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40 CFR 63.460
National Emission Standard for Halogenated Solvent Cleaning:
Control Combinations for Batch Vapor Machines

June 1998

The National Emission Standard for Hazardous Air Pollutants (NESHAP) for Halogenated Solvent Cleaning is a federal regulation that affects facilities with solvent cleaning machines. What your facility must do to comply with this NESHAP depends on the type of solvent cleaning machines that you use (batch vapor, in-line vapor, in-line cold, or batch cold).

This fact sheet provides a general overview of the requirements for **batch vapor solvent cleaning machines using control combinations to comply with the NESHAP**. Other fact sheets describe additional elements of complying with the NESHAP. Additional technical information is available by calling the Small Business Assistance Program (SBAP) at the toll-free number below for free and confidential help. For general information about air emissions regulations, contact the Environmental Ombudsman Unit at the toll-free number below; their assistance is also free and confidential.

Control Combinations

Owners of batch vapor cleaning machines can elect to reduce solvent emissions and comply with the NESHAP by using control devices or methods. It is necessary to choose two or three of the control devices or methods in combination (see Approved Batch Vapor Control Combinations table on p. 3) to achieve compliance. Note that there are two sets of control combination options, based on the solvent surface area within the machine. Smaller machines (≤ 1.21 m^2 or ≤ 13 ft^2) have more options than larger machines. Each of the control devices or methods listed below are designed to reduce emissions (see ✍ for more insight into each control method):

1. A **working-mode cover** is designed to completely cover the machine openings to minimize the influence of outside air disturbances while parts are being cleaned. This cover is opened only during parts entry and removal.

   ✍ *A working-mode cover is a simple device that reduces emissions from a solvent cleaning machine. However, some machine configurations may not be suited for retrofit with a working-mode cover. In addition, the use of a working-mode cover will require operational changes on the part of the machine operator, since the cover must be removed to introduce the parts into the solvent bath. Throughput will also be reduced due to the need to open and close the cover each time a part is introduced or extracted from the machine.*

2. The **freeboard ratio** is the ratio of the machine freeboard height to the smaller interior dimension (length, width, or diameter) of the machine's freeboard area. This ratio must be 1.0 or greater to effectively reduce solvent emissions. For example, if the height of the freeboard is 2 meters (6.6 feet) and the interior dimensions of the freeboard are 2 meters (6.6 feet) by 4 meters (13.2 feet), the freeboard ratio would be 2 meters/2 meters (6.6 feet/6.6 feet) or 1.0.

(over)

Need more facts?

For technical assistance and for help with permitting, call the Small Business Assistance Program (SBAP) of the New York State Environmental Facilities Corporation
(800) 780-7227

For information about regulations, compliance financing assistance, and assistance resolving regulatory difficulties, contact the Environmental Ombudsman Unit of Empire State Development
(800) 782-8369

Both offer free and confidential assistance to small businesses.

The New York State Small Business Stationary Source Technical and Environmental Compliance Assistance **Program**

The information in this fact sheet is intended for general reference only; it is not a full and complete statement of the technical or legal requirements associated with the regulation.

- *In most cases, increasing the freeboard height will require an increase in the overall height of the solvent cleaning machine. For machines that are located at facilities that are tight on space, this option may not be viable. However, the additional freeboard does not contain machinery and does not use energy, so operational and maintenance costs should be negligible.*

3. A **superheated vapor system** heats the solvent within the vapor zone to at least 10°F above the solvent's boiling point. Parts must be held within the superheated vapor zone for at least the minimum proper dwell time to allow the solvent to evaporate from the part. Proper dwell time is determined by using the solvent machine manufacturer's specifications.

   - *Since parts must dwell in the superheated vapor zone to evaporate excess solvent from parts, additional production time is required. This dwell time, however, is much less than the dwell time required for using the dwell technique compliance option because the solvent is heated to evaporate it from the part, rather than simply allowing it to drip off. The benefit of using this method is that the production speed should not be greatly slowed. The costs involved with this method include purchasing, installing, and operating the equipment.* ***Caution:*** *Not all superheated vapor systems are created equal; shop around.*

4. A **freeboard refrigeration device** is a set of coils mounted in the freeboard area that carries a refrigerant to provide a chilled air blanket above the vapor zone, which causes the solvent vapors to condense and return to the tank. The temperature as measured from the center of the air blanket must not exceed 30% of the solvent's boiling point (in °F).

   - *Keep in mind that the freeboard refrigeration device is a set of cooling coils in addition to the primary condenser. The benefit of using this method is that neither the production speed nor the method of operation is affected. The costs involved with this method include purchasing, installing, and operating the equipment.*

5. **Reduced room draft** means decreasing the flow of air across the top of the solvent cleaning machine to 50 feet per minute (fpm), which reduces the amount of solvent emissions entering the air. Methods of achieving this include redirecting fans/vents, moving the machine to a corner where there is less room draft, and constructing a partial or total enclosure for the machine.

   - *Each facility must examine their own situation to determine whether or not to use reduced room draft as a control method. It may be difficult to achieve the 50 fpm air flow across the top of the solvent cleaning machine without installing a vapor barrier in some situations. However, reduced room draft could be an economical control solution that has little impact upon production techniques and volume if it is easily achievable.*

6. A **carbon adsorber** in conjunction with a lip exhaust removes solvent emissions from the solvent cleaning machine and captures the emissions in a cartridge or canister containing activated carbon. The exhaust from the carbon adsorber must not exceed 100 parts per million (ppm).

   - *Although the lip exhaust/carbon adsorption combination reduces worker exposure and emissions to air, it is generally more expensive than other controls listed in the options. Secondly, these units may contribute to polluting other media: effluent discharges may result if the system is not properly operated and maintained and spent carbon beds may have to be disposed of as hazardous waste.*

7. **Dwell time** is the amount of time cleaned parts are held above the vapor zone but within the freeboard area. This allows solvent to drain from the parts or parts basket back into the machine, which minimizes solvent emissions and drag out. A dwell time must be determined for each type of part to be cleaned or a maximum dwell time may be determined based on the configuration of the most complex part or basket. The dwell time must be at least 35% of the time required for a part or basket to stop dripping.

   - *The benefit of using dwell time as a method to control emissions is that it requires no purchase or installation of equipment. Facilities with programmable hoists should easily be able to incorporate dwell time into their procedures. But this additional time will reduce the quantity of parts that a machine can process in a given amount of time.*

Approved Batch Vapor Control Combinations

Cleaning Machine Type	Option	Working Mode Cover	1.0 Freeboard Ratio	Super Heated Vapor	Freeboard Refrigeration Device	Reduced Room Draft	Carbon Adsorber	Dwell
Batch Vapor Cleaning Machine ≤1.21 m^2 [≤13 ft^2]	1	■	■	■				
	2			■	■			
	3	■			■			
	4		■	■		■		
	5				■	■		
	6		■		■			
	7				■			■
	8		■			■		■
	9				■		■	
	10		■	■			■	
Batch Vapor Cleaning Machine >1.21 m^2 [>13 ft^2]	1		■	■	■			
	2				■	■		■
	3	■		■	■			
	4		■	■		■		
	5			■	■	■		
	6		■		■	■		
	7			■	■		■	

Blackened boxes indicate the control devices or methods that can be used in combination for each option.

Design and Work Practices

Owners of batch vapor cleaning machines electing to use control combinations to comply with the NESHAP must also comply with the following equipment design requirements and workplace practices.

Equipment Design Requirements

1. Cover or reduce room draft
2. Freeboard ratio of 0.75 or greater
3. Hoist: maximum speed of 3.4 meters (11 feet) per minute
4. Liquid and vapor level indicators that shut off sump heat
5. Primary condenser (required on vapor cleaning machines)
6. Carbon adsorber, if using a lip exhaust

Work Practices

1. Minimize air disturbances in the cleaning machine and in the room
2. Minimize solvent loss due to spraying operations
3. Rack or hang the parts to reduce the pooling of solvent on and in parts
4. Wait for solvent to stop dripping completely before removing parts
5. During startup, turn primary condenser on before sump heater
6. During shutdown, turn sump heater off before the primary condenser
7. Maintain equipment as recommended by the manufacturer
8. Store solvent waste in closed containers
9. Do not clean absorbent materials
10. Take and pass an operator test, if requested
11. Transfer solvent using leakproof couplings and minimize emissions
12. Size and operate the parts basket to minimize emissions