

Executive Order G-70-191
Healy ORVR Phase II Vapor Recovery System
Exhibit 2
System Specifications

Typical installations of the Healy ORVR Phase II Vapor Recovery System are shown in Figures 2A-1 through 2A-6.

Nozzle

1. A vapor collection boot shall be installed on the nozzle at the base of the spout, as shown in Exhibit 2, Figure 2B-1. Any nozzle with a vapor collection boot which is missing, or which has one half of the mini-boot faceplate or greater missing is defective and shall be immediately removed from service.
2. The Healy Model 600 ORVR / 800 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. Any nozzle with a defective vapor valve shall be immediately removed from service. The integrity of the system shall be restored by replacing the nozzle or otherwise closing the vapor path as soon as practicable.
3. Nozzles shall be 100 percent performance checked at the factory, including checks of all shutoff mechanisms and of the integrity of the vapor valve. The maximum allowable leak rate for the nozzle vapor valve shall not exceed the following:
 - 0.038 CFH at a pressure of two inches water column (2" WC), and
 - 0.005 CFH at a vacuum of eighty three inches water column (approx. 3 psi).

Dispensing Rate

1. The dispensing rate for installations of the Healy ORVR Phase II Vapor Recovery System shall not exceed 10.0 gallons per minute at any time. This shall be determined as specified in Exhibit 4.
2. The dispensing rate shall be not less than 6.0 gallons per minute when measured at the highest possible flow rate and when only one nozzle associated with the product supply pump is operating. Failure to demonstrate at least 6.00 gpm shall be cause for issuing a notice to comply.

Inverted Coaxial Hoses

1. The maximum length of the hose shall be 13 feet.
2. The length of hose which may be in contact with the island and/or ground when the nozzle is properly mounted on the dispenser, is limited to six inches (6") per loop.

Breakaway Couplings

1. Breakaway couplings are optional but, if installed, only CARB-certified breakaways with a valve which closes the vapor path when separated, may be used.

Healy ORVR Phase II Vapor Recovery System

1. The Healy ORVR Phase II Vapor Recovery System shall consist of an integrated vapor recovery unit made up of an electronic (computerized) control unit and a one-eighth (1/8) hp alternating current electric motor that drives a variable speed rotary vane pump. The VP-1000 Vapor Recovery Vane Pump has been sized to satisfy the recovery needs of one dispenser, with two hoses, pumping either individually or simultaneously. Healy Systems supplies a unique regulation valve, built into the face plate of the pump assembly, to assure that proper levels of vacuum are maintained. The actual vapor recovery rate is determined by a valve in the nozzle which senses product flow. As the flow of fuel changes, the Healy ORVR Phase II Vapor Recovery System responds with a change in pump speed to produce adequate vacuum to maintain a vapor to liquid ratio of approximately 1.1.

The A/L ratio of the system measured at a flow rate between six and ten gallons per minute (6 - 10 gpm), shall be 1.10 plus or minus 0.10 (1.00 to 1.20). Any fueling point not capable of demonstrating compliance with this performance standard shall be deemed defective and removed from service. The A/L ratio shall be determined by using the CARB-approved procedure TP-201.5. **Note: A CARB-certified spout adapter / sleeve unique to the Healy 600 ORVR / 800 nozzle must be used in order to obtain accurate results. See Exhibit 2 Figure 2B-3.** Alternative test procedures may be used if they are determined by the Executive Officer, in writing, to yield comparable results.

NOTE: Test Procedure TP-201.5 returns air rather than vapor to the storage tank, and normally causes an increase in storage tank pressure which may result in vent emissions. This is a temporary condition due to the test and should not be considered an indication of malfunction or noncompliance.

2. The Healy ORVR Phase II Vapor Recovery System shall have the following electronic protective features:
 - Over-Temperature Protection. The system shall shut down if the pump exceeds 90 degrees Celsius. Once shut down, the system shall reset automatically when the pump cools down below 80 degrees Celsius.
 - Voltage Protection. For systems designed to operate with 115 volts, the system electronic controls shall automatically regulate voltages of 90 to 135 volts to provide the proper operating voltage for the motor. Voltages outside of this range shall cause the system to shut down (i.e., high voltage may result in over heating and/or power levels being exceeded). For systems designed to operate with 230 volts, the operating voltage range is specified at 180 to 270 volts.
 - Power Level Control. The system shall automatically sense conditions that cause high power levels and shall shut down. Conditions causing high power levels include the following: blocked pump inlets, locked rotor condition of the motor, shorted motor windings and pump overload conditions. An error signal shall be sent to the master control inside the service station. The system shall then restart automatically. This "shut down send signal wait-restart" cycle will occur three times. After the third cycle failure it shall not restart automatically. Instead it must be manually reset by a "restart signal" from the service station.
3. The system shall generate an error signal if a liquid blockage in the vapor path is sustained for more than 15 seconds.

Dispenser Specifications

1. If the Healy ORVR Phase II Vapor Recovery System is installed in dispensers other than those specified in Exhibit 1 of this Order, then each dispenser shall be:
 - a) CARB-certified in the applicable revision of Executive Order G-70-52, or exempt under the provisions of Exhibit 2, Footnote 4, of that Order.
 - b) Electronically compatible with the Healy ORVR Phase II Vapor Recovery System, which must be capable of displaying the electronic protective features as specified in this Exhibit.
 - c) Tested for compliance with air to liquid ratio limits contained in this Exhibit. The test shall be conducted in accordance with TP-201.5, or an alternative test method approved in writing by the Executive Officer.

Pressure/Vacuum Valves for Storage Tank Vents

1. At least one pressure/vacuum (P/V) valve shall be installed on tank vents. Manifolding of vent lines to minimize the number of P/V valves and potential leak sources is recommended, 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.

Vapor Recovery Piping Configurations

1. The recommended maximum pressure drop through the system, measured at a flow rate of 60 SCFH with dry Nitrogen gas, is 0.05 inches water column. 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.
2. The recommended slope for all vapor lines shall be 1/4" per linear foot. Under no circumstances shall the slope be less than 1/8" per linear foot.
3. The dispenser shall be connected to the riser with either flexible or rigid material, which 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 UST. The vapor plumbing within the dispenser shall have a minimum outside diameter (OD) of 1/2".
4. All vapor return and vent piping shall be installed in accordance with the manufacturer's instructions and all applicable regulations.
5. 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.

6. The recommended nominal inside diameter of the underground Phase II plumbing is as indicated in Figures 2A-1 through 2A-5. Smaller vapor lines are not recommended but may be used provided the pressure drop criteria specified above are met. The vapor return lines shall be manifolded below grade at the tanks as indicated in the figures.
7. The dispenser shall be connected to the underground vapor return riser with either flexible or rigid material, which 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 five-eighths inch (5/8") for factory equipped dispensers. Exception: Healy Model series Z0XXX vapor recovery retrofit kits. The Z0XXX series retrofit kits consist of two 0.5" OD copper tubes and flare fittings connecting all hose outlet fittings on one side of the dispenser to a 1/2" pipe running vertically from the canopy to the base of the dispenser. where 0.5" OD copper tubing and flare fittings continue to make connection to the underground vapor return riser. This piping configuration is required on each side of the dispenser.
8. All vapor return and vent piping shall be installed, at a minimum, in accordance with the manufacturer's instructions and all applicable regulations.

Inverted Coaxial Hose Adapters

1. Inverted coaxial hose adapters shall be 100 percent performance checked at the factory to verify the integrity of the vapor path. The adapters shall be tested to the same criteria specified for nozzles in the section above.

Underground Storage Tank (UST) Pressure

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

Phase I System

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 contained in Exhibit 3 of this Order. Coaxial Phase I systems shall not be used with new installations of the Healy ORVR Phase II Vapor Recovery 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. An exception to this prohibition may be made 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 Healy ORVR Phase II Vapor Recovery 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) after May 1, 1995. Manholes with cover-actuated drain valves may remain in use in facilities where installation of the Healy ORVR Phase II Vapor Recovery System does not require modification of the tank fittings provided the facility demonstrates compliance with static pressure decay test criteria both with the cover open and with the cover closed. The local district may require the removal of drain valves provided an alternate method of draining the spill container is specified (i.e., a hand pump maintained at the facility and/or on the product delivery trucks).
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. There shall be no less than one vapor return hose connected for each product being delivered. Provided it is not in conflict with established safety procedures, this may 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;
 - the existing coaxial Phase I equipment is in good working order and has demonstrated compliance with static pressure decay test criteria when tested with all fill caps removed; and
 - the vapor return hose is disconnected from the facility storage tank before it is disconnected from the delivery tank.
4. Storage tank vent piping shall be maintained with a color which minimizes solar gain and having a minimum reflective effectiveness of 55% or greater. EPA AP-42 lists the following examples of colors as having a reflective effectiveness of 55% or greater: yellow, light gray, aluminum, tan, aluminum (new), red iron oxide, cream or pale blue, light green, glossy gray, light blue, light pink, light cream, white, tin plate and mirrored finish.
5. Manholes shall be maintained a color, which minimizes solar gain, as specified above. Manhole covers, which are color coded for product identification, are exempted from this requirement.