

Department of Environmental Quality
Air Quality Program

GENERAL
AIR CONTAMINANT DISCHARGE PERMIT
ASSESSMENT REPORT

HALOGENATED SOLVENT CLEANING

SOURCE DESCRIPTION AND QUALIFICATION

1. This permit incorporates provisions from the National Emission Standards for Hazardous Air Products (NESHAP) for Halogenated Solvent Cleaning (40 CFR part 63 subpart T).
2. The NESHAP applies to each individual solvent cleaning machine that uses solvent containing one of the following halogenated HAP solvents or any combination of these halogenated HAP solvents, in a total concentration greater than 5 percent by weight, as a cleaning or drying agent.
 - Methylene chloride (CAS No. 75-09-2),
 - Perchloroethylene (CAS No. 127-18-4)
 - Trichloroethylene (CAS No. 79-01-6)
 - 1,1,1-trichloroethane (CAS No. 71-55-6,
 - Carbon tetrachloride (CAS No. 56-23-5)
 - Chloroform (CAS No. 67-66-3)

The NESHAP does not apply to buckets, beakers and pails with capacities less than 2 gallons. The 2-gallon exemption does not apply to items specifically designed to carry out solvent cleaning, such as an ultrasonic cleaners.

3. The NESHAP splits solvent cleaning machines into three main categories: batch cold, batch vapor and in-line. This permit incorporates provisions for all three categories.
4. EPA promulgated the NESHAP on December 2, 1994, and numerous amendments and corrections since. The NESHAP, including amendments and corrections through July 1, 2008, are adopted by reference in OAR 340-244-0220(5)(n).
5. EPA added residual risk standards to the NESHAP on May 3, 2007. These standards are also adopted by reference in OAR 340-244-0220(5)(n).

DEFINITIONS AND CLASSIFICATION

6. Vapor cleaning machine: Cleaning machine that boils liquid solvent generating solvent vapor that is used as a part of the cleaning or drying cycle.

7. Cold cleaning machine: Any device or piece of equipment that contains and/or uses liquid solvent, into which parts are placed to remove soils from the surface of parts or to dry the parts. Cleaning machines that contain and use heated, nonboiling solvent to clean the parts are considered cold cleaning machines.
8. Batch cleaning machine: A solvent cleaning machine in which individual parts or a set of parts move through the entire cleaning cycle before new parts are introduced into the solvent cleaning machine. An open-top vapor cleaning machine is a type of batch cleaning machine. A solvent cleaning machine, such as a ferris wheel or a cross-rod degreaser, that clean multiple batch loads simultaneously and are manually loaded are batch cleaning machines.
9. In-line cleaning machine or continuous cleaning machine: Solvent cleaning machine that uses an automated parts handling system, typically a conveyor, to automatically provide a continuous supply of parts to be cleaned. These units are fully enclosed except for the conveyor inlet and exit portals. In-line cleaning machines can be either cold or vapor cleaning machines.
10. Continuous web cleaning machine: A solvent cleaning machine in which parts such as film, coils, wire, and metal strips are cleaned at speeds typically in excess of 11 feet per minute. Parts are generally uncoiled, cleaned such that the same part is simultaneously entering and exiting the solvent application area of the solvent cleaning machine, and then recoiled and cut.
11. Remote reservoir continuous web cleaning machine: A continuous web cleaning machine in which there is no exposed solvent sump. In these units, the solvent is pumped from an enclosed chamber and is typically applied to the continuous web part through a nozzle or series of nozzles. The solvent then drains from the part and is collected and recycled through the machine, allowing no solvent to pool in the work or cleaning area.
12. Immersion batch cold cleaning machine: A cold cleaning machine in which the parts are immersed in the solvent when being cleaned. A remote reservoir cold cleaning machine that is also an immersion cold cleaning machine is considered an immersion cold cleaning machine for the purposes of this subpart.
13. Remote reservoir batch cold solvent cleaning machines: Any device in which liquid solvent is pumped to a sink-like work area that drains solvent back into an enclosed container while parts are being cleaned, allowing no solvent to pool in the work area.

COMPLIANCE APPROACHES

14. Batch vapor and in-line cleaning machines: The NESHAP contains two compliance approaches for batch vapor and in-line solvent cleaning machines: control requirements or alternative standards.
 - Control requirements: For each batch vapor and in-line solvent cleaning machine complying with the control requirement compliance option, a specific control combination, from a list of control combinations, must be installed. The solvent cleaning machine must also meet

specific design requirements. This option requires monitoring of control equipment and adherence to specified work practices.

- Alternative standards: The alternative standards consist of an overall emission limit or an overall solvent control efficiency. The alternative standards do not specify base design, equipment, equipment monitoring, or work practice requirements. The alternative standards allow the flexibility to install any equipment and/or implement any work practices provided the specified limits are met.

15. Batch cold cleaning machines: The NESHAP requires that batch cold cleaners meet the following control and/or design requirements and be operated according to specific work practice requirements.

- Immersion batch cold cleaning machine: Employ a tightly fitting cover over the solvent sump that shall be closed at all times except during the cleaning of parts.
- Remote reservoir batch cold solvent cleaning machines: Employ a tightly fitting cover that shall be closed at all times except during parts entry and removal, and one of the following controls:
 - A 0.75 freeboard ratio (or greater); or
 - A 2.5 cm [1 inch] water layer.

RESIDUAL RISK STANDARDS

16. The residual risk standards contained in the NESHAP are facility-wide emission limits for methylene chloride (MC), perchloroethylene (PCE), and trichloroethylene (TCE):

- Methylene chloride: 132,277 pounds/year
- Perchloroethylene: 31,085 pounds/year
- Trichloroethylene: 10,582 pounds/year

The facility-wide emission limits are applicable to all solvent cleaning machines that use these solvents. Only the emission limit for perchloroethylene is included in the permit because the other emission limits exceed the individual HAP emission limit in Condition 3.1 and the level at which a facility is required to have a Title V permit.

EMISSIONS CALCULATIONS

Potential to emit (PTE)

17. HAP PTE for batch vapor and cold cleaning machines is calculated using the following equation:

$$\text{PTE} = (\text{time in operation}) \times (0.4 \text{ lbs/ft}^2\text{-hr}) \times (\text{solvent-air interface area})$$

Example:

$$\begin{aligned} &= (8,760 \text{ hrs/year}) \times (0.4 \text{ lbs/ft}^2\text{-hr}) \times (10.0 \text{ ft}^2) \\ &= 35,040 \text{ lbs/year} \end{aligned}$$

= 17.5 tons of per year

18. HAP PTE for in-line cleaning machines is calculated using the following equation:

$$\text{PTE} = (\text{time in operation}) \times (0.23 \text{ lbs/ft}^2\text{-hr}) \times (\text{solvent-air interface area})$$

Example:

$$\begin{aligned} &= (8,760 \text{ hrs/year}) \times (0.23 \text{ lbs/ft}^2\text{-hr}) \times (10.0 \text{ ft}^2) \\ &= 20,148 \text{ lbs/year} \\ &= 10.1 \text{ tons of per year} \end{aligned}$$

Actual emissions

19. HAP emissions are determined using the following equation:

$$E_{\text{HAPI}} = [\sum(C_X * D_X * K_X) - W] \times 1 \text{ ton} / 2000 \text{ lb.}$$

where,

- E_{HAPI} = Individual HAP emissions (ton/yr);
- I = Subscript I represents a specific HAP
- \sum = Symbol meaning the sum of the emissions from all types of materials used.
- C = Material usage for the period in gallons;
- D = Material density in pounds per gallon;
- K = Material HAP fraction in pounds of HAP per pound of material;
- X = Subscript X represents a specific material;
- W = Weight of HAP shipped offsite

20. VOC emissions depend on the solvent used. The following solvents are not VOCs: methylene chloride, perchloroethylene, and 1,1,1-trichloroethane. The following solvents are VOCs: trichloroethylene, carbon tetrachloride, and chloroform. VOC emissions are determined using the following equation:

$$E_{\text{VOC}} = [\sum(C_X * D_X * K_X) - W] \times 1 \text{ ton} / 2000 \text{ lb.}$$

where,

- E_{VOC} = VOC emissions (ton/yr);
- \sum = Symbol meaning the sum of the emissions from all types of materials used.
- C = Material usage for the period in gallons;
- D = Material density in pounds per gallon;
- K = Material VOC fraction in pounds of VOC per pound of material;
- X = Subscript X represents a specific material;
- W = Weight of VOC shipped offsite

COMPLIANCE DEMONSTRATION

Batch Vapor and In-Line Cleaning Machines

Control, Design, and Work Practice Requirements

21. **Monitoring:** For each control used to comply with the control combination, there are specific monitoring requirements. The monitoring requirements, which involve periodic checks of key equipment parameters, are necessary to define the controls and ensure that each control is working properly.
22. **Recordkeeping:** For each control used to comply with the control combination, there are specific recordkeeping requirements. Recordkeeping is necessary to document the results of installation, monitoring, and determination results.

Alternative Standards

Overall Emission Limit

23. **Monitoring:** The overall solvent emission limit option has no associated control equipment specific monitoring. It is the easiest compliance option for already well controlled or infrequently used machines. The only monitoring required is tracking of solvent usage and recovery and calculating 3-month rolling average emissions.
24. **Recordkeeping:** For each machine complying with the overall emission limit option the following records must be maintained for 5 years:
 - Records of the dates and amounts of solvent added to the machine.
 - The amount of solvent in the wastes removed from the machine.
 - Calculation sheets showing how the monthly emissions and the 3-month rolling average monthly emissions were determined.

Overall Solvent Control Efficiency

25. **Monitoring:** The overall solvent control efficiency option has no associated control equipment specific monitoring. The only monitoring required is tracking of solvent usage and recovery and calculating the overall cleaning system control efficiency.
26. **Recordkeeping:** For each machine complying with the overall solvent control efficiency option the following records must be maintained for 5 years:
 - Records of the dates and amounts of solvent added to the machine.
 - The amount of solvent in the wastes removed from the machine.
 - Records of the dates and amounts of solvent recovered from the desorption of the carbon adsorber system.

- Calculation sheets showing how the calculations and results of determining the overall cleaning system control efficiency.

REPORTING

27. Initial Notification Report: This report is used to notify EPA and DEQ that a source is subject to the NESHAP. It also provides some preliminary facility and machine information. It is due according to the following schedule.

- Existing sources: Was due August 29, 1995.
- New sources: Is due as soon as possible before construction is scheduled to commence.

Additional reporting for batch vapor and in-line cleaning machines:

28. Initial Statement of Compliance Report: This report is due shortly after the compliance date and is used to demonstrate to EPA and DEQ that the machine is in compliance with the NESHAP. It includes information on the compliance option and/or control option chosen and the necessary demonstration measurements. It is due according to the following schedule.

- Existing sources: Was due May 1, 1998.
- New sources: Is due 150 days after startup.

29. Annual Report: This report is due on February 15 each year for each machine complying with the control combination compliance option.

30. Solvent Emission Report: This report is due on February 15 each year for each machine complying with the overall emission limit or the overall solvent control efficiency compliance option.

31. Exceedance Report: An exceedance report states whether any exceedances in monitored parameters have occurred and what actions were taken to correct any exceedances. An exceedance report is required every six months if there is not an exceedance and every 3 months if there is an exceedance.

Additional reporting for batch cold cleaning machines:

32. Compliance Report: This report is due shortly after the compliance date and is used to demonstrate to EPA and DEQ that the machine is in compliance with the NESHAP. It includes information on the control/design option chosen. It is due according to the following schedule.

- Existing sources: Was due May 1, 1998.
- New sources: Is due 150 days after startup.