



Gasoline Station Reference Manual

Complying with Washington State and Local
Air Quality Regulations

Northwest Clean Air Agency
www.nwcleanairwa.gov
1600 South Second Street
Mount Vernon, WA 98273-5202
(360) 428-1617

What is NWCAA?

Since the passage of the Washington State Clean Air Act in 1967, the Northwest Clean Air Agency (NWCAA) has been the primary government agency responsible for protecting the air in Island, Skagit and Whatcom counties. NWCAA is responsible for enforcing federal, state and local air quality regulations at stationary sources of air pollution in its jurisdiction. This manual was developed to inform owners, operators, and employees of companies dispensing gasoline about air pollution requirements.

The laws and regulations NWCAA enforces include:

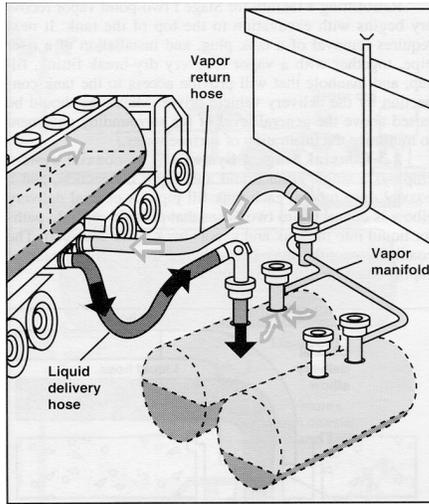
- * The EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart A – General Provisions and Subpart CCCCC – Gasoline Dispensing Facilities
- * Ch. 173-491 Washington Administrative Code (WAC)
- * NWCAA Section 580

Effects on Air Pollution from Gasoline Dispensing

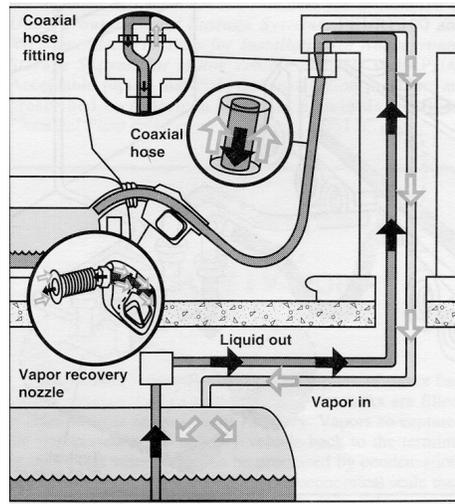
The main air pollutants of concern associated with gasoline dispensing are the vapors that consist of toxic and volatile organic compounds (VOC). These vapors, which contribute to the formation of ozone and smog, are released while refilling underground storage tanks and during vehicle refueling. By doing our part to prevent their emission, we can reduce the health impacts of breathing toxic gasoline vapors, which can cause lung irritation, breathing difficulties, and even cancer.

Types of Vapor Recovery

There are two types of vapor recovery systems. Stage I Vapor Recovery Systems take the gasoline vapors that are displaced when filling the underground tanks and return them to the truck's cargo tanks, while Stage II Systems send the vapors displaced from the vehicle fuel tank back into the underground storage tank using special hoses and nozzles.



Stage I



Stage II

Cars built after the year 2000, however, are fitted with Onboard Refueling Vapor Recovery (ORVR), which allows canisters in the car to prevent vapors from escaping. Due to this improvement, not all facilities are required to have Stage II.

Do I Need Stage I Vapor Recovery?

All gasoline stations that have an annual throughput greater than 360,000 gallons are required to have Stage I. In addition, at this time NWCAA considers Stage I Enhanced Vapor Recovery (EVR) to be the Best Available Control Technology (BACT). This means that all new stations must be fitted with Stage I EVR.

Do I Need Stage II Vapor Recovery?

Stage II is only required if a new or substantially modified gasoline station has an annual gasoline throughput of 1.5 million gallons or greater and the distance from the centroid of the pumps to the nearest point on the property line of a permanent residence is less than allowable distance listed in the table below:

Gasoline Throughput (millions of gallons per year)	Allowable Distance to Nearest Residence Property Line*
1.5	20 m (65 ft)
2.0	25 m (82 ft)
4.0	38 m (124 ft)
6.0	49 m (160 ft)
8.0	58 m (190 ft)
10.0	66 m (216 ft)

*Stage II vapor recovery is required if under these distance limits.
Interpolate to get the distance if throughput is not shown on chart.

In addition, if the distance from the centroid of the pumps to the permanent residence itself is more than twice the allowable distance, Stage II is not required.

What is EVR?

On April 1, 2001, the California Air Resources Board (CARB) adopted Enhanced Vapor Recovery (EVR) amendments to its vapor recovery certification and test procedures for gasoline loading (Stage I) and motor vehicle gasoline refueling (Stage II). These new standards and equipment specifications for both Stage I and II increased vapor recovery from 95% to at least 98% efficiency.

The Northwest Clean Air Agency is not currently requiring the phase out of non-EVR systems. However, any new installations must comply with the CARB certified EVR requirements.

Do I Need EVR?

Are you opening a new gas station?	→	Must install Stage I EVR
Are you reopening a gas station after it has been closed down for more than two years?	→	Must install Stage I EVR
Are you removing Stage II?	→	May install Stage I EVR for a reduced permit fee
Are you installing Stage II?	→	Must install Stage I EVR and Stage II EVR
Replacing or substantially altering the existing emission control technology?	→	Must install Stage I EVR
Do you have a NWCAA permit that requires EVR?	→	Must install Stage I EVR

If your gas station is required to install EVR, you must install the Stage I equipment from one of the California Air Resources Board (CARB) Executive Orders specified at the link below and operate/maintain/test the equipment in accordance with the "Installation, Operation and Maintenance Manual" specific for that system. Contact NWCAA for a permit.

www.arb.ca.gov/vapor/eo-evrphaseI.htm

The Five Currently CARB-Approved Stage I EVR systems:

VR-101	Phil-Tite Phase I Vapor Recovery System
VR-102	OPW Phase I Vapor Recovery System
VR-103	EBW Phase I Vapor Recovery System
VR-104	CNI Manufacturing Phase I Vapor Recovery System
VR-105	EMCO Wheaton Retail Phase I Vapor Recovery System

Stage II EVR Executive Orders can be found at: www.arb.ca.gov/vapor/eo-evrphaseII.htm

Note: referred to as Phase I & II instead of Stage I & II

Do I Need a Permit?

Actions that may trigger the permit process include, but are not limited to:

- Opening a new gas station
- Reopening an existing gas station that has been closed down for more than 2 years
- Installing new gasoline storage tanks
- Removing a Stage II vapor recovery system
- Significant modification of Stage I or Stage II vapor recovery systems (for example, changing from a coaxial to a dual point system or installing EVR)

In addition, all of these actions (the construction of a new gas station or any significant modifications to an existing one) may trigger the requirement to install Stage I EVR equipment. Refer to the previous page for CARB approved EVR equipment.

Please contact NWCAA to request a Notice of Construction (NOC) or General Order application or to discuss whether a specific modification requires a permit. Forms can also be found on our website, www.nwcleanairwa.gov.

Does my Station Need to Be Registered with NWCAA?

Gas stations must be registered with NWCAA if their annual throughput is greater than 120,000 gallons/year. Once a station is registered, it must pay an annual fee, report its annual throughput, and expect unannounced routine inspections to ensure operations are in compliance with local, state, and federal regulations.

If you operate or manage a gas station that is not registered with NWCAA, please contact NWCAA to determine if your facility is subject to registration. Facilities not registered with NWCAA may be inspected to determine if they need to be.

What Does NWCAA Look for During a Facility Inspection?

The NWCAA inspectors visit stations periodically to conduct compliance inspections. Inspectors check the vapor recovery systems to ensure they are in good working order. This includes checking components to see that they are defect-free. Inspectors also check that the station is following the Best Management Practices described on the following page. Because equipment must be in good working order throughout the year, inspectors most inspections are unannounced.

What Happens If I Violate my Permit or Applicable Regulations?

Penalties for violating air pollution regulations can exceed \$10,000 per violation, per day. Remember, reducing VOCs provides for a safer workplace and healthier environment. The most effective way to comply with air quality regulations is to know what your requirements are and conduct regular self inspections to assure that the facility maintains continuous compliance. Nobody wants surprises during an inspection, including the inspector and station personnel. Make sure everyone at your facility understands and follows all applicable vapor recovery requirements.

How Will a Self-Inspection Checklist Help Me?

A self-inspection checklist is a good tool to help ensure that your facility is in compliance. The information in this guide covers the basic requirements you need to know, and will help you prepare for periodic air pollution control inspections. An example of a visual self-inspection checklist is included in this booklet, but you may want to come up with a specific checklist for your facility.

You should regularly check your vapor recovery system using your self-inspection checklist to ensure everything is in good working condition. **Identify any potential problems and take action. Replace or repair defective components immediately.** Do your part to help yourself, your customers, and the environment.

Best Management Practices

To be in compliance, all gas stations must establish and maintain the following Best Management Practices (40 CFR 63 Subpart CCCCCC):

- Minimize gasoline spills
- Clean up spills as quickly as practicable
- Cover all gasoline storage tank fill-pipes with a gasketed seal when not in use
- Minimize gasoline sent to open waste collection systems that collect and transport gasoline to reclamation and recycling devices, such as oil/water separators

In addition, stations must:

- Report annual throughput to NWCAA
- Keep maintenance records for the previous 24 months of operation, and include date and nature of maintenance performed
- Keep all certification test reports on-site and available for inspection
- If applicable, keep a copy of the NWCAA permit on-site and available for inspection
- Comply with all permit conditions
- Pay annual registration fees on time

How to calculate throughput (NESHAP 6C 63.11132):

Add up the total volume of gasoline that is loaded into or dispensed from (keep track of which method is used!) all gasoline storage tanks at the gas station during the previous 364 days, then add that of the current day. Finally, divide by 12.

Benefits of Being in Compliance:

- * Save money by preserving gasoline that would otherwise be lost to the air
- * Reduce health impacts of breathing toxic gasoline vapors, which can cause lung irritation, breathing difficulties, and even cancer
- * Decrease fire hazards and unpleasant odors
- * Most of all, improve our air quality!

Self-Inspection Stage I

#1 Open the covers... White=Unleaded / Blue=Mid-Grade / Red=Super



Fill port: often a grey cap

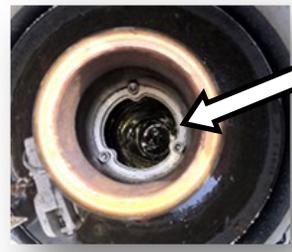


Vapor recovery port: typically an orange cap

Good Condition	To look for:	Poor Condition
<p>Vapor & Fill Dust Caps:</p>   <p>Video</p>	<p>Cap should be:</p> <ul style="list-style-type: none"> * in good condition * on tight (does not turn by hand pressure) * present <p>Repair or replace if missing, loose, or broken</p> <p>EVR: will be labeled w/ "EVR" or is an EVR approved model (listed in CARB executive orders)</p>	<p>Video</p>   <p>Broken handles</p>
<p>Gaskets:</p> 	<p>Located inside of caps <u>and</u> in the inside of the drop tubes</p> <p>Gaskets should be:</p> <ul style="list-style-type: none"> * present * fit snugly inside * in good condition <p>Repair or replace if missing, loose, or broken</p>	<p>Missing gasket</p>   <p>Broken gasket</p>
<p>Adapters (product and vapor):</p> 	<p>Located on ends of fill & vapor tubes</p> <p>EVR: Swivel Adapters on both vapor recovery and fill hook ups</p> <p>If it is a <u>non-swivel adapter</u> should be tight (does not unscrew by hand pressure)</p> <p><u>Swivel Adapter</u>: rotates with hand pressure but does not unscrew</p> <p>Swivel Adapter Video</p>	

Drop tube:

EVR



Non-EVR



Distinguishing EVR from Non-EVR:

Look for— **center protruding ring**

Note: some models have less pronounced rings; if permit requires EVR, the other key distinction to look for is the presence of a swivel adapter

*There should not be water or debris in the spill bucket

*For storage tanks ≥ 250 gallons at a facility with an annual throughput greater than 100,000 gallons— the bottom of the drop tubes must be within 6" of bottom of tank if installed after 11/9/2006

Other form: Coaxial (non-EVR)



Must be spring loaded; when depress center tube, should spring back up to center at a height flush to adapter rim
Replace or repair if jammed or not operating properly

Good Condition

To look for:

Poor Condition

Poppet valve (on vapor recovery tube)



Push down & release several times with a screwdriver— should spring back up.

Replace or repair if it does not return or if it returns off center.

Video

Gap in valve



P/V Caps



Rain Guard

P/V Caps

Installed on gasoline storage tank vent pipes as pressure release devices— designed to minimize vapor loss while maintaining a safe pressure within the gasoline underground storage tanks

Must be present on unleaded fuel vent pipes (not on diesel pipe).

Repair or replace if broken, damaged, or are rain guards.

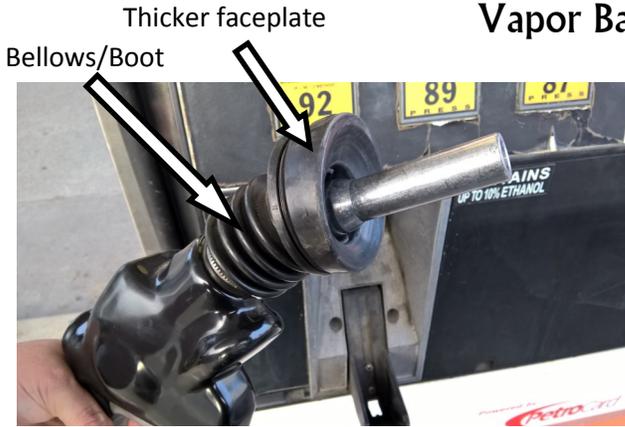
Older P/V Caps often resemble rain guards. Three ways to distinguish a PV Cap include the presence of a label, though it can get worn over time, the set screw at the base and the seam between the adaptor and PV valve (circled to the left).



Broken

Self-Inspection Stage II

Vapor Balance vs. Vacuum Assisted



Vapor Balance System



Vacuum Assist System

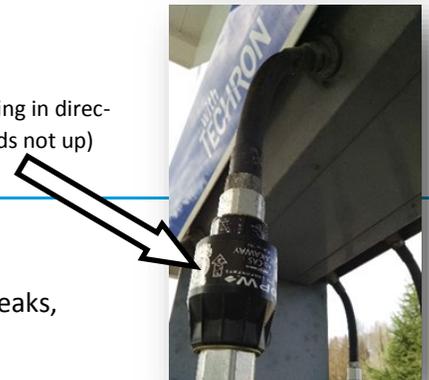


The **vapor balance system** operates by creating a vacuum in the underground storage tank as fuel is removed from the storage tank and pumped into the vehicle's gas tank. The pressure in the fuel tank forces out the vapors and the vacuum draws it into the underground storage tank. A coaxial hose (hose within a hose) allows the flow of gasoline to the vehicle and recovery of vapors at the same time. A rubber "boot" around the nozzle creates the tight seal on the vehicles gas tank allowing the system to function properly.

Vacuum assist Stage II vapor recovery systems do not require a "boot" on the nozzles. Instead, it draws the vapors from the vehicle tank into the storage tank using a vacuum pump located in the gasoline dispenser. The vacuum pump speed varies with the speed of vehicle refueling so that for each gallon of gasoline dispensed, one gallon of vapors are pulled into the station's underground storage tanks.

Balance	Vacuum Assist
<ul style="list-style-type: none"> * Check Bellows/Boot/Faceplate —> if have slits longer than 1 1/2" or are missing more than 1/8" of edge—must be repaired or replaced * When the nozzle is placed in holster the bellows should not be compressed * Nozzle spout and interlock are tight * Faceplate and boot are properly aligned <p><u>Bag Test:</u> 1) bag the nozzle 2) pull back nozzle boot to release interlock. If bag increased or decreased in size—> vapor leak, valve is broken</p>	<ul style="list-style-type: none"> * Holes unobstructed * Latch coil present * Nozzle is not dented or leaking * Interlock is tight * Listen to vacuum pump during refueling to verify it's working

- * Breakaway should be installed in the right direction (photo at right)
- * Hoses in good condition (no cuts, kinks, holes, extreme fraying), inspect for liquid leaks, check operation of swivels (are not tight, frozen, or dirty)



Examples of tests that may be required by permit or regulation:

STAGE I

TP-201.1E Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves

Adopted in 2003, this test determines the pressure at which the P/V Valves open to atmospheric pressure, as well as the leak rate of the P/V valves at varying pressures. This test is conducted by removing the P/V valves from the pipes and placing them on a test stand which introduces flow and measures the pressure.

TP-201.3 Static Pressure Tests (a.k.a. “pressure decay”, “static leak”, 2” WC Static Pressure Performance, “PD”)

Quantifies the vapor tightness of the vapor recovery system to ensure there are no leaks. The entire vapor recovery system is pressurized with nitrogen, and the system pressure is allowed to decay. After five minutes, the pressure is compared with the allowable value that is based on the size of the tank and how much gasoline is in it.

TP-201.1B Static Torque of Rotatable Phase 1 Adapters Test

Only required for facilities with fill tube adapters that are designed to rotate (EVR adapters). Quantifies the amount of static torque required to start the rotation of a rotatable Stage I adapter. This procedure is also used to verify that a Stage I adapter rotates at least 360 degrees. Each CARB Executive Order specifies the acceptable static torque values.

TP-201.1C / TP-201.1D Leak Rate of Drop Tube/Drain Valve Assembly or Leak Rate of Drop Tube Overfill Prevention Devices and Spill Container Drain Valves (a.k.a. “Pressure integrity”, “drop tube”), respectively, depending on whether the system includes an overfill protection device and/or spill container drain valve

STAGE II

TP-201.4 The Dynamic Pressure Performance Test (a.k.a. “back pressure test” or “blockage test”)

Usually only performed once—at start up. Ensures there is no excessive back pressure, generally due to low spots in the Stage II underground piping. This test is conducted wet and dry (the wet portion is what is typically called the “blockage test”). The measured back pressures are compared to allowable values for each Stage II system.

TP-201.5 The Air-to-Liquid (A/L) Ratio Test (vacuum assist Stage II systems only)

Quantifies the air-to-liquid volume ratio to make sure the correct amount of vacuum is being pulled at each nozzle. Each CARB Executive Order specifies the acceptable air-to-liquid ratio values.

What Other Agencies Regulate Gas Stations?

WA State Department of Ecology - Underground Storage Tank Program
NW Regional Office
Bellevue, WA
(425) 649-7000
<http://www.ecy.wa.gov/programs/tcp/ust-lust/tanks.html>

Where Can I Find More Information About Vapor Recovery?

Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101
Tel: (206) 553-1200
www.epa.gov

California Air Resources Board
www.arb.ca.gov/vapor/vapor.htm

American Petroleum Institute
1220 L Street N.W.
Washington, D.C. 20005
Tel: (202) 682-8000
www.api.org

The Petroleum Equipment Institute
www.pei.org

Gas Station Contractors and Equipment

Ace Tank & Equipment Co.

19111 Des Moines Memorial Drive
Suite H
SeaTac, WA 98148
Tel: (206) 281-5000

Cannon Electric & Pump Repair

2801 Roeder Ave
Bellingham, WA 98227
Tel: (360) 733-4070

ESE Corporation

11011 Waller Rd. E.
Tacoma, WA 98446
Tel: (253) 535-3112

Evergreen Environmental

17108 9th Ave. SE
Mill Creek, WA 98012
Tel: (425) 787-8987

Nebar Supply Co.

4778 Shilshole Ave. NW
Seattle, WA 98107
Tel: (206) 622-6292

Northwest Environmental Solutions

P.O. Box 1583
Sumner, WA 98390
Tel: (253) 241-6213

Northwest Tank

17407 59th Ave SE
Snohomish, WA 98296
Toll Free Tel: (800) 742-9620
Tel: (425) 742-9622

NW Pump

22914 64th Ave. S
Kent, WA 98032
Tel: (253) 850-7867

Pacific Environmental Services Co.

P.O. Box 2049
Port Townsend, WA 98368
Tel: (360) 385-4221

Pacific Northern Environmental Corp.

1081 Columbia Blvd.
Longview, WA 98633
Tel: (360) 423-2245
Fax: (360) 423-2272

SME Corporation

10107 S Tacoma Way, Ste A2
Lakewood, WA 98499
Tel: (253) 572-3822

Tanknology

1024 Industrial Way, Suite A-B
Lodi, CA 95240
Tel: (209) 365-1246
Sales: (800) 964-1250

Ultra Tank Services Inc.

P.O. Box 30096
Bellingham, WA 98228
Tel: (360) 815-5361
Fax: (360) 398-2311

W L Repair

959 W. Laurel
Ferndale, WA 98248
Tel: (360) 384-4678