

*This model rule was developed by the Ozone Transport Commission (OTC) as part of a regional effort to attain and maintain the one-hour ozone standard, address emission reduction shortfalls that were identified by the U.S. Environmental Protection Agency in specific State's plans to attain the one-hour ozone standard, and reduce eight-hour ozone levels. A June 1, 2000 Memorandum of Understanding (MOU) designated the list of control measures evaluated as part of this effort. This model rule is being reviewed by the OTC at its March 6, 2001 Winter Meeting.*

*Please note that States opting to promulgate rules based on this model rule must comply with State specific administrative requirements and procedures.*

NOTE: "XXXX" is a place holder for State-specific section numbers, title numbers, or State names.

## Model Rule for Solvent Cleaning

### PART Env-A xxxx SOLVENT CLEANING

01 Definitions

02 Standards

**Env-A xxxx.01 Definitions.** The following words, terms, and abbreviations used in this part (subchapter) shall have the following meanings:

- (a) **Airless cleaning system**—A solvent cleaning machine that is automatically operated and seals at a differential pressure of 0.50 pounds per square inch gauge (psig) or less, prior to the introduction of solvent or solvent vapor into the cleaning chamber and maintains differential pressure under vacuum during all cleaning and drying cycles.
- (b) **Air-tight cleaning system**—A solvent cleaning machine that is automatically operated and seals at a differential pressure no greater than 0.50 psig, prior to the introduction of solvent or solvent vapor into the cleaning chamber and during all cleaning and drying cycles.
- (c) **Batch vapor cleaning machine**—A vapor cleaning machine in which individual parts or a set of parts move through the entire cleaning cycle before new parts are introduced into the cleaning machine. The term includes solvent cleaning machines, such as ferris wheel cleaners or cross rod machines, that

clean multiple loads simultaneously and are manually loaded. The term does not include machines which do not have a solvent/air interface, such as airless and air-tight cleaning systems.

- (d) **Carbon adsorber**—A bed of activated carbon into which an air/solvent gas-vapor stream is routed and which adsorbs the solvent on the carbon.
  
- (e) **Cold cleaning machine**—A device or piece of equipment, containing and/or using an unheated liquid which contains greater than 5% volatile organic compound or 5 percent hazardous air pollutant (hap) by weight, where parts are placed to remove dirt, grease, oil or other contaminants and coatings, from the surfaces of the parts or to dry the parts. The term does not include machines which do not have a solvent/air interface, such as airless and air-tight cleaning systems.
  
- (f) **Dwell**—Holding parts within the freeboard area of a solvent cleaning machine but above the solvent vapor zone. Dwell occurs after cleaning to allow solvent to drain from the parts or parts baskets back into the solvent cleaning machine.
  
- (g) **Dwell time**—The period of time between when a parts basket is placed in the vapor zone of a batch vapor or in-line vapor cleaning machine and when solvent dripping ceases. Dwell time is determined by placing a basket of parts in the vapor zone and measuring the amount of time between when the parts are placed in the vapor zone and dripping ceases.
  
- (h) **Freeboard ratio**—For a cold cleaning machine, the distance from the liquid solvent to the top edge of the cold cleaning machine divided by the width of the cold cleaning machine; for an operating batch vapor cleaning machine or an in-line vapor cleaning machine, the distance from the top of the solvent vapor layer to the top edge of the vapor cleaning machine divided by the width of the vapor cleaning machine.

- (i) **Freeboard refrigeration device**—A set of secondary coils mounted in the freeboard area of a solvent cleaning machine that carries a refrigerant or other chilled substance to provide a chilled air blanket above the solvent vapor. A solvent cleaning machine primary condenser which is capable of maintaining a temperature in the center of the chilled air blanket at not more than 30 percent of the solvent boiling point is both a primary condenser and a freeboard refrigeration device.
- (j) **Immersion cold cleaning machine**—A cold cleaning machine in which the parts are immersed in the solvent when being cleaned.
- (k) **In-line vapor cleaning machine**—A vapor cleaning machine that uses an automated parts handling system, typically a conveyor, to automatically provide a supply of parts to be cleaned. In-line vapor cleaning machines are fully enclosed except for the conveyor inlet and exit portals.
- (l) **Reduced room draft**—Decreasing the flow or movement of air across the top of the freeboard area of a solvent cleaning machine to less than 50 feet per minute (15.2 meters per minute) by methods including redirecting fans and/or air vents, moving a machine to a corner where there is less room draft, or constructing a partial or complete enclosure.
- (m) **Remote reservoir cold cleaning machine**—A machine in which liquid solvent is pumped to a sink-like work area that immediately drains solvent back into an enclosed container while parts are being cleaned, allowing no solvent to pool in the work area.
- (n) **Solvent/air interface**—The location of contact between the concentrated solvent vapor layer and the air. This location of contact is defined as the mid-line height of the primary condenser coils. For a cold cleaning machine, it is the location of contact between the liquid solvent and the air.

- (o) **Solvent cleaning machine**—A device or piece of equipment that uses solvent liquid or vapor to remove contaminants, such as dirt, grease, oil, and coatings, from the surfaces of materials. Types of solvent cleaning machines include batch vapor cleaning machines, in-line vapor cleaning machines, immersion cold cleaning machines, remote reservoir cold cleaning machines, airless cleaning systems and air-tight cleaning systems.
- (p) **Solvent cleaning machine automated parts handling system**—A mechanical device that carries all parts and parts baskets at a controlled speed from the initial loading of soiled or wet parts through the removal of the cleaned or dried parts.
- (q) **Solvent cleaning machine down time**—The period when a solvent cleaning machine is not cleaning parts and the sump heating coils, if present, are turned off.
- (r) **Solvent cleaning machine idle time**—The period when a solvent cleaning machine is not actively cleaning parts and the sump heating coil, if present, is turned on.
- (s) **Superheated vapor system**—A system that heats the solvent vapor to a temperature 10<sup>0</sup>f above the solvent's boiling point. Parts are held in the superheated vapor before exiting the machine to evaporate the liquid solvent on the parts.
- (t) **Vapor cleaning machine**—A solvent cleaning machine that boils liquid solvent, generating a vapor, or that heats liquid solvent that is used as part of the cleaning or drying cycle. The term does not include machines which do not have a solvent/air interface, such as airless and air-tight cleaning systems.
- (u) **Vapor cleaning machine primary condenser**—A series of circumferential cooling coils on a vapor cleaning machine through which a chilled substance is circulated or recirculated to provide continuous

condensation of rising solvent vapors, and thereby, create a concentrated vapor zone.

- (v)        **Vapor up control switch**—A thermostatically controlled switch which shuts off or prevents condensate from being sprayed when there is no vapor. On in-line vapor cleaning machines the switch also prevents the conveyor from operating when there is no vapor.
  
- (w)        **Working mode cover**—Any cover or solvent cleaning machine design that allows the cover to shield the cleaning machine openings from outside air disturbances while parts are being cleaned in the cleaning machine. A cover that is used during the working mode is opened only during parts entry and removal.

## **Env-A xxxx.02 Standards.**

(a) This section applies to all cold cleaning machines that process metal parts and contain more than 1 liter of VOC. The provisions of this section shall not apply if the owner and operator of the cold cleaning machine demonstrates and the Department approves in writing that compliance with the section will result in unsafe operating conditions.

(1) Immersion cold cleaning machines shall have a freeboard ratio of 0.75 or greater unless the machines are equipped with covers that are kept closed except when parts are being placed into or being removed from the machine.

(2) Immersion cold cleaning machines and remote reservoir cold cleaning machines shall:

(i) Have a permanent, conspicuous label summarizing the operating requirements in section (3) below.

(ii) Be equipped with a cover that shall be closed at all times except during cleaning of parts or the addition or removal of solvent. For remote reservoir cold cleaning machines which drain directly into the solvent storage reservoir, a perforated drain with a diameter of not more than six inches shall constitute an acceptable cover.

(3) Cold cleaning machines shall be operated in accordance with the following procedures:

(i) Waste solvent shall be collected and stored in closed containers. The closed containers may contain a device that allows pressure relief, but does not allow liquid solvent to drain from the container.

(ii) Cleaned parts shall be drained at least 15 seconds or until dripping ceases, whichever is longer. Parts having cavities or blind holes shall be tipped or rotated while the part is draining. During the draining, tipping or rotating, the parts shall be positioned so that solvent drains directly back to the cold cleaning machine.

(iii) Flushing of parts using a flexible hose or other flushing device shall be performed only within the freeboard area of the cold cleaning machine. The solvent spray shall be a solid fluid stream, not an atomized or shower spray at a pressure that does not exceed 10 pounds per square inch gauge (psig).

(iv) The owner or operator shall ensure that, when the cover is open, the cold cleaning machine is not exposed to drafts greater than 40 meters per minute (132 feet per minute), as measured between 1 and 2 meters (3.3 and 6.6 feet) upwind and at the same elevation as the tank lip

(v) Sponges, fabric, wood, leather, paper products and other absorbent materials shall not be cleaned in the cold cleaning machine.

(vi) When a pump-agitated solvent bath is used, the agitator shall be operated to produce a rolling motion of the solvent with no observable splashing of the solvent against the tank walls or the parts being cleaned. Air agitated solvent baths may not be used.

(vii) Spills during solvent transfer and use of the cold cleaning machine shall be cleaned up immediately, and the wipe rags or other sorbent material shall be immediately stored in covered containers for disposal or recycling.

(viii) Work area fans shall be located and positioned so that they do not blow across the opening of the degreaser unit.

(ix) The owner or operator shall ensure that the solvent level does not exceed the fill line.

(4) After \_\_\_\_\_ (the blank refers to one year from effective date of regulations), a person shall not use, sell, or offer for sale for use in a cold cleaning machine any solvent with a vapor pressure of 1.0 millimeters of mercury (mm Hg) or greater, measured at 20°C (68°F) containing volatile organic compounds.

(5) On and after \_\_\_\_\_ (the blank refers to one year from the effective date of the regulations), a person who sells or offers for sale any solvent containing volatile organic compounds for use in a cold cleaning machine shall provide, to the purchaser, the following written information:

(i) The name and address of the solvent supplier.

(ii) The type of solvent including the product or vendor identification number.

(iii) The vapor pressure of the solvent measured in mm hg at 20°C (68°F).

(6) A person who operates a cold cleaning machine shall maintain for not less than two years and shall provide to the [*regulatory agency*], on request, the information specified in paragraph (5). An invoice, bill of sale, certificate that corresponds to a number of sales, Material Safety Data Sheet (MSDS), or other appropriate documentation acceptable to the Department may be used to comply with this section.

(b) This section applies to batch vapor cleaning machines that process metal parts.

(1) Batch vapor cleaning machines shall be equipped with:

(i) Either a fully enclosed design or a working and downtime mode cover that completely covers the cleaning machine openings when in place, is free of cracks, holes and other defects, and can be readily opened or closed without disturbing the vapor zone. If the solvent cleaning machine opening is greater than 10 square feet, the cover must be powered. If a lip exhaust is used, the closed cover shall be below the level of the lip exhaust.

(ii) Sides that result in a freeboard ratio greater than or equal to 0.75.

(iii) A safety switch (thermostat and condenser flow switch) which shuts off the sump heat if the coolant is not circulating.

(iv) A vapor up control switch which shuts off the spray pump if vapor is not present.

(v) An automated parts handling system which moves the parts or parts baskets at a speed of 11 feet (3.4 meters) per minute or less when the parts are entering or exiting the vapor zone. If the parts basket or parts being cleaned occupy more than 50% of the solvent/air interface area, the speed of the parts basket or parts shall not exceed 3 feet per minute.

(vi) A device that shuts off the sump heat if the sump liquid solvent level drops to the sump heater coils.

(vii) A vapor level control device that shuts off the sump heat if the vapor level in the vapor cleaning machine rises above the height of the primary condenser.

(viii) Each vapor cleaning machine shall have a primary condenser.

(ix) Each vapor cleaning machine that uses a lip exhaust shall be designed and operated to route all collected solvent vapors through a properly operated and maintained carbon adsorber such that the concentration of organic solvent in the exhaust does not exceed 100 parts per million.

(x) A permanent, conspicuous label summarizing the operating requirements found in Section (b)(4).

(2) In addition to the requirements of Section (1), the operator of a batch vapor cleaning machine with a solvent/air interface area of 13 square feet or less shall implement one of the following options:

(i) A working mode cover, freeboard ratio of 1.0, and superheated vapor.

(ii) A freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point and superheated vapor.



(iii) A working mode cover and a freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point.

(iv) Reduced room draft, freeboard ratio of 1.0 and superheated vapor;

(v) A freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point and reduced room draft.

(vi) A freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point and a freeboard ratio of 1.0.

(vii) A freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point and dwell. Dwell shall be not less than 35 percent of the dwell time determined for the part or parts.

(viii) Reduced room draft, dwell and a freeboard ratio of 1.0.

(ix) A freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point and a carbon adsorber which reduces solvent emissions in the exhaust to a level not to exceed 100 ppm at any time.

(x) A freeboard ratio of 1.0, superheated vapor and a carbon adsorber which reduces solvent emissions in the exhaust to a level not to exceed 100 ppm at any time.

(3) In addition to the requirements of Section (1), the operator of a batch vapor cleaning machine with a solvent/air interface area of greater than 13 square feet shall use one of the following devices or strategies:

(i) A freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point, a freeboard ratio of 1.0 and superheated vapor.

(ii) Dwell, a freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point, and reduced room draft. Dwell shall be not less than 35 percent of the dwell time determined for the part or parts.

(iii) A working mode cover and a freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point and superheated vapor.

(iv) Reduced room draft, freeboard ratio of 1.0 and superheated vapor.

(v) A freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point, reduced room draft and superheated vapor.

(vi) A freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point, reduced room draft and a freeboard ratio of 1.0.

(vii) A freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point, superheated vapor, and a carbon adsorber which reduces solvent emissions in the exhaust to a level not to exceed 100 ppm at any time;

(4) Batch vapor cleaning machines shall be operated in accordance with the following procedures:

(i) Waste solvent, still bottoms and sump bottoms shall be collected and stored in closed containers. The closed containers may contain a device that allows pressure relief, but does not allow liquid solvent to drain from the container.

(ii) Cleaned parts shall be drained at least 15 seconds or until dripping ceases, whichever is longer. Parts having cavities or blind holes shall be tipped or rotated while the part is draining. A superheated vapor system shall be an acceptable alternate technology.

(iii) Parts baskets or parts shall not be removed from the batch vapor cleaning machine until dripping has ceased.

(iv) Flushing or spraying of parts using a flexible hose or other flushing device shall be performed within the vapor zone of the batch vapor cleaning machine or within a section of the machine that is not exposed to the ambient air. The solvent spray shall be a solid fluid stream, not an atomized or shower spray.

(v) When the cover is open, the batch vapor cleaning machine shall not be exposed to drafts greater than 40 meters per minute (132 feet per minute), as measured between 1 and 2 meters (3.3 and 6.6 feet) upwind and at the same elevation as the tank lip

(vi) Sponges, fabric, wood, leather, paper products and other absorbent materials shall not be cleaned in the batch vapor cleaning machine.

(vii) Spills during solvent transfer and use of the batch vapor cleaning machine shall be cleaned up immediately or the machine shall be shut down. Wipe rags or other sorbent material shall be immediately stored in covered containers for disposal or recycling.

(viii) Work area fans shall be located and positioned so that they do not blow across the opening of the batch vapor cleaning machine.

(ix) During startup of the batch vapor cleaning machine the primary condenser shall be turned on before the sump heater.

(x) During shutdown of the batch vapor cleaning machine, the sump heater shall be turned off and the solvent vapor layer allowed to collapse before the primary condenser is turned off.

(xi) When solvent is added to or drained from the batch vapor cleaning machine, the solvent shall be transferred using threaded or other leakproof couplings and the end of the pipe in the solvent sump shall be located beneath the liquid solvent surface.

(xii) The working and downtime covers shall be closed at all times except during parts entry and exit from the machine, during maintenance of the machine when the solvent has been removed, and during addition of solvent to the machine.

(xiii) If a lip exhaust is used on the open top vapor degreaser, the ventilation rate shall not exceed  $20 \text{ m}^3/\text{min}/\text{m}^2$  ( $65 \text{ ft}^3/\text{min}/\text{ft}^2$ ) of degreaser open area, unless a higher rate is necessary to meet OSHA requirements.

(c) This section applies to in-line vapor cleaning machines.

(1) In-line vapor cleaning machines shall be equipped with:

(i) Either a fully enclosed design or a working and downtime mode cover that completely covers the cleaning machine openings when in place, is free of cracks, holes and other defects, and can be readily opened or closed without disturbing the vapor zone.

(ii) A switch (thermostat and condenser flow switch) which shuts off the sump heat if the coolant is not circulating.

(iii) Sides which result in a freeboard ratio greater than or equal to 0.75.

(iv) A vapor up control switch.

(v) An automated parts handling system which moves the parts or parts baskets at a speed of 11 feet (3.4 meters) per minute or less when the parts are entering or exiting the vapor zone. If the parts basket or parts being cleaned occupy more than 50% of the solvent/air interface area, the speed of the parts basket or parts shall not exceed 3 feet per minute.

(vi) A device that shuts off the sump heat if the sump liquid solvent level drops to the sump heater coils.

(vii) A vapor level control device that shuts off the sump heat if the vapor level in the vapor cleaning machine rises above the height of the primary condenser.

(viii) A permanent, conspicuous label summarizing these operating requirements [part (c)(3)].

(ix) A primary condenser.

(x) Each machine that uses a lip exhaust shall be designed and operated to route all collected solvent vapors through a properly operated and maintained carbon adsorber such that the concentration of organic solvent in the exhaust does not exceed 100 parts per million.

(2) In addition to the requirements of Section (1), the operator of an in-line vapor cleaning machine shall use one of the following devices or strategies:

(i) A freeboard ratio of 1.0 and superheated vapor.

(ii) A freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point and a freeboard ratio of 1.0.

(iii) Dwell and a freeboard refrigeration device operated to ensure that the chilled air blanket temperature is no greater than 30 percent of the solvent's boiling point. Dwell shall be not less than 35 percent of the dwell time determined for the part or parts.

(iv) Dwell and a carbon adsorber which reduces solvent emissions in the exhaust to a level not to exceed 100 ppm at any time. Dwell shall be not less than 35 percent of the dwell time determined for the part or parts.

(3) In-line vapor cleaning machines shall be operated in accordance with the following procedures:

(i) Waste solvent, still bottoms, and sump bottoms shall be collected and stored in closed containers. The closed containers may contain a device that allows pressure relief, but does not allow liquid solvent to drain from the container.

(ii) Parts shall be oriented so that the solvent drains freely from the parts. Cleaned parts shall be drained at least 15 seconds or until dripping ceases, whichever is longer. Parts having cavities or blind holes shall be tipped or rotated while the part is draining.

(iii) Parts baskets or parts shall not be removed from the in-line vapor cleaning machine until dripping has ceased.

(iv) Flushing or spraying of parts using a flexible hose or other flushing device shall be performed within the vapor zone of the in-line vapor cleaning machine or within a section of the machine that is not exposed to the ambient air. The solvent spray shall be a solid fluid stream, not an atomized or shower spray.

(v) Sponges, fabric, wood, leather, paper products and other absorbent materials shall not be cleaned in the in-line vapor cleaning machine.

(vi) Spills during solvent transfer and use of the in-line vapor cleaning machine shall be cleaned up immediately, and the wipe rags or other sorbent material shall be immediately stored in covered containers for disposal or recycling.

(vii) Use no workplace fans near the degreaser opening, and ensure that exhaust ventilation does not exceed  $20 \text{ m}^3/\text{min}/\text{m}^2$  of degreaser opening, unless a higher rate is necessary to meet OSHA requirements.

(viii) During startup of the in-line vapor cleaning machine the primary condenser shall be turned on before the sump heater.

(ix) During shutdown of the in-line vapor cleaning machine, the sump heater shall be turned off and the solvent vapor layer allowed to collapse before the primary condenser is turned off.

(x) Spraying operations shall be done in the vapor zone or within a section of the machine that is not exposed to the ambient air.

(xi) When solvent is added to or drained from the in-line vapor cleaning machine, the solvent shall be transferred using threaded or other leakproof couplings and the end of the pipe in the solvent sump shall be located beneath the liquid solvent surface.

(xii) Minimize openings during operation so that entrances and exits silhouette workloads with an average clearance between the parts and the edge of the degreaser opening of less than 10 cm (4 in) or less than 10 percent of the width of the opening.

(d) This section applies to airless cleaning machines and air-tight cleaning machines that process metal parts.

(1) The operator of each machine shall maintain a log of solvent additions and deletions for each machine including the weight of solvent contained in activated carbon or other sorbent material used to control emissions from the cleaning machine.

(2) The operator of each machine shall demonstrate that the emissions from each machine, on a three-month rolling average, are equal to or less than the allowable limit determined by the use of Table 5 or the following equation if the volume of the cleaning machine exceeds 2.95 cubic meters:

$$EL = 330 (\text{vol})^{0.6}$$

where:

EL = the three-month rolling average monthly emission limit (kilograms/month).  
vol = the cleaning capacity of machine (cubic meters).

TABLE 5. EMISSION LIMITS FOR CLEANING MACHINES WITHOUT A SOLVENT/AIR INTERFACE

Cleaning capacity (M <sup>3</sup> )	3-Month rolling average monthly emission limit (kilograms/month)	Cleaning capacity (cubic meters)	3-Month rolling average monthly emission limit (kilograms/month)	Cleaning capacity (cubic meters)	3-Month rolling average monthly emission limit (kilograms/month)
0.00	0	1.00	330	2.00	500
0.05	55	1.05	340	2.05	508
0.10	83	1.10	349	2.10	515
0.15	106	1.15	359	2.15	522
0.20	126	1.20	368	2.20	530
0.25	144	1.25	377	2.25	537
0.30	160	1.30	386	2.30	544
0.35	176	1.35	395	2.35	551
0.40	190	1.40	404	2.40	558
0.45	204	1.45	412	2.45	565
0.50	218	1.50	421	2.50	572
0.55	231	1.55	429	2.55	579
0.60	243	1.60	438	2.60	585
0.65	255	1.65	446	2.65	592
0.70	266	1.70	454	2.70	599
0.75	278	1.75	462	2.75	605
0.80	289	1.80	470	2.80	612
0.85	299	1.85	477	2.85	619

Cleaning capacity (M <sup>3</sup> )	3-Month rolling average monthly emission limit (kilograms/month)	Cleaning capacity (cubic meters)	3-Month rolling average monthly emission limit (kilograms/month)	Cleaning capacity (cubic meters)	3-Month rolling average monthly emission limit (kilograms/month)
0.90	310	1.90	485	2.90	625
0.95	320	1.95	493	2.95	632



(3) The operator of each machine shall operate the machine in conformance with the manufacturer's instructions and good air pollution control practices.

(4) The operator of each machine equipped with a solvent adsorber shall measure and record the concentration of solvent in the exhaust of the carbon adsorber weekly with a colorimetric detector tube designed to measure a concentration of 100 ppm by volume of solvent to air at an accuracy of  $\pm 25$  ppm by volume. This test shall be conducted while the solvent cleaning machine is in the working mode and is venting to the adsorber.

(5) The operator of each machine equipped with a solvent adsorber shall maintain and operate the machine and adsorber system so that emissions from the adsorber exhaust do not exceed 100 ppm by volume measured while the solvent cleaning machine is in the working mode and is venting to the adsorber.

(6) The machine shall be equipped with a permanent, conspicuous label summarizing the operating requirements in paragraph (7) below.

(7) Airless cleaning machines and air-tight cleaning machines shall be operated in accordance with the following procedures:

(i) Waste solvent, still bottoms, and sump bottoms shall be collected and stored in closed containers. The closed containers may contain a device that allows pressure relief, but does not allow liquid solvent to drain from the container.

(ii) Parts shall be oriented so that the solvent drains freely from the parts. Cleaned parts shall be drained at least 15 seconds or until dripping ceases, whichever is longer. Parts having cavities or blind holes shall be tipped or rotated while the part is draining.

(iii) Parts baskets or parts shall not be removed from the in-line vapor cleaning machine until dripping has ceased.

(iv) Sponges, fabric, wood, leather, paper products and other absorbent materials shall not be cleaned in the airless cleaning machines and air-tight cleaning machines.

(v) Spills during solvent transfer and use of the airless cleaning machines and air-tight cleaning machines shall be cleaned up immediately, and the wipe rags or other sorbent material shall be immediately stored in covered containers for disposal or recycling.

(vi) Work area fans shall be located and positioned so that they do not blow across the airless cleaning machine and air-tight cleaning machine.

(vii) Spraying operations shall be done in the vapor zone or within a section of the machine that is not exposed to the ambient air.

(viii) When solvent is added to or drained from the airless cleaning machine and air-tight cleaning machine, the solvent shall be transferred using threaded or other leakproof couplings and the end of the pipe in the solvent sump shall be located beneath the liquid solvent surface.

(e) As an alternative to complying with the provisions of sections (b) through (d) above the operator of a solvent cleaning machine may demonstrate compliance with paragraph (1) or (2) below. The operator shall maintain records sufficient to demonstrate compliance. The records shall include, at a minimum, the quantity of solvent added to and removed from the solvent cleaning machine, the dates of the addition and removal and shall be maintained for not less than 2 years.

(1) If the cleaning machine has a solvent/air interface, the owner or operator shall:

(i) Maintain a log of solvent additions and deletions for each solvent cleaning machine.

(ii) Ensure that emissions from each solvent cleaning machine are equal to or less than the applicable emission limit presented in Table 6.

Table 6.

EMISSION LIMITS FOR BATCH VAPOR AND IN-LINE  
SOLVENT CLEANING MACHINES WITH A  
SOLVENT/AIR INTERFACE

Solvent cleaning machine limit	3-month rolling average monthly emission	
	kg/m <sup>2</sup> /month	lb/ft <sup>2</sup> /month
Batch vapor solvent cleaning machines	150	30.7
Existing in-line solvent cleaning machines	153	31.3
New in-line solvent cleaning machines	99	20.2

(2) If the cleaning machine is a batch vapor cleaning machine and does not have a solvent/air interface, the owner or operator shall:

(i) Maintain a log of solvent additions and deletions for each solvent cleaning machine.

(ii) Ensure that the emissions from each solvent cleaning machine are equal to or less than the appropriate limits as described in paragraphs (3) and (4) of this section. Each owner or operator of a batch vapor or in-line cleaning

machine complying with section (e) above shall demonstrate compliance with the applicable 3-month rolling average monthly emission limit on a monthly basis.

(3) For cleaning machines with a cleaning capacity that is less than or equal to 2.95 cubic meters, the emission limit shall be determined using the Table 5 or the equation in paragraph 4. If the table is used, and the cleaning capacity of the cleaning machine falls between two cleaning capacity sizes, then the lower of the two emission limits applies.

(4) For cleaning machines with a cleaning capacity that is greater than 2.95 cubic meters, the emission limit shall be determined using the following equation.

$$EL = 330 (\text{vol})^{0.6}$$

where:

EL = the 3-month rolling average monthly emission limit (kilograms/month).  
vol = the cleaning capacity of machine (cubic meters).

(5) Each owner or operator of a batch vapor or in-line solvent cleaning machine complying with section (e) above shall demonstrate compliance with the applicable 3-month rolling average monthly emission limit on a monthly basis. If the applicable 3-month rolling average emission limit is not met, an exceedance has occurred. All exceedances shall be reported to the Department within 30 days of the determination of the exceedance.

(f) The owner or operator of a batch vapor or in-line solvent cleaning machine complying with Section (e) shall maintain records and determine compliance with the applicable provisions in accordance with the following.

(1) On the first operating day of every month ensure that the solvent cleaning machine system contains only clean liquid solvent. This includes, but is not limited to, fresh unused solvent, recycled solvent and used solvent that has been cleaned of soils. A fill line must be indicated during the first month the measurements are made. The solvent level within the machine must be returned to the same fill-line each month, immediately prior to calculating monthly emissions as specified in Section (f). The solvent cleaning machine does not have to be emptied and filled with fresh unused solvent prior to the calculations.

(2) Using the records of all solvent additions and deletions for the previous monthly reporting period, determine solvent emissions (E) using one of the following equations:

for cleaning machines with a solvent/air interface:

$$E = \frac{SA - LSR - SSR}{AREA}$$

where:

E = the total halogenated HAP solvent emissions from the solvent cleaning machine during the most recent monthly reporting period (kilograms of solvent per square meter of solvent/air interface area per month).

SA = the total amount of halogenated HAP liquid solvent added to the solvent cleaning machine during the most recent monthly reporting period (kilograms of solvent per month).

LSR = the total amount of halogenated HAP liquid solvent removed from the solvent cleaning machine during the most recent monthly reporting period (kilograms of solvent per month).

SSR = the total amount of halogenated HAP solvent removed from the solvent cleaning machine in solid waste during the most recent monthly reporting period (kilograms of solvent per month) determined from tests conducted using EPA reference method 25d or by engineering calculations included in the compliance report

Area = the solvent/air interface area of the solvent cleaning machine (square meters).

for cleaning machines without a solvent/air interface:

$$E = SA - LSR - SSR$$

where:

E = the total halogenated HAP solvent emissions from the solvent cleaning machine during the most recent monthly reporting period i, (kilograms of solvent per month).

SA = the total amount of halogenated HAP liquid solvent added to the solvent cleaning machine during the most recent monthly reporting period (kilograms of solvent per month).

LSR = the total amount of halogenated HAP liquid solvent removed from the solvent cleaning machine during the most recent monthly reporting period (kilograms of solvent per month).

SSR = the total amount of halogenated HAP solvent removed from the solvent cleaning machine in solid waste during the most recent monthly reporting period (kilograms of solvent per month) determined from tests conducted using EPA reference method 25d or by engineering calculations included in the compliance report

(3) Determine the monthly rolling average, EA, for the 3-month period ending with the most recent reporting period using one of the following equations:

for cleaning machines with a solvent/air interface

$$EA = \frac{\sum_{j=1}^3 E}{3}$$

where:

EA = the average halogenated HAP solvent emissions over the preceding 3 monthly reporting periods, (kilograms of solvent per square meter of solvent/air interface area per month).

E = halogenated HAP solvent emissions for each month (j) for the most recent 3 monthly reporting periods (kilograms of solvent per square meter of solvent/air interface area).

j=1 = the most recent monthly reporting period.

j=2 = the monthly reporting period immediately prior to j=1.

j=3 = the monthly reporting period immediately prior to j=2.

for cleaning machines without a solvent/air interface

$$EA = \frac{\sum_{j=1}^3 E}{3}$$

where:

EA = the average halogenated HAP solvent emissions over the preceding 3 monthly reporting periods (kilograms of solvent per month).

E = halogenated HAP solvent emissions for each month (j) for the most recent 3 monthly reporting periods (kilograms of solvent per month).

j=1 = the most recent monthly reporting period.

j=2 = the monthly reporting period immediately prior to j=1.

j=3 = the monthly reporting period immediately prior to j=2.

(g) The operator of a solvent cleaning machine subject to the provisions of Sections (b) through (d) of this section shall conduct monitoring and record keeping as follows.

(1) If a freeboard refrigeration device is used to comply with these standards, the owner or operator shall use a thermometer or thermocouple to measure the temperature at the center of the air blanket during the idling mode. Measurements and recordings shall be made weekly.

(2) If a superheated vapor system is used to comply with these standards, the owner or operator shall use a thermometer or thermocouple to measure the temperature at the center of the superheated solvent vapor zone while the solvent cleaning machine is in the idling mode. Measurements and recordings shall be made weekly.

(3) If a cover (working-mode, downtime-mode, and/or idling-mode cover) is used to comply with these standards, the owner or operator shall conduct a visual inspection to determine if the cover is opening and closing properly, completely covers the cleaning machine openings when closed, and is free of cracks, holes, and other defects. Observations and recordings shall be made weekly.

(4) If dwell is used, the owner or operator shall determine the actual dwell time by measuring the period of time that parts are held within the freeboard area of the solvent cleaning machine after cleaning. Observations and recordings shall be made monthly.

(5) The owner or operator shall determine the hoist speed by measuring the time it takes for the hoist to travel a measured distance. The speed is equal to the distance in meters divided by the time in minutes (meters per minute). Measurements and recordings shall be made monthly.

(6) The owner or operator of a batch vapor or in-line solvent cleaning machine complying using reduced room draft, maintained by controlling room parameters (i.e.,

redirecting fans, closing doors and windows, etc.), shall conduct monitoring and record the results as follows.

(i) Initially measure the windspeed within 6 inches above the top of the freeboard area of the solvent cleaning machine in accordance with the following:

(A) Determine the direction of the wind current by slowly rotating a velometer or similar device until the maximum speed is located.

(B) Orient a velometer in the direction of the wind current at each of the four corners of the machine.

(C) Record the reading for each corner.

(D) Average the values obtained at each corner and record the average wind speed.

(ii) Record the room parameters established during the initial compliance test to achieve the reduced room draft.

(iii) Quarterly monitor of the windspeed in accordance with subparagraph(i).

(iv) Weekly monitoring of the room parameters as specified in paragraphs.

(7) If an enclosure (full or partial) is used to achieve reduced room draft, the owner or operator shall conduct an initial monitoring test and, thereafter, monthly monitoring tests of the windspeed within the enclosure by slowly rotating a velometer inside the entrance to the enclosure until the maximum speed is located and record the maximum wind speed. The owner or operator shall also conduct a monthly visual inspection of the enclosure to determine if it is free of cracks, holes and other defects.

(8) The owner or operator of a using a carbon adsorber to comply with this section subpart shall measure and record the concentration of halogenated HAP solvent in the exhaust of the carbon adsorber weekly with a colorimetric detector tube. This test shall be conducted while the solvent cleaning machine is in the working mode and is venting to the carbon adsorber. The exhaust concentration shall be determined using a colorimetric detector tube designed to measure a concentration of 100 parts per million by volume of solvent in air to an accuracy of plus or minus 25 parts per million by volume. The concentration shall be determined through a sampling port for monitoring within the exhaust outlet that is easily accessible and located at least 8 stack or duct diameters downstream and 2 stack or duct diameters upstream from any flow disturbance such as a bend, expansion, contraction, or outlet; downstream from no other inlet.