

Executive Order G-70-196

Exhibit 2

Specifications for the SaberVac VR Phase II Vapor Recovery System

Figure 2A1 – 2A4 depict the pump location, dispenser and hose configuration possibilities for the SaberVac VR system with the SaberVac Model V01001 pump installed outside of the dispenser. The SaberVac Model V01001 pump may also be installed inside the dispenser housing just before the dispenser outlet fitting. Figure 2B provides instructions for conducting air-to-liquid ratio testing with the Husky 605104 nozzle.

Nozzle

1. Husky Model 605104 nozzle has a solid spout and recovers the vapor through the vapor splash guard (VSG). The vapor splash guard (VSG) has a 1/8" vapor bleed hole. A Vapor Splash Guard (VSG) shall be installed on the Husky Model 605104 nozzle at the base of the spout, as shown in Figure 1A.

Any Husky Model 605104 with a VSG which is missing, or which is damaged such that at least a one and one-half (1.5) inch slit has developed, or which has cumulative damage equivalent to at least a 1.5 inch slit, is defective and shall be immediately removed from service. Any Husky 605104 nozzle which is damaged such that at least a three-sixteenth (3/16) inch hole has developed, or which has the cumulative damage equivalent to at least a 3/16 inch hole, is defective and shall be immediately removed from service.

Any Husky 605104 nozzle, when properly latched into a vehicle fillpipe meeting the CARB standard, where the VSG flange portion does not make contact with or cover the entire fillpipe opening is defective and shall be immediately removed from service.

2. The nozzles shall have an integral vapor valves which prevent the loss of vapor from the underground storage tanks and ensure proper operation of the system.
3. Nozzles shall be 100 percent performance checked at the factory, including checks of all shutoff mechanisms and of the integrity of the vapor path. The maximum allowable leak rate for the nozzle shall not exceed the following:

0.038 CFH at a pressure of two inches water column (2" wc).

Coaxial Hose

1. The hoses shall be installed in conformance with the specifications contained in the latest revision of G-70-52 for those hose configurations as specified in Exhibits 2A-1 through 2A-4 of this executive order.

Dispensing Rate

1. The dispensing rate for installations of the SaberVac VR system shall not exceed 10.0 gallons per minute. This shall be determined as specified in Exhibit 3.

Breakaway Couplings

1. Breakaway couplings are optional but, if installed, only **CARB-certified breakaway couplings which close the vapor path upon separation may be used.**

Pressure/Vacuum Valves for Storage Tank Vents

1. A pressure/vacuum (P/V) valve shall be installed on each tank vent. Vent lines may be manifolded to minimize the number of P/V valves and potential leak sources, provided the manifold is installed at a height not less than 12 feet above the driveway surface used for Phase I tank truck filling operations. At least one P/V valve shall be installed on manifolded vents. If two P/V valves are desired, they shall be installed in parallel, so that each can serve as a backup for the other if one should fail to open properly. The P/V valve shall be a CARB-certified valve as specified in Exhibit 1. The outlets shall vent upward and be located to eliminate the possibility of vapor accumulating or traveling to a source of ignition or entering adjacent buildings.
2. The P/V valve is designed to open at a pressure of approximately three inches water column (3" wc). Storage tank pressure which exceeds 3" wc for more than a short time may indicate a malfunctioning pressure/vacuum vent valve.

SaberVac VR System

1. The A/L ratio of the system measured at a flowrate between six and ten gallons per minute (6.0 - 10.0 gpm), shall be within the values listed in the following table. Any fueling point not capable of demonstrating compliance with this performance standard shall be deemed defective and removed from service. Alternative test procedures may be used if they are determined by the Executive Officer, in writing, to yield comparable results. The Husky 6051 models require a special adapter to conduct A/L ratio testing. The site is required to maintain the Husky V1 605104 adapter on site and available for A/L testing at all times.

Limits of Measured Values of A/L between 6.0 to 10.0 gpm fuel flow rate:

Minimum Measured value of A/L	0.85
Maximum Measured value of A/L	1.05

Note: The SaberVac VR system is an assisted balance system and the use of the standard A/L procedure to evaluate the performance of the total SaberVac VR system is thus not valid, just as it is not valid for other balance systems. The use of the A/L adapter prevents the system from being tested in true balance-like operational mode. No seal can be made with the A/L tank during this test, and the effective pressure at the nozzle vapor inlet is always slightly less than atmospheric, due to the drag of the A/L vapor flow meter.

In the SaberVac VR system, A/L measurements are used to determine that "balance" system back pressure is within limits and that the SaberVac Model V01001 pumps are operating within the manufacturer's specification. The A/L procedure is used to determine that the SaberVac VR system is operating properly under fixed, defined, conditions for each measurement. This can be accomplished most easily by conducting the A/L test at fixed pressure conditions at both the nozzle and the UST, preferably with both the nozzle and UST at atmospheric pressure.

To insure that the SaberVac system is operating within designed operating parameters, the fuel dispensed into the A/L test tank should only be returned to the UST after all A/L tests are concluded. If this is not possible due to the need to do a large number of A/L tests, the ARB has approved of the following procedures:

- a. When the A/L test tank must be emptied, the vapor poppet on the UST shall be opened during the return of the fuel to the UST. A stand-pipe of about 6 ft tall shall be used to allow venting of the displaced vapors from the UST above ground level during the dumping of the fuel. After fuel dumping, the vapor valve poppet shall be closed.
- b. Alternatively, the A/L test tank may be equipped with a vapor return hose (like a Phase I delivery tank truck), allowing the displaced vapors in the UST to be returned to the A/L test tank.

Both procedures above provide for consistent measurements of the A/L values without abnormally changing the pressure drop across the total system during A/L tests.

Instructions on how to conduct A/L testing with the Husky 605104 nozzle are listed in Figure 2B.

2. Saber **SaberVac** Model V01001 vapor pump. A fluid driven turbine magnetically coupled to a radial flow fan to pull the vapors from the nozzle vapor splash guard and return them to the UST through the hoses and piping. The pump is equipped with male 1 7/8 inch - 12 thread coax connection on the dispenser fuel outlet end and a female connection on the opposite end. The pump may be installed directly into the dispenser outlet fitting, or it may be equipped with alternate threaded connections to allow it to be installed at the end of a short whip hose or inside the dispenser housing in new installations.
3. In the case that the SaberVac VR system is operating at an Underground Storage Tank (UST) gauge pressure greater than 2" wc over an extended period the system's operation will be deemed defective and the whole station will be considered out of order.

Note: If a fuel drop has occurred within 2 hours of the pressure measurement (or the station was closed during the fuel drop and fuel dispensing did not resume within 2 hours of the pressure measurement) and the UST pressure exceeds 2" WC, the station shall not be considered out of order.

Vapor Recovery Piping Configurations

1. The maximum allowable pressure drop through the system shall never exceed one-half inch (0.5") water column at 60 SCFH. The pressure drop shall be measured from the dispenser riser to the UST with pressure/vacuum valves installed and with the poppeted Phase I vapor connection open.

Note: The A/L test may be used to verify proper operation of the system, in lieu of measuring the pressure drop through the lines, by performing the A/L test when the UST is vented to atmospheric pressure, provided that two gallons of product is introduced into the system at the termination of the vapor return lines, prior to the test.

2. All vapor return and vent lines shall slope a minimum of 1/8 inch per foot. A slope of 1/4 inch or more per foot is recommended wherever feasible. The dispenser shall be connected to the riser with either flexible or rigid material which is listed for use with gasoline. Clamps shall be used to secure the flexible lines. The dispenser-to-riser

connection shall be installed so that any liquid in the lines will drain toward the UST. The internal diameter of the connector, including all fittings, shall be not less than three-fourths inch (3/4").

3. All vapor return and vent piping shall be installed in accordance with the manufacturer's instructions and all applicable regulations.
4. No product shall be dispensed from any fueling point associated with a vapor line which is disconnected and open to the atmosphere. If vapor lines are manifolded, this includes all fueling points in the facility. Dispensing of product from any fueling point associated with a disconnected vapor line is considered to be a defect.

Phase I System

WARNING: Phase I fill caps should be opened with caution because the storage tank may be under pressure.

1. The Phase I system shall be a CARB-certified system which is in good working order and which demonstrates compliance with the static pressure decay test criteria of TP-201.3. Coaxial Phase I systems shall not be used with new installations of the system. **Replacement of storage tanks at existing facilities, or modifications which cause the installation of new or replacement Phase I vapor recovery equipment, are considered new installations with regard to this prohibition.** Districts may grant an exception to this prohibition for coaxial Phase I systems CARB-certified after January 1, 1994, as compatible for use with Phase II systems which require pressure/vacuum vent valves. Where installation of the SaberVac VR system is made by retrofitting previously installed equipment, local districts may elect to allow existing coaxial Phase I systems to remain in use for a specifically identified period of time provided the following conditions are met:
 - the existing coaxial Phase I system is a poppeted, CARB-certified system capable of demonstrating compliance with the static pressure decay test as specified above; and
 - installation of the Phase II system requires no modification of the UST(s) and/or connections.
2. Spill containment manholes which have drain valves shall demonstrate compliance with the static pressure decay criteria with the drain valves installed as in normal operation. Manholes with cover-actuated drain valves shall not be used in new installations (as defined above). Manholes with cover-actuated drain valves may remain in use in facilities where installation of the SaberVac VR system does not require modification of the tank fittings provided the facility demonstrates compliance with static pressure decay test criteria both with the cover in place and with the cover removed.
3. The Phase I vapor recovery system shall be operated during product deliveries so as to minimize the loss of vapors from the facility storage tank which may be under pressure. Provided it is not in conflict with established safety procedures, this shall be accomplished in the following manner:
 - **the Phase I vapor return hose is connected to the delivery tank and to the delivery elbow before the elbow is connected to the facility storage tank;**

- **the delivery tank is opened only after all vapor connections have been made, and is closed before disconnection of any vapor return hoses; and**
 - **the vapor return hose is disconnected from the facility storage tank before it is disconnected from the delivery tank.**
4. Phase I deliveries shall be accomplished so as to ensure that there is at least one vapor connection between the cargo tank compartment headspace and the storage tank associated with the product delivery. There shall be no more than two product hoses used with one vapor hose connected, and no more than three product hoses used with two vapor hoses connected.
5. Storage tank vent pipes, and fill and vapor and manhole tops, shall be maintained *in* any color which minimizes solar gain and has a reflective effectiveness of 55% or greater. Reflectivity shall be determined by visual comparison of the paint with paint color cards obtained from a paint manufacturer who uses the "Master Pallet Notation" to specify the paint color (i.e. 58YY *88*/180 where the number in italics is the paint reflectivity). Examples of colors having a reflective effectiveness of 55% or greater include, but not limited to: yellow, light gray, aluminum, tan, red iron oxide, cream or pale blue, light green, glossy gray, light blue, light pink, light cream, white, silver, beige, tin plate and mirrored finish.. **Manhole covers which are color coded for product identification are exempted from this requirement.**