

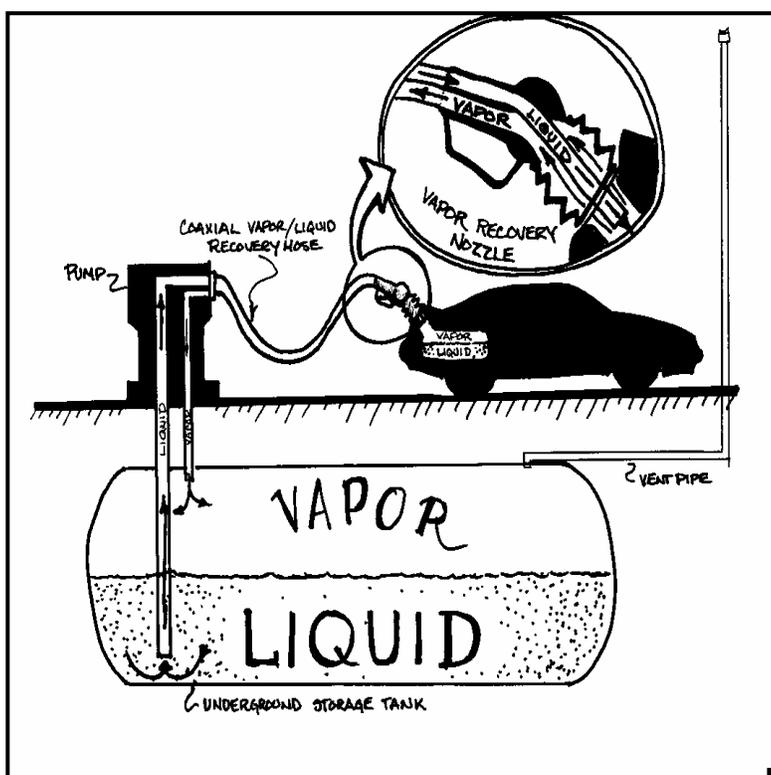
Stage II Gasoline Vapor Recovery Controls

Background

In 1999 the Vermont Agency of Natural Resources adopted a regulation for Stage II vapor recovery controls at gasoline dispensing facilities. This regulation reduces the amount of gasoline vapor emitted to the atmosphere in Vermont from fueling vehicles. Stage II controls allow the gasoline vapor displaced from a vehicle tank to be captured and returned to the gasoline storage tank, instead of being lost to the atmosphere. These vapors are then recovered through Stage I controls when a gasoline tank truck makes a delivery at a station, thereby closing the loop.

Why do Stage II?

- Gasoline vapor is a complex mixture of some 200 chemicals, a number of which are toxic or carcinogenic, such as benzene. This requirement provides health protection benefits by reducing exposure to toxic gasoline vapors.
- Gasoline vapors are composed of volatile organic compounds (VOCs) that contribute to the formation of ground-level ozone or photochemical smog. Smog impairs the human respiratory system, threatens the immune system and causes damage to forests and man-made materials.
- Air monitoring stations in both urban and rural areas of Vermont routinely detect levels of benzene in the air in excess of Vermont's health-based standard. In 2005, the annual average benzene concentration in Burlington was over 11 times the health standard.
- Stage II controls can capture over 95% of the gasoline vapor that would otherwise be emitted to the atmosphere during vehicle fueling.



To Whom Does the Stage II Regulation Apply?

Stage II controls are required at all gasoline dispensing facilities that pump over 400,000 gallons in a calendar year.

Environmental Fact Sheet: Stage II Gasoline Vapor Recovery Controls

What Equipment Is Available for Stage II Vapor Recovery?

There are two general types of Stage II equipment available to owners: balance systems and vacuum-assist systems. Either type will satisfy the requirements of the Stage II regulation. A brief description of each type of system follows:

Balance System: Balance systems use the slight amount of pressure that is created in a vehicle fuel tank by the incoming liquid gasoline and the slight vacuum created in the underground storage tank by the departing liquid gasoline to pull the vapors out of the vehicle tank and transfer them to the underground storage tank. Balance systems require the tight seal of a boot on the nozzle with the vehicle fill-pipe so that the vapors generated during fueling are captured by the nozzle and can't escape to the atmosphere. Advantages of balance systems include their simplicity and relatively low cost to install. A potential drawback to a balance system is that they may be perceived as cumbersome and difficult to use by self-service customers.

Vacuum-Assist System: Vacuum-assist systems utilize a pump to create a vacuum to enable the nozzle to capture vapors from the vehicle fuel tank. This design allows vapors to be captured without the need for a tight seal by the nozzle boot. These systems are more expensive to install than balance equipment, but may be perceived as easier to use. To the user, most vacuum-assist nozzles are virtually indistinguishable from non-vapor recovery nozzles.

What is Required to Comply With the Regulation?

Owners or operators of facilities required to have Stage II controls need to take these actions:

- Install equipment that is certified by the California Air Resources Board or approved by the Vermont Agency of Natural Resources. It is up to station owners to decide whether to install balance or vacuum-assist systems. A list of installers is available from the Vermont Air Pollution Control Division.
- Provide adequate training to employees in the proper operation and maintenance of the Stage II system used at the station.
- Maintain all Stage I and Stage II controls in good working order.
- Conduct a weekly visual inspection of the Stage II system to verify proper operation.
- Tag "Out of Order" any nozzles where Stage II controls are not functioning properly.
- Post operating instructions on the proper operation of Stage II nozzles.
- Perform compliance testing of Stage II controls for proper operation within 30 days of putting a system into initial operation and retest the system at least every 5 years. Typically, this testing will include a pressure decay test, dynamic back pressure (blockage) test and for vacuum-assist systems only, an air to liquid (A/L) ratio test. A list of testing consultants is available from the Vermont Air Pollution Control Division.
- Submit to the Air Pollution Control Division a Stage II Installation and Compliance Form, provided by the Division, within 10 days of the compliance date by which a station is required to have installed Stage II controls.

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- By May 15th of each year, either conduct and pass a pressure decay test or perform specified maintenance on the Stage II system. Submit a report documenting completion of one of these tasks by June 15th of each year.

Questions?

If you have questions on this regulation please contact the Air Pollution Control Division at the following address:

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