

RULE 410.3 Organic Solvent Degreasing Operations - Adopted 6/26/79, Amended 11/27/79, 6/29/81, 5/6/91, 3/7/96, 5/7/98

I. **Applicability**

Requirements of this Rule shall apply to organic solvent degreasing operations.

II. **Definitions**

- A. **Cold Cleaner**: any batch loaded, non-boiling solvent degreaser.
- B. **Condenser Equipment**: any equipment, such as refrigerated or non-refrigerated freeboard chillers, condenser coils, or water jackets, used to condense solvent vapor in a vapor degreaser.
- C. **Condenser Flow Switch**: safety switch which shuts off sump heat if condenser water fails to circulate or if condenser water temperature rises above designated operating temperature.
- D. **Conveyorized Degreaser**: any continuously loaded, conveyorized solvent degreaser, either boiling or non-boiling.
- E. **Degreaser**: tank, tray, drum, or other container in which objects to be cleaned are exposed to a liquid or vapor degreasing solvent.
- F. **Freeboard Height**:
1. For a cold cleaning degreaser, distance from top of solvent or solvent drain to top of degreaser, based on inside tank dimensions.
 2. For a remote reservoir degreaser, distance from solvent drain to top of degreaser, based on inside dimensions.
 3. For a vapor degreaser, distance from solvent air-vapor interface to top of basic degreaser tank, based on inside tank dimensions.
- G. **Freeboard Ratio**: freeboard height divided by smaller of length or width of degreaser.
- H. **High Volatility Solvent**: any solvent that is not a low volatility solvent.
- I. **Low Volatility Solvent**: any solvent, including emulsions, containing no more than 2% volatile organic compounds by weight as determined by U.S. EPA Test Method 24.
- J. **Make-Up Solvent**: solvent added to a degreaser to replace solvent lost through evaporation, carryout, splashing, leakage, or disposal.

- K. Open-Top Vapor Degreaser: any batch loaded, boiling solvent degreaser.
- L. Remote Reservoir: liquid solvent tank which is completely enclosed except for a solvent return opening no larger than 100 cm² (15 in²) which allows used solvent to drain into it from a separate solvent sink or work area and which is not accessible for soaking parts.
- M. Solvent: any liquid containing an organic compound or combination of organic compounds used as diluent, thinner, dissolver, viscosity reducer, cleaning agent, or other similar uses. These liquids are principally derived from petroleum and include petroleum distillates, chlorinated hydrocarbons, chlorofluorocarbons, ketones, and alcohols. Solutions, emulsions, and dispersions of water and soap, or water and detergent, are not considered organic solvents. Soaps and detergents are considered waterbased surfactants.
- N. Spray Safety Switch: safety switch which cuts off spray applicator pump if vapor level drops below a specified level.
- O. Vapor Level Control Thermostat: safety switch which turns off sump heater if temperature rises above design operating level at center of air-vapor interface.
- P. Volatile Organic Compound (VOC): any compound containing at least one atom of carbon except for compounds exempted by Rule 102, Subsection L.
- Q. Ultrasonic: enhancement of cleaning process by vibrating solvent with high frequency sound waves, causing implosion of microscopic vapor cavities within liquid solvent.
- R. Wipe Cleaning: method of cleaning which utilizes a cloth, cotton swab or other material, wetted with a solvent, which is physically rubbed on surface to be degreased.

III. Exemptions

- A. Provisions of this Rule do not apply to wipe cleaning.
- B. Provisions of this Rule, except Subsection IV.A.3.b., shall not apply to degreasing equipment using low volatility solvent.
- C. Provisions of this Rule shall not apply to single pieces of degreasing equipment which use unheated solvent, and which have liquid surface area of less than 929 cm² (1.0 ft²). Such equipment is not exempt if aggregate liquid surface area of all degreasers of this type at the stationary source is greater than 0.93 m² (10 ft²). (See Rule 210.1, Section II for definition of Stationary Source.)
- D. Provisions of this Rule shall not apply to degreasing equipment using halogenated solvents. Such equipment shall comply with Rule 423 (Subpart T of Part 63).

IV. Requirements

A. Cold Cleaner Requirements: Any person who operates a cold cleaner shall conform to following requirements:

1. General Operating Requirements:

- a. Degreaser equipment and any emission control equipment shall be operated and maintained in proper working order;
- b. Solvent leaks shall be corrected immediately, or degreaser shut down and drained;
- c. No device designed to cover solvent shall be opened or removed unless processing work in degreaser or performing maintenance on degreaser;
- d. If solvent flow is utilized, only continuous fluid stream (not fine, atomized, or shower type spray) shall be used at pressure which does not cause liquid solvent to splash outside of solvent container;
- e. No porous or absorbent materials such as cloth, leather, wood, or rope shall be degreased;
- f. No solvent shall be stored or disposed, including waste solvent and solvent residues, in such manner to cause or allow its evaporation into atmosphere;
- g. Waste solvent and waste solvent residues shall be managed in compliance with California and Federal requirements applicable to solid wastes, hazardous wastes, or recyclable materials;
- h. Solvent agitation, where necessary, shall be achieved only by pump circulation, by means of mixer, or with ultrasonics. Air agitation shall not be used;
- i. Cleaned parts shall be drained for at least 15 seconds after cleaning or until dripping ceases; and
- j. Solvent spraying shall be done at least 4 inches below top of vapor layer.

2. Design Requirements (Except Remote Reservoir Cold Cleaners):

- a. Freeboard height shall provide freeboard ratio greater than or equal to 0.75;
- b. Container (degreaser) shall be provided for solvent and objects being degreased;
- c. Apparatus or cover shall be provided which prevents solvent from evaporating when not degreasing objects in degreaser. Such cover shall be designed to be opened and closed easily with one hand;

- d. Device shall be provided for draining cleaned parts such that drained solvent is returned to a reservoir;
 - e. If high volatility solvent is used, drainage device shall be internal, so that degreased objects are enclosed under a cover while draining. Such drainage device may be external for applications where internal type cannot fit into cleaning system;
 - f. Permanent, conspicuous label or sign shall be affixed which lists all requirements of Subsection IV.A.1.; and
 - g. Permanent, conspicuous mark shall be placed locating maximum allowable solvent level which conforms to applicable freeboard requirement of Subsection IV.A.2.a.
3. Control Requirements (Except Remote Reservoir Cold Cleaners)
- a. If high volatility solvent is used, then one of following control devices shall be used:
 - 1) Water cover if solvent is insoluble in and heavier than water; or
 - 2) Any other system of emission control demonstrated to have overall capture and control efficiency equivalent to at least 85%.
 - b. If low volatility solvent is used, freeboard height shall be at least six inches.
4. Design Requirements (Remote Reservoir Cold Cleaners)
- a. If high volatility solvent is used, cover shall be provided for drain when no objects are being degreased;
 - b. Freeboard height of at least six inches shall be maintained;
 - c. Sink-like work area shall be provided which is sloped sufficiently towards drain to preclude pooling of solvent;
 - d. Workplace fans shall not be used in manner which disturbs air-vapor interface;
 - e. Permanent, conspicuous label or sign shall be affixed summarizing applicable operating requirements of Subsection IV.A.1.; and
 - f. Permanent conspicuous mark shall be placed locating maximum allowable solvent level which conforms to applicable freeboard requirement of Subsection IV.A.4.b.

B. Open-Top Vapor Degreasers: Any person who operates an open-top vapor degreaser shall conform to following requirements:

1. General Operating Requirements:

- a. Degreaser equipment and any emission control equipment shall be operated and maintained in proper working order;
- b. Solvent leaks shall be corrected immediately, or degreaser shut down and drained;
- c. No device designed to cover solvent shall be removed or opened unless degreasing objects work in degreaser or performing maintenance on degreaser;
- d. If solvent flow is utilized, only continuous fluid stream (not fine, atomized, or shower type spray) shall be used at pressure which does not cause liquid solvent to splash outside of solvent container;
- e. No porous or absorbent materials such as cloth, leather, wood, or rope shall be degreased;
- f. No solvent, including waste solvent and solvent residues, shall be stored or disposed in such manner as will cause or allow its evaporation into atmosphere;
- g. Waste solvent and waste solvent residues shall be managed in compliance with California and Federal requirements applicable to solid wastes, hazardous wastes, or recyclable materials;
- h. Solvent agitation, where necessary, shall be achieved only by pump circulation, by means of mixer, or with ultrasonics. Air agitation shall not be used;
- i. Objects to be degreased shall not occupy more than half of degreaser's open top area;
- j. Solvent spraying shall be done at least 4 inches below top of vapor layer;
- k. Water shall not be visually detectable in solvent returning from water separator to solvent cleaner;
- l. For open-top vapor degreasers equipped with a lip exhaust, exhaust shall be turned off when degreaser is covered;
- m. Solvent carry-out shall be minimized by implementing following measures:
 1. Rack degreased objects to allow complete drainage,

2. Move objects in and out of degreaser at less than 3.3 m/min (2.2 inches/sec),
 3. Degrease objects in vapor zone until condensation ceases,
 4. Allow degreased objects to dry within degreaser until visually dry, and
 5. Tip out any pools of solvent on degreased objects before removal;
- n. If unit is equipped with refrigerated freeboard chiller and/or primary condenser, following procedures shall be followed:
1. When starting up degreaser, cooling system shall be turned on before, or simultaneously with, sump heater, and
 2. When shutting down degreaser, sump heater shall be turned off before, or simultaneously with cooling system; and
- o. Exhaust ventilation shall not exceed 20 m³/min per m² (65 cfm/ft²) of degreaser open area, unless necessary to meet OSHA requirements. Ventilation fans shall be positioned to not disturb vapor zone.
2. Design Requirements:
- a. Freeboard height shall provide a freeboard ratio greater than or equal to 0.75;
 - b. Container (degreaser) shall be provided for solvent and objects being degreased;
 - c. An apparatus or cover shall be provided, which prevents solvent from evaporating when not degreasing objects in degreaser. Cover shall be designed to be opened and closed easily without disturbing vapor zone;
 - d. Device shall be provided for draining degreased objects such that drained solvent is returned to a reservoir; and
 - e. Permanent, conspicuous label or signs shall be affixed which lists all operating requirements of Subsection IV.B.1.
3. Control Requirements: One of following or combination of following control devices shall be utilized:
- a. Condenser equipment with chilled air blanket temperature measured in degrees F at coldest point on vertical axis in center of solvent cleaner shall be operated at either temperature no greater than 30% of initial boiling point of the solvent used, or 41 F;

- b. Enclosed design (cover or door opens only when dry object to be degreased is actually entering or exiting degreaser);
- c. Carbon adsorption system which ventilates air-vapor interface at minimum rate of 15 m³/min per m² (50 cfm/ft²), but not greater than 20 m³/min per m² (65 cfm/ft²), unless required by OSHA standards, and exhausts less than 25 ppm of solvent by volume over complete adsorption cycle, and with overall capture and control efficiency of 85%; or
- d. Any other system of emission control demonstrated to have overall capture and control efficiency of at least 85%.

4. Safety Switch Requirements:

- a. Degreaser shall be equipped with condenser flow switch with solvent temperature indicator, except where non-water refrigerant is used;
- b. Degreaser shall be equipped with spray safety switch; and
- c. Degreaser shall be equipped with manual reset vapor level control thermostat with solvent temperature indicator.

C. Conveyorized Solvent Degreaser: Any person who operates a conveyorized solvent degreaser shall conform to following requirements:

1. General Operating Requirements:

- a. Degreaser equipment and emission control equipment shall be operated and maintained in proper working order;
- b. Solvent leaks shall be corrected immediately, or degreaser shut down and drained;
- c. If solvent flow is utilized, degreaser shall use only continuous fluid stream (not fine, atomized, or shower type spray) at pressure which does not cause liquid solvent to splash outside of solvent container;
- d. No porous or absorbent materials such as cloth, leather, wood, or rope shall be degreased;
- e. No solvent, including waste solvent and solvent residues, shall be stored or disposed in such manner as will cause or allow its evaporation into atmosphere;
- f. Waste solvent and waste solvent residues shall be managed in compliance with California and Federal requirements applicable to solid wastes, hazardous wastes,

or recyclable materials;

- g. Solvent agitation, where necessary, shall be achieved only by pump circulation, by means of a mixer, or with ultrasonics. Air agitation shall not be used;
- h. Solvent carryout shall be minimized by implementing following measures:
 - 1. Racking degreased objects to allow complete drainage; and
 - 2. Maintaining vertical conveyor speed at less than 3.3 meters/min. (2.2 inches/sec);
- i. Exhaust ventilation shall not exceed 20 m³/min per m² (65 cfm/ft²) of degreaser opening, unless necessary to meet OSHA requirements. Ventilation fans shall be positioned to not disturb vapor zone; and
- j. Down-time cover shall be placed over entrances and exits of conveyORIZED degreasers immediately after conveyor and exhaust are shutdown and removed just before start up.

2. Design Requirements:

- a. Container shall be provided for solvent and objects being degreased;
- b. Freeboard height shall provide freeboard ratio greater than or equal to 0.75;
- c. An apparatus or cover shall be provided which prevents solvent from evaporating when not degreasing objects. Covers shall be provided for closing off entrance and exit during non-operation;
- d. Device for draining degreased objects shall be provided such that drained solvent is returned to a reservoir;
- e. For degreasers with greater than 2 m² air/vapor interface, hood or enclosure shall be provided with device or ductwork to collect degreaser emissions, exhausting to carbon adsorber or equivalent control device;
- f. Drying tunnel or other device, such as rotating basket, sufficient to prevent cleaned parts from carrying out solvent liquid or vapor shall be provided; and
- g. Entrances and exits shall be minimized by silhouetting objects to be degreased so that average clearance between objects and edge of degreaser opening is either less than 10 cm (4in.) or less than 10 percent of width of opening, whichever is less.
- h. Permanent, conspicuous label or sign shall be affixed which lists all operating

requirements of Subsection IV.C.1.

3. Control Requirements: One of following or combination of following control devices shall be utilized:
 - a. Condenser equipment with chilled air blanket temperature measured in degrees F at coldest point on vertical axis in center of solvent cleaner shall be operated at temperature no greater than 30% of initial boiling point of solvent used, or 41 F;
 - b. Carbon adsorption system which ventilates air-vapor interface at minimum rate of 15 m³/min per m² (50 cfm/ft²), but not greater than 20 m³/min per m² (65 cfm/ft²), unless required by OSHA standards, and exhausts less than 25 ppm of solvent by volume over complete adsorption cycle, and with overall capture and control efficiency of 85% by weight; or
 - c. Any other system of emission control demonstrated to have overall capture and control efficiency of at least 85%.
4. Safety Switch Requirements:
 - a. Degreaser shall be equipped with condenser flow switch with solvent temperature indicator, except where non-water refrigerant is used;
 - b. Degreaser shall be equipped with spray safety switch; and
 - c. Degreaser shall be equipped with manual reset vapor level control thermostat with solvent temperature indicator.

V. Administrative Requirements

A. Record Keeping:

1. Any person subject to requirements of this Rule shall have solvent manufacturer specification sheets available for review and shall maintain records which show on quarterly basis, following information for each degreaser:
 - a. Type of degreaser,
 - b. Type of solvent,
 - c. Solvent(s) initial boiling point,
 - d. Volume of solvent used, and
 - e. Volume of make-up solvent added to degreaser.
2. Each time waste solvent or waste solvent residues are removed from facility, records

shall be kept confirming compliance with acceptable disposal methods listed in Subsections IV.A.1.g., IV.B.1.g., or IV.C.1.f.

3. Records shall be maintained for minimum of two years and made available for inspection by Control Officer upon request.

B. Test Methods:

Following test methods shall apply to this Rule:

1. Initial boiling point of solvent shall be determined by ASTM 1078-78;
2. Where “add-on” control equipment is utilized, collection efficiency shall be determined using U.S. EPA document entitled "Model Regulatory Language for Capture Efficiency Testing" dated 8/3/90;
3. Analysis of halogenated exempt compounds shall be made using CARB Test Method 432;
4. VOC emissions shall be measured by using U.S. EPA Test Method 25, 25a, or 25b, as applicable, and analysis of halogenated exempt compounds shall be made with CARB Test Method 422; and
5. Exhaust ventilation rates shall be measured using U.S. EPA Test Method 2, 2a, 2b, or 2c.