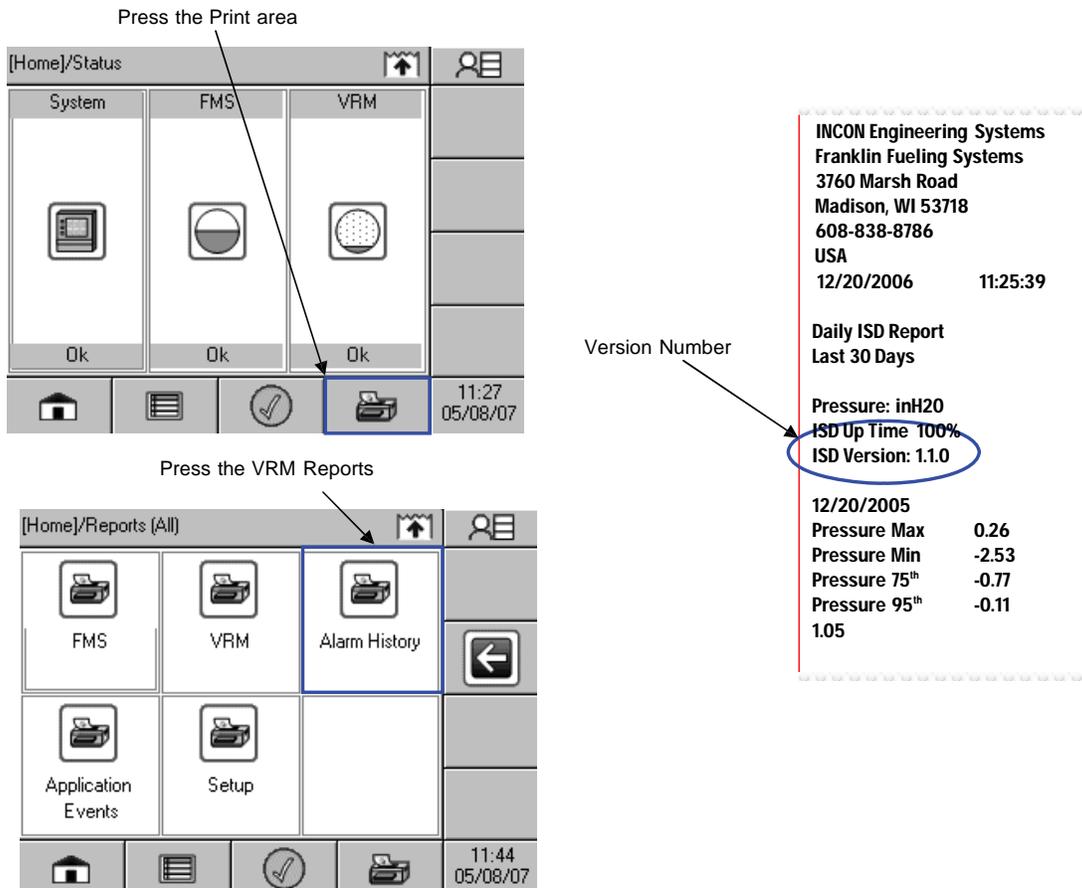
The console, including interface modules, do not require scheduled maintenance. The VRM System uses a Self-Test Monitoring feature that is designed to verify proper selection, setup and operation of the console and sensors. There is no recommended maintenance, inspection nor calibration for the Vapor Flow Meter or the Vapor Pressure Sensor. Servicing should be performed in response to warning or alarm conditions.

**Figure 2B-5**  
**Finding the INCON VRM Version Number**

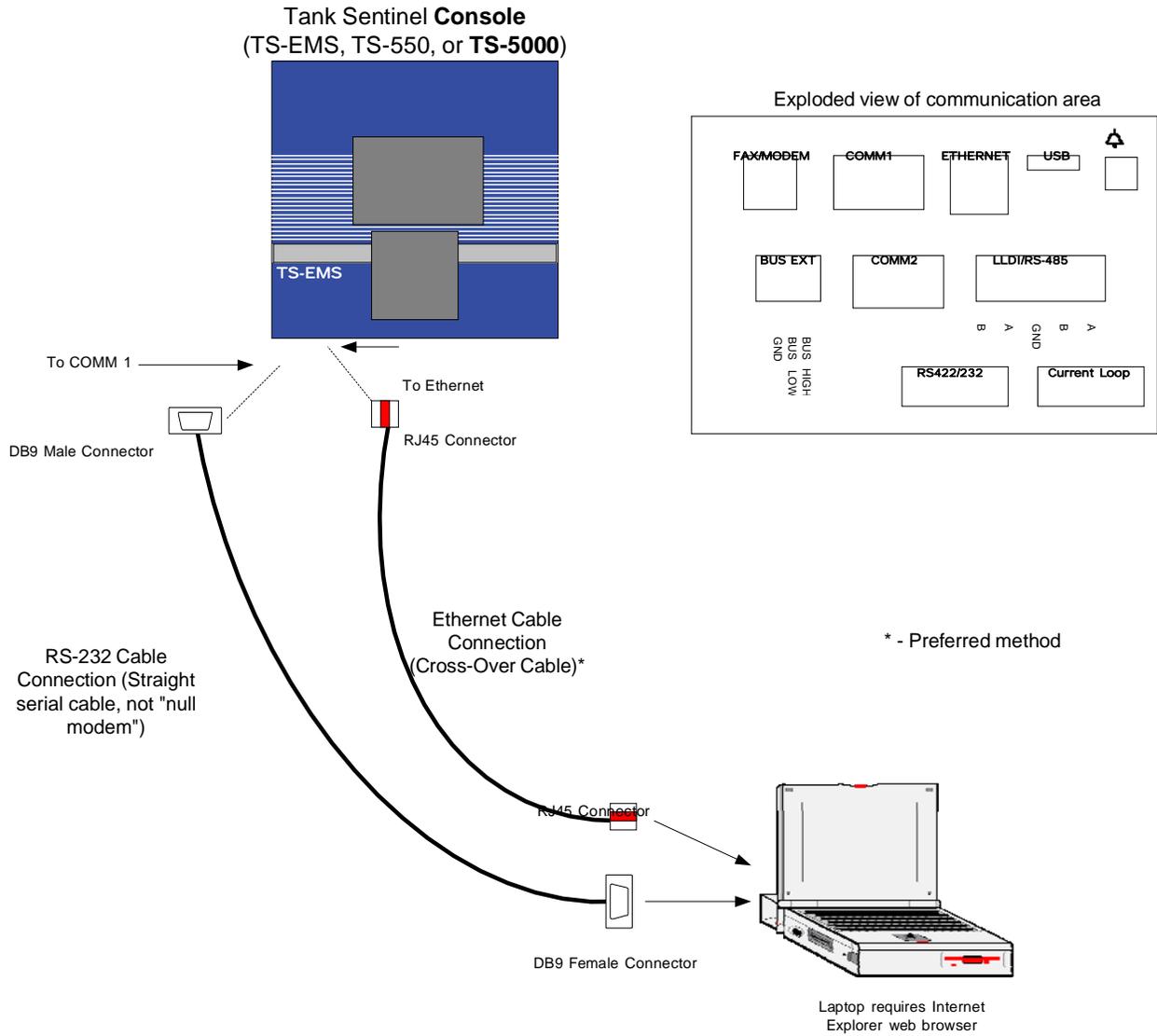
Version number on the LCD:



Version number on the VRM Daily Report or Monthly Report:



**Figure 2B-6**  
**Standard Tank Sentinel Console**



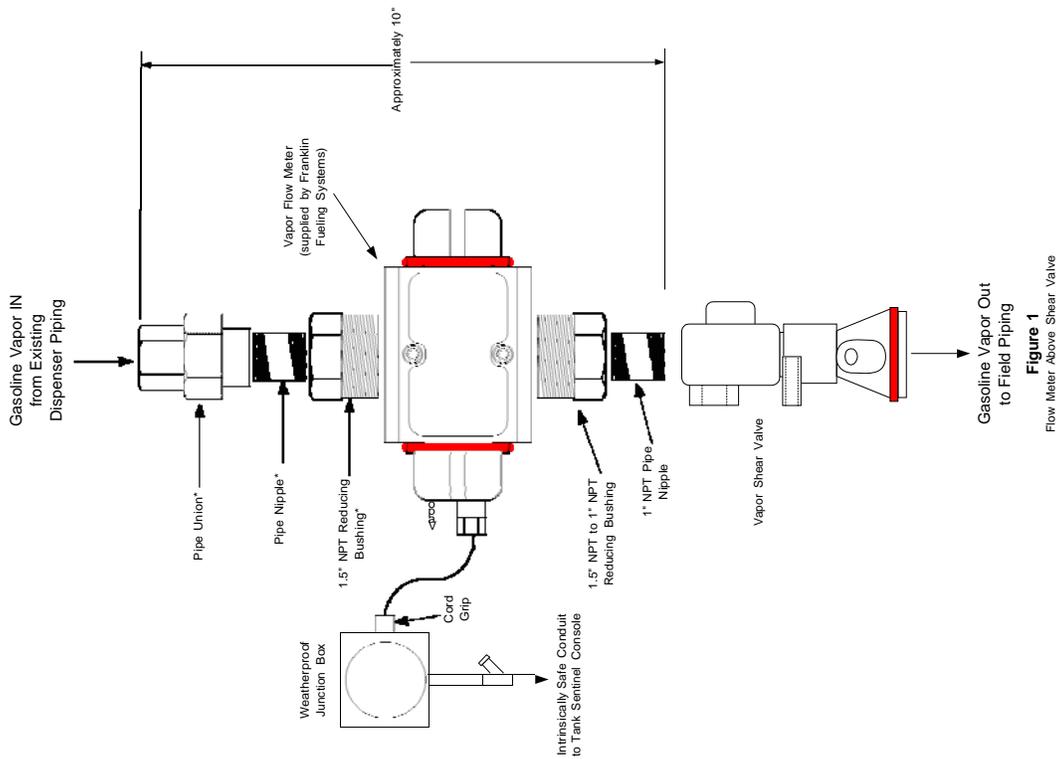
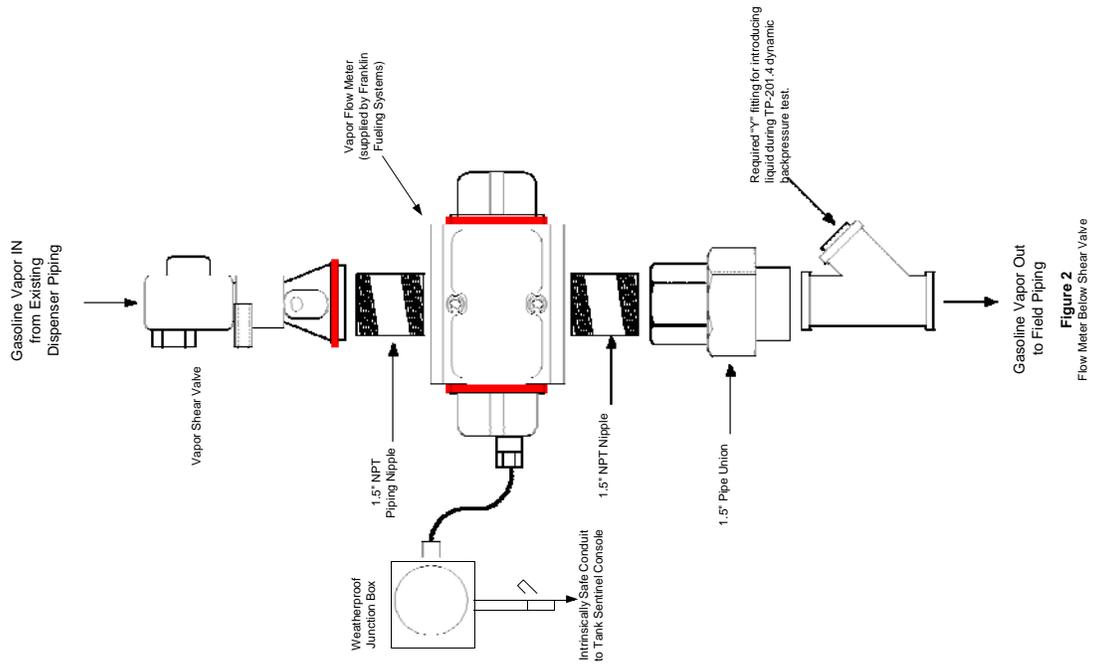
**Figure 2B-7  
INCON TS-VFM  
Vapor Flow Meter**



**Figure 2B-8  
INCON TS-VPS  
Vapor Pressure Sensor**

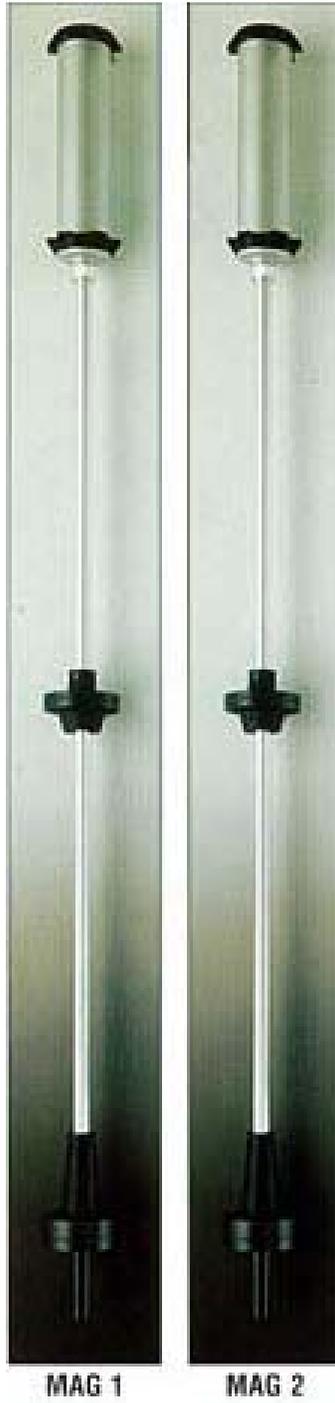


**Figure 2B-9**  
**Typical Installation of the INCON Vapor Flow Meter**





**Figure 2B-11**  
**Tank Inventory Probe Sensor**



**Executive Order VR-208-A**  
**Emco Phase II EVR System with Hirt Thermal Oxidizer Including INCON ISD**

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

**Part I - Emco Manufacturing Performance Standards and Specifications**

The Emco 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 in Nozzles and Hoses           |
| TP-201.2J | - Pressure Drop Bench Testing of Vapor Recovery Components |
- e. The nozzle bellows is manufactured such that the force necessary to compress the nozzle bellows 0.883 inches is 5.95 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 - Pressure Drop Bench Testing of Vapor Recovery Components

## 3. Safe Break Valves

- a. Every safe break valve is tested for continuity and pressure tests in accordance with UL Standard 567.
- b. Every safe break valve is manufactured to the standard that passed all tests conducted during the ARB certification for the following:
  - TP-201.2J - Pressure Drop Bench Testing of Vapor Recovery Components

## Part II - Hirt Manufacturing Performance Standards and Specifications

The Hirt VCS 100 thermal oxidizer 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. HIRT VCS 100 THERMAL OXIDIZER

- a. The VCS 100 processor is subjected to an assembly quality check.
- b. The VCS 100 processor is visually inspected to verify identification, caution/warning, electrical, and other Agency labels are in place.
- c. The VCS 100 processor is subjected to vacuum and pressure leak tests.
- d. The VCS 100 processor is subjected to the following functional tests:
  - i. Power test;
  - ii. Verify set point of vacuum sensor switch;
  - iii. Verify operation of main vapor valve;
  - iv. Verify flow rate of pilot and main vapor valves; and
  - v. Dielectric test.

### **Part III - INCON Vapor Recovery Monitoring (VRM) Manufacturing Performance Standards and Specifications**

The INCON VRM 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. CONSOLE**

- a. Every INCON Console has been designed and manufactured to have an Operating Temperature Range of 32°F to 104°F (0°C to 40°C) and Storage Temperature Range of -4°F to 140°F (-20°C to +60°C).
- b. Every INCON Console system including software, sensors and modules have been designed and is Underwriters Laboratories (UL) approved for operation near potentially hazardous fuel storage tanks.
- c. Every INCON Console system including software, sensors and modules have been designed and tested in accordance with ISO-9001 manufacturing quality standards.

#### **2. VRM SOFTWARE**

- a. Every INCON Console with VRM software is manufactured to the specifications that passed the operational test and is compliant with CP-201 ISD performance standards and specifications.
- b. Every INCON Console with VRM software has been designed, manufactured and tested to continually monitor the connectivity and operability status of all sensors and modules. All Console VRM software has been designed, manufactured and tested to issue a visual, audible as well as printed notification upon failure of the connectivity or operability status of sensors and modules.

#### **3. VAPOR FLOW METER**

- a. Every INCON Vapor Flow Meter is designed, tested and manufactured to interface to the INCON Console. The Vapor Flow Meter has been designed and tested for measuring flow between 1 - 100 GPM in HC concentrations between 0 – 100% saturation across a -40°F to 140°F (-40°C to 60°C) operating range.

#### **4. VAPOR PRESSURE SENSOR**

- a. Every INCON Vapor Pressure Sensor is designed, tested and manufactured to interface to the INCON Console. The Vapor Pressure Sensor has been designed and tested for measuring vapor pressure between -8 to +8 IWC in HC concentrations between 0 – 100% saturation across a -40°F to 140°F (-40°C to 60°C) operating range.

#### **5. TANK INVENTORY PROBE SENSOR**

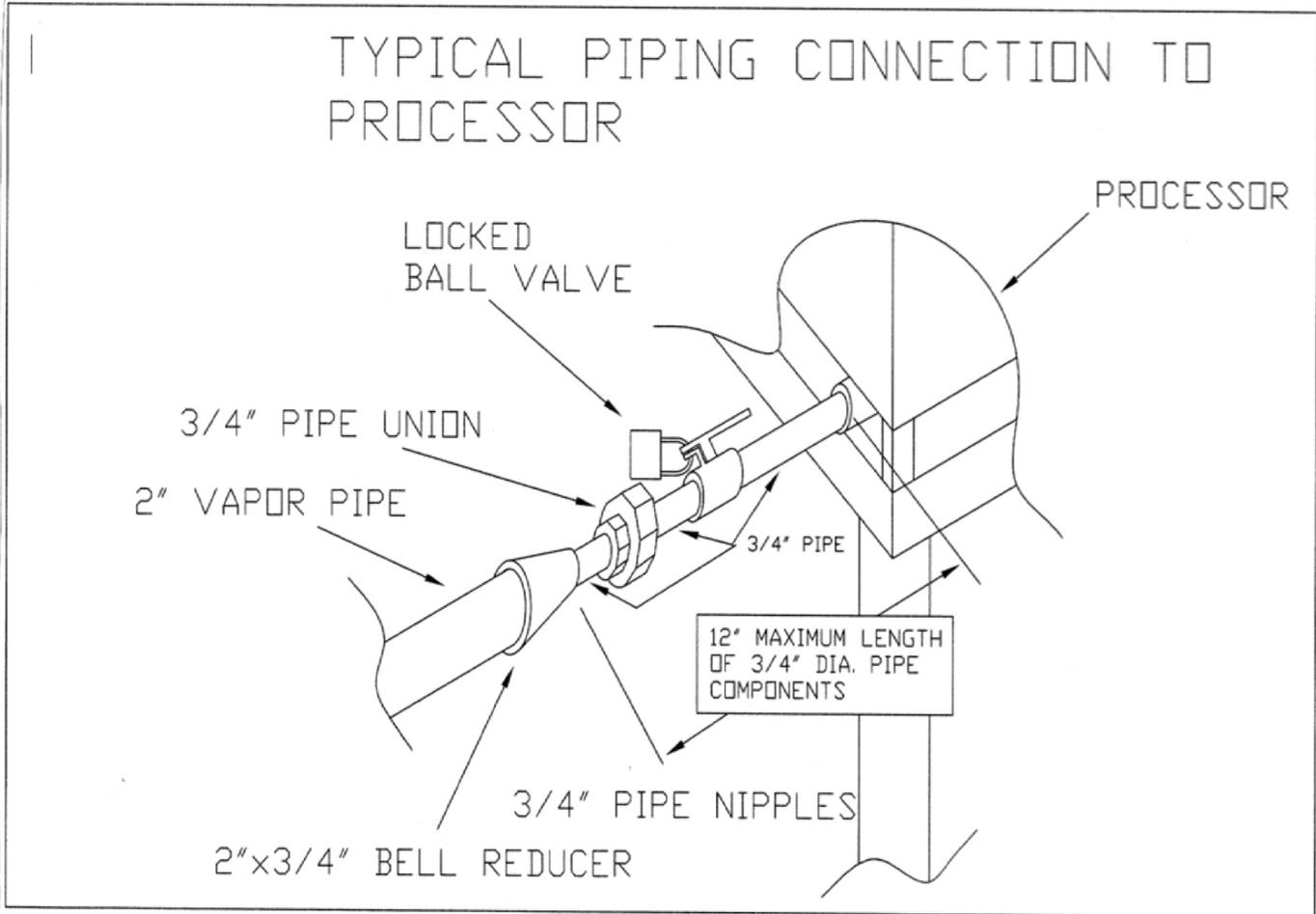
- a. Every INCON Magnetostrictive Probe is designed, tested and manufactured to interface to the INCON Console System. The Magnetostrictive Probe has been designed and tested to have an Operating Temperature Range of -40°F to 140°F (-40°C to 60°C) and Storage Temperature Range of -40°F to 140°F (-40°C to +60°C).

#### **6. CONSOLE MODULES**

- a. Every Console system module has been designed and tested to interface to the INCON Console. The Console system modules have been designed, tested and manufactured to have an Operating Temperature Range of 32°F to 104°F (0°C to 40°C) and Storage Temperature Range of -4°F to 140°F (-20°C to +60°C).



Figure 1  
Configuration of Hirt VCS 100 Thermal Oxidizer to Conduct TP-201.3



**Executive Order VR-208-A**  
**Emco Phase II EVR System with Hirt Thermal Oxidizer Including INCON ISD**

**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-207 and VR-208 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 hose) 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 Emco's nozzle spout plug, P/N 494635EVR 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 seal 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 Emco's spout plug, P/N 494635EVR (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 Emco's spout plug, P/N 494635EVR 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 Emco'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 ( $\pm 0.5$ ) 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.

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

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 Emco's spout plug, P/N 494635EVR 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 Emco'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 Emco'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 ( $\pm 0.5$ ) 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.

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

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

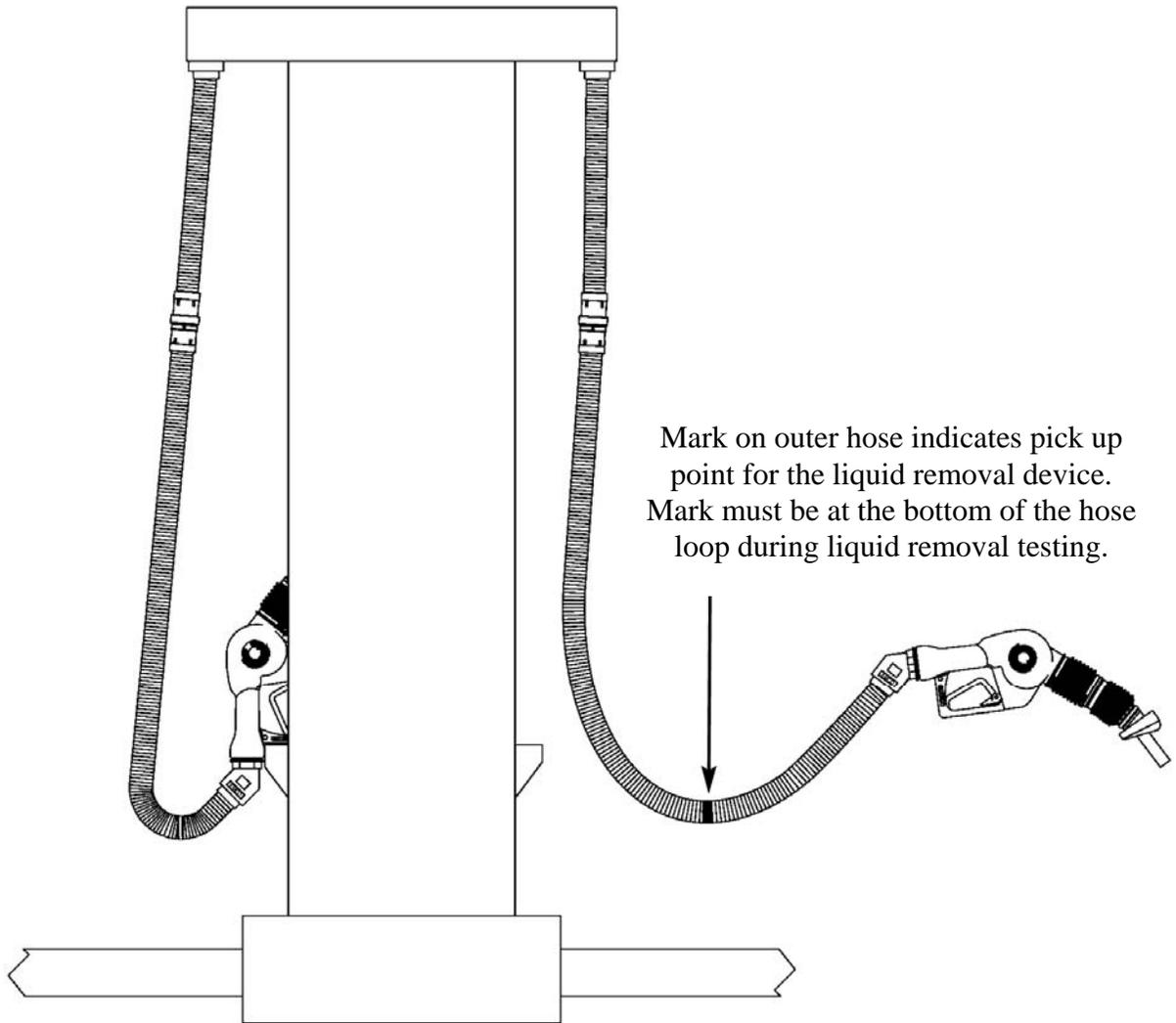
- 10.1. Record all applicable liquid removal rate information on the appropriate form as shown in Form 1 and 2. Districts may require the use of alternate forms provided that the alternate forms include the same parameters as identified in Forms 1 and 2.
- 10.2. If the calculated liquid removal rate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

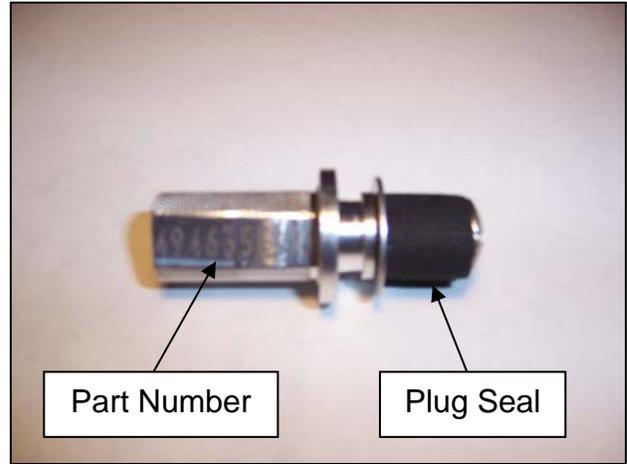
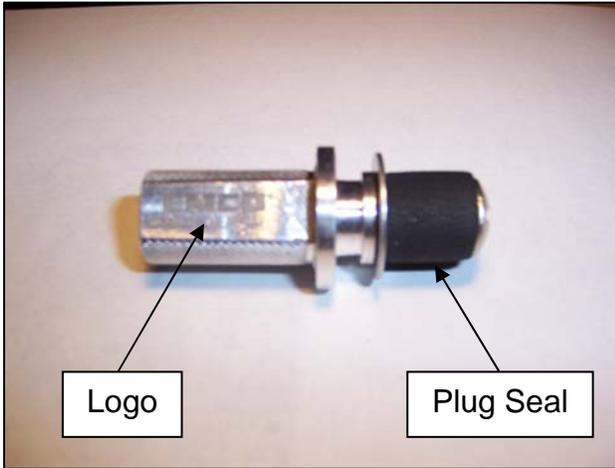
#### **11. ALTERNATIVE TEST PROCEDURES**

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.

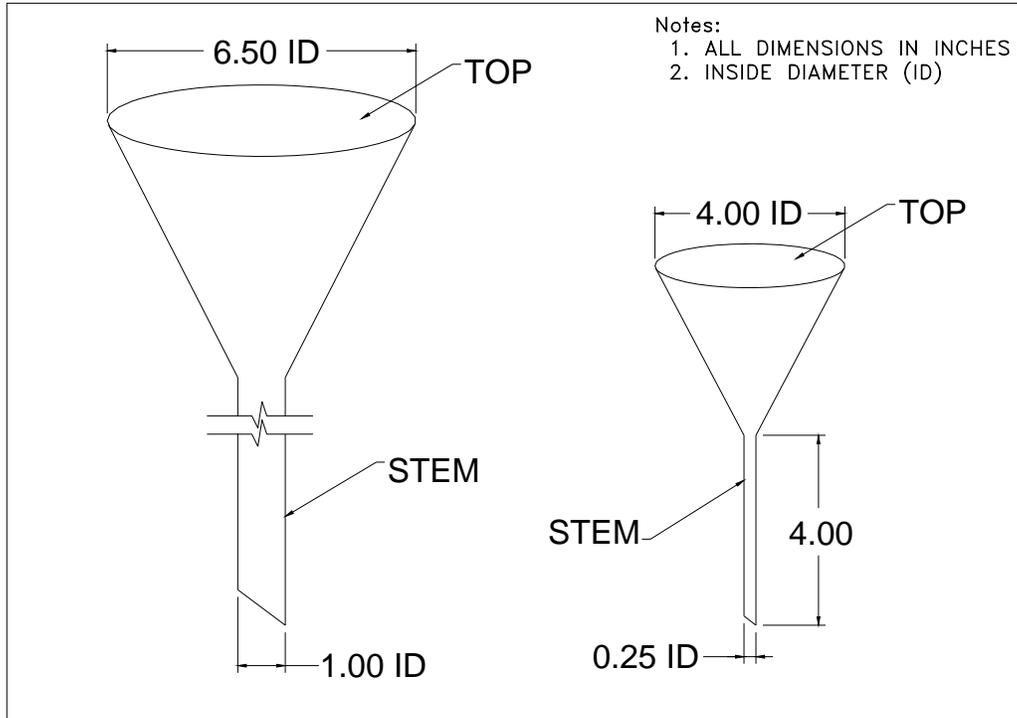
**FIGURE 1**  
**Position of Liquid Removal Device**  
**When Conducting Liquid Removal Testing**



**FIGURE 2**  
**Emco Nozzle Spout Plug P/N 494635EVR**



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









**Executive Order VR-208-A**  
**Emco Phase II EVR System with Hirt Thermal Oxidizer Including INCON ISD**

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

Verification of the integrity of the Emco 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





**Executive Order VR-208-A**  
**Emco Phase II EVR System with Hirt Thermal Oxidizer Including INCON ISD**

**Exhibit 8**  
**Hirt VCS 100 Processor**  
**With Indicator Panel**  
**Operability 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 “ARB Executive Officer” refers to the Executive Officer of the ARB or his or her authorized representative or designate.

**1. PURPOSE AND APPLICABILITY**

This test procedure verifies the operational status of the Hirt VCS 100 Processor and Indicator Panel.

The station may remain open (normal fuel dispensing) while conducting this procedure.

**2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE**

The Hirt VCS 100 Processor is designed to activate (e.g. thermally oxidize vapors) when the underground storage tank (UST) ullage pressure exceeds a nominal -0.40 inches water column (“w.c.”). Processor activation will be verified by exposing the processor’s internal vacuum sensor/switch to an atmospheric pressure input. The processor should activate, the Hirt Indicator Panel Processing lamp should light and the Incon VRM Console warning lamp should light. The Incon VRM Console should also post a VRM alarm.

**3. BIASES AND INTERFERENCES**

- 3.1 This test is only valid when total ullage is 70% or less than capacity of GDF storage tanks.
- 3.2 At least 24 hours must have elapsed after any tests that introduce air and/or nitrogen into the vapor spaces, such as, but not limited to TP-201.3 (including Exhibit 4), TP-201.4 (including Exhibit 6) and Exhibit 5.
- 3.3 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.
- 3.4 Processor should be inactive (i.e. powered but not processing gasoline vapor).

**4. EQUIPMENT**

- 4.1 Hand tools: 5/16” nut driver or equivalent, 3/8” open end wrench.

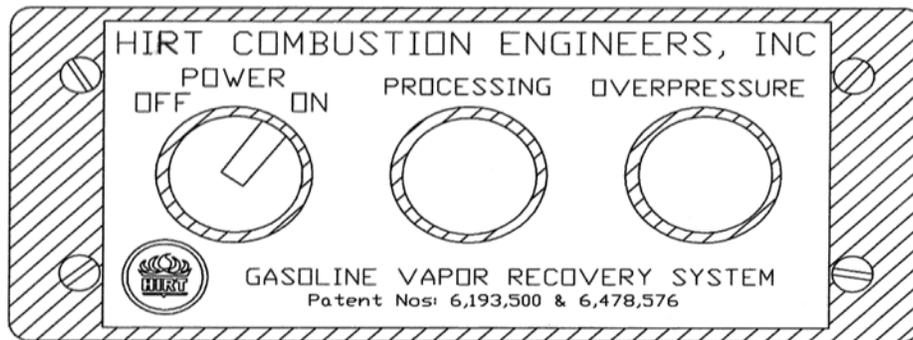
4.2 Stopwatch: Use a stopwatch with an accuracy of  $\pm 0.2$  seconds.

4.3 Teflon pipe tape.

## 5. TEST PROCEDURE

5.1 System Status Check: Locate Hirt Indicator Panel and verify that the green lamp on the POWER switch is lit, to be sure power is ON. Record on Form 1. If the Power switch is not lit, the processor does not meet the Exhibit 2 Hirt VCS 100 Thermal Oxidizer specifications and no testing shall be conducted.

# Indicator Panel Face



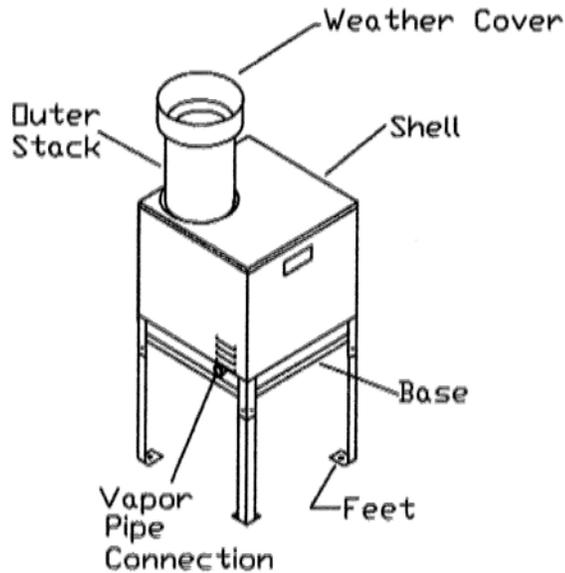
5.2 Check green PROCESSING lamp on Indicator Panel. Is the green PROCESSING lamp on? Record on Form 1. If so, then wait until PROCESSING lamp is extinguished before proceeding to step 5.3, to meet BIAS condition 3.4.

5.3 Forced Processor Operation: Turn POWER to processor OFF at Indicator Panel.

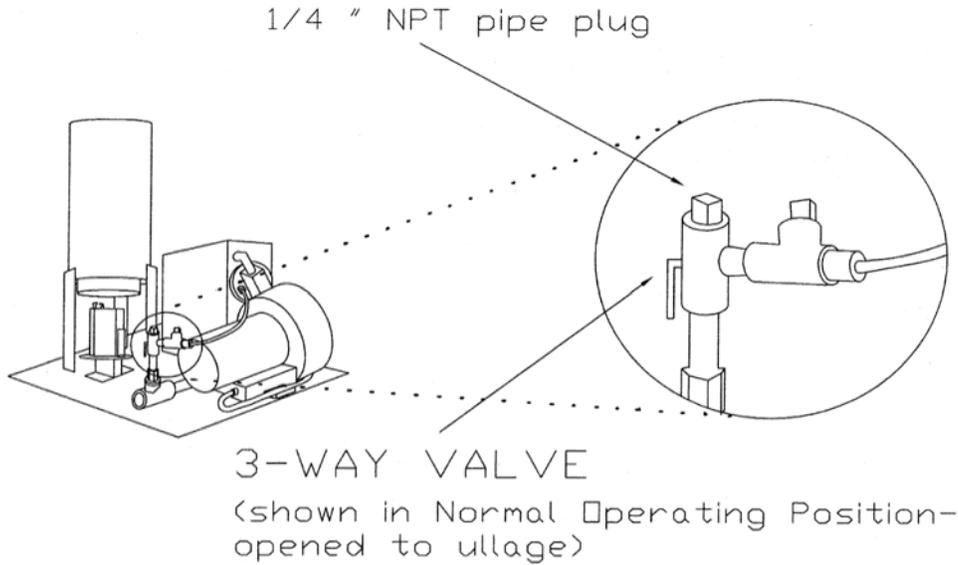
**CAUTION: Processor components, such as Shell, Stack, Burner, and Weather Cover can be Hot! Use care when handling processor or removing its parts.**

5.4. Remove screw from Weather Cover with 5/16" nut driver and remove Weather Cover from Outer Stack.

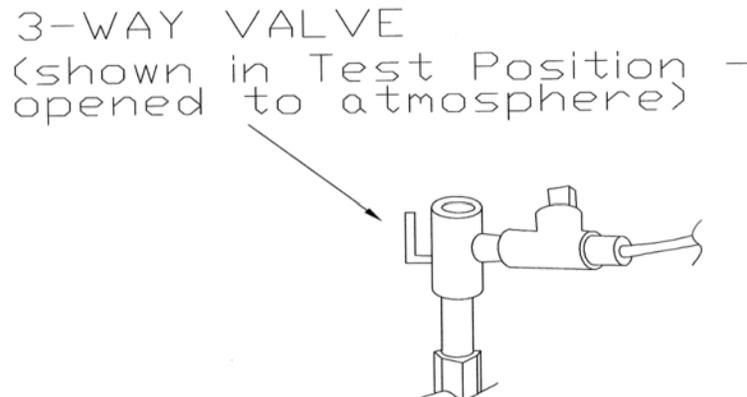
5.5 Remove (4) screws holding Shell to Base with 5/16" nut driver and then remove Shell.



5.6 Locate 3-Way Valve on tubing leading to Vacuum Sensor/Switch. The 3-Way Valve handle should be pointing down, in the Normal Operating Position – Opened to UST Ullage. Remove the 1/4" NPT pipe plug from 3-Way Valve with 3/8" wrench.



5.7 Turn 3-Way Valve handle to the up position.



- 5.8 Turn POWER to processor ON at Indicator Panel, and verify that green lamp on POWER switch is lit. Start the stopwatch.
- 5.9 Verify green PROCESSING lamp on the Indicator Panel lights within 3 minutes. Record on Form 1. If the Processing lamp is on, processor meets the Exhibit 2 Processor specifications. If the Processing lamp is not on within 3 minutes, the processor does not meet the Exhibit 2 Processor specifications and needs technical service.
- 5.10 Verify the OVERPRESSURE lamp on the Indicator Panel lights within sixty two (62) minutes. Record on Form 1. If the OVERPRESSURE lamp is on, processor meets the Exhibit 2 Processor specifications. If the OVERPRESSURE lamp is not on within sixty two (62) minutes, the processor does not meet the Exhibit 2 Processor specifications and needs technical service.
- 5.11 Verify the Warning lamp on the Incon VRM Console is lit. Press the alarm button and print the alarm posting. Record on Form 1 and attach alarm printout.
- 5.12 Turn POWER to processor OFF at the Hirt Indicator Panel.
- 5.13 Turn 3-Way Valve handle back down to Normal Operating Position. Reinstall 1/4" NPT plug (with Teflon pipe tape) and tighten ¼ turn past snug. Reinstall Shell and Weather Cover.
- 5.14 Turn POWER to processor ON at the Hirt Indicator Panel. Testing is completed.

## **6. REPORTING**

Record all results on Form 1. Districts may require the use of an alternate Form, provided it includes the same minimum parameters as identified in Form 1.

**FORM 1: HIRT VCS 100 PROCESSOR OPERABILITY TEST**

**DATE OF TEST:**

|  |  |   |                          |
|--|--|---|--------------------------|
| SERVICE COMPANY NAME   |  | SERVICE COMPANY'S TELEPHONE   |                          |
| SERVICE TECHNICIAN   |  | HIRT TECHNICIAN CERTIFICATION #(as applicable)<br><br>CC or DISTRICT TRAINING CERTIFICATION (as applicable) |                          |
| STATION NAME   |  | DISTRICT PERMIT #   |                          |
| STATION ADDRESS  |  | CITY  | STATE ZIP                |
| Was TP-201.3 (Including Exhibit 4) conducted in the last 24 hours? |  | Yes ____  | No ____                  |
| Was TP-201.4 (Including Exhibit 6) conducted in the last 24 hours? |  | Yes ____  | No ____                  |
| Was Exhibit 5 conducted in the last 24 hours?                      |  | Yes ____  | No ____                  |
| Was there a fuel delivery within the last 3 hours?                 |  | Yes ____  | No ____                  |
| The % ullage of GDF storage tank(s) is _____ gallons.              |  |   |                          |
| <b>STEP 5.1</b>  | <b>Is POWER switch lit?</b>  | YES   | <input type="checkbox"/> |
|  |  | NO  | <input type="checkbox"/> |
| <b>STEP 5.2</b>  | <b>Is PROCESSING lamp ON?</b><br>If "YES", test cannot be performed until lamp goes off.                                       | YES   | <input type="checkbox"/> |
|  |  | NO  | <input type="checkbox"/> |
| <b>STEP 5.9</b>  | <b>Time for PROCESSING Lamp to Light? _____ minutes</b><br><b>Did PROCESSING Lamp light within three (3) minutes?</b>          | YES   | <input type="checkbox"/> |
|  |  | NO  | <input type="checkbox"/> |
| <b>STEP 5.10</b>   | <b>Time for OVERPRESSURE Lamp to Light? _____ minutes</b><br><b>Did OVERPRESSURE Lamp light within sixty two (62) minutes?</b> | YES   | <input type="checkbox"/> |
|  |  | NO  | <input type="checkbox"/> |
| <b>STEP 5.11</b>   | <b>Did Warning Lamp light on Incon VRM Console?</b><br><b>(Attach Active Alarm Printout)</b>                                   | YES   | <input type="checkbox"/> |
|  |  | NO  | <input type="checkbox"/> |

**Executive Order VR-208-A**  
**Emco Phase II EVR System with Hirt Thermal Oxidizer Including INCON ISD**

**Exhibit 9**  
**Warranty**



**WARRANTY POLICY**

Emco Wheaton Retail Corporation service station products are warranted to be free from defects in material and workmanship under normal use and service. Vapor recovery nozzles are warranted for a period of twelve (12) months from date of shipment from Emco Wheaton Retail Corporation or from installation date as specified by the returned warranty card, not to exceed fourteen (14) months from the date of shipment from Emco Wheaton Retail Corporation. This warranty excludes the spout and/or front end components of balance vapor recovery nozzles unless damage is obvious when the nozzle is removed from the shipping carton and the defective nozzle is returned to Emco Wheaton Retail Corporation prior to use and within two (2) months from the date of invoice. Other service station products are warranted for a period of twelve (12) months from the date of manufacture.

Emco Wheaton Retail Corporation shall, at its option, repair or replace that part which proves to be defective. Repaired or replacement nozzles are warranted for the balance of the original warranty period. This warranty is void unless the original purchaser and any subsequent purchaser returns the claimed defective item to Emco Wheaton Retail Corporation for inspection to determine whether the claimed defect is covered by this warranty.

The exclusive and sole remedy under this warranty is repair or replacement of the defective part. Emco is not responsible for claims for damage caused by improper installation or maintenance; corrosive fluids; misuse of the product or use the product for other than its intended purpose; or accident, acts of God, or natural phenomena. Emco will not pay for labor or related expenses, nor shall Emco be liable for any incidental, consequential or exemplary damages. This warranty is void if the Emco Wheaton Retail Corporation product has been previously repaired with parts not approved by Emco Wheaton Retail Corporation, or if a nozzle bears the mark or imprint of a company other than Emco Wheaton Retail Corporation, indicating the nozzle has been rebuilt or repaired by a company other than Emco Wheaton Retail Corporation.

**EMCO WHEATON RETAIL CORPORATION MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, (WHETHER WRITTEN OR ORAL), INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.**

In the event a nozzle is returned to Emco Wheaton Retail Corporation within the warranty period described above, and when tested is found to be functional and without defect, Emco Wheaton Retail Corporation reserves the right to return the nozzle to the customer or apply a Core Credit (see Nozzle Core Return Program), at Emco Wheaton Retail Corporation's discretion.

In the event of failure within the warranty period, call the Customer Service Department at **(800) 234-4394**. Describe the problem and provide the product date stamp information to the customer service representative. In the case of a nozzle, provide the serial number. The customer service representative will provide a product complaint number, if applicable. Ship the defective equipment **PREPAID**, to Emco Wheaton Retail Corporation for repair or replacement.

Emco Wheaton Retail Corporation products should be used in compliance with applicable federal, state and local laws and regulations. Product selection should be based on physical specifications and limitations and compatibility with the environment and material to be handled. All illustrations and specifications are based on the latest product information available at the time of publication. Emco Wheaton Retail Corporation reserves the right to make changes at any time in prices, materials, specifications and models and to discontinue models without notice or obligation.

Emco Wheaton Retail Corporation warrants the workmanship and materials to be free of defects and will comply with the performance standards of California ARB CP-201 for a period of one (1) year from the date of installation or fourteen months from the date of shipment from Emco Wheaton Retail Corporation.

The following warranty card will be shipped with the Emco vapor recovery components:



**Emco Wheaton Retail Corp.**

252-243-0150 • 252-243-4759 (fax) • [www.emcoretail.com](http://www.emcoretail.com)

**IMPORTANT**  
**Product Warranty**  
**Registration Card**

12 month warranty becomes effective at time of installation. If this card is not returned, warranty becomes effective from date of shipment from Emco.

The maximum warranty life is 14 months from date of shipment.

Please call Emco if this product is being used as a replacement. Replacement with a non-Emco product voids any warranty.

|   |
|---|
| Serial Number:  |
| Installation Date:  |
| Installation Site:  |
| City/State/Zip:   |
| Distributor Name:   |
| Product Style:<br><input type="checkbox"/> A4005EVR Nozzle<br><input type="checkbox"/> A4110EVR Hose Swivel<br><input type="checkbox"/> A4119EVR Safe Break Valve |

## **HIRT COMBUSTION ENGINEERS, INC. (HCE) VCS 100 THERMAL OXIDIZER WARRANTY POLICY**

- HCE warrants the workmanship and materials to be free from defects and will comply with the performance standards of California ARB CP-201 for a period of one (1) year from the date of installation or from date of shipment from HCE, if registration card is not returned.
- Liability under any implied or expressed warranty is limited to replacement of the product.
- HCE is not responsible for improperly installed or misuse of the product.
- HCE cannot be held responsible for damage to the product or its equipment due to acts of nature, vandalism, or neglect.
- HCE products are warranted to be free of defects in material and workmanship.
- In the event of a warranty claim, the purchaser must obtain a Return Authorization Number prior to returning product. All shipping costs are the responsibility of the customer.
- HCE shall repair or replace, at its option, any HCE component which proves to be defective.
- The cost of labor for any field repair, removal, replacement, or diagnosis is not covered by this warranty.
- The liability of HCE is limited solely and specifically to this warranty.
- HCE shall not be liable for any special, collateral, or consequential damages arising from this warranty, the use of this equipment or from any order accepted pursuant thereto.
- The use of parts not authorized by HCE voids the warranty.
- Installation, start-up, service, or repairs of this product by personnel not certified by HCE voids the above described warranty.

The following warranty card will be shipped with the Hirt VCS 100 Thermal Oxidizer:

|  |  |  |                |   |                 |   |                    |               |                          |                   |                             |                      |
|--|--|--|----------------|---|-----------------|---|--------------------|---------------|--------------------------|-------------------|-----------------------------|----------------------|
| <p><b><u>IMPORTANT</u></b><br/>PRODUCT WARRANTY<br/>REGISTRATION CARD</p> <p>THE 12 MONTH WARRANTY BECOMES EFFECTIVE AT TIME OF INSTALLATION IF THIS CARD IS RETURNED WITHIN 30 DAYS OF START-UP. IF THIS CARD IS NOT RETURNED, WARRANTY BECOMES EFFECTIVE FROM DATE OF SHIPMENT FROM HIRT COMBUSTION ENGINEERS, INC.</p> <p>THE MAXIMUM WARRANTY LIFE IS 18 MONTHS FROM DATE OF SHIPMENT FROM HIRT COMBUSTION ENGINEERS, INC.</p> <p>PROCESSOR WAS FACTORY TESTED TO AND MET APPLICABLE PERFORMANCE STANDARDS &amp; SPECIFICATIONS TO WHICH IT WAS CERTIFIED: REFERENCE ALL APPLICABLE CARB EXECUTIVE ORDERS, CARB TEST PROCEDURES, AND EXHIBITS.</p> | <p><b>Hirt Combustion Engineers, Inc.</b><br/>Tel: (562) 692-1490<br/>Fax: (562) 692-7413<br/>Email: HirtVCS@aol.com</p> | <table border="1"><tr><td>SERIAL NUMBER:</td></tr><tr><td>VSE <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/></td></tr><tr><td>TURBINE NUMBER:</td></tr><tr><td>VSE <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/></td></tr><tr><td>INSTALLATION DATE:</td></tr><tr><td>SITE ADDRESS:</td></tr><tr><td>CITY / STATE / ZIP CODE:</td></tr><tr><td>DISTRIBUTOR NAME:</td></tr><tr><td>ISD BRAND / MODEL (IF ANY):</td></tr><tr><td>DATE OF MANUFACTURE:</td></tr></table> | SERIAL NUMBER: | VSE <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | TURBINE NUMBER: | VSE <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | INSTALLATION DATE: | SITE ADDRESS: | CITY / STATE / ZIP CODE: | DISTRIBUTOR NAME: | ISD BRAND / MODEL (IF ANY): | DATE OF MANUFACTURE: |
| SERIAL NUMBER:   |  |  |                |   |                 |   |                    |               |                          |                   |                             |                      |
| VSE <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>  |  |  |                |   |                 |   |                    |               |                          |                   |                             |                      |
| TURBINE NUMBER:  |  |  |                |   |                 |   |                    |               |                          |                   |                             |                      |
| VSE <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>  |  |  |                |   |                 |   |                    |               |                          |                   |                             |                      |
| INSTALLATION DATE:   |  |  |                |   |                 |   |                    |               |                          |                   |                             |                      |
| SITE ADDRESS:  |  |  |                |   |                 |   |                    |               |                          |                   |                             |                      |
| CITY / STATE / ZIP CODE:   |  |  |                |   |                 |   |                    |               |                          |                   |                             |                      |
| DISTRIBUTOR NAME:  |  |  |                |   |                 |   |                    |               |                          |                   |                             |                      |
| ISD BRAND / MODEL (IF ANY):  |  |  |                |   |                 |   |                    |               |                          |                   |                             |                      |
| DATE OF MANUFACTURE:   |  |  |                |   |                 |   |                    |               |                          |                   |                             |                      |

**Maxxim Premier™ Plus Hose Warranty  
California EVR**

Veyance Technologies, Inc., the manufacturer of Goodyear Engineered Products guarantees each assembly of Maxxim Premier™ Plus hose to be free from defects in material and workmanship for a period of the earlier to occur of (i) one (1) year from the date of installation or (ii) a maximum of fourteen months from the date of shipment from Veyance Technologies, Inc. to the initial purchaser. No claims under Veyance’s warranty will be allowed unless they have been first submitted to Veyance for review. When in Veyance’s judgment a defect in material or workmanship has occurred, Veyance’s liability is limited to only replacement of the hose assembly.

This warranty applies to the initial purchaser and any subsequent purchaser only and liability with respect thereto is limited to replacement of the original hose assembly. It does not extend to any Maxxim Premier™ Plus hose which has been subject to misuse, neglect, accident, puncturing, cutting or caused by poorly maintained or malfunctioning retractors, pumps, and nozzles or improper installations.

This warranty is in lieu of all warranties expressed or implied including the warranty of merchantability and fitness for a particular purpose. No representative or person is authorized to assume any other liability in connection with the sales of Maxxim Premier™ Plus hose.

Veyance Technologies, Inc., the manufacturer of Goodyear Engineered Products warrants the workmanship and materials of the Maxxim Premier™ Plus to be free of defects and will comply with the performance standards of California ARB CP-201 for a period of the earlier to occur of (i) one (1) year from the date of installation or (ii) a maximum of fourteen months from the date of shipment from Veyance Technologies, Inc.



**Veyance Technologies, Inc.**

2701 Omaha Ave. \* Norfolk, NE 68701  
402.644.2600

**IMPORTANT**

Product Warranty  
Registration Card

Warranty is effective until the earlier to occur: (i) 12 months from date of installation or (ii) 14 months from the date of shipment by Veyance Technologies, Inc.

Please call Veyance Technologies, Inc if this product is being used as a replacement. Replacement with a non-Veyance Technologies, Inc product voids any warranty.

|                                 |
|---------------------------------|
| Serial Number:                  |
| Installation Date:              |
| Installation Site:              |
| City/State/Zip:                 |
| Distributor Name:               |
| Product:<br>Maxxim Premier Plus |

### **FFS/INCON ISD System Warranty Policy**

We warrant that this product shall be free from defects in material and workmanship for a period of one (1) year from the date of installation or twenty-four (24) months from the date of invoice, whichever occurs first. During the warranty period, we or our representative will repair or replace the product, if determined by us to be defective, at the location where the product is in use and at no charge to the purchaser and any subsequent purchaser within the warranty period. Fuses are not covered under warranty.

We shall not be responsible for any expenses incurred by the user.

This warranty applies only when the product is installed in accordance with FFS / In- con's specifications, and a Warranty Registration Form has been filed with FFS / Incon by an authorized FFS / Incon Distributor. This warranty will not apply to any product which has been subjected to misuse, negligence, accidents, systems that are misapplied or are not installed per Incon specifications, modified or repaired by unauthorized persons, or damage related to acts of God.

### **ISD Components (Vapor Flow Sensor, Vapor Pressure Sensor, Data Transfer Unit & Software)**

We warrant that these components shall be free from defects in material and workman- ship and will comply with the performance standards of the California ARB CP-201 for a period of one (1) year from the date of installation or twenty-four (24) months from the date of invoice, whichever occurs first. We will repair or replace the product which has not been subjected to misuse, negligence, accidents, systems that are misapplied or are not installed per the **ARB Approved Installation, Operation and Maintenance Manual**, modified or repaired by unauthorized persons, or damage related to acts of God if the product is returned to us transportation prepaid by the user, within the warranty period. We shall not be responsible for any expenses incurred by the user.

**Executive Order VR-208-A**  
**EMCO Phase II EVR System with Hirt Thermal Oxidizer Including INCON ISD**

**Exhibit 10**  
**INCON ISD System Vapor Flow Meter Operability 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 verify the setup and operation of the INCON ISD System Vapor Flow Meter certified for use with the EMCO Balance Phase II EVR System installed at gasoline dispensing facilities (GDF). This procedure is applicable to ARB Executive Order (EO) VR-208-A.

**2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE**

- 2.1 A tight fitting Balance Nozzle Adapter is placed on the spout of the dispensing nozzle. The adapter, which allows the introduction of nitrogen into the nozzle vapor collection path, is connected to the outlet side of a reference volume gas meter. The inlet side of the reference volume gas meter is connected to a flow meter (rotometer) that is attached to a high pressure nitrogen cylinder and a pressure regulator. See Figure 2. Nitrogen is introduced through both the reference volume gas meter and the INCON ISD System Vapor Flow Meter. Nitrogen flow volumes from both meters are then compared with each other to determine the accuracy of the INCON ISD System Vapor Flow Meter. This process is repeated for the remaining INCON ISD System Vapor Flow Meter equipped dispensers at the GDF.
- 2.2 The test is conducted with the pressure/vacuum (P/V) vent valve(s) installed on the storage tank vent pipes, the Hirt VCS-100 processor turned off, the product emergency shut-off valve (product sheer valve) of the dispenser in the closed position, and the Phase I vapor poppet opened to atmosphere.
- 2.3 The test procedure requires no modifications to the GDF being evaluated.
- 2.4 The fueling point on the opposite side of the fueling point being tested must be blocked off so that dispensing is not allowed.

### **3. BIASES AND INTERFERENCES**

- 3.1** Nozzle spouts that are damaged such that the Balance Nozzle Adapter cannot fit over the nozzle spout preclude the use of this test.
- 3.2** Phase I vapor poppet must be opened to allow the ullage pressure to equalize with atmosphere pressure. Failure to do so may bias the results toward noncompliance.
- 3.3** Drain or remove any liquid gasoline that may be in the nozzle and the vapor return path of the hose. Failure to drain this gasoline liquid will bias the test toward noncompliance.
- 3.4** The O-ring in the Balance Nozzle Adapter and the face seal (boot face) of the nozzle that is not properly lubricated may bias the results toward noncompliance.
- 3.5** Failure to turn off the Hirt VCS-100 processor will bias this test toward noncompliance.
- 3.6** The nominal inside diameter of the flexible hose and fittings not between 0.75 and 1.00 inches will bias the test toward noncompliance.

### **4. SENSITIVITY, RANGE, AND ACCURACY**

- 4.1** The maximum rated capacity of the reference gas volume meter shall be at least 800 CFH and not greater than 3000 CFH.
- 4.2** The minimum rated capacity of the reference gas volume meter shall be 25 CFH.
- 4.3** The minimum readability of the reference gas volume meter shall be 0.01 cubic feet.
- 4.4** Accuracy of the reference gas volume meter, determined during calibration, will be  $\pm 5$  percent of the meter reading.

## 5. EQUIPMENT

- 5.1 Nitrogen High Pressure Cylinder with Pressure Regulator.** Use a high pressure nitrogen cylinder capable of maintaining a pressure of at least 2000 pounds per square inch gauge (psig) and equipped with a compatible two-stage pressure regulator and a one psig relief valve. A ground strap is recommended during introduction of nitrogen into the system.
- 5.2 Flow meter.** Use a flow meter (rotameter) capable of accurately measuring nitrogen flow rate of 60 cubic feet per hour (cfh).
- 5.3 Pressure Measuring Device.** An electronic pressure measuring device with a full range that shall not exceed 0-10 inches of water column (WC) with a minimum accuracy of 0.5 percent of full-scale. A 0-20 inches WC device may be used provided the minimum accuracy is 0.25 percent of full-scale.
- 5.4 Squeeze Bulb.** A rubberized or equivalent device used to increase pressure to 5.00" WC.
- 5.5 Balance Nozzle Adapter.** Only the EMCO Wheaton Retail Balance Nozzle Adapter Part Number **494761EVR** can be used to conduct this operability test. Figure 1 shows the EMCO Wheaton Retail Balance Nozzle Adapter.
- 5.6 Surrogate Spout.** Only the EMCO Wheaton Retail Surrogate Spout Assembly Part Number **494771EVR** can be used to conduct the pre-test leak check. Figure 1 shows the EMCO Wheaton Retail Surrogate Spout Assembly.
- 5.7 Adapter Supply Hose.** The nominal inside diameter of the flexible hose and fittings shall be between 0.75 and 1.00 inches, and the maximum length of the tubing shall be 6 feet.
- 5.8 Ball Valve.** The nominal inside diameter of the ball valve shall be between 0.25 inch and 1.00 inch.
- 5.9 Nitrogen Supply Line.** The nominal inside diameter of the flexible tubing and fittings shall be between 0.25" and 0.375" and the maximum length of the tubing shall be 20 feet.

**5.10 Reference Gas Volume Meter.** Use a Dresser Measurement Roots Meter®, or equivalent (preferably fitted with a digital readout), to measure the volumetric flow rate through the Balance Nozzle Adapter. The reference gas volume meter shall be calibrated within 180 days prior to conducting this procedure. The maximum allowable pressure drop(s) determined by the manufacture across the meter shall be:

For a meter with a maximum rated capacity of 1000 CFH through 3,000 CFH:  
1.10 inches H<sub>2</sub>O at a flowrate of 3,000 CFH  
0.05 inches H<sub>2</sub>O at a flowrate of 30 CFH

For a meter with a maximum rated capacity of 800 to 1,000 CFH:  
0.70 inches H<sub>2</sub>O at a flowrate of 800 CFH  
0.04 inches H<sub>2</sub>O at a flowrate of 16 CFH

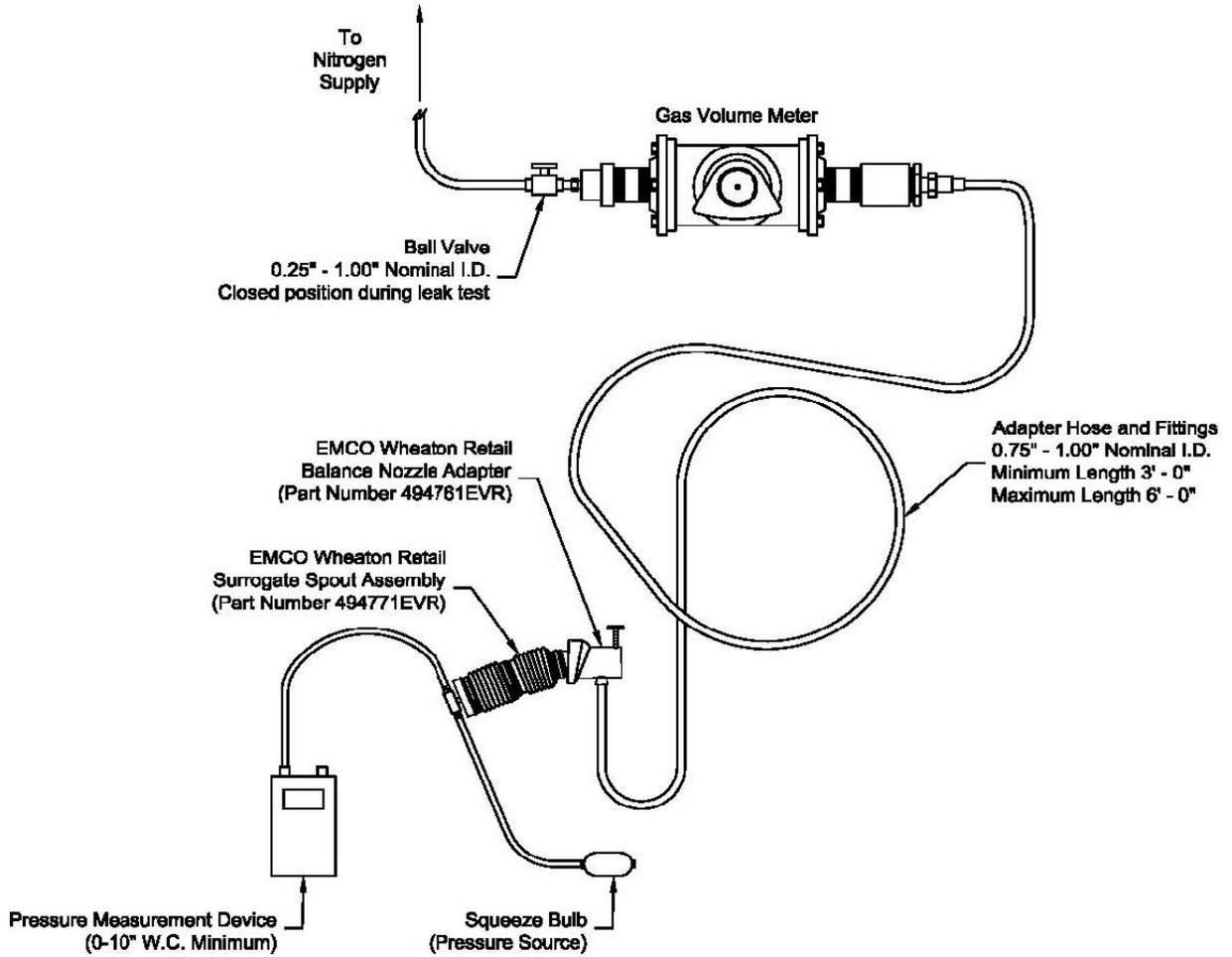
**5.11 Stopwatch.** Use a stopwatch accurate to within 0.2 seconds.

**5.12 Lubricant.** Appropriate lubricant, either grease or spray lubricant, shall be used to ensure a tight seal on the interface of the nozzle and the Balance Nozzle Adapter.

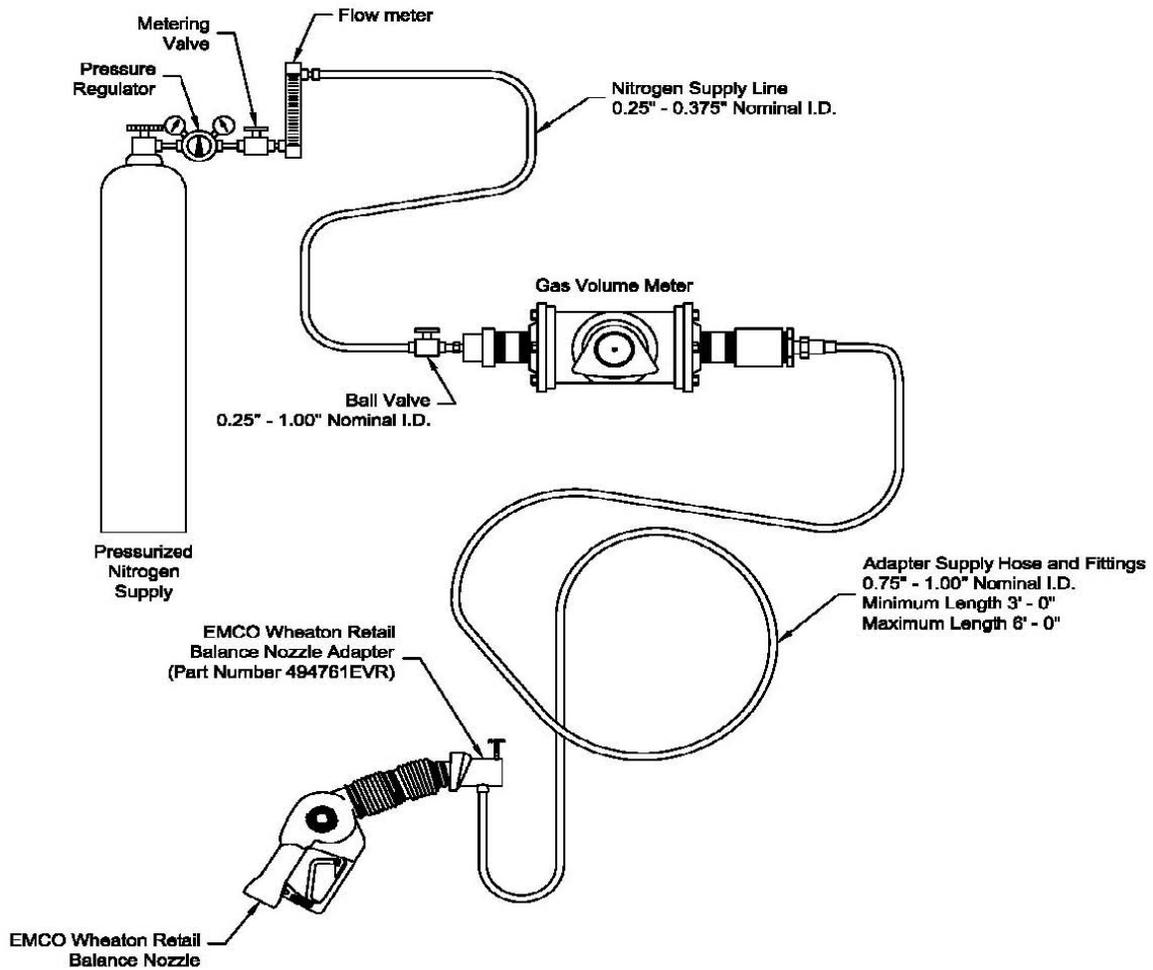
**5.13 Leak Detection Solution.** Any liquid solution designed to detect gaseous leaks may be used to verify the pressure integrity of test equipment during this test.

**5.14 Lap Top Computer.** With INCON software TSA Upgrade Tool Application File installed on the lap top computer. This tool is available at Franklin Fueling Systems web site under Service Tab, then click New Software Downloads. This is the web page for new software downloads:  
<http://www.franklinfueling.com/sw/TS-5/index.aspx>

**Figure 1**  
EMCO Wheaton Retail Surrogate Spout Assembly



**Figure 2**  
INCON ISD System Vapor Flow Meter Test Assembly



## 6. PRE-TEST PROCEDURES

- 6.1 Disabling power to the Hirt VCS-100 vapor processor. Locate the Hirt VCS-100 indicator panel and **disable** power by turning the ON/ OFF switch to the **OFF** position. Disabling the power to the processor will trigger a vapor processor warning alarm indicated by a yellow light on the INON ISD console. The testing contractor must document this event in the GDF's maintenance records kept on site.
- 6.2 Opening the Phase I vapor poppet to atmosphere. Locate the Phase I EVR vapor poppet on the 87 grade tank and remove the dust cap. **Open** the vapor poppet to atmosphere by using a modified dust cap.
- 6.3 Closing the product emergency shut-off valve (product sheer valve) to disable dispensing. Remove the dispenser covers and locate the emergency shut-off valve for the 87 grade gasoline. Locate the hex bolt and linkage arm on the side of the emergency shut-off valve. Use index finger to pull the linkage arm away until it clears the latch and the poppet snaps **closed**. Verify that the **poppet** is closed by attempting to dispense fuel in to a gasoline approved container.

**Note: The test requires that the nozzle handle be squeezed and liquid product must not flow from the dispenser.**

- 6.4 Verify leak integrity of test assembly. Conduct a pre-test leak check of the Balance Nozzle Adapter, the reference gas volume meter, and the adapter supply hose by connecting the Balance Nozzle Adapter to a surrogate spout as shown in Figure 1. Turn the ball valve in Figure 1 to the closed position. Raise the test assembly pressure to 5.00"  $\pm$ 0.50" WC using a squeeze bulb. There shall not be a pressure drop of more than 1.00" WC from the above starting pressure for 30 seconds from the start of the test. If the leak test passes, proceed with the testing. If the leak test fails, proceed to isolate the source of the leak by pressurizing the test equipment again. Apply liquid leak detector solution on interfaces and other potential leak sources and watch for the formation of bubbles. Once leak(s) are repaired, repeat the leak test procedure.

**Note: Leak checks shall be conducted in a shaded area or away from direct sunlight. Leak checks may be conducted during the testing to ensure leak integrity of test equipment**

- 6.5 Assemble the equipment as shown in Figure 2: INCON ISD System Vapor Flow Meter Test Assembly. Leave the Balanced Nozzle Adapter off of the nozzle at this time. Do not enable the dispenser to dispense product. Remove nozzle and utilize any method to keep the nozzle hook in the off position.
- 6.6 Ensure that the ground strap is properly connected to an acceptable ground.

## 7. TEST PROCEDURES

- 7.1 Prevent dispensing from all other fueling positions that share the same INCON ISD System Vapor Flow Meter being tested.
- 7.2 Record the INCON ISD System Vapor Flow Meter serial number and fueling position being tested on a field data sheet. An example of a typical field data sheet is provided at the end of this exhibit.
- 7.3 Completely drain any gasoline that may be in the nozzle and hose vapor return path by any acceptable method.
- 7.4 Turn the ball valve to the open position and adjust the nitrogen flow using the rotometer to 60 cfh +/- 5.0 cfh.
- 7.5 Once the nitrogen flow is set, turn the ball valve to the closed position to stop the flow of nitrogen through the gas volume meter. This will ensure the nitrogen flow rate is set and the nitrogen can instantaneously be activated when the ball valve is turned to the open position.
- 7.6 Install the Balance Nozzle Adapter on the appropriate nozzle as shown in Figure 2. Apply appropriate amount of lubricant to the O-rings located inside the Balance Nozzle Adapter. Lubricant can also be applied to the nozzle spout and the face seal or boot face (rubber boot) of the nozzle and the back of the Balance Nozzle Adapter if necessary.
- 7.7 Authorize the fueling point you are testing at the point of sale (POS) and select a fuel grade at the dispenser. Record the initial reference gas volume meter reading on the field data sheet. An example field data sheet is provided at the end of this exhibit.

**Note: Only one fueling point and grade per dispenser needs to be tested.**

- 7.8 Simultaneously squeeze the nozzle handle to the full dispensing position and turn the ball valve to the open position to allow nitrogen to flow.

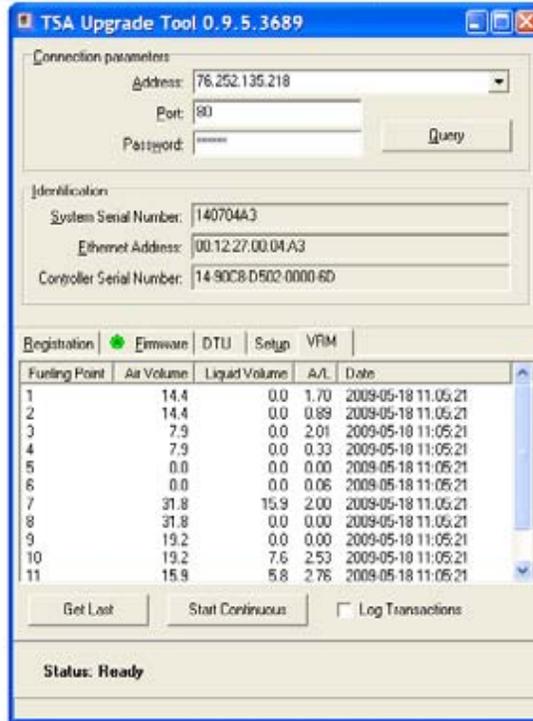
**Note: If the nozzle handle is not engaging the vapor/product valves will not open within the nozzle, turn off the nitrogen flow using the ball valve; remove the Balance Nozzle Adapter from the nozzle to release the nitrogen pressure build up and repeat sections 7.8 and 7.9. Excess pressure build up in the nozzle will engage the secondary shut-off diaphragm and not allow the vapor/product valves within the nozzle to open.**

- 7.9** Simulate dispensing fuel for approximately 1 - 2 minutes. Simultaneously stop the flow of nitrogen by turning the ball valve to the closed position and also releasing the nozzle handle. Immediately (use any means to turn the hook signal off) hang up the nozzle in the dispenser (dispenser lever in the close position) to end the transaction at the POS.

**Note: Final volume values may be biased if the ball valve and the nozzle handle are not activated at the same time. If the ball valve is open before the nozzle vapor valve leakage will occur around the nozzle boot. If this happens you must Re-run the test.**

- 7.10** Record the end meter reading from the reference gas volume meter. Calculate the total cubic feet value by subtracting the initial meter reading obtained in section 7.7 from the final meter reading in this section.
- 7.11** Convert the total cubic feet value to gallons using the equation on the field data sheet or section 9.1 of this procedure. Record the final vapor gallon value on the field data sheet.
- 7.12** Wait two minutes after the fueling transaction has ended with the dispenser lever in the close position.
- 7.13** To obtain the fueling transaction from the INCON ISD System, connect a Lap Top computer or equivalent to the INCON ISD System console using a Cat 5 crossover cable. Open TSA Upgrade Tool Application file "TSA UpgradeTool.exe." Type in the INCON IP address from the console and Query the ISD. Click on Tab "VRM"; Click on "Get Last". The last transactions for all of the fueling points will be displayed. See Figure 3 below.

**Figure 3  
TSA Upgrade Tool**



Note: The same air volume for the two Fueling Points on the same Dispenser will be shown. This is because there is only one INCON ISD System Vapor Flow Meter installed at each dispenser. The product column will display “0.0”. See examples below.

| FP | Air | Product Gallons | A/L  | Date & Time         |
|----|-----|-----------------|------|---------------------|
| 11 | 6.5 | 0.0             | 0.01 | 2009-04-07 11:16:07 |
| 12 | 6.5 | 0.0             | 0.00 | 2009-04-07 11:16:07 |
| 11 | 8.5 | 0.0             | 0.01 | 2009-04-07 11:20:46 |
| 12 | 8.5 | 0.0             | 0.00 | 2009-04-07 11:20:46 |
| 11 | 6.3 | 0.0             | 0.01 | 2009-04-07 11:24:08 |
| 12 | 6.3 | 0.0             | 0.00 | 2009-04-07 11:24:08 |
| 11 | 8.3 | 0.0             | 0.01 | 2009-04-07 11:26:15 |
| 12 | 8.3 | 0.0             | 0.00 | 2009-04-07 11:26:15 |
| 11 | 4.2 | 0.0             | 0.01 | 2009-04-07 11:28:07 |
| 12 | 4.2 | 0.0             | 0.00 | 2009-04-07 11:28:07 |
| 11 | 7.2 | 0.0             | 0.01 | 2009-04-07 11:29:56 |
| 12 | 7.2 | 0.0             | 0.00 | 2009-04-07 11:29:56 |
| 11 | 4.5 | 0.0             | 0.01 | 2009-04-07 11:31:38 |
| 12 | 4.5 | 0.0             | 0.00 | 2009-04-07 11:31:38 |

- 7.14** Record the Fueling Point you are testing and write the corresponding air volume in gallons on the field data sheet. Note: The air volume is displayed in gallons.
- 7.15** Calculate the percent difference between the final vapor gallons reading from the reference gas volume meter and the final INCON ISD System Vapor Flow Meter reading shown on the field data sheet using the calculations shown in Section 9 below.

**Pass:** If the volume percent difference between the recorded INCON ISD System Vapor Flow Meter and the reference gas volume meter is within 15%, check “Pass” on the field data sheet, and repeat the Test Procedures for the remaining INCON ISD System Vapor Flow Meter equipped dispensers at the GDF.

**Fail:** If the volume percent difference between recorded INCON ISD System Vapor Flow Meter and the reference gas volume meter is not within 15%, then proceed to section 7.16.

- 7.16** Conduct the leak test in section 6.4 to evaluate the test equipment. If the equipment leak test passes proceed to section 7.17. If the test fails, repair the leak and go back to section 7.7.
- 7.17** Perform this test two more times and average the three readings together. If the vapor volume percent difference between the three recorded INCON ISD System Vapor Flow Meter and the three reference gas volume meter is within 15%, check “Pass” on the field data sheet.
- 7.18** If the operability test fails, check the fueling point and make sure the reading from the dispenser is correct. Be sure that the fueling point opposite the nozzle is hung up (i.e. hook lever closed during the test). Each test run must start and end at the same POS. Only perform one transaction at a time and complete this transaction before starting another transaction.

## 8. POST-TEST PROCEDURES

- 8.1 Remove the Balance Nozzle Adapter and all equipment from the nozzle assembly.
- 8.2 Opening the product emergency shut-off valve (product sheer valve) to enable dispensing. Locate the emergency shut-off valve for the 87 grade gasoline. Use a hand wrench to turn the hex bolt located on the side of the emergency shut-off valve upward until the latch clears the linkage arm. Slowly release the hex bolt downward until the latch catches on the linkage arm and the poppet snaps **open**. Verify that the poppet is **open** by attempting to dispense fuel in to a gasoline approved container. Reinstall dispenser covers.
- 8.3 A post-leak test of the equipment is not required if all the Vapor Flow Meter's are within range. For the Vapor Flow Meter's that are not within range, sections 7.16 – 7.17 must be conducted. The leak test in section 6.4 will be conducted to further evaluate the test equipment.
- 8.4 Closing the Phase I EVR vapor poppet. Locate the Phase I vapor poppet on the 87 grade tank. Close the vapor poppet by removing the modified dust cap. Reinstall the original dust cap.
- 8.5 Enable power to the Hirt VCS-100 vapor processor. Locate the Hirt VCS-100 indicator panel and **enable** power by turning the ON/ OFF switch to the **ON** position.

## 9. CALCULATING RESULTS

9.1 The conversion of the cubic feet reading from the reference volume gas meter to gallons shall be calculated as shown in Equation 9-1.

$$\text{Gallons} = \text{Cubic Feet} \times 7.481 \quad \text{[Equation 9-1]}$$

Where:

|            |   |   |
|------------|---|---|
| Gallons    | = | Nitrogen volume from the reference meter in gallons                     |
| Cubic Feet | = | Cubic feet nitrogen volume reading from reference gas volume meter      |
| 7.481      | = | Conversion factor from gallons to cubic feet, or gallons per cubic foot |

9.2 The percent difference between the reference gas volume meter and the INCON Vapor Flow Meter shall be calculated as shown in Equation 9-2.

$$\%Diff = \frac{ISDtotalGal - GasFlowMeterDiffGal}{GasFlowMeterDiffGal} \times 100 \quad \text{[Equation 9.2]}$$

Where:

|                            |   |   |
|----------------------------|---|---|
| <i>%Diff</i>               | = | Percent difference between reference gas volume meter and INCON ISD System Vapor Flow Meter                           |
| <i>ISDtotalGal</i>         | = | Total gallons of flow from the INCON ISD System Vapor Flow Meter reported as "Air" from the TSA Upgrade Tool Software |
| <i>GasFlowMeterDiffGal</i> | = | The difference between the initial meter reading and the final meter reading from the reference gas volume meter.*    |
| 100                        | = | Conversion factor, percentage   |

\* Note: Most readings from reference gas volume meters are in cubic feet and must be converted to gallons as shown in Equation 9.1

## **10. REPORTING RESULTS**

- 10.1** Document test data and other information as required in the INCON ISD Operability Test Form at the end of this document. Districts may require the use of alternate forms, provided they include the same minimum parameters as identified in the INCON ISD Operability Test Form.

## **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 the Certification Procedure CP-201.

**VR-208-A: Exhibit 10  
INCON ISD System Vapor Flow Meter Operability Test  
Field Data Sheet**

|                      |      |                             |
|----------------------|------|-----------------------------|
|                      |      | Date of Test                |
| Service Company Name |      | Service Company's Telephone |
| Service Technician   |      | INCON Tech Certification #  |
| Station Name         |      | District Permit #           |
| Station Address      | City | State & Zip                 |

| INCON ISD System Vapor Flow Meter |             |                        | Reference Volume Gas Meter |                   |                                      |  |                     |      |      |
|-----------------------------------|-------------|------------------------|----------------------------|-------------------|--------------------------------------|--|---------------------|------|------|
| Vapor Flow Meter S/N              | Fueling POS | Vapor Volume (gallons) | Start (cubic feet)         | Stop (cubic feet) | Difference Cubic feet (Stop – Start) | Convert Cubic Feet To Gallons <sup>1</sup> | % Diff <sup>2</sup> | Pass | Fail |
|                                   |             |                        |                            |                   |                                      |  |                     |      |      |
|                                   |             |                        |                            |                   |                                      |  |                     |      |      |
|                                   |             |                        |                            |                   |                                      |  |                     |      |      |
|                                   |             |                        |                            |                   |                                      |  |                     |      |      |
|                                   |             |                        |                            |                   |                                      |  |                     |      |      |
|                                   |             |                        |                            |                   |                                      |  |                     |      |      |
|                                   |             |                        |                            |                   |                                      |  |                     |      |      |
|                                   |             |                        |                            |                   |                                      |  |                     |      |      |
|                                   |             |                        |                            |                   |                                      |  |                     |      |      |

<sup>1</sup> Gallons = Cubic Feet x 7.481

<sup>2</sup> %Diff =  $\frac{ISDTotalGal - GasFlowMeterDiffGal}{GasFlowMeterDiffGal} \times 100$

**Executive Order VR-208-A**  
**EMCO Phase II EVR System with Hirt Thermal Oxidizer Including INCON ISD**

**Exhibit 11**  
**Incon ISD System Vapor Pressure Sensor Verification Test procedure**

Definitions common to all certification and test procedures are in:

**D-200 Definition 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 designee.

**1. Purpose and Applicability**

1.1 The purpose of this test procedure is to determine if the INCON ISD System Vapor Pressure Sensor (listed in Exhibit 1) is operating in accordance with the vapor pressure sensor requirements of Exhibit 2. This procedure is used:

1.1.1 To determine whether the Vapor Pressure Sensor complies with the performance specification when the sensor is exposed to ambient pressure.

1.1.2 To determine the measured ullage pressure in underground gasoline storage tanks (USTs) installed at gasoline dispensing facilities (GDFs) equipped with a EMCO Phase II Enhanced Vapor Recovery system with Hirt Thermal Oxidizer Including INCON ISD and compare to the pressure reading of the INCON ISD System at the Vapor recovery Monitoring (VRM) console.

1.2 This procedure is applicable for compliance testing.

**2. Principle and Summary of Test Procedure**

**Determining Ambient Pressure** - The Vapor Pressure Sensor (VPS) is subjected to ambient pressure by turning the Vapor Pressure Sensor valve, which is located in the dispenser closest to the tanks, to the Atmospheric Valve Position as shown in Figure 2. This test can be performed while product is being dispensed into motor vehicles.

**Determining UST Pressure** - The pressure of the Underground Storage Tank (UST) is determined at the Phase I vapor recovery adaptor (dry break assembly) with a vapor coupler test assembly as shown in Figures 2 and 3 of TP-201.3 (*Determination of 2 Inch WC Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities*) or a modified dust cap test assembly as shown in Figures 1a and 1b of this exhibit. The test assembly is equipped with a center probe, which opens the dry break, and a quick connect fitting that is connected to an electronic pressure measuring device or digital manometer. The test assembly should open the dry break with minimal venting of the USTs. This test can be performed while product is being dispensed into motor vehicles.

### **3. Biases and Interferences**

- 3.1 This test shall not be conducted within 30 minutes following gasoline transfer from a cargo tank.
- 3.2 This test shall not be conducted if the processor is operating (the VCS-100 vapor processor is running if the green indicator lamp on the Hirt indicator panel is lit).
- 3.3 This test shall not be conducted if the system ullage pressure is less than negative eight (-8.0) inches WC or greater than positive eight (+8.0) inches WC.

### **4. Range and Accuracy**

Digital Manometer (Electronic Pressure Measuring Device)

Minimum readability shall be 0.01 inches WC with measurement range(s) to include at least up to positive and negative ten ( $\pm 10$ ) inches WC with a minimum accuracy of plus or minus 0.05 inches WC of full scale.

### **5. Equipment**

- 5.1 The dust cap test assembly shall be modified in the following manner:
  - 5.1.1 Install a probe in the center of the dust cap as shown in Figure 1a (one method is to tap and thread probe). The probe shall be of sufficient length to open approximately  $\frac{1}{2}$  inch of the dry break while allowing the cap to maintain a leak tight seal on the adaptor.
  - 5.1.2 Install female quick connect fitting on the top of the dust cap, offset from the center probe as shown in Figure 1a. A Swagelok, part number SS-QC4-B-4-PM, quick connect fitting or equivalent can be used.
  - 5.1.3 Use "Tygon tubing" or equivalent to connect the manometer to the dust cap (Figure 1b). Install a male quick connect fitting (Swagelok

part number SS-QC4-5-400 or equivalent can be used) on one end of a ferrule stainless steel tube (or equivalent material). Connect one end of the “Tygon tubing” to the stainless steel tube and connect the other end to the digital manometer (Figure 1b).

- 5.2 Alternatively, the vapor coupler test assembly, Figures 2 and 3 of TP-201.3 may be used in lieu of the dust cap test assembly.
- 5.3 Digital Manometer (Electronic Pressure Measuring Device)

Use a minimum range  $\pm 10.00$  inches WC digital manometer to monitor the UST pressure with a minimum readability of 0.01 inches of WC. Dwyer Series 475 Mark III Digital manometer or equivalent can be used. A copy of the manufacturer’s operating instructions shall be kept with the equipment.

## **6. Digital Manometer Calibration Requirements**

- 6.1 A copy of the most current calibration of the digital manometer shall be kept with the equipment.
- 6.2 All digital manometers shall be bench tested for accuracy using a reference gauge, incline manometer or National Institute of Standards and Technology (NIST) traceable standard at least once every twelve (12) consecutive months. Accuracy checks shall be performed at a minimum of five (5) points (e.g., 10, 25, 50, 75 and 90 percent of full scale) each for both positive and negative pressure readings. Accuracy shall meet the requirements of Section 3.2 of TP-201.3.

## **7. Pre-Test Procedure**

- 7.1 Turn on digital manometer and allow instrument to warm up for five minutes.
- 7.2 Zero out digital manometer using adjustment pod on top of instrument in accordance with manufacturer’s instructions. Drift may be minimized by re-zeroing immediately after use by venting both pressure ports to atmosphere and adjusting the knob until the display reads exactly zero.
- 7.3 Attach the male quick connect fitting to the female quick connect fitting on the modified vapor dust cap.
- 7.4 Attach digital manometer to open end of Tygon tubing.

## Determining Ambient Pressure

### 8. Test Procedure for Testing the INCON ISD System Vapor Pressure Sensor at Ambient Pressure

- 8.1 Access the INCON ISD System Vapor Pressure Sensor, which is located in the dispenser closest to the USTs. Record the Vapor Pressure Sensor location and serial number on the data forms 1 and 2.
- 8.2 Turn the Vapor Pressure Sensor ball valve to the closed position. This isolates the Vapor Pressure Sensor from the UST ullage space (see Figure 2).
- 8.3 Remove the plug from the Vapor Pressure Sensor ball valve (see Figure 2).
- 8.4 Verify on the VRM Status on the LCD of the console that the pressure value is zero inches WC,  $\pm 0.20$  inches WC.

If the vapor pressure sensor is within  $\pm 0.2$  inches WC of zero, proceed to Section 8.5 of this exhibit.

If the pressure value is not within  $\pm 0.2$  inches WC of zero, the vapor pressure sensor will need to be calibrated. Proceed to section 8.4.1-8.4.3.

- 8.4.1 On the LCD of the console, go to the VRM Control page, refer to Figure 3, and perform the following steps
  - a. Press the CONTROL icon. This allows access to the control menu screen.
  - b. Press the CALIBRATE ZERO OFFSET icon.
  - c. Press anywhere in the upper calibration box. Select "Yes" to calibrate the sensor. This will zero the pressure reading for atmospheric pressure.
- 8.4.2 Verify on the VRM Status page that the pressure value is now reading zero (0.0) inches WC,  $\pm 0.20$  inches WC.
- 8.4.3 If the pressure reading from the INCON VRM Console is NOT within  $\pm 0.2$  inches WC from zero, **the Vapor Pressure Sensor is not in compliance with the pressure sensor requirements of Exhibit 2.** Proceed to the INCON ISD System trouble shooting manual available on the Franklin Fueling Systems website.

- 8.5 Record the above information on Form 1 “Data Form for Vapor Pressure Sensor Ambient Reference Test.” Districts may require the use of an alternate form, provided it includes the same minimum parameters as identified in the Data Form.
- 8.6 Reinstall the plug on the Vapor Pressure Sensor ball valve. Turn the ball valve handle to the “normal position” (See Figure 2).

### **Determining UST Pressure**

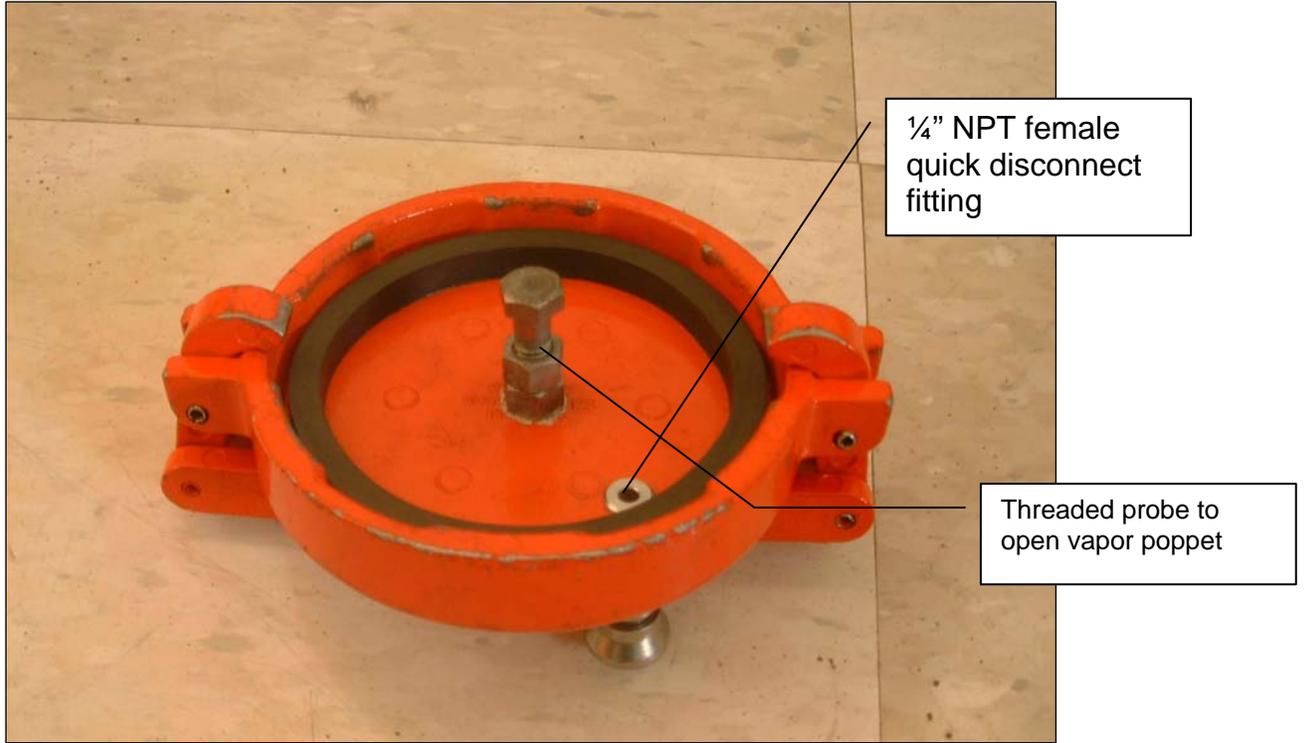
#### **9. Test Procedure for Testing the INCON ISD System Vapor Pressure Sensor at UST Pressure**

- 9.1 Attach the dust cap or vapor coupler test assembly to the vapor adaptor (Figure 1b).
- 9.2 On the touch-screen display at the INCON VRM console, go to the *VRM»Status* page.
- 9.3 Simultaneously record the ullage pressure from the digital manometer (connected to the vapor coupler test assembly) and the INCON VRM Console. Record the above information on Form 2 “Data Form for Vapor Pressure Sensor UST Pressure Test.” Districts may require the use of an alternate form, provided it includes the same minimum parameters as identified in the Data Form.
- 9.4 Verify the vapor pressure sensor reading from the INCON VRM Console is within  $\pm 0.2$  inches WC from the digital manometer reading. If difference is not within  $\pm 0.2$  inches WC, **the Vapor Pressure Sensor is not in compliance with the pressure sensor requirements of Exhibit 2.** Proceed to the INCON ISD System trouble shooting manual available on the Franklin Fueling Systems website.

#### **10. Alternate 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 ARB Executive Officer, pursuant to Section 14 of CP-201.

**Figure 1a - Typical Modified Vapor Adaptor Dust Cap (Bottom View)**



**Figure 1b - Typical Field Installation of UST Pressure Measurement Assembly**



Figure 2 – Vapor Pressure Sensor Test Port

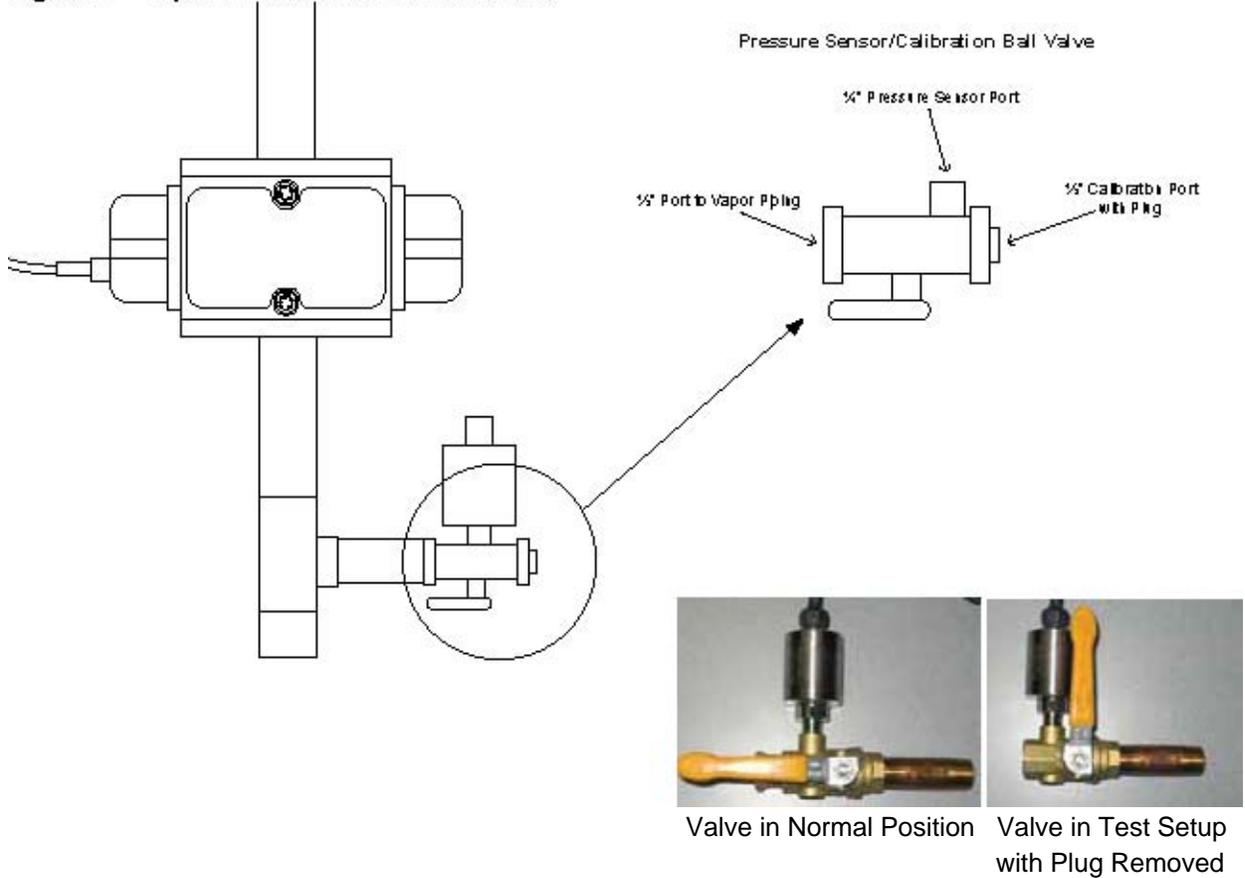
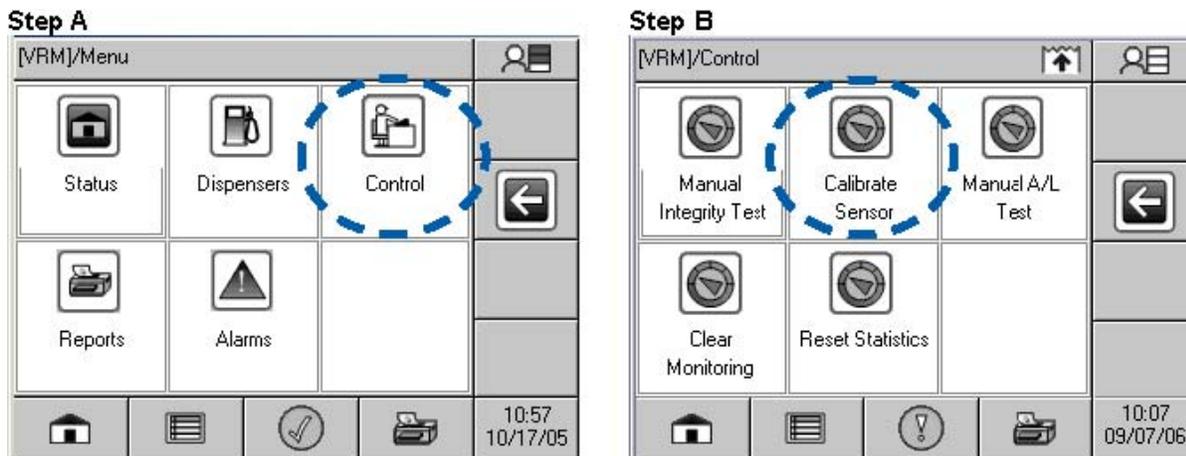
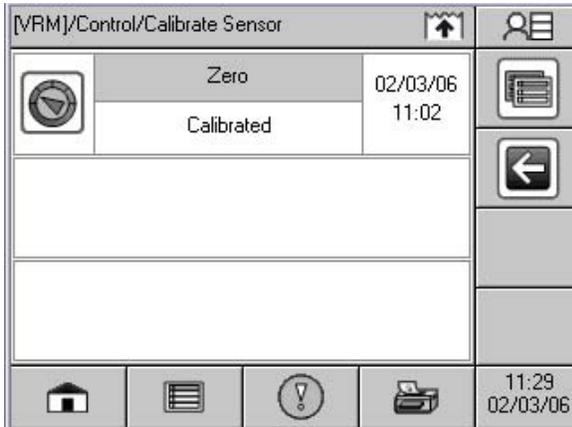


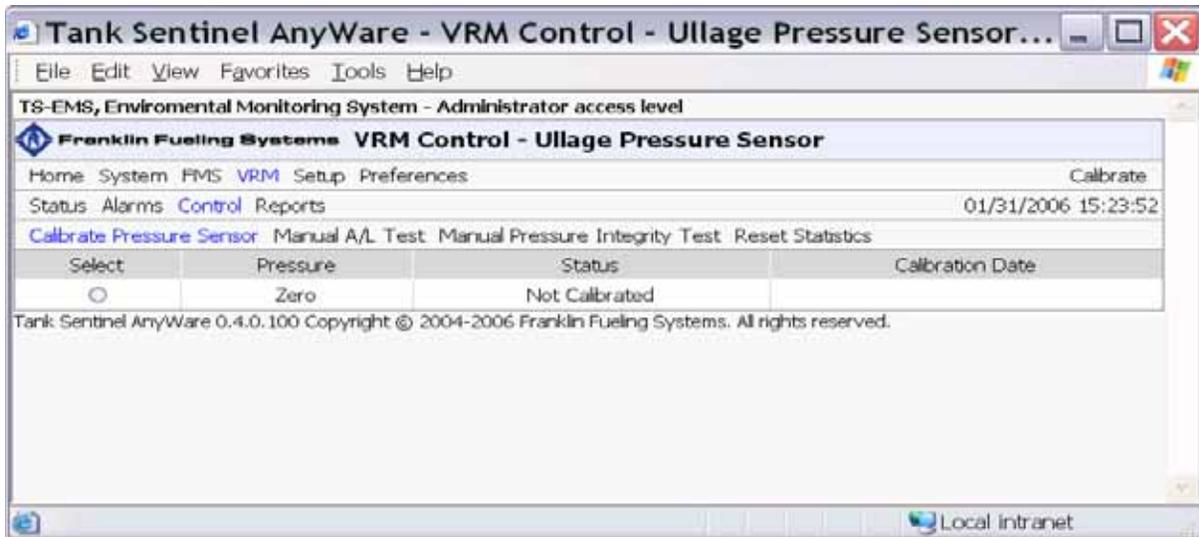
Figure 3 – Steps to Calibrate the Vapor Pressure Sensor



**Step C**



**Calibrate Pressure Sensor Web Page View**



**Data Form for Vapor Pressure Sensor Ambient Reference Test**

DATE OF TEST \_\_\_\_\_

|                      |   |   |                          |
|----------------------|---|---|--------------------------|
| SERVICE COMPANY NAME |   | SERVICE COMPANY'S TELEPHONE   |                          |
| SERVICE TECHNICIAN   |   | FFS INCON ISD TECH CERTIFICATION #<br>(as applicable)<br><br>ICC or DISTRICT TRAINING CERTIFICATION (as applicable) |                          |
| STATION NAME         |   | DISTRICT PERMIT #   |                          |
| STATION ADDRESS      |   | CITY  | STATE      ZIP           |
| STEP 8.1             | PRESSURE SENSOR LOCATION:<br><br>DISPENSER NUMBER _____   | PRESSURE SENSOR SERIAL NUMBER: _____  |                          |
| STEP 8.3             | VAPOR PRESSURE SENSOR BALL VALVE PLUG REMOVED?  |   | <input type="checkbox"/> |
|                      | VALVE SET TO AMBIENT REFERENCE POSITION (PER FIG. 2)?   |   | <input type="checkbox"/> |
| STEP 8.4             | AMBIENT PRESSURE SENSOR VALUE _____ Inches WC<br>(OBTAIN PRESSURE VALUE FROM THE VRM STATUS ON THE LCD OF THE CONSOLE).   |   |                          |
| STEP 8.4             | <p>IS THE PRESSURE BETWEEN +0.20 &amp; -0.20?      <input type="checkbox"/> Yes      <input type="checkbox"/> No</p> <p>IF NO, THE VAPOR PRESSURE SENSOR MAY NEED TO BE CALIBRATED. TO CALIBRATE PRESSURE SENSOR, REFER TO SECTION 8.4.1 OF THE VAPOR PRESSURE SENSOR TEST PROCEDURE.</p> <p>AFTER SUCCESSFULLY COPLETING VAPOR PRESSURE SENSOR CALIBRATION</p> <p>IS THE PRESSURE BETWEEN +0.20 &amp; -0.20?      <input type="checkbox"/> Yes      <input type="checkbox"/> No</p> <p>IF NO: THE PRESSURE SENSOR IS NOT IN COMPLIANCE WITH THE PRESSURE SENSOR REQUIREMENTS OF EXHIBIT 2. PROCEED TO THE INCON ISD SYSTEM TROUBLESHOOTING MANUAL AVAILABLE ON THE FRANKLIN FUELING SYSTEMS WEBSITE.</p> |   |                          |
| STEP 8.5             | VAPOR PRESSURE SENSOR BALL VALVE PLUG REINSTALLED?  |   | <input type="checkbox"/> |
|                      | BALL VALVE SET TO NORMAL POSITION (See FIG. 2)?   |   | <input type="checkbox"/> |

**Data Form for Vapor Pressure Sensor UST Pressure Test**

DATE OF TEST \_\_\_\_\_

|                             |  |              |            |
|-----------------------------|--|--------------|------------|
| <b>SERVICE COMPANY NAME</b> | <b>SERVICE COMPANY'S TELEPHONE</b>   |              |            |
| <b>SERVICE TECHNICIAN</b>   | <b>FFS INCON ISD TECH CERTIFICATION #<br/>(as applicable)</b><br><br><b>ICC or DISTRICT TRAINING<br/>CERTIFICATION (as applicable)</b> |              |            |
| <b>STATION NAME</b>         | <b>DISTRICT PERMIT #</b>   |              |            |
| <b>STATION ADDRESS</b>      | <b>CITY</b>  | <b>STATE</b> | <b>ZIP</b> |

|                                      |       |   |
|--------------------------------------|-------|---|
| <b>PRESSURE SENSOR<br/>LOCATION:</b> | _____ | <b>PRESSURE SENSOR<br/>SERIAL NUMBER:</b> |
| <b>DISPENSER NUMBER</b>              | _____ | _____                                     |

|                 |   |
|-----------------|---|
| <b>STEP 9.3</b> | <b>UST PRESSURE DIGITAL MANOMETER VALUE _____<br/>INCHES WC</b> |
|-----------------|---|

|                 |   |
|-----------------|---|
| <b>STEP 9.3</b> | <b>UST PRESSURE FROM INCON ISD SYSTEM VRM CONSOLE _____Inches<br/>WC</b><br><b>(OBTAIN PRESSURE VALUE FROM THE VRM STATUS ON THE LCD OF THE<br/>CONSOLE).</b> |
|-----------------|---|

|                 |   |
|-----------------|---|
| <b>STEP 9.4</b> | <b>VRM CONSOLE SENSOR VALUE WITHIN ±0.2 INCHES WC OF DIGITAL<br/>MANOMETER VALUE? YES <input type="checkbox"/> NO <input type="checkbox"/></b><br><b>IF NO: THE PRESSURE SENSOR IS NOT IN COMPLIANCE WITH THE<br/>PRESSURE SENSOR REQUIREMENTS OF EXHIBIT 2. PROCEED TO THE<br/>INCON ISD SYSTEM TROUBLE SHOOTING MANUAL AVAILABLE ON THE<br/>FRANKLIN FUELING SYSTEMS WEBSITE.</b> |
|-----------------|---|