

Section 39 - Perchloroethylene Dry Cleaning.

1/11/93

a. Applicability.

1. This Section applies to any perchloroethylene dry cleaning facility.
2. Perchloroethylene dry cleaning facilities that are coin-operated are exempt from the provisions of paragraphs (c)(1) and (c)(2) of this Section.
3. Any other facilities that the Department determines are demonstrated to experience hardships that justify exclusion are exempt from the provisions of paragraphs (c)(1) and (c)(2) of this Section provided that their exemption is approved as part of a State Implementation Plan (SIP) or Federal Implementation Plan (FIP) revision.

b. Definitions. As used in this Section, all terms not defined herein shall have the meaning given them in the November 15, 1990 Clean Air Act Amendments, or in Section 2 of this regulation.

"Dry cleaning facility" means a facility engaged in the cleaning of fabrics in an essentially nonaqueous solvent by means of one or more washes in solvent, extraction of excess solvent by spinning, and drying by tumbling in an airstream. The facility includes, but is not limited to, any washer, dryer, filter and purification system, waste disposal system, holding tank, pump, and attendant piping and valves.

c. Standards. The owner or operator of a perchloroethylene dry cleaning facility subject to this Section shall:

1. Vent the entire dryer exhaust through a properly functioning carbon adsorption system or equally effective control device.
2. Emit no more than 100 parts per million volumetric (ppmv) of volatile organic compounds (VOCs) from the dryer control device before dilution.
3. Maintain the system so as to prevent the leaking of liquid VOC and prevent perceptible vapor losses from gaskets, seals, ducts, and related equipment.
4. Cook or treat all diatomaceous earth filters so that the residue contains 25 kilograms (kg) (55 pounds [lb]) or less of VOC per 100 kg (220 lb) of wet waste material.
5. Reduce the VOCs from all solvent stills to 60 kg (132 lb) or less per 100 kg (220 lb) of wet waste material.

6. Drain all filtration cartridges in the filter housing for at least 24 hours before discarding the cartridges.
7. Dry or store all drained cartridges so that VOC is not emitted to the atmosphere.

d. Compliance provisions.

1. Compliance with paragraphs (c)(1), (c)(6), and (c)(7) of this Section shall be determined by means of a visual inspection.
2. Compliance with paragraph (c)(3) of this Section shall be determined by means of a visual inspection of the following components:
 - i. Hose connections, unions, couplings and valves.
 - ii. Machine door gaskets and seatings.
 - iii. Filter head gasket and seating.
 - iv. Pumps.
 - v. Base tanks and storage containers.
 - vi. Water separators.
 - vii. Filter sludge recovery.
 - viii. Distillation unit.
 - ix. Diverter valves.
 - x. Saturated lint from lint basket.
 - xi. Cartridge filters.
3. Compliance with paragraph (c)(2) of this Section shall be determined by one of the following:
 - i. A test as described in EPA Guideline Series document, "Measurement of Volatile Organic Compounds," EPA-450/2-78-041.

- ii. Proof of the proper installation, operation, and maintenance of equipment that has been demonstrated to be adequate to meet the emission limit in paragraph (c)(2) of this Section.
 4. Compliance with paragraphs (c)(4) and (c)(5) of this Section shall be determined by means of the test method in paragraph (e) of this Section.
- e. Test methods. The test method in paragraph (e) of this Section shall be used to determine compliance with paragraphs (c)(4) and (c)(5) of this Section.
 1. Applicability of the method. This method is applicable to the sampling and determination of perchloroethylene in wet waste material from diatomaceous earth filters and solvent stills at perchloroethylene dry cleaners on a weight percent basis.
 2. Principle. Samples are obtained from waste material at a perchloroethylene dry cleaning facility. A known sample mass is mixed with water and placed in a glass still equipped with a Liebig straight-tube-type reflux condenser and a Bidwell-Sterling-type graduated trap. Water and perchloroethylene in the sample are separated through repeated distillation until all of the perchloroethylene has been recovered in the trap and the volume recorded. The mass of perchloroethylene collected is determined from the product of its volume and specific gravity. The total weight of perchloroethylene obtained is divided by the total weight of sample analyzed to obtain the perchloroethylene content of the wet waste residue.
 3. Apparatus. The following apparatus shall be used:
 - i. Flask. Round-bottom, short-necked flask having a nominal capacity of 500 milliliters (ml).
 - ii. Condenser. Liebig straight-tube type, with a jacket not less than 400 millimeters (mm) long and with an inner tube having an outside diameter of 10 to 13 mm.
 - iii. Trap. Bidwell-Sterling type, graduated from 0 to 5 ml in 0.1-ml divisions. Calibrate at four or more points by first filling the trap with water and then adding a hydrophobic solvent with a specific gravity greater than water from a standard buret having a calibrated capacity at least equal to that of the trap. The error of the indicated volume shall not exceed 0.05 ml.
 - iv. Heater. Any suitable gas burner or electric heater for the glass

flask.

- v. Sample container. Metal can with a leakproof closure, 150 ml.

4. Sampling procedure.

- i. From distiller (cooker).

- A. After a cycle of perchloroethylene distilling and when the still bottoms have come approximately to room temperature (i.e., 21 to 38°C), obtain three 150-ml samples of the wet waste residue from the distiller (cooker) drain. Completely fill each of the three sample containers to prevent evaporation loss.
- B. Immediately close the sample container lids securely.
- C. Label the containers using waterproof and oil-proof ink.
- D. Store the samples in a cool, dry atmosphere.
- E. Transfer the samples to the appropriate laboratory for analysis within 48 hours of obtaining the samples. The samples shall remain sealed until the time of analysis.

- ii. From wet waste containers.

- A. Large unmixed containers. Using a clean sampling spoon, spatula, or other appropriate device, obtain three 150-ml samples. Each sample shall be comprised of three 50-ml subsamples, one each from the top, midpoint, and bottom of the wet waste container. Transfer the three subsamples that comprise each of the 150-ml samples to a sample container. Each of the three sample containers should be completely filled to prevent evaporation loss.
- B. Small containers. If the waste container can be thoroughly mixed prior to sampling, mix the container contents thoroughly and obtain three 150-ml samples by pipetting. The pipette should have a capacity of at least 150 ml and should be long enough to reach within

2 cm of the bottom of the wet waste container. Each 150-ml sample should be transferred to a sample container. Each sample container should be completely filled to prevent evaporation loss.

- C. Immediately close the sample container lids securely.
- D. Label the containers using waterproof and oil-proof ink.
- E. Store the samples in a cool, dry atmosphere.
- F. Transfer the samples to the appropriate laboratory for analysis within 48 hours of obtaining the samples. The samples shall remain sealed until the time of analysis.

5. Analysis procedure.

- i. Conduct duplicate analyses of each sample and record the recovered perchloroethylene from each analysis.
- ii. For each analysis, weigh and record the weight of an empty flask and stopper (W_i) to the nearest 0.1 mg.
- iii. Mix each unopened sample container by shaking.
- iv. Open the sample container and immediately transfer approximately 20 ml of wet waste material to the flask.
- v. Stopper the flask and reseal the sample container.
- vi. Weigh and record the weight of the flask plus added portion, d_i , to the nearest 0.1 g. The mass added to the flask shall not exceed 35 g.
- vii. Add water to the flask to make a total mixture volume of approximately 250 ml.
- viii. Fill the trap with cold water.
- ix. Connect the flask to the distillation trap.
- x. Assemble the apparatus so that the tip of the condenser is

directly over the indentation in the trap.

- xi. Heat the flask so that refluxing starts within 7 to 10 minutes. Adjust the rate of boiling so that the condensed distillate is discharged from the condenser at a rate of 1 to 3 drops per second.
- xii. From the time refluxing starts, obtain readings of the amount of perchloroethylene collected after 5, 15, and 30 minutes, and each following 15 minutes. End the test when the volume of perchloroethylene is increased by not more than 0.1 ml in a 15-minute period or the amount of perchloroethylene exceeds the trap capacity.
- xiii. At the end of the test run, turn off the heater. Allow the equipment to stand at least 30 minutes to allow the distillate to settle clear and to cool to room temperature.
- xiv. Read the volume of perchloroethylene collected in the trap. If the amount of perchloroethylene exceeded the calibrated capacity of the trap, report the volume of perchloroethylene as 5.0 ml plus.

6. Calculations.

- i. Calculate the total mass of the portion in the flask:

where:

$$S_i = d_i - W_i$$

S_i = Weight of wet waste portion, g.

W_i = Weight of the empty flask and stopper, g.

d_i = Weight of flask plus wet waste portion, g.

- ii. Calculate the total mass of perchloroethylene (f_i) collected in the trap from each analysis:

$$f_i = V_i \times D$$

where

- f_i = Weight of perchloroethylene in the wet waste portion, g.
 V_i = Volume of perchloroethylene collected in the trap, ml.
 D = Density of perchloroethylene at 20°C, 1.6227 g/ml.

- iii. Calculate the perchloroethylene content of the wet waste (R) using the following equation:

$$R = \frac{\sum_{i=1}^n f_i}{\sum_{i=1}^n S_i} \times 100$$

where:

- R = The perchloroethylene content of the wet waste, expressed in kg per 100 kg (lb per 200 lb) wet waste material.
 f_i = Weight of perchloroethylene in the wet waste portion, g.
 S_i = Weight of wet waste portion, g.
 n = The total number of analyses.

7. Precision and Accuracy.

- i. Accuracy. Concentrations of audit samples obtained by the analyst shall agree within 10 percent of the actual concentrations. If the 10-percent specification is not met, reanalyze the compliance samples and audit samples, and include initial and reanalysis values in the test report.

- ii. Precision. Duplicate results produced by the same analyst should be considered suspect if they differ by more than 5 percent.

- f. Recordkeeping. Each owner or operator of a perchloroethylene dry cleaning facility subject to this Section shall maintain the following records in a readily accessible location for at least 5 years and shall make these records available to the Department upon verbal or written request:
 - 1. A record of control equipment maintenance, such as replacement of the carbon in a carbon adsorption unit.
 - 2. A record of the results of visual leak inspections conducted in accordance with paragraph (d) of this Section.
 - 3. The results of all tests conducted in accordance with the requirements described in paragraphs (d)(3) and (d)(4) of this Section.

- g. Reporting requirements. The owner or operator of any facility containing sources subject to this Section shall:
 - 1. Comply with the initial compliance certification requirements of Section 5(a) of this regulation.
 - 2. Comply with the requirements of Section 5(b) of this regulation for excess emissions related to the control devices required to comply with paragraph (c) of this Section, as well as any other State of Delaware exceedance reporting requirements.