

## Chapter NR 420

CONTROL OF ORGANIC COMPOUND EMISSIONS  
FROM PETROLEUM AND GASOLINE SOURCES

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**Note:** Corrections made under s. 13.93 c2md cbd 6. and 7., Stats., Register, December, 1996, No. 492.

**NR 420.01 Applicability; purpose. c1d** APPLICABILITY. This chapter applies to all petroleum and gasoline air contaminant sources and to their owners and operators.

**c2d** PURPOSE. This chapter is adopted under ss. 285.11, 285.13 and 285.17, Stats., to categorize organic compound emissions from petroleum and gasoline sources into a separate organic compound air contaminant source category and to establish emission limitations for this category of sources in order to protect air quality.

**History:** Cr. Register, September, 1986, No. 369, eff. 10-1-86; am. Register, February, 1990, No. 410, eff. 3-1-90.

**NR 420.02 Definitions.** The definitions contained in chs. NR 400 and 419 apply to the terms used in this chapter. In addition, the following definitions apply to the terms used in this chapter and chs. NR 421 and 425:

**c1d** XAccumulatorY means the reservoir of a condensing unit receiving the condensate from the condenser. This includes hot wells.

**c5d** XAverage monthly storage temperatureY means an arithmetic average calculated for each calendar month, or portion thereof if storage is for less than a month, from bulk petroleum liquid storage temperatures determined at least once every 7 days.

**c6d** XBottom fillingY means the filling of a tank truck or stationary storage tank through an opening that is flush with or near the tank bottom.

**c8d** XBulk gasoline terminalY means a gasoline storage facility which receives gasoline from refineries primarily by pipeline, ship, or barge, and delivers gasoline to bulk gasoline plants or to commercial or retail accounts primarily by tank truck.

**c9d** XComponentY means, for purposes of petroleum refineries, any piece of equipment at a refinery which has the potential to leak VOCs. These pieces of equipment include, but are not limited to, pumping seals, compressor seals, seal oil degassing vents, pipeline valves, flanges and other connections, pressure relief devices, process drains, and open ended pipes. Excluded from these pieces of equipment are valves which have no external controls, such as in-line check valves.

**c10d** XCondensateY means hydrocarbon liquid separated from natural gas which condenses due to changes in the temperature or pressure and remains liquid at standard conditions.

**c11d** XCondenserY means any heat transfer device used to liquefy vapors by removing their latent heats of vaporization. Such devices include, but are not limited to, shell and tube, coil, surface, or contact condensers.

**c13d** XCrude petroleumY means a naturally occurring mixture which consists of hydrocarbons; or sulfur, nitrogen and oxygen derivatives of hydrocarbons, and which is liquid at standard conditions.

**c14d** XCustody transferY means the transfer of produced crude petroleum or condensate, after processing or treating in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.

**c15d** XDelivery vesselY means a tank truck or trailer or a railroad tank car equipped with a storage tank used for the transport of gasoline from sources of supply to stationary storage tanks of bulk gasoline plants or gasoline dispensing facilities.

**c16d** XFireboxY means the chamber or compartment of a boiler or furnace in which materials are burned but does not mean the combustion chamber of an incinerator.

**c17d** XForebaysY means the primary sections of a wastewater separator.

**c18d** XFuel gasY means any gas which is generated by a petroleum refinery process unit or by a petroleum liquid transfer operation and which is combusted, or any gaseous mixture of such gas and natural gas which is combusted.

**c20d** XGasoline dispensing facilityY means any site where gasoline is dispensed to motor vehicle gasoline tanks from stationary storage tanks.

**c21d** XGaseous serviceY means petroleum refinery equipment which processes, transfers or contains a VOC or mixture of VOCs in the gaseous phase.

**c22d** XLeaking componentY means any component at a petroleum refinery which has a VOC concentration exceeding 10,000 ppm when tested in the manner approved by the department.

**c23d** XLiquid-mounted sealY means a primary floating roof seal mounted in continuous contact with the liquid in a liquid organic compound storage tank between the tank wall and the floating roof around the internal circumference of the tank.

**c24d** XLiquid serviceY means petroleum refinery equipment which processes, transfers or contains a VOC or mixture of VOCs in the liquid phase.

**c24md** XLiquid tightY means having a liquid leak rate not exceeding 0.10 gallons per hour when measured with a 5% accuracy.

**c25d** XLower explosive limitY or XLELY means the lower limit of flammability of a gas or vapor at ordinary ambient temperatures expressed as percent propane in air by volume.

**c27d** XPetroleumY means the crude oil removed from the earth and the oils derived from tar sands, shale, coal and coke.

**c29d** XPetroleum refineryY means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants or other products through distillation of petroleum or through redistillation, cracking, extraction or reforming of unfinished petroleum derivatives.

**c29md** XProcess gasY means any gas generated by a petroleum refinery process unit except fuel gas and process upset gas as defined in this section.

**c29pd** XProcess upset gasY means any gas generated by a petroleum refinery process unit as a result of startup, shutdown, upset or malfunction.

**c30d** XRefinery process unitY means any segment of a petroleum refinery in which a specific processing operation is conducted.

**c31d** XReid vapor pressureY means the absolute vapor pressure of volatile crude petroleum and volatile nonviscous petroleum liquids except liquefied petroleum gases as determined by ASTM D323-08, incorporated by reference in s. NR 484.10 c6d.

**c32md** XTop offY means to attempt to dispense more gasoline to a motor vehicle fuel tank after the vapor recovery dispensing nozzle has shut off.

**c33d** XTrue vapor pressureY means the equilibrium partial pressure exerted by a petroleum liquid as determined in accordance with methods described in American Petroleum Institute Publication 2517, *Evaporative Loss from External Floating Roof Tanks*, 3rd edition, February 1989, incorporated by reference in s. NR 484.11.

**c34d** XTurnaroundY means the procedure of shutting a refinery unit down after a run to do necessary maintenance and repair work and putting the unit back on stream.

**c35d** XVacuum producing systemY means any reciprocating, rotary, or centrifugal blower or compressor, or any jet ejector or device that takes suction from a pressure below atmospheric and discharges against atmospheric pressure.

**c36d** XVapor balance systemY means a combination of pipes or hoses which create a closed system between the vapor spaces of an unloading tank and a receiving tank such that vapors displaced from the receiving tank are transferred to the tank being unloaded.

**c37d** XVapor collection systemY means, for the purpose of liquid organic compound transfer operations, a vapor transport system which uses direct displacement by the liquid loaded to force vapors from the tank into a vapor control system or vapor holding tank.

**c38d** XVapor-mounted sealY means any primary floating roof seal mounted so that there is an annular vapor space underneath the seal. The annular vapor space is bounded by the bottom of the primary seal, the tank wall, the liquid surface, and the floating roof.

**c39d** XVapor recovery systemY or Xvapor control systemY mean a system that gathers organic compound vapors released during the operation of any transfer, storage, or process equipment and processes the vapors so as to prevent their emission into the ambient air.

**c39md** XVapor tightY means having the detection of less than 10,000 ppm hydrocarbon concentration, as determined by Method 21 in Appendix A of 40 CFR part 60, incorporated by reference in s. NR 484.04 c17d, at a distance of one inch from the source.

**c40d** XWastewater coil-water separatorY means any device or piece of equipment which utilizes the difference in density between oil and water to remove oil and associated chemicals from water. This includes any device, such as a flocculation tank, clarifier, etc., which removes petroleum derived compounds from wastewater.

**c41d** XWaxy, heavy pour crude petroleumY means a crude petroleum with a pour point of 10vC c50vFd or higher as determined by ASTM D97-02, incorporated by reference in s. NR 484.10 c2d.

**History:** Renum. from NR 154.01, Register, September, 1986, No. 369, eff. 10-1-86; renum. c2d, c3d, c4d, c7d and c12d to be NR 419.02 c1d, 400.02 c11md,

c16ed, c21md and c26md, r. c19d, am. c21d, c29md and c29pd renum. from NR 420.02 c71d and c72d, Register, February, 1990, No. 410, eff. 3-1-90; am. c31d, c33d and c41d, Register, May, 1992, No. 437, eff. 6-1-92; cr. c8md, c24md, c32md, c38md and c39md, Register, January, 1993, No. 445, eff. 2-1-93; am. c31d, c33d, c39md, c41d, Register, February, 1995, No. 470, eff. 3-1-95; am. cintro.d, renum. c28d to be NR 419.02 c13d, Register, December, 1995, No. 480, eff. 1-1-96; am. c41d, Register, December, 1996, No. 492, eff. 1-1-97; am. cintro.d, c31d and c41d, Register, October, 1999, No. 526, eff. 11-1-99; CR 02-146: am c31d and c41d Register October 2003 No. 574, eff. 11-1-03 correction in c33d and c39md made under s. 13.93 c2md cbd 7., Stats., Register October 2003, No. 574; CR 11-005: am. c31d Register January 2012 No. 673, eff. 2-1-12; CR 15-077: r. c8md, c26d, c32d, c38md, am. c39d Register July 2016 No. 727, eff. 8-1-16.

**NR 420.03 Storage of petroleum liquids. c1d** APPLICABILITY. The storage, recordkeeping and maintenance requirements of subs. c2d, c3d and c4d apply to all storage vessels for petroleum liquids of more than 151,412 liter c40,000 gallon capacity on which construction or modification is commenced after July 1, 1975, with the exception of:

cad Storage vessels being used for number 2 through number 6 fuel oils as specified in ASTM D396-02, gas turbine fuel oils numbers 2-GT through 4-GT as specified in ASTM D2880-00, or diesel fuel oils numbers 2-D and 4-D as specified in ASTM D975-02. These ASTM standards are incorporated by reference in s. NR 484.10 c8d, c13d and c40d.

cbd Storage vessels for the crude petroleum or condensate stored, processed or treated at a drilling and production facility outside a metropolitan county prior to custody transfer.

ccd Pressure vessels which are designed to operate at pressures in excess of 104 kPa c15 psig without emissions except under emergency conditions.

cdd Subsurface caverns or porous rock reservoirs.

ced Horizontal underground storage tanks used to store JP-4 jet fuel.

**c2d** STORAGE REQUIREMENTS. The owner or operator of any storage vessel to which this section applies shall store petroleum liquids as follows:

cad If the true vapor pressure of the petroleum liquid, as stored, is equal to or greater than 10.5 kPa c1.52 psiad but not greater than 77 kPa c11.1 psiad, the storage vessel shall be equipped with a floating roof, a vapor recovery system or an equally effective alternative control method approved by the department.

cbd If the true vapor pressure of the petroleum liquid, as stored, is greater than 77 kPa c11.1 psiad, the storage vessel shall be equipped with a vapor recovery system or an equally effective alternative control method approved by the department.

**c3d** RECORDKEEPING. cad *General records.* The owner or operator of any storage vessel to which this section applies shall, for each such storage vessel, maintain a file of each type of petroleum liquid stored, the typical Reid vapor pressure of each type of petroleum liquid stored and the dates of storage. Dates on which the storage vessel is empty shall be indicated.

cbd *Vapor pressure dependent records.* The owner or operator of any storage vessel to which this section applies shall, for each such storage vessel, determine and record the average monthly storage temperature and true vapor pressure of the petroleum liquid stored at that temperature if one of the following applies:

1. The petroleum liquid has a true vapor pressure, as stored, greater than 3.5 kPa c0.51 psiad but less than 10.5 kPa c1.52 psiad and is stored in a vessel other than one equipped with a floating roof, a vapor recovery system or their equivalents.

2. The petroleum liquid has a true vapor pressure, as stored, greater than 63 kPa c9.1 psiad and is stored in a storage vessel other than one equipped with a vapor recovery system or its equivalent.

ccd *Vapor pressure determination.* The true vapor pressure shall be determined by application of the procedures in API Publication 2517, 3rd edition, incorporated by reference in s. NR 484.11 c5d, in accord with this paragraph. This procedure is dependent upon determination of the average monthly storage temperature and the Reid vapor pressure, which requires sampling of the petroleum liquids in the storage vessels. Unless the department requires in specific cases that the stored petroleum liquid be sampled, the true vapor pressure may be determined by using the average monthly storage temperature and the typical Reid vapor pressure. For those liquids for which certified specifications limiting the Reid vapor pressure exist, that Reid vapor pressure may be used. For other liquids, supporting analytical data shall be made available on request to the department when typical Reid vapor pressure is used.

**c4d** EQUIPMENT MAINTENANCE. cad *Applicability.* In addition to the vessels identified in sub. c1d this subsection applies to all storage vessels for petroleum liquids of more than 7,571 liter c2,000 gallons capacity.

cbd *Requirements.* No person may place, hold or store in a storage vessel any petroleum liquid which has a true vapor pressure as stored greater than 10.5 kPa c1.52 psiad unless all of the following requirements are met:

1. Any tank surface exposed to the rays of the sun is painted and maintained white so as to prevent excessive temperature and vapor pressure increases.
2. The seals of any floating roof are maintained so as to minimize emissions.
3. All gauging and sampling devices are vapor tight except when gauging or sampling is taking place.

**c5d** FIXED ROOF VESSELS. cad *Applicability.* This subsection applies, subject to the provisions of s. NR 425.03, to all fixed roof storage vessels with capacities greater than 151,412 liters c40,000 gallonsd with the exception of those having capacities less than 1,600,000 liters c416,000 gallonsd used to store crude petroleum and condensate prior to custody transfer.

cbd *Storage requirements.* No owner or operator of a fixed roof storage vessel to which this subsection applies may permit the storage vessel to be used for storing any petroleum liquid which has a true vapor pressure as stored greater than 10.5 kPa c1.52 psiad, unless all of the following requirements are met:

1. The vessel has been retrofitted with an internal floating roof equipped with a closure seal, or seals, to close the space between the roof edge and tank wall, or with equally effective alternative controls approved by the department.
3. The vessel is maintained such that there are no visible holes, tears, or other openings in the seal or any seal fabric or materials.
4. All openings, except stub drains, are equipped with covers, lids, or seals such that:
  - a. The cover, lid or seal is in the closed position at all times except when in actual use.
  - b. Automatic bleeder vents are closed at all times except when the roof is floated off or landed on the roof leg supports.
  - c. Rim vents, if provided, are set to open when the roof is being floated off the roof leg supports or at the manufacturer[s] recommended setting.

5. Routine inspections are conducted through roof hatches at monthly intervals during the ozone season. These routine inspections shall include, at a minimum, a visual examination to determine that the roof is resting on the liquid surface, no liquid has accumulated on the roof, no seal is detached and that there are no tears or holes in the seal material.

6. The vessel is repaired or removed from service as expeditiously as practicable, but no later than 45 days after any routine inspection in which any of the defects described in subd. 5. are found, unless an extension is granted by the department. If a defect identified in subd. 5. cannot be repaired or the vessel removed from service within 45 days, a one time 30 day extension may be requested by the owner or operator. The department may grant such a request if the owner or operator demonstrates that alternative storage capacity is not available or that repair or removal of the tank from service is infeasible for reasons beyond the control of the owner or operator.

7. A complete inspection of cover and seal is conducted periodically as required by par. ccd

8. Records are maintained and retained for a minimum of 5 years, unless otherwise noted, that shall include both of the following:

a. The results of inspections conducted under subds. 5. and 7., including LEL readings, if applicable. All LEL readings and inspection report records shall be maintained for a minimum of 10 years if the facility elects to comply with par. ccd through use of par. ccd 2.

b. The information required under sub. c3d.

ccd *Complete inspection requirements.* All fixed roof storage vessels at a facility to which this subsection applies are required to periodically undergo a complete inspection of cover and seal, and all shall use either subd. 1. or 2. to demonstrate compliance. No facility may use different compliance methods for different fixed roof storage vessels to comply with this paragraph. The complete inspection shall be conducted according to one of the following schedules:

1. Whenever a fixed roof storage vessel is emptied and degassed or at least every 5 years, whichever is more frequent.

2. Whenever a fixed roof storage vessel is emptied and degassed or at least every 10 years, whichever is more frequent, if all of the following requirements are met:

a. The routine monthly inspections during the ozone season, in addition to meeting the requirements of par. cbd 5., include the measurement with an explosimeter of the organic vapor space above the internal floating roof to demonstrate that the organic vapor concentration does not exceed 50% of the lower explosive limit cLELD for the stored petroleum liquid.

b. The fixed roof storage vessel is repaired or removed from service as expeditiously as practicable, but no later than 45 days after the completion of the routine inspection, if any of the defects described in par. cbd 5. are found or if the measurement required under subd. 2. a. exceeds 50% of the LEL.

c. Repair steps meeting the requirements of subd. 2. b. may include tests, maintenance or inspections followed by LEL measurements below 50% within 45 days of the initial LEL reading exceeding 50% that confirm further repair or removal of the tank from service is not warranted.

cdd *Notification and change of compliance method requirements.* All existing facilities which have one or more storage vessels subject to par. ccd shall notify the department in writing, by January 3, 2000, as to whether the facility will comply with this section under the provisions of par. ccd 1. or 2. After January 3, 2000, a facility owner or operator may only change the compliance option from par. ccd 1. to par. ccd 2. after completing a complete inspection of every affected fixed roof storage vessel at the facility. For any newly constructed facility, the owner or operator shall notify the department prior to commencing operation as to which compliance option will be used. A facility owner or operator may at any time elect to change the compliance option from

par. [ccd 2.](#) to par. [ccd 1.](#) provided the following conditions are met:

1. The facility owner or operator notified the department, in writing, at least 30 days prior to the date on which the facility owner or operator plans to begin meeting the requirements of par. [ccd 1.](#)

2. All tanks at the facility were found to be in compliance with the 50% LEL requirement of par. [ccd 2.](#) during their last LEL measurement.

**c6d** EXTERNAL FLOATING ROOF VESSELS. *cad Applicability.* This subsection applies, subject to the provisions of s. [NR 425.03 c4d](#) or [c5d](#), to all storage vessels equipped with external floating roofs having capacities greater than 151,412 liters c40,000 gallonsd with the exception of:

1. Storage vessels having capacities less than 1,500,000 liters c396,270 gallonsd used to store crude petroleum and condensate prior to custody transfer.

2. Storage vessels used to store waxy, heavy pour crude petroleum.

3. Storage vessels used solely for petroleum liquids with a true vapor pressure of less than 10.5 kPa c1.52 psiad.

4. Storage vessels used solely for petroleum liquids with a true vapor pressure of less than 27.6 kPa c4.0 psiad, and which are of welded construction, and presently possess a metallic-type shoe seal, a liquid-mounted foam seal, a liquid-mounted liquid filled type seal, or equally effective alternative control, approved by the department.

5. Storage vessels of welded construction, equipped with metallic-type shoe primary seal which has a secondary seal from the top of the shoe seal to the tank wall.

*cbd Storage requirements.* No owner or operator of a storage vessel equipped with an external floating roof to which this subsection applies may permit such storage vessel to be used for storing any petroleum liquid unless all of the following requirements are met:

1. The vessel has been fitted with a continuous secondary seal extending from the floating roof to the tank wall, or the vessel has been fitted with an equally effective alternative control, approved by the department.

2. The vessel is maintained such that all seal closure devices meet the following requirements:

a. There are no visible holes, tears, or other openings in the seal or any seal fabric or material.

b. The seal or seals are intact and uniformly in place around the circumference of the floating roof between the floating roof and the tank wall.

c. For vapor-mounted seals, the accumulated area of gaps exceeding 0.32 cm c1.8 ind in width between the secondary seal and tank wall may not exceed 21.2 cm<sup>2</sup> per meter c1.00 in<sup>2</sup> per footd of tank diameter.

3. All openings in the external floating roof, except for automatic bleeder vents, rim space vents, and leg sleeves, are:

a. Equipped with covers, seals, or lids kept in the closed position except when in actual use.

b. Equipped with projections into the tank which remain below the liquid surface at all times.

4. Automatic bleeder vents are closed at all times except when the roof is floated off or landed on the roof leg supports.

5. Rim vents are set to open only when the roof is being floated off the leg supports or at the manufacturer[s recommended setting.

6. Emergency roof drains are provided with slotted membrane fabric covers or equivalent covers which cover at least 90% of the area of the opening.

7. Routine visual inspections are conducted of all seals and seal closure devices at monthly intervals during the ozone season.

8. The secondary seal gap of vapor-mounted seals is measured annually, in a manner approved by the department.

9. The vessel is repaired or removed from service as expeditiously as practicable, but no later than 45 days after the completion of the routine inspection under subd. 7. or the annual inspection under subd. 8., if the inspection reveals a failure to meet any of the requirements of subd. 2.

10. Records are maintained and retained for a minimum of 5 years that shall include:

a. The results of inspections conducted under subds. 7. and 8.

b. The information required under sub. [c3d cad](#) and [cbd cintro.d.](#)

**c7d** EXTERNAL FLOATING ROOF VESSELS WITH NO SECONDARY SEAL REQUIREMENT. *cad Applicability.* This subsection applies to all storage vessels with capacities greater than 151,412 liters c40,000 gallonsd equipped with external floating roofs operating without secondary seals or their approved equivalent pursuant to sub. [c6d cad 1.](#) to 4.

*cbd Recordkeeping.* The owner or operator of a petroleum liquid storage vessel with an external floating roof not covered under sub. [c6d](#) but containing a petroleum liquid with a true vapor pressure greater than 7.0 kPa c1.0 psiad, shall maintain and retain for at least 2 years records of the average monthly storage temperature, the type of liquid, throughput quantities and the maximum true vapor pressure for all petroleum liquids with a true vapor pressure greater than 7.0 kPa c1.0 psiad.

**c8d** ALTERNATIVE CONTROL. Any alternative control method approved by the department under sub. [c2d](#), [c5d cbd 1.](#) or [c6d cbd 1.](#) shall be submitted to, and will not become effective for federal purposes until approved by, the administrator or designee as a source-specific revision to the department[s state implementation plan for ozone.

**History:** Renum. from NR 154.13 c2d cad and am. [Register, September, 1986, No. 369, eff. 10-1-86;](#) am. c1d cintro.d, c4d cbd cintro.d c5d cad, cbd cintro.d and 7. b., c6d cad cintro.d, cbd cintro.d and 2. c. and c7d cad, [Register, February, 1990, No. 410, eff. 3-1-90;](#) am. c1d cad and c3d cad, [Register, May, 1992, No. 437, eff. 6-1-92;](#) am. c1d cad, c2d cad and cbd, c5d cbd 6., cr. c8d, [Register, December, 1993, No. 456, eff. 1-1-94;](#) am. c1d cad, c3d cad, [Register, February, 1995, No. 470, eff. 3-1-95;](#) am. c1d cbd, [Register, December, 1995, No. 480, eff. 1-1-96;](#) am. c1d cad, c3d cbd cintro.d, c4d cbd cintro.d and c5d cbd cintro.d, 1., 7. intro., c6d cbd cintro.d, c8d, r. c5d cbd 2., [Register, December, 1996, No. 492, eff. 1-1-97;](#) am. c1d cad and c5d cbd 5., renum. c5d cbd 6., 7. and c6d cbd 9. to be c5d cbd 7., 8. and c6d cbd 10. and am. c5d cbd 7., 8. cintro.d, a. and c6d cbd 10. cintro.d, cr. c5d cbd 6., ccd, cdd and c6d cbd 9., [Register, October, 1999, No. 526, eff. 11-1-99;](#) correction in c2d cad and c8d made under s. 13.93 c2md cbd 7., Stats., [Register, October, 1999, No. 526.; CR 02-146;](#) am c1d cad [Register October 2003 No. 574, eff. 11-1-033;](#) correction in c3d cad made under s. 13.93 c2md cbd 7., Stats., [Register October 2003, No. 574;](#) correction in c5d ccd 2. b. made under s. 13.92 c4d cbd 7., Stats., [Register May 2011 No. 665; CR 15-077;](#) am. c4d cbd 3. [Register July 2016 No. 727, eff. 8-1-16.](#)

**NR 420.035 Gasoline storage tank vent pipes. c1d** APPLICABILITY AND EXEMPTIONS. *cad Applicability.* Except as provided in par. [cbd](#), this section applies to all stationary gasoline storage tanks at a gasoline dispensing facility with a total stationary storage tank capacity of 2000 gallons or more located in Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Washington or Waukesha county.

*cbd Non-highway fuel use exemption.* This section does not apply to any gasoline dispensing equipment that is used exclusively for fueling marine vessels, aircraft or snowmobiles.

**c2d** VAPOR CONTROL REQUIREMENTS. *cad* No owner or operator of a gasoline dispensing facility described in sub. [c1d cad](#)

may permit gasoline to be transferred from either a gasoline delivery vessel to a stationary storage tank, or from a stationary storage tank to a motor vehicle fuel tank, unless the owner or operator has installed a pressure vacuum valve on the stationary gasoline storage tank vent pipe.

cbd The owner or operator of a gasoline dispensing facility subject to par. cad shall ensure that each pressure vacuum valve installed on a storage tank vent pipe is certified by the California air resources board under section 41954 of the California health and safety code, and is maintained in good working order.

**c3d COMPLIANCE SCHEDULE.** cad The owner or operator of a gasoline dispensing facility subject to sub. c2d on August 1, 1994 shall install a pressure vacuum valve on each stationary gasoline storage tank vent pipe by March 31, 1995.

cbd The owner or operator of an existing gasoline dispensing facility previously exempt from the vapor control requirements of sub. c2d because its gasoline storage tank capacity was less than 2000 gallons shall install a pressure vacuum valve on each stationary gasoline storage tank vent pipe not later than 120 days after the exemption level is exceeded, making sub. c2d applicable.

ccd The owner or operator of a gasoline dispensing facility on which construction was commenced after August 1, 1994 and which is subject to the vapor control requirements of sub. c2d shall install a pressure vacuum valve on each stationary gasoline storage tank vent pipe before the tank is first filled with gasoline.

**History:** Cr. Register, July, 1994, No. 463, eff. 8-1-94; am. c2d cbd, Register, December, 1995, No. 480, eff. 1-1-96.

**NR 420.04 Transfer operations and associated equipment. c1d BULK GASOLINE TERMINALS.** cad *Applicability.* This subsection applies, subject to the provisions of s. NR 425.03, to all bulk gasoline terminals and the associated equipment necessary to load tank truck or trailer compartments.

cbd *Vapor control system.* No person may load gasoline into any tank trucks or trailers from any bulk gasoline terminal unless all of the following requirements are met:

1. The bulk gasoline terminal is equipped with a vapor control system which is properly installed, in good working order, in operation and consisting of one of the following:

a. An adsorber, absorption, refrigeration or condensation system.

b. A vapor collection system which directs all vapors to a fuel gas system.

2. All displaced vapors and gases are vented only to the vapor control system.

3. A means is provided to prevent liquid drainage from the loading device when it is not in use or to accomplish complete drainage before the loading device is disconnected.

4. All loading and vapor lines are equipped with fittings which make vapor tight connections and which close automatically when disconnected.

ccd *Emission limitation.* The vapor control system required under par. cbd 1. may not allow mass emissions of VOCs from control equipment to exceed 80 milligrams per liter c4.7 grains per gallon of gasoline loaded.

cdd *Operating requirements.* The vapor collection system and the gasoline loading equipment shall be designed and operated in a manner that prevents:

1. Gauge pressure from exceeding 4.5 kPa c18 inches of H<sub>2</sub>Od and vacuum from exceeding 1.5 kPa c6 inches of H<sub>2</sub>Od in the gasoline tank truck.

2. A reading equal to or greater than 100% of the LEL at 2.5 centimeters from all points on the perimeter of a potential leak source.

3. Avoidable visible liquid leaks during loading or unloading operations.

ced *Repair deadline.* Provisions shall be made to repair and retest a vapor collection or control system that exceeds the limits of par. cdd 2. within 15 days.

cfđ *Precautions.* Sources to which this subsection applies may not do either of the following:

1. Allow gasoline to be discarded in sewers or stored in open containers, s. NR 419.04 notwithstanding.

2. Allow the pressure in the vapor collection system to exceed the tank truck or trailer pressure relief settings.

cgd *Truck sticker.* No person may load gasoline into any tank truck or trailer from any bulk gasoline terminal unless the tank truck displays a current sticker demonstrating that the truck is in compliance with sub. c4d.

**c2d BULK GASOLINE PLANTS.** cad *Applicability.* Subject to the provisions of s. NR 425.03, this subsection applies to the unloading, loading, and storage facilities of all bulk gasoline plants which have an average daily throughput of 15,000 liters c4,000 gallons of gasoline or more on a 30-day rolling average; and to all delivery vessels involved in such loading or unloading operations, except as provided in subs. 1. and 2. Any plant that becomes or is subject to this subsection shall remain subject to this subsection even if its throughput later falls below the applicability thresholds. The requirements of pars. cbd to cgd do not apply to the following:

1. The loading or unloading of stationary storage tanks with a capacity of 2,176 liters c575 gallons or less, notwithstanding s. NR 439.10.

2. Bulk plant unloading facilities, the delivery vessels receiving gasoline from bulk plants, and the operation of transferring gasoline from bulk plant to delivery vessel when the transfer takes place outside the counties of Brown, Calumet, Dane, Dodge, Door, Fond du Lac, Jefferson, Kenosha, Kewaunee, Manitowoc, Milwaukee, Outagamie, Ozaukee, Racine, Rock, Sheboygan, Walworth, Washington, Waukesha and Winnebago or when the gasoline is delivered exclusively to facilities exempted from the requirements of sub. c3d by sub. c3d cad 1., 2., 3., 4., 5. or 6. However, the requirements of pars. cbd to cgd do apply if gasoline is transferred during the ozone season to a delivery vessel whose last previous delivery was to a gasoline dispensing facility, either inside or outside this state, which is required to have a vapor balance system.

cbd *Equipment requirements for bulk plants.* No owner or operator of a bulk gasoline plant may permit stationary storage tanks to load or unload gasoline unless each tank is equipped with a vapor balance system as described under par. ced and approved by the department, and with one of the following:

1. A submerged fill pipe approved by the department.

2. A fill line whose discharge opening is flush with or near the bottom of the tank.

ccd *Equipment requirements for delivery vessels.* No owner or operator of a bulk gasoline plant or delivery vessel may permit the gasoline transfer operations regulated under this subsection unless each delivery vessel involved in such operations is equipped with a vapor balance system as described under par. ced and approved by the department and the following conditions are met:

1. Equipment is available at the bulk gasoline plant to provide for the submerged filling of each delivery vessel or each delivery vessel is equipped for bottom filling.

3. After October 1, 1981, the tank truck displays a current sticker demonstrating that the truck is in compliance with sub. [c4d](#).

*cdd Transfer requirements.* No owner or operator of a bulk gasoline plant or delivery vessel may permit the transfer of gasoline unless all of the following requirements are met:

1. Submerged or bottom filling is used.
2. The vapor balance system is in good working order and is connected and operating.
3. Delivery vessel hatches are closed at all times during transfer operations.
4. There are no leaks in the delivery vessels[ pressure-vacuum relief valves and hatch covers, nor in the delivery vessel tanks or stationary storage tanks or associated vapor and liquid lines during loading or unloading.

5. The pressure relief valves on stationary storage tanks and delivery vessels are set to release at no less than 4.8 kPa [c0.7](#) psigd, or the highest possible pressure consistent with state or local fire codes or the national fire prevention association guidelines.

*ced Vapor balance system.* Vapor balance systems required under pars. [cbd](#) and [ccd](#) shall include vapor space connections on the stationary storage tank and on the delivery vessel with connecting pipe or hose. These connections are required either for loading of the bulk plant storage tank only or for both loading and unloading, as indicated in par. [cad](#). Both sides of all junctions shall be equipped with fittings which are vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic compound vapors.

*cfid Operating requirements.* The vapor collection system and the gasoline loading equipment shall be designed and operated in a manner that prevents:

1. Gauge pressure from exceeding 4.5 kPa [c18](#) inches of H<sub>2</sub>Od and vacuum from exceeding 1.5 kPa [c6](#) inches of H<sub>2</sub>Od in the gasoline tank truck.
2. A reading equal to or greater than 100% of the LEL at 2.5 centimeters from all points on the perimeter of a potential leak source.
3. Avoidable visible liquid leaks during loading or unloading operations.

*cgd Repair deadline.* Provisions shall be made to repair and retest a vapor collection or control system that exceeds the limits of par. [cfd 2](#). within 15 days.

*chd Precautions.* Notwithstanding s. [NR 419.04](#), no owner or operator of a bulk gasoline plant may permit gasoline to be spilled, discarded in sewers or stored in open containers.

**c3d GASOLINE DISPENSING FACILITIES.** *cad Applicability.* Subject to the provisions of s. [NR 425.03](#), this subsection applies to gasoline dispensing facilities, to the delivery vessels used to bring these facilities the gasoline which they dispense, and to the operation of transferring gasoline to the dispensing facilities with the following exceptions:

1. Gasoline dispensing facilities which are supplied exclusively by bulk gasoline plants whose unloading operations are exempted from the requirements of sub. [c2d](#) by sub. [c2d cad 1](#).
2. Gasoline dispensing facilities located outside the counties of Brown, Calumet, Dane, Dodge, Door, Fond du Lac, Jefferson, Kenosha, Kewaunee, Manitowoc, Milwaukee, Outagamie, Ozaukee, Racine, Rock, Sheboygan, Walworth, Washington, Waukesha and Winnebago.
3. Delivery vessels used exclusively to supply exempt gasoline dispensing facilities or used exclusively for the transfer operations exempted under subds. [4](#). to [6](#).

4. Transfers made to storage tanks of gasoline dispensing facilities equipped with floating roofs or their equivalent which have been approved by the department.

5. Transfers made to any stationary storage tank at a gasoline dispensing facility with a capacity of 7,580 liters [c2,000](#) gallonsd or less which is in place on or before August 1, 1979.

6. Transfers made to any stationary storage tank at a gasoline dispensing facility with a capacity of 2,176 liters [c575](#) gallonsd or less which is installed after August 1, 1979.

*cbd Vapor control requirements.* No owner or operator of a gasoline dispensing facility and no owner of a gasoline storage tank at such a facility may transfer or cause or allow the transfer of gasoline from any delivery vessel into any stationary storage tank not excluded under par. [cad](#) unless:

1. The storage tank is equipped with a submerged fill pipe.
2. The vapors displaced from it by filling are processed by a vapor control system in accordance with par. [ccd](#).

3. After October 1, 1981, the tank truck displays a current sticker demonstrating that the truck is in compliance with sub. [c4d](#).

*ccd Vapor control system.* The vapor control system required by par. [cbd](#) shall include one or more of the following:

1. A vapor balance system with a vapor tight vapor return line from the storage tank to the delivery vessel and a system that will ensure the vapor line is connected before gasoline can be transferred into the storage tank.
2. A refrigeration-condensation system capable of recovering at least 90% by weight of the organic compounds in the displaced vapor or an equally effective alternative control method approved by the department. Any alternative control method approved by the department under this subdivision shall be submitted to, and will not become effective for federal purposes until approved by, the administrator or designee as a source-specific revision to the department[s state implementation plan for ozone.

*cdd Operating requirements.* The vapor collection system and the gasoline loading equipment shall be designed and operated in a manner that prevents:

1. Gauge pressure from exceeding 4.5 kPa [c18](#) inches of H<sub>2</sub>Od and vacuum from exceeding 1.5 kPa [c6](#) inches of H<sub>2</sub>Od in the gasoline tank truck.
2. A reading equal to or greater than 100% of the LEL at 2.5 centimeters from all points on the perimeter of a potential leak source.
3. Avoidable visible liquid leaks during loading or unloading operations.

*ced Delivery vessel unloading.* The operator of a delivery vessel may not commence transfer of gasoline to any gasoline dispensing facility equipped with a vapor balance system pursuant to par. [ccd 1](#). without first properly connecting the vapor return line. The delivery vessel shall be designed, maintained and operated to be vapor tight at all times that it is vapor-laden.

*cfid Delivery vessel refilling.* During the ozone season, vapor-laden delivery vessels shall be refilled in this state only at one of the following:

1. Bulk gasoline terminals complying with sub. [c1d](#).
2. Bulk gasoline plants equipped with a vapor balance system for unloading as described in sub. [c2d ced](#).

*cgd Control equipment installation and maintenance.* Each owner of a gasoline storage tank or delivery vessel shall do all of the following:

1. Install all necessary control systems and make all necessary process modifications in accordance with pars. [cbd](#), [ccd](#), [cdd](#) and [ced](#).

2. Repair, replace or modify any worn out or malfunctioning component or element of design, and keep such records as may be requested in writing by the department relating to the repair, replacement or modification of any component or element of design of the control system.

3. Repair and retest a vapor collection or control system that exceeds the limits of par. [cdd 2.](#) within 15 days.

*chd Control equipment operating and maintenance instructions.* Each owner of a gasoline storage tank shall provide written instructions to the operator of the gasoline dispensing facility describing necessary operating and maintenance procedures and procedures for prompt notification of the owner in case of any malfunction of the control system.

*cid Control system operation and maintenance requirements.* Each operator of a gasoline dispensing facility shall:

1. Maintain and operate the control system in accordance with the specifications and the operating and maintenance procedures specified by the owner.

2. Promptly notify the owner of the control system of any scheduled maintenance or of any malfunction requiring replacement or repair of major components of the system.

3. Keep on the premises a copy of the instructions provided pursuant to par. [chd](#) and make these instructions available to an authorized representative of the department on request.

4. Maintain such records on maintenance and malfunction as may be requested in writing by the department.

5. Maintain gauges, meters, or other specified testing devices in proper working order.

**c4d GASOLINE DELIVERY VESSELS.** *cad Applicability.* This subsection applies, with compliance deadlines in accord with the compliance schedules for subs. [c1d](#) to [c3d](#), to all gasoline delivery vessels except those exempted from vapor balance system installations under subs. [c2d cad](#) and [c3d cad 3.](#)

*cbd Equipment requirements.* Except as provided under par. [cad](#), the owner or operator of a gasoline delivery vehicle shall:

1. Provide for all gasoline delivery vessels to be equipped for gasoline vapor collection.

2. Provide for all loading and vapor lines to be equipped with fittings which make vapor-tight connections.

3. Equip vapor lines leading to the vapor space in the delivery vessel with fittings which close automatically when disconnected.

4. Demonstrate through the sticker required in subd. [5.](#) that the gasoline delivery vessel is in compliance with the following provisions:

a. An annual pressure test shall be performed on the vessel according to the test methods and procedures specified in s. [NR 439.06 c3d cdd.](#)

b. The vessel may not undergo a pressure change of more than 0.75 kPa c3 inches of H<sub>2</sub>Od in 5 minutes when pressurized to a gauge pressure of 4.5 kPa c18 inches of H<sub>2</sub>Od or evacuated to a gauge pressure of 1.5 kPa c6 inches of H<sub>2</sub>Od during the test required in subd. [4. a.](#)

c. A vessel failing to meet the requirements of subd. [4. b.](#) shall be repaired and retested within 15 days.

5. Display a sticker near the department of transportation certification plate which:

a. Shows the date that the gasoline delivery vessel was last certified under subd. [4.](#)

b. Shows the identification number of the gasoline delivery vessel.

6. Design and operate the gasoline loading and unloading equipment in a manner that prevents:

a. A reading equal to or greater than 100% of the LEL at 2.5 centimeters from all points on the perimeter of a potential leak source.

b. Avoidable visible liquid leaks during loading or unloading operations.

7. Repair and retest, within 15 days, components exceeding the limits of subd. [6. a.](#)

*ccd Pressure test records.* 1. Maintain for a period of 3 years from the recording date a log for each delivery vessel containing, at a minimum:

a. Company name and the date and location of the test required under par. [cbd 4.](#)

b. Delivery vessel identification number.

c. The results of the test, including all data collected during the test.

2. Annually submit to the department information as developed under par. [cbd 4. b.](#), and as recorded under subd. [1.](#)

**History:** Renum. from NR 154.13 c3d cad to cdd and am., [Register, September, 1986, No. 369](#), eff. 10-1-86; am; c1d ccd and cfd cintro.d, c2d cbd cintro.d, ccd cintro.d, cdd cintro.d and chd, c3d cbd cintro.d and ccd, c4d cad, cbd 4. a. and b., ccd 1. a. and b. r. and recr. c4d ccd 1. c., r. c4d ccd 1. d. to f., [Register, February, 1990, No. 410](#), eff. 3-1-90; correction in c2d cad 1. and ccd cintro.d. made under s. 13.93 c2md cbd 7., Stats., [Register, February, 1990, No. 410](#); am. c3d cdd cintro.d. [Register, May, 1992, No. 437](#), eff. 6-1-92; correction in c2d cad 2. made under s. 13.93 c2md cbd 7., Stats., [Register, May, 1992, No. 437](#); am. c2d cad 2. and c3d cad 2., [Register, January, 1993, No. 445](#), eff. 2-1-93; am. c1d cbd 1. b., c2d cad cintro.d, c3d ccd 2., c4d ccd 1. c., r. c1d cbd 1. c. and c3d ccd 3., [Register, December, 1993, No. 456](#), eff. 1-1-94; am. c2d cad cintro.d and 2., [Register, December, 1995, No. 480](#), eff. 1-1-96; am. c1d cbd cintro.d, cfd cintro.d, 1., c2d cbd, ccd cintro.d, 1., cdd cintro.d, c3d ccd 2., cfd cintro.d, cgd cintro.d, c4d cbd 4. b., r. c2d ccd 2., [Register, December, 1996, No. 492](#), eff. 1-1-97; am. c2d cad 2. and c3d cgd 1., [Register, October, 1999, No. 526](#), eff. 11-1-99; [CR 15-077](#): am. c1d cbd 4., c3d ccd 1. [Register July 2016 No. 727](#), eff. 8-1-16.

**NR 420.05 Petroleum refinery sources. c1d VACUUM PRODUCING SYSTEMS.** *cad Applicability.* This subsection applies, subject to the provisions of s. [NR 425.03](#), to vacuum producing systems at petroleum refining sources.

*cbd Requirements.* The owner or operator of any vacuum producing systems at a petroleum refinery may not permit the emission of any noncondensable VOC, from the condensers or accumulators of the system. The control required by this paragraph shall be achieved by one of the following:

1. Piping the noncondensable vapors to an operating firebox or incinerator.

2. Compressing the vapors and adding them to the refinery fuel gas.

**c2d WASTEWATER SEPARATORS.** *cad Applicability.* This subsection applies, subject to the provisions of s. [NR 425.03](#), to wastewater separators at petroleum refining sources.

*cbd Requirements.* The owner or operator of any wastewater coil-watered separators at petroleum refinery shall do both of the following:

1. Provide covers and seals approved by the department on all separators and forebays.

2. Equip all openings in covers, separators, and forebays with lids or seals such that the lids or seals are in the closed position at all times except when in actual use.

**c3d PROCESS UNIT TURNAROUNDS.** *cad Applicability.* This subsection applies to process unit turnarounds at petroleum refining sources.

*cbd Requirements.* The owner or operator of a petroleum refinery shall develop and submit to the department for approval a detailed procedure for minimizing VOC emissions during

process unit turnaround. At a minimum, the procedure shall provide for all of the following:

1. Depressurization venting of the process unit or vessel to a flare, firebox or vapor recovery system which prevents release to the ambient air of at least 90% by weight of the VOCs vented.

2. No emission of VOCs from a process unit or vessel until its internal pressure is 136 kPa c19.7 psia or less.

3. Recordkeeping of the following items during the ozone season:

- a. Every date that each process unit or vessel is shut down.
- b. The approximate total quantity of VOCs emitted and the duration of the emission.

**c4d FUGITIVE EMISSION SOURCES.** cad *Applicability.* This subsection applies to specific fugitive emissions sources at petroleum refineries.

cbd *Valve requirements.* The owner or operator of a petroleum refinery may not:

1. Install a valve at the end of a pipe or line containing VOCs unless one of the following applies:

- a. The pipe or line is sealed with a second valve, a blind flange, a plug, or a cap.
- b. The valve is a safety pressure relief valve.

2. Operate a pipeline valve or pressure relief valve in gaseous service unless it is visibly marked.

ccd *Monitoring.* The owner or operator of a petroleum refinery shall:

1. Develop and submit to the department for approval a monitoring schedule for fugitive emission sources. At a minimum, the schedule shall provide for:

- a. Yearly monitoring of all pump seals, pipeline valves in liquid service, and process drains.
- b. Quarterly monitoring of all compressor seals, pipeline valves in gaseous service, and pressure relief valves in gaseous service.
- c. Routine visual inspection of all pump seals on a weekly basis.

2. Provide for the following actions to be performed immediately under the following circumstances:

- a. Monitoring of any pump seals from which liquids are observed dripping.
- b. Monitoring, subsequent to repair, of any component that had been found leaking.
- c. Visual inspection of the seating of any pressure relief valve after it has vented to the atmosphere.

3. Be exempt from the monitoring requirements of subs. 1. and 2. for:

- a. A pressure relief device connected to an operating flare header, or vapor recovery device.
- b. Inaccessible valves.

c. Storage tank valves.

d. Valves not externally regulated.

4. Upon detection of a leaking component which is producing a VOC concentration in excess of 10,000 ppm at any point accessible to the monitoring device, do all of the following:

a. Affix a weatherproof and readily visible tag bearing an identification number and the date the leak is detected to the leaking component.

b. Include the leaking component on a written list of scheduled repairs within 24 hours.

c. Repair and retest the component within 15 days when this is possible without shutting down operations.

d. Identify all leaking components which cannot be repaired until the unit is shut down for turnaround.

cdd *Reporting.* Beginning January 15, 1982, the owner or operator of a petroleum refinery shall submit quarterly reports to the department containing the following:

1. A statement attesting to performance of the monitoring program as approved under par. ccd 1.

2. The number of each type of components inspected and the total number of components found leaking.

3. Lists of all leaking components awaiting unit turnaround.

4. Lists of any additional leaking components detected but not repaired within 15 days.

5. Status of repair operations of leaking components.

ced *Recordkeeping.* The owner or operator of a petroleum refinery shall maintain a leaking component monitoring log, for a period of 3 years from the recording date, containing at a minimum all of the following:

1. The name of the process unit where the component is located.

2. The type of component (e.g., valve, seal).

3. The composition of the stream on which the component is located.

4. The tag number of the component.

5. The date on which a leaking component is discovered.

6. The date on which a leaking component is repaired.

7. The date and instrument reading of the recheck procedure after a leaking component is repaired.

8. A record of the calibration of the monitoring instrument.

9. A list of leaks that cannot be repaired until turnaround.

10. The total number of components checked in the last quarter and the total number of components found leaking.

**History:** Renum. from NR 154.13 c7d and am. c1d cad, c2d cad, c3d cad, c4d cad, ccd 1. cintro.d and cdd cintro.d, Register, September, 1986, No. 369, eff. 10-1-86; am. c1d cbd cintro.d, c4d cbd cintro.d, cdd cintro.d and ced cintro.d, Register, February, 1990, No. 410, eff. 3-1-90; correction in c1d cad made under s. 13.93 c2md cbd 7., Stats., Register, August, 1990, No. 416; am. c3d cbd cintro.d and c4d ccd cintro.d, Register, May, 1992, No. 437, eff. 6-1-92; am. c1d cbd cintro.d, c2d cbd cintro.d, c3d cbd cintro.d, c4d cbd 1. intro., ccd 4. intro., ced cintro.d, Register, December, 1996, No. 492, eff. 1-1-97.