California Environmental Protection Agency

Air Resources Board

ARB Approved

Installation, Operation and Maintenance Manual

for

Executive Order

VR-209-A
VST Phase II EVR System
with FFS Clean Air Separator
Not Including In-Station Diagnostics (ISD)

Table of Contents

About VST

Vapor Systems Technologies, Inc. began in 1989 with the vision of One Company – One Integrated Solution.

Today, that philosophy is still in place and getting stronger. Recognizing that a healthier environment is a need and not an option, VST has dedicated its undivided attention to the ever-changing, stringent regulations that govern fugitive vapors at gasoline dispensing facilities (GDF).

To this challenge, VST is committed to a continual R&D campaign of developing the most current, technologically advanced solutions to service not only the United States, but also the world.

VST specializes in the development, engineering, and manufacturing of products that are sold into the GDF segment of the petroleum industry. The VST focus provides our customers and users with exceptional products, services, and innovative solutions for improving the fueling-station experience as well as for the world's air quality.

VST's product offering includes curb pump and vapor recovery hoses, safety breakaways, nozzles, and emission-control system *Processors*. The ENVIRO-LOC™ vapor-recovery product offering represents the most innovative concept in the industry for trapping fugitive vapors from the front end (vehicle refueling) to the back end (vent risers) of the GDF site.

Table of Terms and Abbreviations

ASC:	Authorized Service Contractor
APCD:	Air Pollution Control District
AQMD:	Air Quality Management District
ATG:	Automatic Tank Gauge
CARB:	California Air Resources Board
CAS:	Clean Air Separator
CDFA:	California Department of Food & Agriculture
CVLD:	Continuous Vapor Leakage Detection, another name for Vapor Leak Detection
ECS:	Emissions Control System
EO:	Executive Order
EVR:	Enhanced Vapor Recovery
GDF:	Gasoline Dispensing Facility
HC:	Hydrocarbon
ISD:	In-Station Diagnostics
LEL:	Lower Explosive Level
MAG Probe:	A type (brand) of Tank Inventory Probe
NEC:	National Electric Code
NFPA:	National Fire Protection Association
ORVR:	On-Board Refueling Vapor Recovery
OSHA:	Occupational Safety Health Administration
PMC:	Pressure Management Control
RVP:	Reid Vapor Pressure
TLS:	Tank Level System
TS:	Troubleshooting
Ullage:	Vapor space above liquid in a UST
UST:	Underground Storage Tank
VCK:	Vapor Collection Kit
VOC:	Volatile Organic Compounds
VST:	Vapor Systems Technologies, Inc.
WC:	Water Column

VST Contractor Requirements

Unless specified in this IOM, only skilled technicians that are trained certified and licensed by VST, Inc. (i.e. VST Authorized Service Contractors) are able to perform installation, maintenance or repairs of components manufactured by VST, Inc. or the warranty will be void.

It is the responsibility of each VST Authorized Service Contractor (ASC) to be familiar with the current requirements of state, federal, and local codes for installation and repair of gasoline dispensing equipment.

It is also the responsibility of the VST ASC to be aware of the manual, necessary safety precautions and site safety requirements to assure a safe and trouble-free installation.

To participate in a VST training class, a candidate will need to complete an enrollment form, which can be downloaded from the VST website at www.vsthose.com or requested by phone at 937-704-9333. Once the enrollment form is approved by VST, the candidate can enroll in a VST training class. A schedule of classes is also available on the above VST website.

To confirm a VST Authorized Service Contractor status, a regulator can go to the VST website at www.vsthose.com.

Due to the highly volatile nature of gasoline and its handling and storage, VST requires the following certifications for its ASC's to work on this system configuration:

Level	Component	Authorized Tasks	Training Pre-Requisites
A **Must be re-certified every two years**	Hanging Hardware	Functional Testing Installation Maintenance Repair	No pre-requisite
NOTE: **Depending on local codes, in addition to the VST training, contractors may be required to take air-district training or ICC certification as an approved vapor-recovery installer.**			

ASC's must be able to show proof of certification if asked. Carry the wallet card or have a copy of your certification on file with the GDF. The ASC must record his or her certification number on the applicable paperwork for all warranties to be deemed valid.

Contractors should **ALWAYS** verify the training and certification requirements with the air-district staff **BEFORE** beginning installation of EVR systems.

FFS/Healy Contractor Requirements (for CAS)

Unless specified otherwise, only skilled technicians that are trained, certified and licensed by Franklin Fueling Systems (i.e. Healy or INCON Certified Technicians) are able to perform installation, maintenance or repairs of components manufactured by Franklin Fueling Systems or warranty will be void.

It is the responsibility of each Healy Certified Technician to be familiar with the current requirements of state, federal, local codes and air district rules and regulations for installation and repair of gasoline dispensing equipment.

It is also the responsibility of the Healy Certified Technician to be aware of all the necessary safety precautions and site safety requirements to assure a safe and trouble free installation.

To confirm a Healy or INCON Certified Technician training status, a regulator can access a searchable database at the following web site:

http://www.franklinfueling.com/CertifiedInstallers/CertifiedInstallers.asp

Executive Order VR-209-A

Exhibit 1
Equipment List

Component	Manufacturer / Model
Nozzle	VST Model VST-EVR-NB, VST-EVR-NB-R (Rebuilt) (VR-209, Exhibit 1, Figure 1A-1)
Coaxial Curb Hose	VST Model VDV-EVR Series (VR-209, Exhibit 1, Figure 1A-2)
Coaxial Whip Hose	VST Model VSTA-EVR Series (VR-209, Exhibit 1, Figure 1A-2)
Breakaway Coupling	VST Model VSTA-EVR-SBK (VR-209, Exhibit 1, Figure 1A-2)
Hanging Hardware with Liquid Removal Device	(VR-209, Exhibit 1, Figure 1A-3)
Clean Air Separator	(VR-209, Exhibit 1, Figures 1A-4 and 1A-5 – Vertical CAS Configuration) (VR-209, Exhibit 1, Figures 1A-6 and 1A-7 – Horizontal CAS Configuration)

Weekly Inspections

HANGING HARDWARE SYSTEM					
Component	**Procedure**	**Fail Criteria**	**Corrective Action**	**Reference Manuals**	**Authorized Personnel**
Nozzle Hose Breakaway	Inspect each hose, breakaway, and nozzle for loose connections and vapor/liquid leaks	Presence of a leak	Tighten connections or replace with new VST product	IOM-8	**Nozzle, hose, or breakaway replacement**: GDF owner-operator or VST ASC Levels A, B, or C **Component repair:** VST ASC Levels A, B, or C
		Presence of residue from a leak	Tighten connections or replace with new VST product	IOM-10	
		Visible o-ring between any component connection	Tighten connections or replace with new VST product	IOM-11	
CO-AXIAL HOSES					
Component	**Procedure**	**Fail Criteria**	**Corrective Action**	**Reference Manuals**	**Authorized Personnel**
Coaxial Hose	Inspect hoses for wear, severe kinks, cracks, splitting, and functional swivels	Kinks, cracks, splitting, non-functional swivels, or any visible openings	Replace with new VST hose	IOM-10	**Hose replacement:** GDF owner-operator or VST ASC Levels A, B, or C
BREAKAWAY					
Component	**Procedure**	**Fail Criteria**	**Corrective Action**	**Reference Manuals**	**Authorized Personnel**
Breakaway	Inspect breakaway for leaks around the scuff	Presence of a leak around the scuff	Replace with new breakaway	IOM-11	**Replace breakaway:** Owner/Operator or VST ASC Levels A, B, or C

NOZZLE					
Nozzle Component	**Procedure**	**Fail Criteria**	**Corrective Action**	**Reference Manuals**	**Authorized Personnel**
Nozzle lever, lever guard, lever lock	Inspect for defects, cuts, or damage to the: Nozzle Lever Lever Guard Lever Lock Spout Spout Vent Hole Face Seal Interlock Rod Vapor Collection Sleeve.	Damaged or missing	Replace with new VST nozzle	IOM-8	GDF Owner/Operator or VST ASC Levels A, B, or C
Nozzle Spout		Sheared or bent	Replace nozzle spout assembly with new VST spout or replace with new VST nozzle	IOM-8 IOM-9	VST ASC Levels A, B, or C
Nozzle Vent Hole		Vent hole blocked	Clear blockage	IOM-8	GDF Owner/Operator or VST ASC Levels A, B, or C
Nozzle Collection Sleeve		If greater than 18 inches total length of cuts (if greater than .375 sq. inches of material missing)	Replace vapor collection kit	IOM-9 Exhibit 2	VST ASC Levels A, B, or C
			Replace nozzle with new VST nozzle	IOM-8 Exhibit 2	GDF Owner/Operator or VST ASC Levels A, B, or C
Nozzle Face Seal		Greater than 30% of the material is missing (if greater than 2.5 inches of the accumulated faceplate circumference is missing)	Replace vapor collection kit	IOM-9	VST ASC Levels A, B, or C
			Replace nozzle with new VST nozzle	IOM-8	GDF Owner/Operator or VST ASC Levels A, B, or C
Nozzle Front-End Kit (Collection sleeve and face seal)		Alignment lines are misaligned and/or the assembly is cockeyed	Replace vapor collection kit	IOM-9	VST ASC Levels A, B, or C
			Replace nozzle with new VST nozzle	IOM-8	GDF Owner/Operator or VST ASC Levels A, B, or C
Nozzle Interlock Rod	IOM-8 IOM-9	Interlock rod sticks during engagement or disengagement	Replace vapor collection kit	IOM-9	VST ASC Levels A, B, or C
			Replace nozzle with new VST nozzle	IOM-8	GDF Owner/Operator or VST ASC Levels A, B, or C

Weekly Inspection and Testing Checklist

Checklist results may be used to assist with filling out GDF maintenance log.			Date:	Page: ______of_____
Dispenser Number	Unihose or Fuel Grade (circle one)	Nozzle Inspection (circle one)	Hose Inspection (circle one)	Breakaway (circle one)
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail
	Unihose 87 89 91 other __________	Pass Fail	Pass Fail	Pass Fail

Quarterly Inspections

Inspect Clean Air Separator for proper operating configuration. See EO VR-209-A, Exhibit 2, Figure 2B-2 or 2B-2H for guidance. Figure 2B-2 applies to vertical CAS installations. Figure 2B-2H applies to horizontal CAS installations.

Annual System Compliance Testing

Annual System Compliance Testing	
Static Pressure Test:	TP-201.3 Exhibit 8
Dynamic Back Pressure Test:	TP-201.4 Exhibit 6
Liquid Removal Test Procedure:	Exhibit 5
Clean Air Separator Test:	Exhibit 4

Drive-Offs and Other Customer Abuse

If the hanging hardware components are involved in a drive-off or if they incur some customer abuse, and they are not replaced as new, each individual component of the hanging hardware **must be visually inspected and functionally tested** before the components can return to dispensing fuel.

- A visual assessment and functional tests are outlined in the following pages.

ANY COMPONENT THAT DOES NOT PASS A VISUAL INSPECTION OR FUNCTIONAL TEST MUST BE REPLACED.

IF THE BREAKAWAY IS INVOLVED IN A DRIVEOFF, IT MUST BE REPLACED.

THE BREAKAWAY IS NON-RECONNECTABLE.

Before beginning work, barricade the work area to block customer use.

1 Drive Offs & Other Customer Abuse: Perform a Visual Assessment

Visually inspect the hanging hardware system as follows to determine the extent of the damage:

Action	Test Procedure	Corrective Action	Reference Material	Authorized Personnel
Perform a thorough visual examination of the exterior of the whip hose and the curb hose for any obvious imperfections.	Obvious imperfections include, but are not limited to: Damage to the swivels Damage to the couplings Kinks / flat spots Tears to the outer hose	Replace with new VST hose(s).	IOM-10	**Hose replacement**: GDF Owner/Operator or VST ASC Levels A, B, or C
	If there are no imperfections to the whip and curb hose, those hoses may be reused.	After reassembly, conduct liquid removal test.	IOM-10 EO VR-209 Exhibit 5	VST ASC Levels A, B, or C
		If the liquid removal test fails, replace the hose(s).	IOM-10	GDF Owner/Operator or VST ASC Levels A, B, or C
Perform a thorough visual inspection of the nozzle for any obvious imperfections.	Obvious imperfections include, but are not limited to: Damaged spout (broken, bent) Damage to the face-seal collection sleeve / interlock rod assembly Broken face seal Torn collection sleeve Bent interlock rod Nozzle alignment marks Damage to the lever and lever guard	Replace damaged components where applicable.	IOM-9	**Nozzle repair:** VST ASC Levels A, B, or C
		Replace with new VST nozzle.	IOM-8	**Nozzle replacement**: GDF Owner/Operator or VST ASC Levels A, B, or C
If no imperfection or damage is visibly evident, proceed to functional testing.				

Function Testing Description

Perform the following functional tests prior to re-using a hose or a nozzle following a drive-off:

Test	Test Procedure	Corrective Action	Authorized Personnel
Leak Check	Verify that there are no liquid leaks in all components. Dispense fuel and check each connection between the components. A visual inspection of the nozzle can determine any obvious liquid leaks.	Any component that does not pass the functional test must be replaced. Go to IOMs 8, 10 and 11	GDF Owner/Operator or VST ASC Levels A, B, or C
Meter Creep	Checking for meter creep will verify the integrity of the connections. Dispense 1/10 to 2/10 of a gallon of fuel into an approved container then release lever and move components around and/or gently shake the hose and verify if the displace amount on the dispenser changes.	Any component that does not pass the functional test must be replaced. Go to IOMs 8, 10 and 11	GDF Owner/Operator or VST ASC Levels A, B, or C
Automatic Shut-Off and Insertion Interlock	Section 10 The insertion interlock mechanism shall not allow dispensing when the bellows is uncompressed as determined by direct observation or GDF-09 (See Vapor Recovery Defects list).	Repair or replace the nozzle Go to IOM-9	**Nozzle replacement** GDF Owner/Operator or VST ASC Levels A, B, or C **Nozzle repair** VST ASC Levels A, B, or C
Resistance	Section 10	Any component that does not pass the functional test must be replaced. Go to IOMs 8, 10 and 11	GDF Owner/Operator or VST ASC Levels A, B, or C

VST Installation Procedure for Phase II Coaxial EVR Balance Dripless Nozzles

Part Number Series: VST-EVR-NBcc, VST-EVR-NBccR

cc = Scuff Guard Color Code and R = rebuilt

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GENERAL INFORMATION

If hanging hardware components are involved in a drive-off or incur other customer abuse, each individual component must be functionally tested prior to customer dispensing activities.

INSTALLATION PREPARATION

This procedure must be followed to insure leak-proof installation and operation of these nozzles.

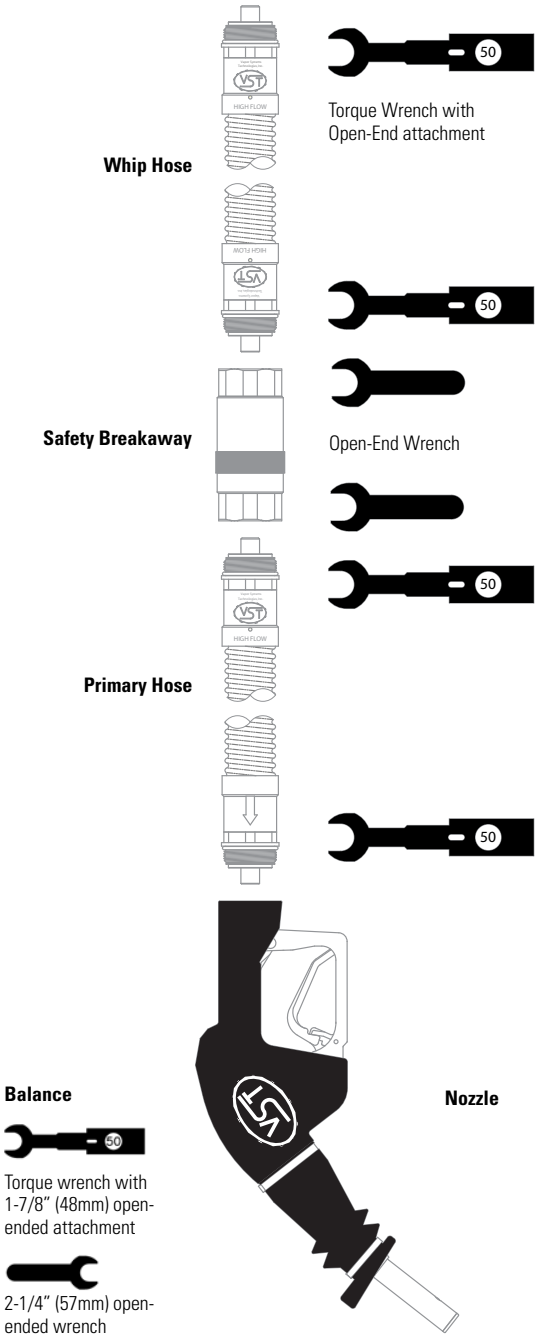
1. Turn off and tag the power to the dispenser. Dispenser must be de-energized prior to service to avoid personal injury.
2. Barricade work area to block vehicle access to the dispenser.
3. Close the dispenser shear valve prior to removing hanging hardware (hoses, safety breakaways, and nozzles).
4. Drain liquid product from the hanging hardware set into an approved container prior to replacing any hanging hardware components.
5. Remove hanging hardware from the dispenser prior to making replacement component assembly connections. VST recommends connecting the whip hose to the dispenser as the last connection during the hanging hardware assembly.

INSTALLATION AND FUNCTION TESTS

1. **STOP!** If this is a new facility installation, the fueling point must be flushed into an approved container before installing the nozzle. Using this nozzle to flush the system could result in foreign material becoming lodged in the nozzle's valve and cause it not to shut off.
2. Initial inspection and function tests:
   a. Carefully unpack nozzle from shipping carton.
   b. Inspect nozzle exterior for any damage.
   c. Inspect threads, lever, lever lock, spout, collection sleeve, band clamps, and face seal to determine that they are present and undamaged.
   d. Verify interlock rod alignment. Check interlock for engagement and release. Proper function of interlock rod requires the nozzle collection sleeve to be compressed ¼" to ½" and the lever to be engaged into the dispensing position. Nozzle will not function without interlock rod properly engaged.
   e. Inspect spout vent hole. It should be clear of debris.

Figure 1.

EVR Hanging Hardware Assembly



VST Installation Procedure for Phase II Coaxial EVR Balance Dripless Nozzles

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3. Lightly lubricate ALL O-Rings on mating connections with petroleum jelly or other suitable lubricant. DO NOT USE pipe dope or thread sealant.
4. Attach nozzle onto mating hose connection and tighten by hand.
5. Tighten the nozzle connection to 50 ft-lbs of torque. DO NOT OVER TIGHTEN. Use a torque wrench with an open-end attachment to fit the hose couplings and an open-end wrench to properly tighten coupling connections. DO NOT USE channel-locks or pliers to tighten hose joints. Proper ft./lb. torque may not be achieved with these tools.
6. Purge air from the system by pumping one-tenth (1/10) to two-tenths (2/10) of a gallon of fuel into an approved container. Inspect the nozzle connection for liquid leaks and make proper adjustments at hose connection if necessary.
7. Check the nozzle shut-off action by dispensing fuel into an approved container at least three times to assure the proper automatic operation of the interlock rod. According to U/L requirement 842, the fuel flow-rate must be greater than 3 gpm for the automatic shut-off mechanism to operate.

   To test, operate the nozzle and submerge the spout tip in fuel until the fuel level covers the vent hole. The main valve of the nozzle automatically shuts off when the liquid covers the vent hole at the end of the spout. The nozzle is not designed to operate on gravity flow. The hold-open latch will disengage automatically when liquid covers the vent hole in the spout. Verify that the fuel flow stops when the nozzle collection sleeve is decompressed (e.g. interlock rod is disengaged). To test that the fuel flow stops, dispense some fuel into an approved container. Slowly remove the nozzle from the container while dispensing fuel. Fuel flow should stop when the nozzle collection sleeve is fully decompressed.
8. Measure the resistance between the dispenser outlet casting and the tip of the nozzle spout. Use an electronic multimeter set on the high range of the ohmmeter function. Resistance should not indicate more than 70,000 ohms per foot of hose. Example: The measured resistance for a 12-foot hose must not exceed 840,000 ohms (840 kilohms).

MAINTENANCE

Inspect nozzles daily for damaged component parts: vapor collection sleeve, face seal, interlock rod, spout, lever, lever lock, etc. Damaged components must be replaced. Vent hole at the end of the spout should be clear of debris. The nozzle will not operate properly if vent hole becomes clogged. The nozzle will not function properly without the interlock rod properly engaged. Keep the hose connections tight.

Should there be a drive-off or incidence of customer abuse, follow the initial inspection instructions found in the INSTALLATION section. The nozzle should be replaced when damaged. The nozzle is designed and constructed to give lasting service if properly handled and maintained. If for any reason it should need attention, contact your VST distributor for proper disposition.

NOTE

Due to abuse, misuse, changing gasoline formulas, variation in maintenance practices, environmental conditions, and/or conditions beyond the manufacturer's control, dispensing equipment may need replacement before five (5) years. Inspections and proper maintenance procedures should be followed by the station manager to determine if replacement is required before five (5) years.

WARNING

Unauthorized rebuilding or modifying of nozzles voids ALL approvals and warranties.

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

If local regulatory codes prohibit use of the nozzle's hold-open clip, it must be removed prior to nozzle installation. Remove the nozzle to a safe work area.

Place the nozzle on a flat surface.

Locate the alloy rivet securing the hold-open clip and spring in the nozzle's handle. Use a drill with a 3/16" (5mm) drill bit, drill out the rivet securing the hold-open clip, and discard the clip, spring, and all other rivet debris.

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VST Installation Procedure for Phase II Coaxial EVR Balance Nozzle Repair Kits

Part Number Series: VST-FEK-100 (Front End Kit includes VCK & NSA)
VST-VCK-100 (Vapor Collection Kit: Boot Assembly Only)
VST-NSA-100 (Nozzle Spout Assembly: Spout Assembly Only)

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TOOLS

Adjustable Wrench	Nozzle Band Clamp Pincers
Approved Fuel Container	Torque Wrench
Wide Mouth Funnel	Vaseline (or suitable lubricant)

GENERAL INFORMATION

If hanging hardware components are involved in a drive-off or incur other customer abuse, each individual component must be functionally tested prior to customer dispensing activities.

INSTALLATION PREPARATION

This procedure must be followed to insure leak-proof installation and operation of these nozzles.

1. Turn off and tag the power to the dispenser. Dispenser must be de-energized prior to service to avoid personal injury.
2. Barricade work area to block vehicle access to the dispenser.
3. Close the dispenser shear valve prior to removing hanging hardware (hoses, safety breakaways, and nozzles).
4. Visually inspect and assess the extent of the damage to all hanging hardware components. If there are no imperfections/damages, proceed to FUNCTIONAL TEST.
5. Drain liquid product from the hanging hardware set into an approved container prior to replacing any hanging hardware components.
6. Remove hanging hardware from the dispenser prior to making replacement component assembly connections. VST recommends connecting the whip hose to the dispenser as the last connection during the hanging hardware assembly.
7. To drain nozzle, engage nozzle interlock:
   a. Push in face seal on nozzle boot assembly
   b. Hold the backend of the nozzle over an approved container
   c. Pull nozzle lever to fully drain the nozzle

VAPOR COLLECTION KIT (VST-VCK-100) REMOVAL

(See Figure 1)

1. Remove large band clamp from the Vapor Collection assembly with nozzle band clamp pincers. (VST-BPT-100)
2. Pull the Vapor Collection assembly (boot) off of the clamping groove of nozzle body.
3. Pull Vapor Collection assembly off of the spout by slightly twisting to go over the spout latch ring.
4. Properly discard the removed components.

VAPOR COLLECTION KIT (VCK) REPLACEMENT

1. Place the large band clamp on the collection sleeve. (See Figure 1)
2. Check proper orientation of the interlock rod. (See Figure 2)
3. Slide VCK over the spout.
4. Align and insert the interlock rod into the interlock port. (See Figure 2)
5. Align and center all alignment marks on top of the vapor collection kit and nozzle scuff. (See Figure 1)
6. Engage interlock a few times to check for correct alignment and functionality. (See Function Test 3)
7. Tighten collection band clamp until collection sleeve will not rotate. (See Figure 1)

NOZZLE SPOUT ASSEMBLY (VST-NSA-100) REMOVAL

1. Remove Vapor Collection Assembly.
2. Loosen spout nut with smooth-jaw wrench. (See Figure 3) **NOTE** Do not use pipe wrench or locking-type pliers.
3. Once threads are completely disengaged, pull the spout straight out.

NOZZLE SPOUT ASSEMBLY (NSA) REPLACEMENT (See Figure 3)

1. Fuel chamber should remain in the nozzle casting with the vacuum sensing tube hole oriented at the top.
2. If the fuel chamber is pulled out of the nozzle casting:
   a. Check O-ring for damage.
   b. Replace O-ring if damaged (check for cuts, nicks, etc.).
   c. Lubricate O-ring prior to re-assembly.
3. Insert fuel chamber into nozzle casting:
   a. Poppet stem with spring goes through poppet hole in the fuel chamber (center hole).
   b. Push fuel chamber until it is flush with casting.
   c. Vacuum sensing tube in the fuel chamber should be oriented at the top.

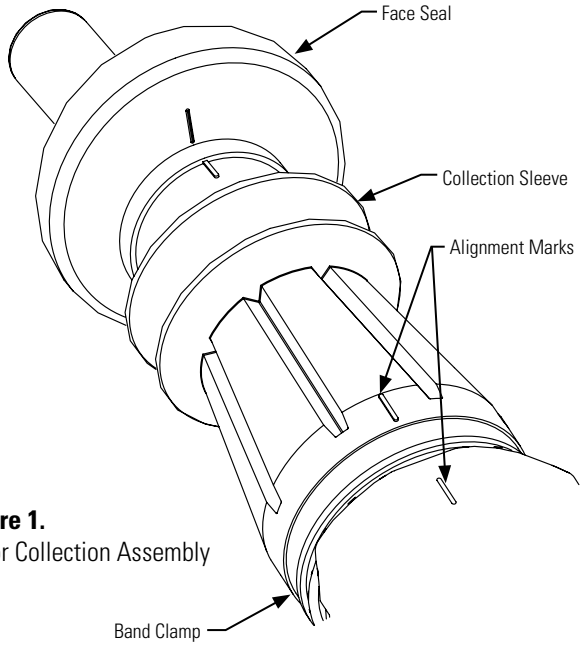


Figure 1.
Vapor Collection Assembly

VST Installation Procedure for Phase II Coaxial EVR Balance Nozzle Repair Kits

Part Number Series: VST-FEK-100 (Front End Kit includes VCK & NSA)
VST-VCK-100 (Vapor Collection Kit: Boot Assembly Only)
VST-NSA-100 (Nozzle Spout Assembly: Spout Assembly Only)

4. Lightly lubricate **ALL** O-rings on the spout assembly.
   NOTE Do not block vacuum sensing-tube hole with lubricant.
5. Align vacuum sensing tube with mating hole in the fuel chamber.
6. Align the anti-rotation bump on the spout with the casting notch. Be careful not to damage the spout O-rings.
7. Firmly insert spout assembly into the nozzle casting.
8. Apply a dab of Loctite® 565 (or equivalent thread sealant) to the male thread of the nozzle casting. Be careful not to apply the Loctite® so that it would enter into the casting notch. (See Figure 3)
9. Thread spout nut onto the nozzle casting and tighten firmly. Torque to 30 foot-pounds. Spout should be tight and not able to rotate. Do not over-tighten the spout nut.
10. After tightening the spout nut, place the Vapor Collection Kit onto the spout. Examine the location of the interlock rod to make sure it does not interfere or ride against the spout nut. If there is interference, tighten the spout nut a few degrees to allow the interlock rod to move freely.
11. Re-install the Vapor Collection Kit assembly per the Vapor Collection Kit Replacement instructions.

FUNCTION TESTS

1. Follow the VST Installation Procedure for each hanging hardware component. (Procedures: Section 10, 12, and 13)
2. Purge air from the system by pumping one-tenth (1/10) to two-tenths (2/10) of a gallon of fuel into an approved container. Inspect the nozzle connection for liquid leaks and make proper adjustments at the hose connection if necessary.
3. Check the nozzle shut-off action by dispensing fuel into an approved container at least three times to assure the proper automatic operation of the interlock rod. According to U/L requirement 842, the fuel flow-rate must be greater than 3 gpm for the automatic shut-off mechanism to operate.

   To test, operate the nozzle and submerge the spout tip in fuel until the fuel level covers the vent hole. The main valve of the nozzle automatically shuts off when the liquid covers the vent hole at the end of the spout. The nozzle is not designed to operate on gravity flow. The hold-open latch will disengage automatically when liquid covers the vent hole in the spout. Verify that the fuel flow stops when the nozzle collection sleeve is decompressed (e.g. interlock rod is disengaged). To test that the fuel flow stops, dispense some fuel into an approved container. Slowly remove the nozzle from the container while dispensing fuel. Fuel flow should stop when the nozzle collection sleeve is fully decompressed.
4. Measure the resistance between the dispenser outlet casting and the tip of the nozzle spout. Use an electronic multimeter set on the high range of the ohmmeter function. Resistance should not indicate more than 70,000 ohms per foot of the hose. Example: The measured resistance of a 12-foot hose must not exceed 840,000 ohms (840 kilohms).

MAINTENANCE Inspect nozzles daily for damaged components parts: vapor collection sleeve, face seal, interlock rod, spout, lever, lever lock, etc. Damaged components must be replaced. Vent hole at the end of the spout should be clear of debris. The nozzle will not operate properly if vent hole becomes clogged. The nozzle will not function properly without the interlock rod properly engaged. Keep the hose connections tight.

Should there be a drive-off or incidence of customer abuse, follow the initial inspection instructions found in the VST Installation Procedure Section 10. The nozzle should be replaced when damaged. The nozzle is designed and constructed to give lasting service if properly handled and maintained. If for any reason it should need attention, contact your VST distributor for proper disposition.

NOTE Due to abuse, misuse, changing gasoline formulas, variation in maintenance practices, environmental conditions, and/or conditions beyond the manufacturer's control, dispensing equipment may need replacement before five (5) years. Inspections and proper maintenance procedures should be followed by the station manager to determine if replacement is required before five (5) years.

WARNING Unauthorized rebuilding or modifying of nozzles voids ALL approvals and warranties.VST products must be used in compliance with applicable federal, state, and local laws and regulations. If local regulatory codes prohibit use of the nozzle's hold-open clip, it must be removed prior to nozzle installation. Remove the nozzle to a safe work area. Place the nozzle on a flat surface. Locate the alloy rivet securing the hold-open clip and spring in the nozzle's handle. Use a drill with a 3/16" (5mm) drill bit, drill out the rivet securing the hold-open clip, and discard the clip, spring, and all other rivet debris.

Figure 2.
Interlock Assembly

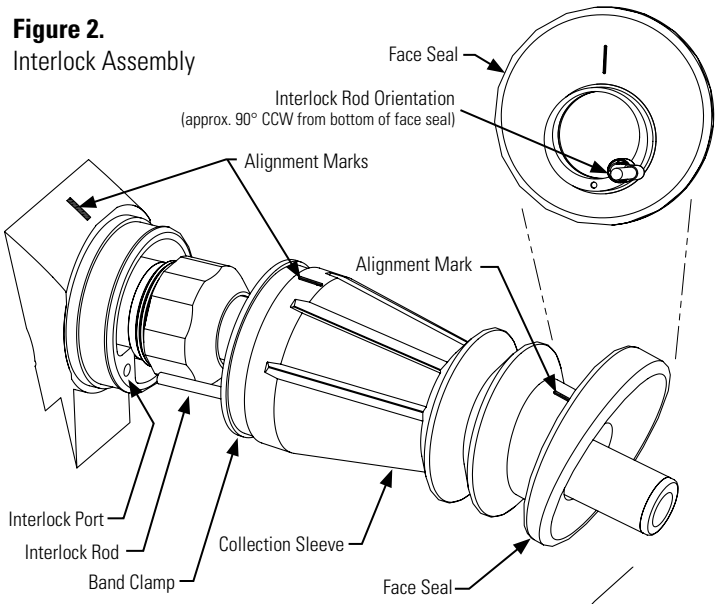
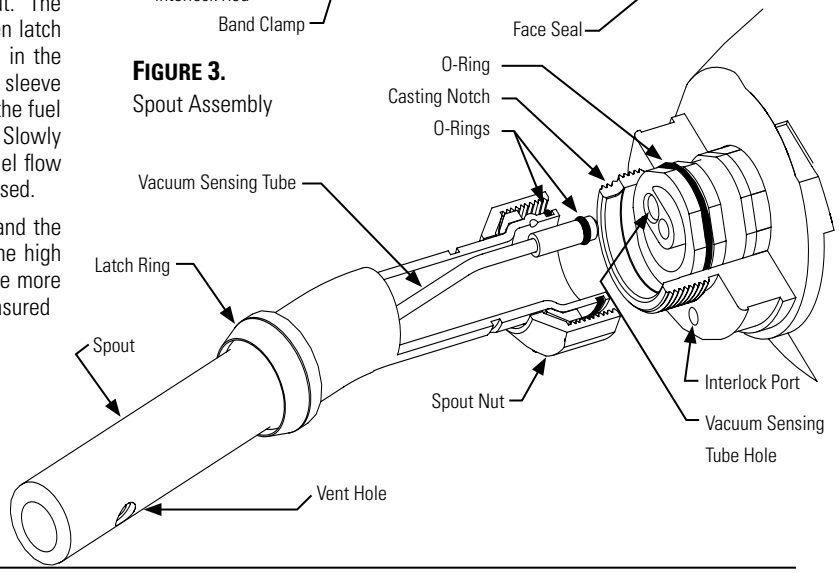


FIGURE 3.
Spout Assembly



VST Installation Procedure for Phase II Coaxial EVR Balance Fuel Hoses

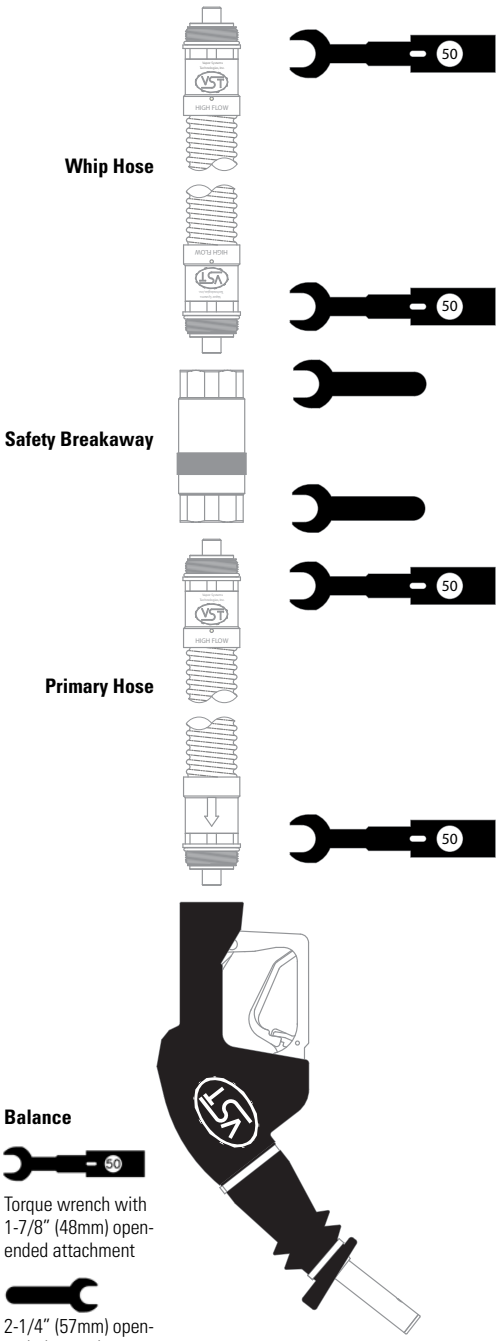
Part Number Series: VSTA-EVR and VDV-EVR

Vapor Systems Technologies, Inc.
650 Pleasant Valley Drive
Springboro, Ohio 45066 (USA)

Toll Free: 1-888-878-4673
Phone: 937-704-9333
Fax: 937-704-9443
www.vsthose.com

Figure 1.

EVR Balance Hanging Hardware Assembly



GENERAL INFORMATION

If hanging hardware components are involved in a drive-off or incur other customer abuse, each individual component must be functionally tested prior to customer dispensing activities.

INSTALLATION PREPARATION

This procedure must be followed to insure leak-proof installation and operation of these hose products.

1. Turn off and tag the power to the dispenser. Dispenser must be de-energized prior to service to avoid personal injury.
2. Barricade work area to block vehicle access to the dispenser.
3. Close the dispenser shear valve prior to removing hanging hardware (hoses, safety breakaways, and nozzles).
4. Drain liquid product from the hanging hardware set into an approved container prior to replacing any hanging hardware components.
5. Remove hanging hardware from the dispenser prior to making replacement component assembly connections. VST recommends connecting the whip hose to the dispenser as the last connection during the hanging hardware assembly.

INSTALLATION AND FUNCTION TESTS

1. Initial inspection:
   a. Carefully unpack hose from shipping carton.
   b. Inspect ALL O-Rings on each end of the hose to determine that they are present and undamaged.
   c. Inspect hose exterior for any damage.
   d. Inspect coupling threads for any damage.
2. Lightly lubricate ALL O-Rings on mating connections with petroleum jelly or other suitable lubricant. DO NOT USE pipe dope or thread sealant.
3. Insert the hose coupling into the mating connection and hand-tighten.
   NOTE Flow direction arrows on whip and primary hoses, where applicable, are indicated on hose coupling cuffs.
4. Tighten all the hose-joint connections to 50 foot-pounds of torque. DO NOT OVER TIGHTEN. Use a torque wrench with an open-end attachment to fit the hose couplings and an open-end wrench to properly tighten coupling connections. DO NOT USE channel-locks or pliers to tighten hose joints. Proper ft./lb. torque may not be achieved with these tools.
5. Purge air from the system by pumping one-tenth (1/10) to two-tenths (2/10) of a gallon of fuel into an approved container. Inspect each hose-joint connection for liquid leaks and make proper adjustments if necessary.

6. Check the nozzle shut-off action by dispensing fuel into an approved container at least three times to assure the proper automatic operation of the interlock rod. According to U/L requirement 842, the fuel flow-rate must be greater than 3 gpm for the automatic shut-off mechanism to operate.

   To test, operate the nozzle and submerge the spout tip in fuel until the fuel level covers the vent hole. The main valve of the nozzle automatically shuts off when the liquid covers the vent hole at the end of the spout. The nozzle is not designed to operate on gravity flow. The hold-open latch will disengage automatically when liquid covers the vent hole in the spout. Verify that the fuel flow stops when the nozzle collection sleeve is decompressed (e.g. interlock rod is disengaged). To test that the fuel flow stops, dispense some fuel into an approved container. Slowly remove the nozzle from the container while dispensing fuel. Fuel flow should stop when the nozzle collection sleeve is fully decompressed.
7. Measure the resistance between the dispenser outlet casting and the tip of the nozzle spout. Use an electronic multimeter set on the high range of the ohmmeter function. Resistance should not indicate more than 70,000 ohms per foot of hose. Example: The measured resistance for a 12-foot hose must not exceed 840,000 ohms (840 kilohms).

MAINTENANCE

Inspect hoses daily for damage, loose connection, or leaks. Replace as necessary. Subject to customer abuse, hose should be replaced when damaged.

The hose is designed and constructed to give lasting service if properly handled and maintained. If for any reason it should need attention, contact your VST distributor for proper disposition.

NOTE Due to abuse, misuse, changing gasoline formulas, variation in maintenance practices, environmental conditions, and/or conditions beyond the manufacturer's control, dispensing equipment may need replacement before five (5) years. Inspections and proper maintenance procedures should be followed by the station manager to determine if replacement is required before five (5) years.

WARNING Unauthorized rebuilding or modifying of hoses voids **ALL** approvals and warranties. VST products must be used in compliance with applicable federal, state and local laws and regulations.

PROCEDURE FOR POSITIONING THE LIQUID REMOVAL DEVICE

This procedure must be followed to insure proper positioning for the liquid removal device in Part Number Series: VDV-EVR (See Figure 2).

1. After installing the VST hanging hardware, hold the nozzle straight out from the dispenser so that the compressed bellows is 48 inches away from the front face of the dispenser and the spout tip of the nozzle is 30 inches above the pavement. The nozzle spout is to be at a 30-degree angle above the horizontal plane. (Simulate when the bellows is compressed in the filler neck of a vehicle.)
2. When the hose and nozzle are held in position as shown in Figure 2, the factory installed liquid removal device indicator mark on the vapor hose must be at the bottom of the loop. If the indicator mark is not at the bottom of the primary hose loop, the installer may choose one of the following options:

   Adjust the hose retractor (if installed)

   Use a different length whip hose

   Use a different length primary hose

IMPORTANT

It is the installing technician's responsibility to insure that the properly sized and marked hanging hardware is installed at the dispenser. Failure to properly install and locate the liquid removal device may reduce the effectiveness of the product in application resulting in outer hose liquid blockage and failure of the liquid removal test procedure.

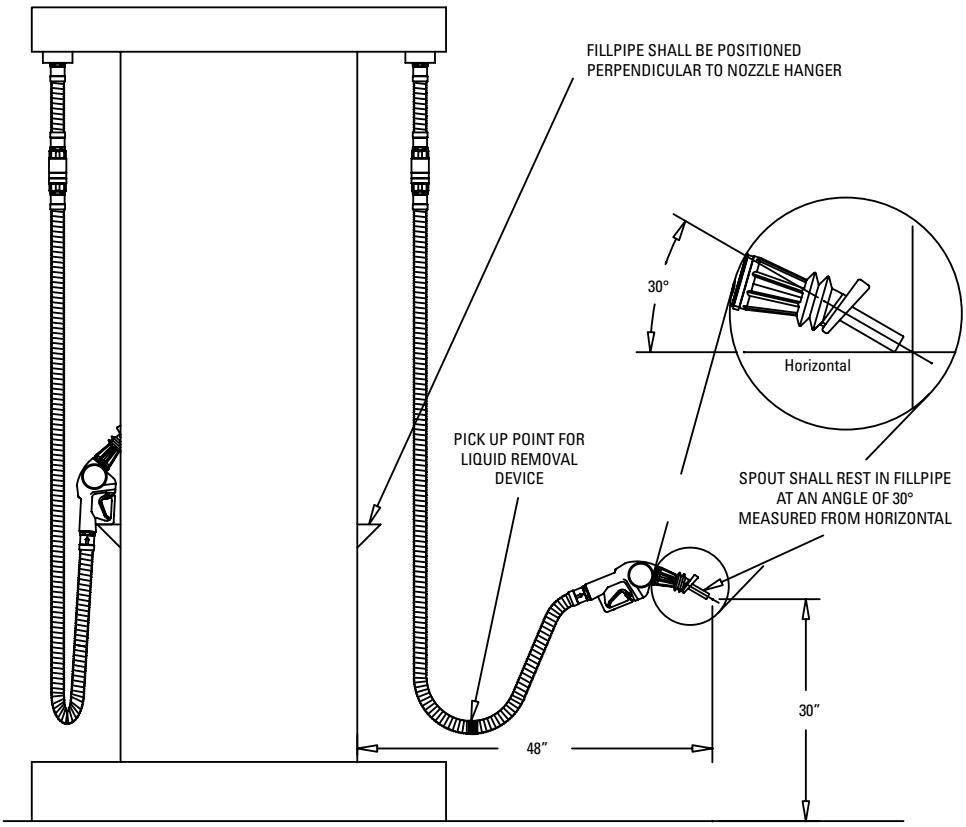


Figure 2. Procedure For Positioning the Liquid Removal Device

VST Installation Procedure for Phase II Coaxial EVR Balance Safety Breakaway Devices

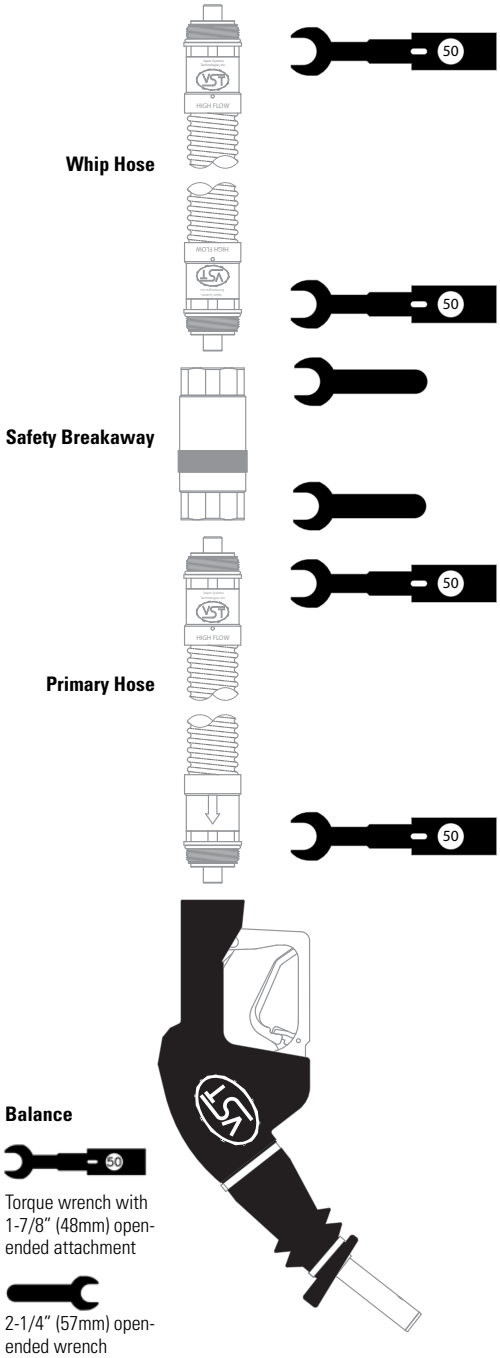
NON-Reattachable Breakaway Part Number Series: VSTA-EVR

Vapor Systems Technologies, Inc.
650 Pleasant Valley Drive
Springboro, Ohio 45066 (USA)

Toll Free: 1-888-878-4673
Phone: 937-704-9333
Fax: 937-704-9443
www.vsthose.com

Figure 1.

EVR Balance Hanging Hardware Assembly



APPLICATION

These VST Safety Breakaway devices are intended to prevent damage to the dispenser and hose in the event of a vehicle drive off. These devices separate at pull forces up to 350 lbs. Prior to installation (see Installation Preparation), you will need to determine that 350 lbs. of pull force will not damage the dispenser. After verifying that the dispenser is securely bolted to the island, it can be tested by using a spring scale and a length of rope. The rope must be connected at the dispenser outlet casting, which may require a threaded bushing with a hole for attaching the rope. Attach the scale to the rope and pull to 350 lbs. in several directions. Be sure to avoid damaging the dispenser.

NOTE

a. The whip hose ALWAYS attaches to the dispenser. If a retractor is being used, the retractor clamp MUST be between the breakaway and the dispenser.

b. VST hoses are made to withstand 350 pounds tensile pull without damage. If another brand of hose is present at the dispenser, VST recommends that you contact the hose manufacturer regarding the compatibility with this breakaway device.

GENERAL INFORMATION

If hanging hardware components are involved in a drive-off or incur other customer abuse, each individual component must be functionally tested prior to customer dispensing activities.

INSTALLATION PREPARATION

This procedure must be followed to insure leak-proof installation and operation of these safety breakaway products.

1. Turn off and tag the power to the dispenser. Dispenser must be de-energized prior to service to avoid personal injury.
2. Barricade work area to block vehicle access to the dispenser.
3. Close the dispenser shear valve prior to removing hanging hardware (hoses, safety breakaways, and nozzles).
4. Drain liquid product from the hanging hardware set into an approved container prior to replacing any hanging hardware components.
5. Remove hanging hardware from the dispenser prior to making replacement component assembly connections. VST recommends connecting the whip hose to the dispenser as the last connection during the hanging hardware assembly

VST Installation Procedure for Phase II Coaxial EVR Balance Safety Breakaway Devices

NON-Reattachable Breakaway Part Number Series: VSTA-EVR

Vapor Systems Technologies, Inc.
650 Pleasant Valley Drive
Springboro, Ohio 45066 (USA)

Toll Free: 1-888-878-4673
Phone: 937-704-9333
Fax: 937-704-9443
www.vsthose.com

INSTALLATION AND FUNCTION TESTS

1. Initial inspection:
   a. Carefully unpack safety breakaway from shipping carton.
   b. Inspect safety breakaway for any damage to threads, O-Rings, exterior, etc.
2. Lightly lubricate ALL O-Rings on mating connections with petroleum jelly or other suitable lubricant. DO NOT USE pipe dope or thread sealant.
3. Attach breakaway on mating connection and tighten by hand. NOTE THE FLOW DIRECTION ARROW (where applicable). Use the hex on the breakaway body to tighten. DO NOT USE the breakaway body to tighten the unit.
4. Tighten breakaway connection to 50 foot-pounds torque. DO NOT OVER TIGHTEN. Use the hex on the breakaway body to tighten. Use a torque wrench with an open-end attachment to fit the hose couplings and an open-end wrench to properly tighten breakaway connections. DO NOT USE channel-locks or pliers to tighten connections. Proper ft./lb. torque may not be achieved with these tools.
5. Purge air from the system by pumping one-tenth (1/10) to two-tenths (2/10) of a gallon of fuel into an approved container. Inspect each hose joint connection for liquid leaks and make proper adjustments if necessary.
6. Check the nozzle shut-off action by dispensing fuel into an approved container at least three times to assure the proper automatic operation of the interlock rod. According to U/L requirement 842, the fuel flow-rate must be greater than 3 gpm for the automatic shut-off mechanism to operate.

   To test, operate the nozzle and submerge the spout tip in fuel until the fuel level covers the vent hole. The main valve of the nozzle automatically shuts off when liquid covers the vent hole at the end of the spout. The nozzle is not designed to operate on gravity flow. The hold-open latch will disengage automatically when liquid covers the vent hole in the spout. Verify that the fuel flow stops when the nozzle collection sleeve is decompressed (e.g. interlock rod is disengaged). To test that the fuel flow stops, dispense some fuel into an approved container. Slowly remove the nozzle from the container while dispensing fuel. Fuel flow should stop when the nozzle collection sleeve is fully decompressed.
7. Measure the resistance between the dispenser outlet casting and the tip of the nozzle spout. Use an electronic multimeter set on the high range of the ohmmeter function. Resistance should not indicate more than 70,000 ohms per foot of hose. Example: The measured resistance for a 12-foot hose must not exceed 840,000 ohms (840 kilohms).

MAINTENANCE

Inspect safety breakaways daily for damage, loose connections or leaks. Replace as necessary. Subject to customer abuse, safety breakaway should be replaced when damaged.

The safety breakaway is designed and constructed to give lasting service if properly handled and maintained. If for any reason it should need attention, contact your VST distributor for proper disposition.

NOTE

Due to abuse, misuse, changing gasoline formulas, variation in maintenance practices, environmental conditions and/or conditions beyond the manufacturer's control, dispensing equipment may need replacement before five (5) years. Inspections and proper maintenance procedures should be followed by the station manager to determine if replacement is required before five (5) years.

WARNING

Unauthorized rebuilding or modifying of safety breakaways voids **ALL** approvals and warranties.

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

INSTALLATION INSTRUCTIONS for HEALY SYSTEMS, INC. CLEAN AIR SEPARATOR

The Model 9961 or 9961H, Healy Systems Clean Air Separator (CAS) consists of a 400 gallon steel vapor processor vessel that contains a fuel resistant bladder to hold excess gasoline vapors that may develop in gasoline storage tanks during idle periods of gasoline dispensing facility operation. Models and Drawings with a "H" suffix apply to horizontal CAS installations and those without a "H" suffix apply to vertical CAS installations. The CAS assembly weighs approximately 800 pounds which makes it necessary to have a power assisted lifting device available at the installation site to remove the CAS from the transportation vehicle and place it on the required concrete pad (see drawing 9900-9945 or 9900-9945H). The pad (level within 1/8"/foot) is located within 100 feet to the gasoline storage tank vent lines. The pad is a requirement of this installation. DO NOT PLACE THE CLEAN AIR SEPARATOR DIRECTLY ON THE GROUND OR ASPHALT SURFACE. NOTICE: The installer is responsible to ensure that the installation meets the latest edition requirements of NFPA 30A, Chapter 10. No electrical connections are required. The CAS securement method shown in drawing 9900-9945 or 9900-9945H shall be approved by the local authority having jurisdiction with respect to wind and seismic loading. Installer shall not loosen, rotate or remove factory installed fittings or flange as this may damage factory seals and void warranty.

In addition to the vapor processor vessel, there is a hardware kit that contains the following:

- 4 Locking 1" NPT Ball Valves
- 4 Pad locks (keyed alike)
- 1 Breather Assembly, Healy Model 9948
- 1 Float Check Valve Assembly, Model 9466G

Reference the appropriate Healy Systems installation drawing (9900-9942, 9900-9942H, 9900-9971, 9900-9971H, 9900-9972, 9900-9972H, 9900-9973 or 9900-9973H of this manual) for placement of the above parts for the vent stack configuration required by the local Authority Having Jurisdiction (AHJ) for the Underground Storage Tank (UST) system. **A flexible connection between the Clean Air Separator and the vent line(s) is allowable if required by the local Authority Having Jurisdiction (AHJ) to meet seismic requirements. Should the flex connection be installed such that it is not supported, the slope of the flex connection shall be greater than the 1/8"/foot slope required for the rest of the one inch galvanized piping.** The local contractor is responsible to provide all necessary, galvanized piping, non-hardening, UL classified pipe joint compound and plumbing fittings. Additional Pressure/Vacuum (P/V) vent valves to complete installation are not included in the hardware kit. Healy is not responsible for the warranty of any other P/V vent valve purchased to complete installation.

The CAS arrives at the site assembled and tested. All plumbing shall be done using 1" galvanized steel pipe (Schedule 40) and approved nipples, as called out in the installation drawing appropriate for the site installation. Mounting hardware shall be galvanized or stainless steel. Careful attention must be paid to the installation drawing appropriate for the site installation to assure proper operation of the bladder system. Do not inflate the bladder assembly after installation.

It is important that the CAS be secured to the concrete pad as shown in drawing 9900-9945 or 9900-9945H of this manual to prevent any unintentional repositioning of the CAS as the connecting plumbing to the vent system is accomplished.

OPERATION AND PURGING

NORMAL OPERATION:

- There are four ball valves on the CAS. Each ball valve is to be installed so as to allow opening and closing with nothing obstructing the full range (90°) of movement. In normal operation, only the valve (A) at the top of the CAS shall be open – the other three valves (B, C and D) shall be closed. All four valves shall be locked in the above positions. The two plugs (E and F) should be installed using a non-hardening, UL classified pipe joint compound and tightened to 60 ft-lbs.

DRAINING THE BLADDER:

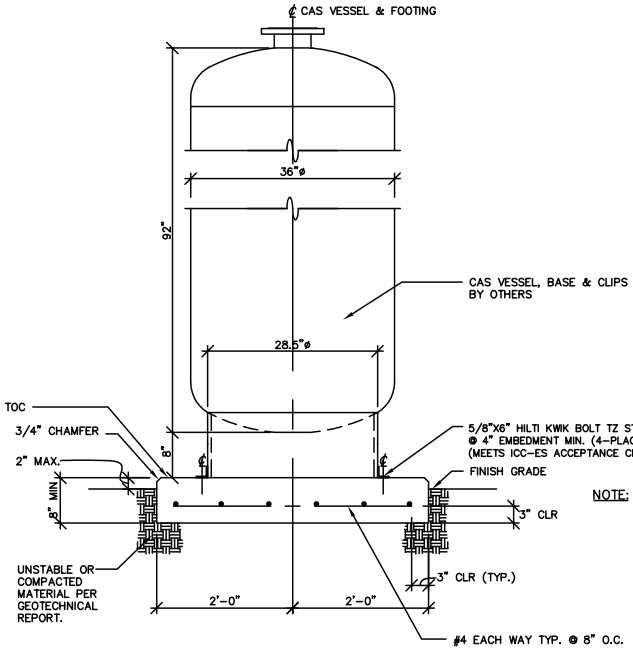
- Any liquid coming over from the vent system would have collected above the valve (A) in the riser pipe before going into the bladder. An inspection of the need to drain the bladder is easily made by removing the plug (E) at the tee on the bottom plumbing of the CAS. Before removing this plug, open the valve (B) above the tee to release any liquid into the piping below. Wait approximately 30 seconds and then close the valve (B). Now, remove the plug (E) at the tee on the bottom plumbing of the CAS – be sure to have a container suitable for gasoline available to catch fluid. If liquid in excess of 16 ounces (473 ml) drains out, the bladder should also be drained.

- Should it be necessary to drain the bladder:
    1. Close the upper ball valve (A) (usually open) leading to the gasoline storage tank vent lines.
    2. Open the valve (C) that goes to the internal syphon tube. Be sure the other three ball valves (A, B and D) that connect to the vent lines and CAS are closed.
    3. Remove the plug (E) from the bottom tee and connect an explosion proof evacuation pump capable of handling liquid. Have a liquid tight, container suitable for gasoline positioned to receive any fluid that may exit the system and start the pump. If no liquid returns within 30 seconds, the bladder is dry – discontinue pumping, remove the pump, replace the plug (E) and return the ball valves to their normal, locked, positions.

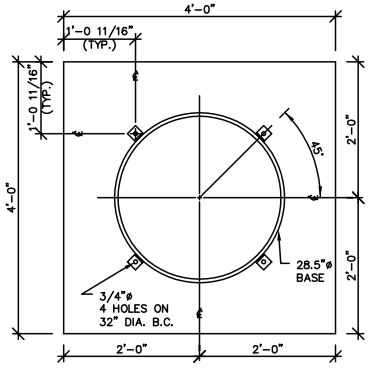
DRAINING THE CAS:

- Should it be necessary to drain the CAS (between the bladder and steel wall):
    1. Close the ball valve at the top (A) of the CAS and also the two valves (B and C) on the vertical risers.
    2. Remove the plug (E) in the bottom tee and place a metal container below the pipe opening.
    3. Carefully open the ball valve (D) at the bottom of the CAS – observe that the container that is being drained into does not overflow – empty container as required until fluid no longer comes from the pipe when the valve is open.
    4. Close the ball valve (D) and replace the plug (E) into the tee.
    5. Return all ball valves to their normal locked positions.

DRW NO: 9900–9945

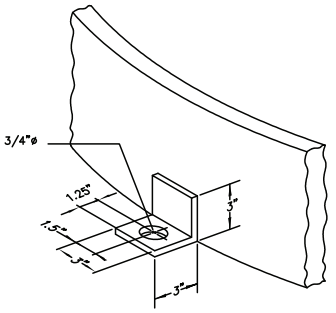


SECTION @ CAS SLAB
SCALE = 3/4" = 1'–0"



BASE PLAN
SCALE = 3/4" = 1'–0"

NOTE:
⚠ WHERE ICC–ES ACCEPTANCE CRITERIA IS NOT REQUIRED, 5/8" X 6" HILTI KWIK BOLT 3 @ 4" EMBEDMENT MIN. CAN BE USED (PER ESR–1385 REPORT, ISSUED 09/01/04).



TYPICAL HOLD DOWN CLIP
SCALE = NONE

CRITERIA
SOIL BEARING 1000 psf
BASIC WIND SPEED 100mph
SEISMIC S_s=2g
S_{s1}=1g
MIN. CONCRETE COMP STRENGTH, f_c' = 2500 psi
MIN. REINF. YIELD STRENGTH, f_y = 40000 psi

REV	DESCRIPTION	ECN NO	BY	DATE
7	ADDED CAS DIMENSIONS, REVISED CRITERIA LIST	–	TF/MB	01/02/08
6	KB–TZ SS WAS KB3, ESR–1917 WAS ESR–1385, ADDED NOTE 1	–	TF/MB	12/21/07

MATERIAL:

DO NOT SCALE DRAWING

STANDARD INCH TOLERANCES (UNLESS OTHERWISE SPECIFIED)

.XX ± .02
.XXX ± .005
ANGULAR ± 1/2°

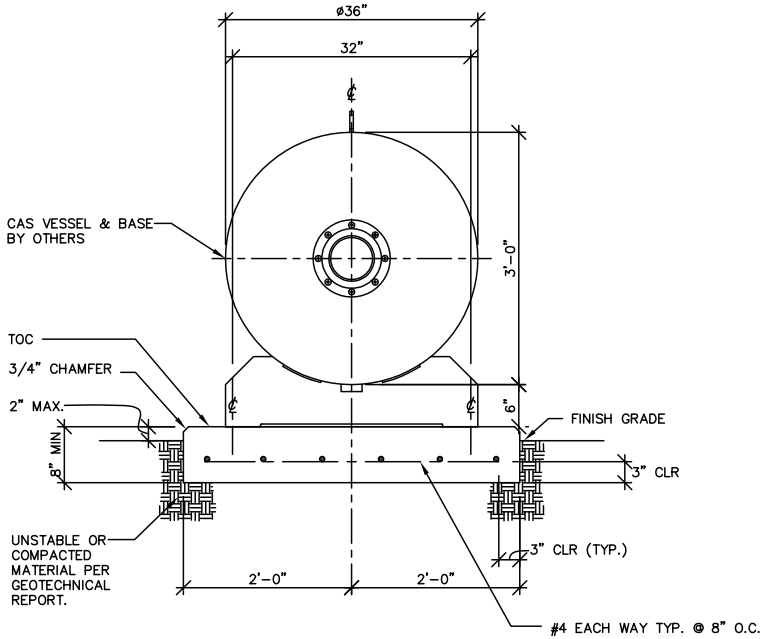
SPECIAL DIST:

Franklin Fueling Systems
Madison, WI 53718

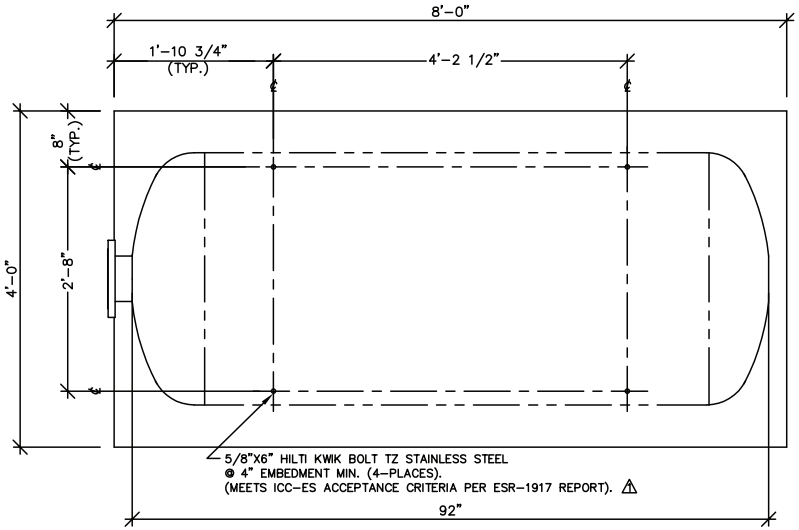
TITLE: CLEAN AIR SEPARATOR MOUNTING SLAB DETAILS

DRAWN:	DATE:	DRW NO:	SUFFIX:
JWH	07/31/02	9900–9945	
APPRVL:	DATE:	SCALE: 1/8	SHEET 1 OF 1

DRW NO: 9900–9945H



SECTION @ CAS SLAB



BASE PLAN

NOTE:
⚠ WHERE ICC–ES ACCEPTANCE CRITERIA IS NOT REQUIRED, 5/8" X 6" HILTI KWIK BOLT 3 @ 4" EMBEDMENT MIN. CAN BE USED (PER ESR–1385 REPORT, ISSUED 09/01/04).

CRITERIA
SOIL BEARING 1000 psf
BASIC WIND SPEED 100mph
SEISMIC S_s=2g
S_{s1}=1g
MIN. CONCRETE COMP STRENGTH, f_c' = 2500 psi
MIN. REINF. YIELD STRENGTH, f_y = 40000 psi

REV	DESCRIPTION	ECN NO	BY	DATE
5	ADDED CAS DIMENSIONS, REVISED CRITERIA LIST	–	TF/MB	01/02/08
4	KB–TZ SS WAS KB3, ESR–1917 WAS ESR–1385, ADDED NOTE 1	–	TF/MB	12/21/07

MATERIAL:

DO NOT SCALE DRAWING

STANDARD INCH TOLERANCES (UNLESS OTHERWISE SPECIFIED)

.XX ± .02
.XXX ± .005
ANGULAR ± 1/2°

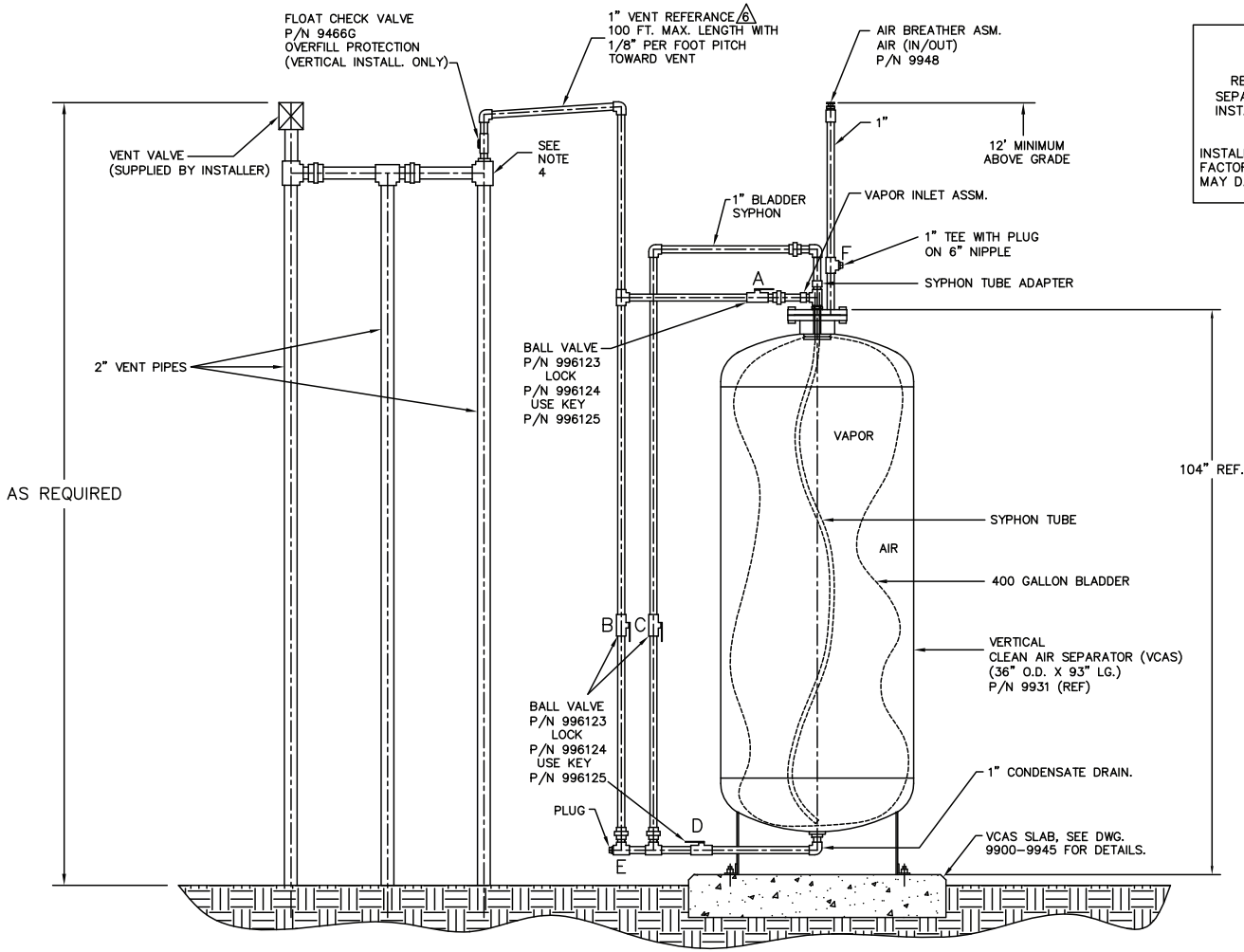
SPECIAL DIST:

Franklin Fueling Systems
Madison, WI 53718

TITLE:
CLEAN AIR SEPARATOR HORIZONTAL MOUNTING SLAB DETAILS

DRAWN:	DATE:	DRW NO:	SUFFIX:
TF	05/22/07	9900–9945	H
APPRVL: MDB	DATE: 06/05/07	SCALE: 3/4"=1'	SHEET 1 OF 1

DRW NO: 9900–9942



NOTICE

DRAWINGS ARE TWO DIMENSIONAL REPRESENTATION OF TYPICAL CLEAN AIR SEPARATOR (CAS) INSTALLATION. ACTUAL CAS INSTALLATIONS WILL VARY SLIGHTLY FROM THE REPRESENTATION SHOWN.

INSTALLER SHALL NOT LOOSEN, ROTATE OR REMOVE FACTORY INSTALLED FITTINGS OR FLANGE AS THIS MAY DAMAGE FACTORY SEALS AND VOID WARRANTY.

NOTE:
1 – ALL BALL VALVES (B.V.) TO BE UL LISTED AND HAVE PADLOCK FEATURE.
2 – PASSIVE PRESSURE CONTROL–NO ELECTRICAL POWER REQUIRED.
3 – AIR BREATHER MUST BE INSTALLED AT A MINIMUM HEIGHT OF 12' ABOVE GRADE.
4 – VENT LINE TIE IN CAN BE INSTALLED ANYWHERE ALONG THE VENT STACK LINE PROVIDED THAT PIPE SLOPE IS MAINTAINED AND THE CHECK VALVE IS IN THE CORRECT VERTICAL INSTALLATION.
5 – ONLY GALVANIZED PIPE IS TO BE USED FOR PIPING CONNECTIONS
6 – A FLEXIBLE CONNECTION BETWEEN THE CLEAN AIR SEPARATOR AND THE VENT LINE(S) IS ALLOWABLE IF REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) TO MEET SEISMIC REQUIREMENTS. SHOULD THE FLEX CONNECTION BE INSTALLED SUCH THAT IT IS NOT SUPPORTED, THE SLOPE OF THE FLEX CONNECTION SHALL BE GREATER THAN THE 1/8" PER FOOT SLOPE REQUIRED FOR THE REST OF THE ONE INCH GALVANIZED PIPING.

MATERIAL:

DO NOT SCALE DRAWING

STANDARD INCH TOLERANCES (UNLESS OTHERWISE SPECIFIED)

.XX ±.02
.XXX ±.005
ANGULAR ±1/2°

SPECIAL DIST:

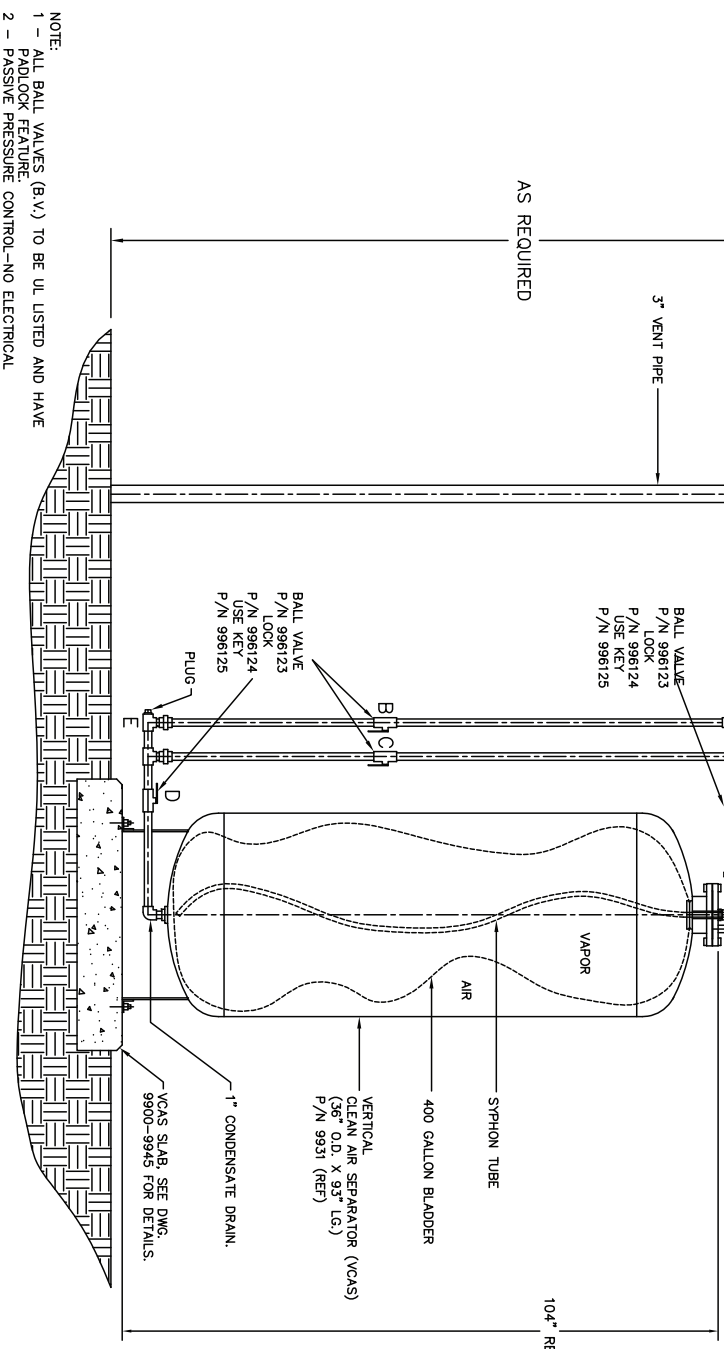
REV	DESCRIPTION	ECN NO	BY	DATE
15	ADDED NOTE 6	401666	TF/MDB	03/20/08

Franklin Fueling Systems
Madison, WI 53718

TITLE: CLEAN AIR SEPARATOR VERTICAL INSTALLATION

DRAWN:	DATE:	DRW NO:	SUFFIX:
JWH	05/14/02	9900–9942	
APPRVL:	DATE:		
MDB	06/05/07		

ACAD HLY | SCALE: N.T.S. | SHEET 1 OF 1



NOTE:

1 – ALL BALL VALVES (B.V.) TO BE UL LISTED AND HAVE PADLOCK FEATURE
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5 – ONLY GALVANIZED PIPE IS TO BE USED FOR PIPING CONNECTIONS
6 – A FLEXIBLE CONNECTION BETWEEN THE CLEAN AIR SEPARATOR AND THE VENT LINE(S) IS ALLOWABLE IF REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) TO MEET SEISMIC REQUIREMENTS. SHOULD THE FLEX CONNECTION BE INSTALLED SUCH THAT IT IS NOT SUPPORTED, THE SLOPE OF THE FLEX CONNECTION SHALL BE GREATER THAN THE 1/8" PER FOOT SLOPE REQUIRED FOR THE REST OF THE ONE INCH GALVANIZED PIPING.

DRW NO: 9900–9971

NOTICE

DRAWINGS ARE TWO DIMENSIONAL REPRESENTATION OF TYPICAL CLEAN AIR SEPARATOR (CAS) INSTALLATION. ACTUAL CAS INSTALLATIONS WILL VARY SLIGHTLY FROM THE REPRESENTATION SHOWN.

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REV	DESCRIPTION	EON NO	BY	DATE
8	ADDED NOTE 6	401666	TF MDB	03/20/08

MATERIAL:

DO NOT SCALE DRAWING

STANDARD INCH TOLERANCES (UNLESS OTHERWISE SPECIFIED) .XX ± .02 .XXX ± .005 ANGULAR ± 1/2°

SPECIAL DIST:

Franklin Fueling Systems
Madison, WI 53718

TITLE: CLEAN AIR SEPARATOR VERTICAL INSTALLATION (1 VENT)

DRAWN: JWH DATE: 05/14/02

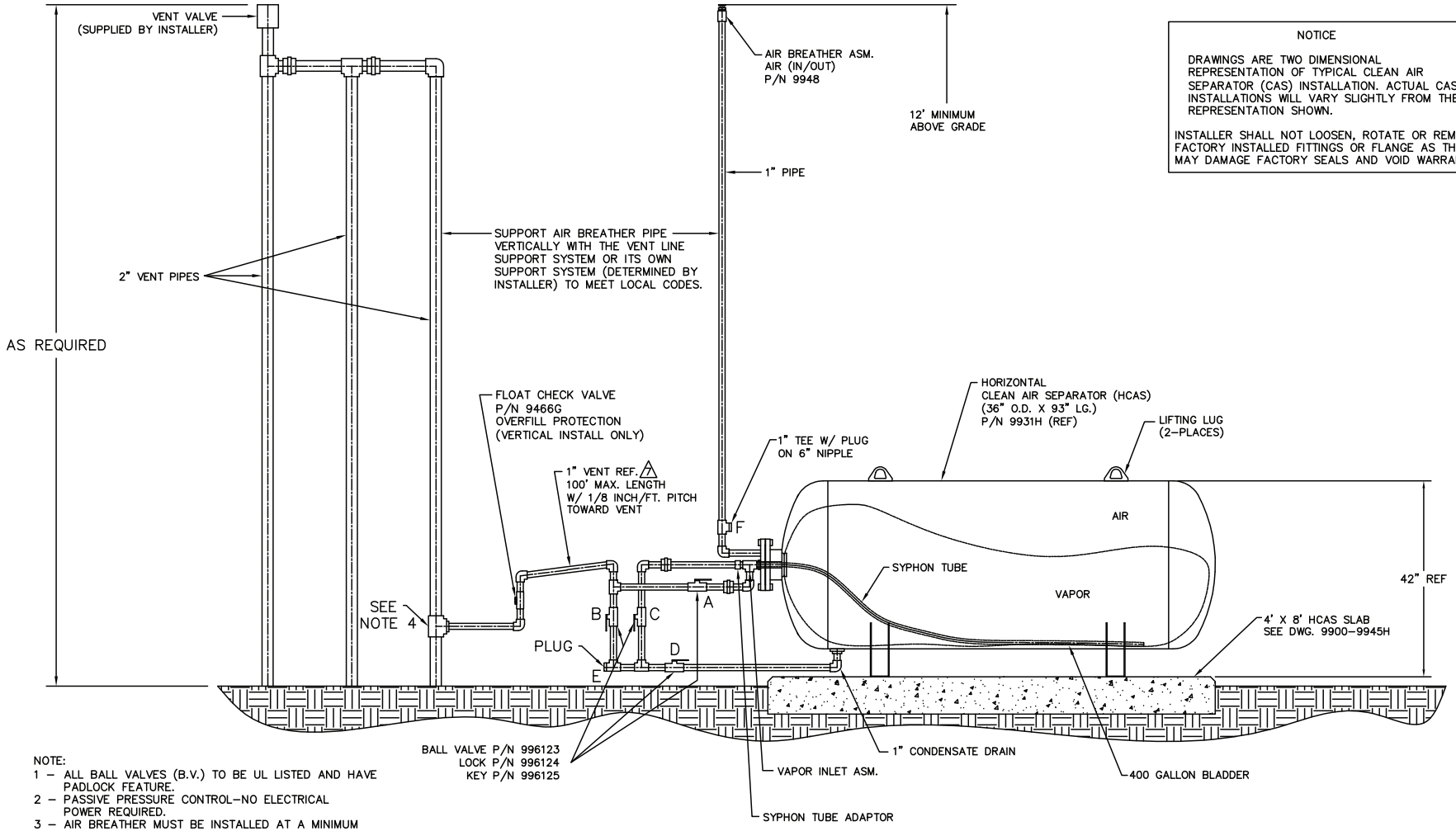
APPRVL: MDB DATE: 06/05/07

DRW NO: 9900–9971

SUFFIX:

ACAD HLY SCALE: N.T.S. SHEET 1 OF 1

DRW NO: 9900–9942H



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NOTE:
1 – ALL BALL VALVES (B.V.) TO BE UL LISTED AND HAVE PADLOCK FEATURE.
2 – PASSIVE PRESSURE CONTROL–NO ELECTRICAL POWER REQUIRED.
3 – AIR BREATHER MUST BE INSTALLED AT A MINIMUM HEIGHT OF 12' ABOVE GRADE ON 1" PIPE.
4 – VENT LINE TIE IN CAN BE INSTALLED ANYWHERE ALONG THE VENT STACK LINE PROVIDED THAT PIPE SLOPE IS MAINTAINED AND THE CHECK VALVE IS IN THE CORRECT VERTICAL INSTALLATION.
5 – ONLY GALVANIZED PIPE IS TO BE USED FOR PIPING CONNECTIONS
6 – HCAS TO SLOPE SLIGHTLY TOWARD CONDENSATE DRAIN. PITCH SLAB WITHIN 1/8 INCH/FOOT TOWARD CONDENSATE DRAIN END OR SHIM HCAS FOR PROPER VESSEL DRAINAGE.
7 – A FLEXIBLE CONNECTION BETWEEN THE CLEAN AIR SEPARATOR AND THE VENT LINE(S) IS ALLOWABLE IF REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) TO MEET SEISMIC REQUIREMENTS. SHOULD THE FLEX CONNECTION BE INSTALLED SUCH THAT IT IS NOT SUPPORTED, THE SLOPE OF THE FLEX CONNECTION SHALL BE GREATER THAN THE 1/8" PER FOOT SLOPE REQUIRED FOR THE REST OF THE ONE INCH GALVANIZED PIPING.

REV	DESCRIPTION	ECN NO	BY	DATE
7	ADDED NOTE 7	401666	TF / MDB	03/20/08

MATERIAL:

DO NOT SCALE DRAWING | .XX ±.02
STANDARD INCH TOLERANCES (UNLESS OTHERWISE SPECIFIED) | .XXX ±.005 | ANGULAR ±1/2°

SPECIAL DIST:

Franklin Fueling Systems
Madison, WI 53718

TITLE: CLEAN AIR SEPARATOR HORIZONTAL INSTALLATION

DRAWN:	DATE:	DRW NO:	SUFFIX:
TF	05/23/07	9900–9942	H
APPRVL: MDB	DATE: 06/05/07	SCALE: N.T.S.	SHEET 1 OF 1

DRW NO: 9900–9972

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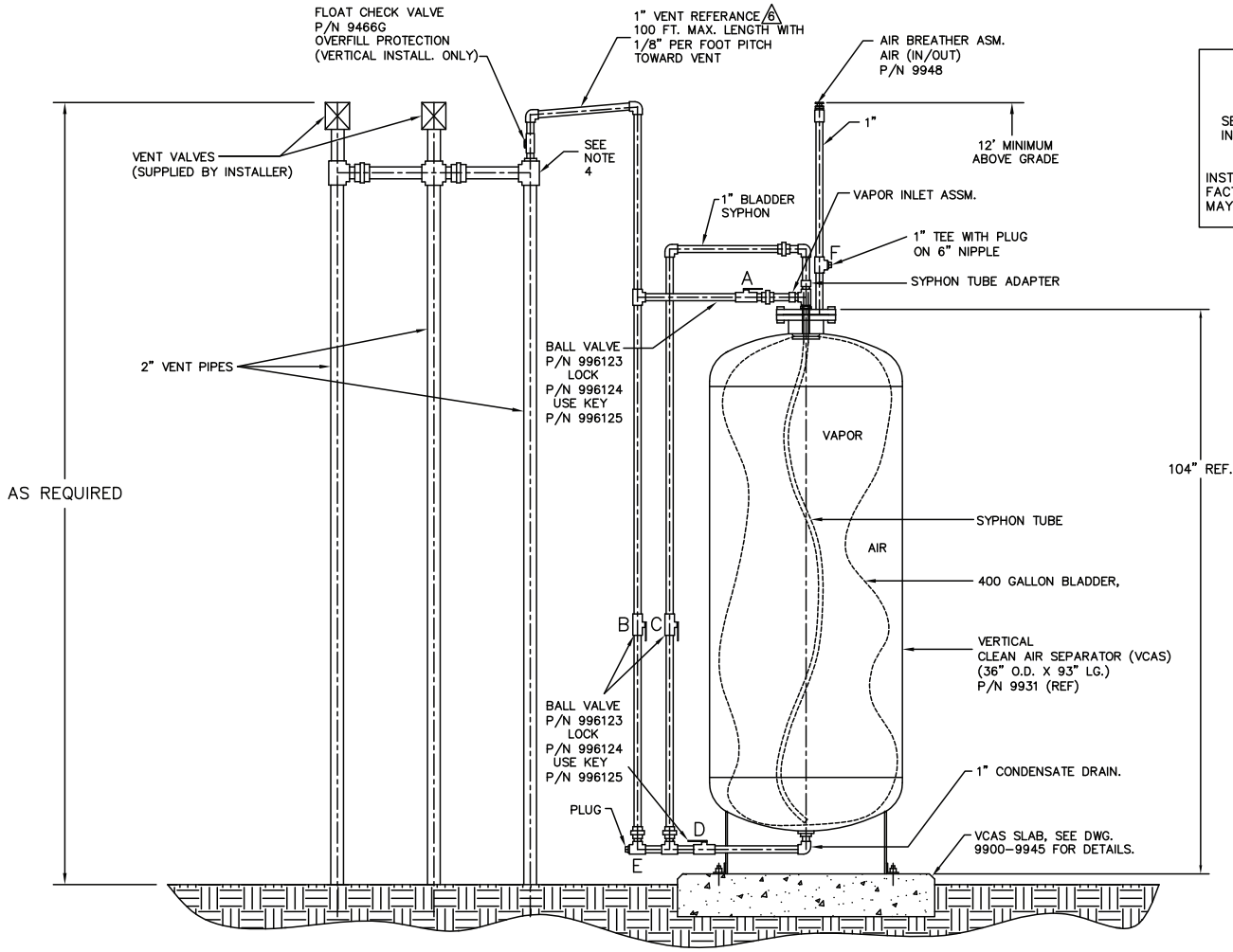

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REV	DESCRIPTION	ECN NO	BY	DATE
8	ADDED NOTE 6	401666	TF MDB	03/20/08

MATERIAL:

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STANDARD INCH TOLERANCES (UNLESS OTHERWISE SPECIFIED)

.XX ± .02
.XXX ± .005
ANGULAR ± 1/2°

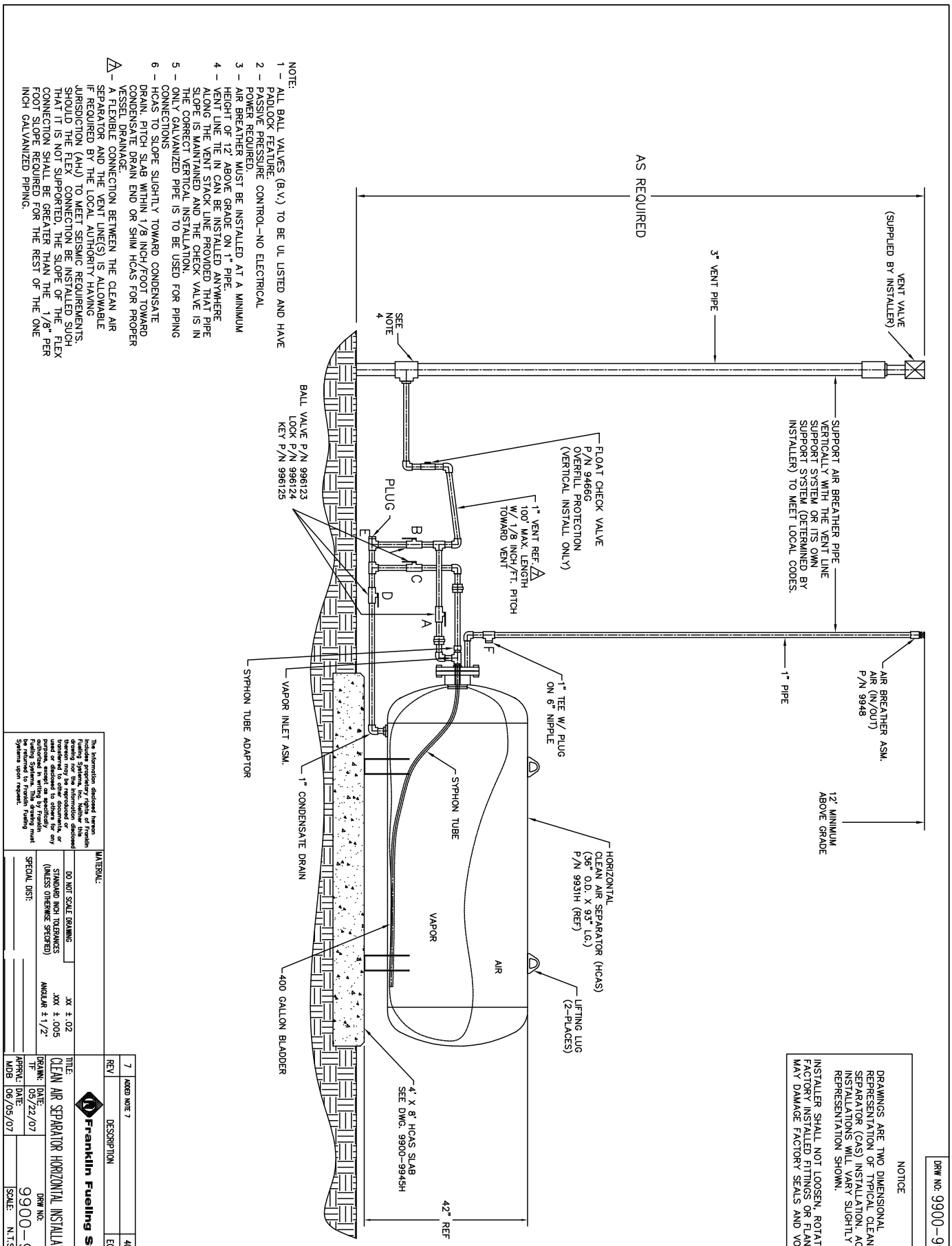
SPECIAL DIST:

Franklin Fueling Systems
Madison, WI 53718

TITLE: CLEAN AIR SEPARATOR VERTICAL INSTALLATION (2 VENT)

DRAWN:	DATE:	DRW NO:	SUFFIX:
JWH	05/14/02	9900–9972	
APPRVL:	DATE:		
MDB	06/05/07		

ACAD HLY | SCALE: N.T.S. | SHEET 1 OF 1



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DRW NO: 9900-9971H

REV	DESCRIPTION	EON NO	BY	DATE
7	ADDED NOTE 7	401666	TF	03/20/08

Franklin Fueling Systems
Madison, WI 53718

TITLE: CLEAN AIR SEPARATOR HORIZONTAL INSTALLATION (1 VENT VALVE)

DRAWN: TF DATE: 05/22/07
APPRV.: MDB DATE: 06/05/07

DRW NO: 9900-9971 SUFFIX: H

SCALE: N.T.S. SHEET 1 OF 1

MATERIAL:

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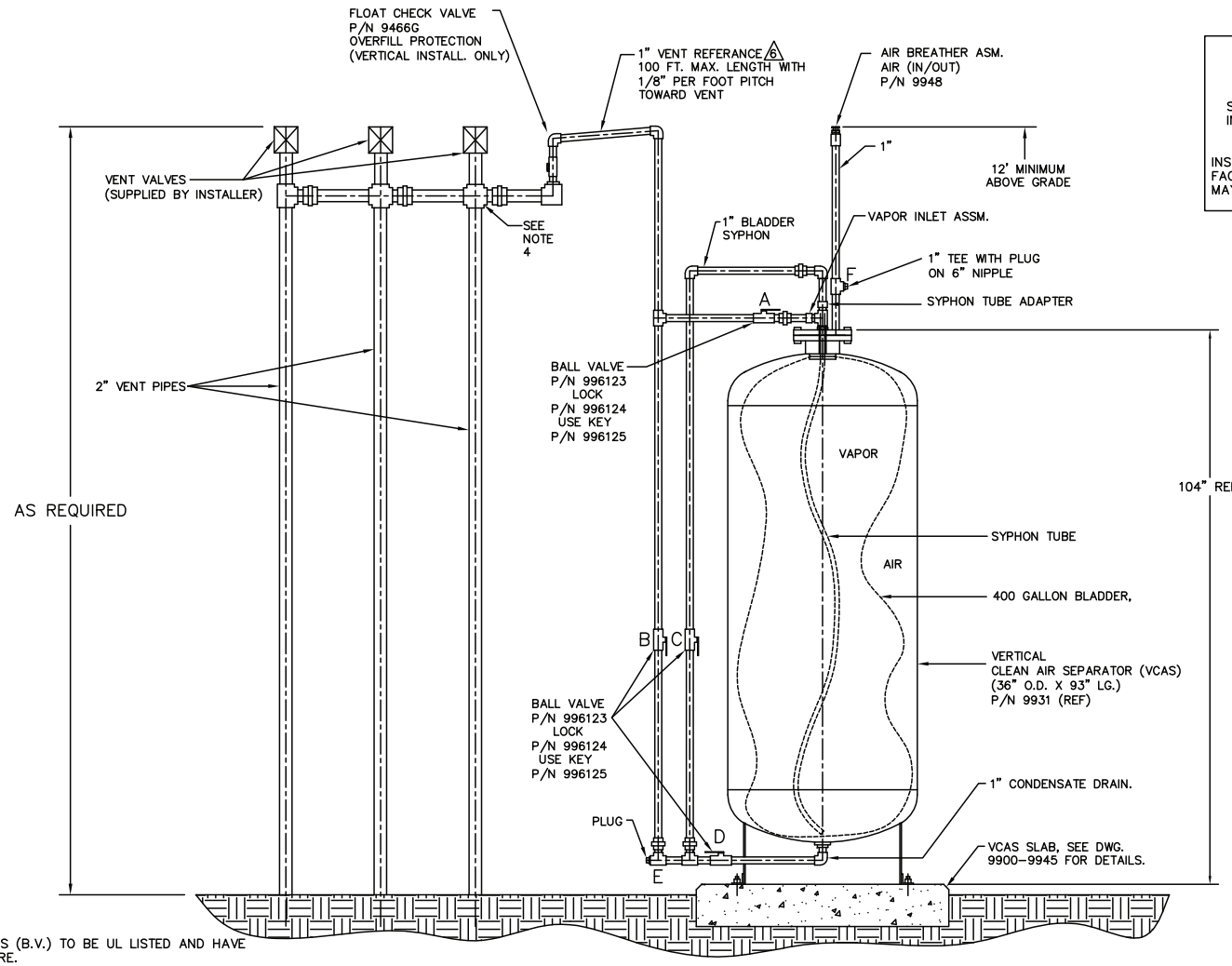
STANDARD INCH TOLERANCES (UNLESS OTHERWISE SPECIFIED) .XX ± .02 .XXX ± .005 ANGULAR ±1/2°

SPECIAL DIST:

DRW NO: 9900–9973



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REV	DESCRIPTION	ECN NO	BY	DATE
8	ADDED NOTE 6	401666	TF / MDB	03/20/08

MATERIAL:

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.XX ± .02
.XXX ± .005
ANGULAR ± 1/2°

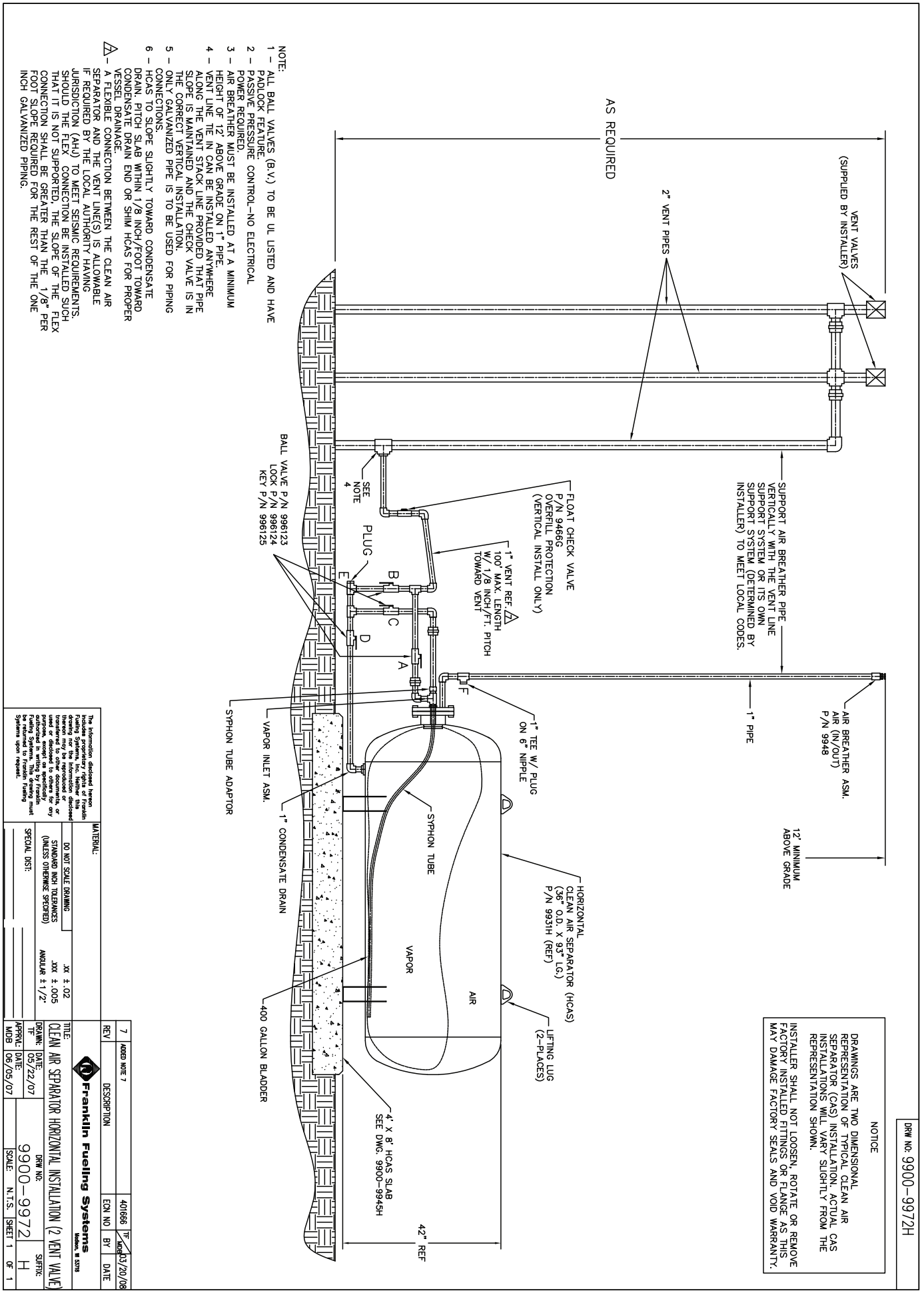
SPECIAL DIST:

Franklin Fueling Systems
Madison, WI 53718

TITLE: CLEAN AIR SEPARATOR VERTICAL INSTALLATION (3 VENT)

DRAWN:	DATE:	DRW NO:	SUFFIX:
JWH	05/14/02	9900–9973	
APPRVL:	DATE:		
MDB	06/05/07		

ACAD HLY | SCALE: N.T.S. | SHEET 1 OF 1



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DRW NO: 9900-9972H

REV	DESCRIPTION	EON NO	BY	DATE
7	ADDED NOTE 7	401666	TF	03/20/08

MATERIAL:

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SPECIAL DIST:

Franklin Fueling Systems Madison, WI 53718

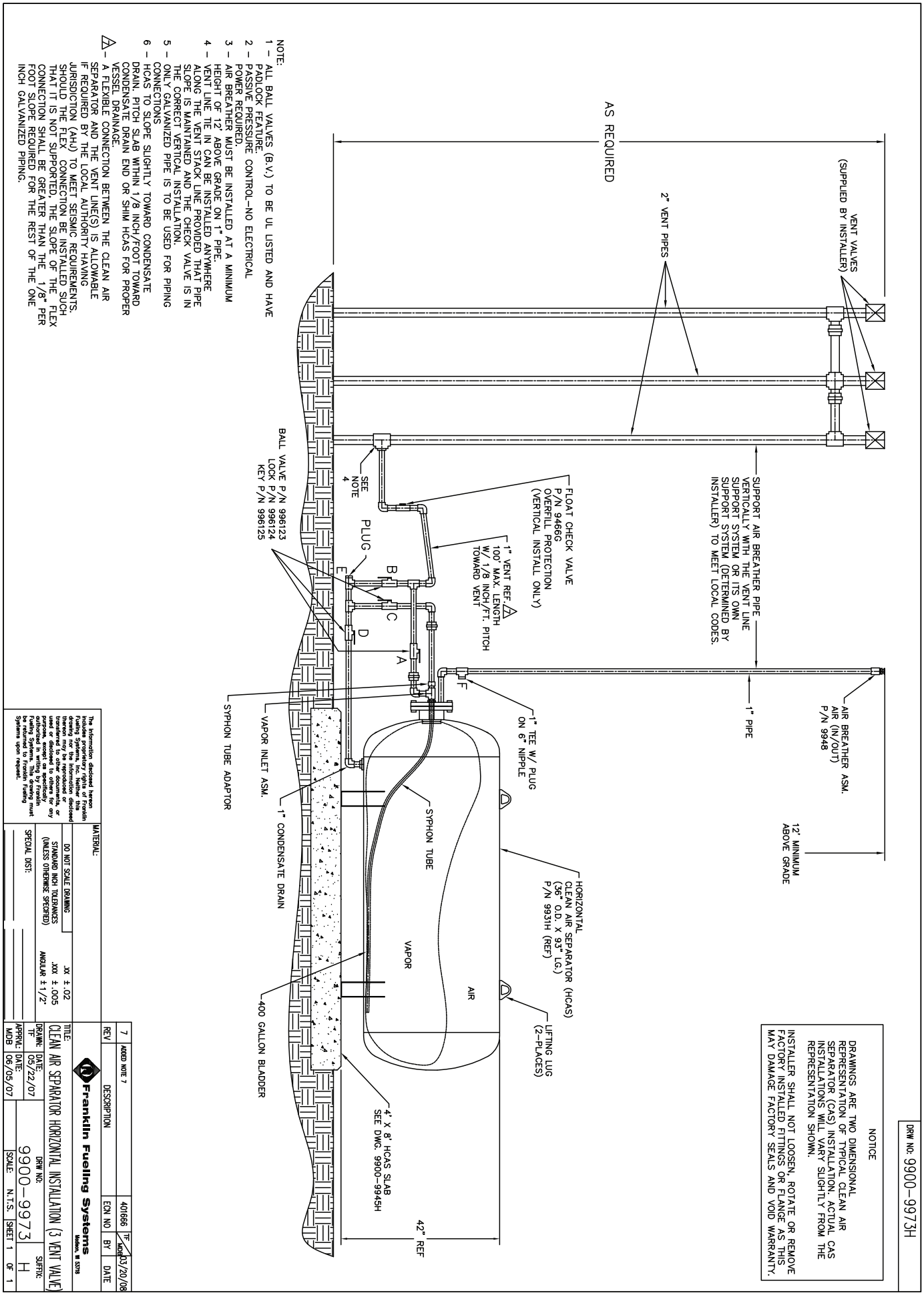
TITLE: CLEAN AIR SEPARATOR HORIZONTAL INSTALLATION (2 VENT VALVE)

DRAWN: TF DATE: 05/22/07

APPRV: MDB DATE: 06/05/07

DRW NO: 9900-9972 SUFFIX: H

SCALE: N.T.S. SHEET 1 OF 1



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DRW NO: 9900–9973H

REV	DESCRIPTION	EON NO	BY	DATE
7	ADDED NOTE 7	401666	TF	03/20/08

MATERIAL:

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SPECIAL DIST:

TITLE: CLEAN AIR SEPARATOR HORIZONTAL INSTALLATION (3 VENT VALVE)

DRAWN: TF DATE: 05/22/07
APPRV: MDB DATE: 06/05/07

DRW NO: 9900–9973 SUFFIX: H

SCALE: N.T.S. SHEET 1 OF 1

Franklin Fueling Systems
Madison, WI 53718