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RULE 1122

Solvent Degreasers

(a) Applicability

This rule applies to all persons who own or operate remote reservoir cold cleaners, batch-loaded cold cleaners, open-top vapor degreasers, and all types of conveyORIZED degreasers that carry out solvent cleaning operations with a solvent containing Volatile Organic Compounds (VOCs). Solvent cleaning operations that are regulated by this rule include, but are not limited to, the removal of uncured coatings, adhesives, inks, and contaminants such as dirt, soil, oil, and grease from parts, products, tools, machinery, and equipment.

(b) Definitions

For the purpose of this rule, the following definitions shall apply:

- (1) AIR-SOLVENT INTERFACE is the point of contact between the exposed solvent and air.
- (2) AIR-VAPOR INTERFACE is the point of contact between the exposed solvent vapor and air.
- (3) AIR-VAPOR INTERFACE SURFACE AREA
 - (A) Means the geometric surface area of the open top of the degreaser for OPEN-TOP VAPOR DEGREASERS; or
 - (B) Means the combined geometric surface areas of the projected plane surfaces of all degreaser openings for CONVEYORIZED DEGREASERS.
- (4) AIR-SOLVENT INTERFACE SURFACE AREA means the combined geometric surface areas of the projected plane surfaces of all degreaser openings for CONVEYORIZED DEGREASERS.
- (5) BATCH-LOADED COLD CLEANER is a degreaser that is designed to contain liquid solvent at a temperature below its boiling point and is used for cleaning objects in a batch-type operation.
- (6) CONDENSER WATER FLOW SWITCH is a safety switch that turns off the sump heat if condenser water fails to circulate or rises above the design operating temperature.

- (7) CONVEYORIZED DEGREASER is any degreaser which uses an integral, continuous, mechanical system for moving materials or parts to be cleaned into and out of a solvent liquid or vapor cleaning zone.
- (8) DRAG-OUT is that solvent carried out of a degreaser that adheres to or is entrapped in the part being removed.
- (9) DEGREASER is any equipment designed and used for holding a solvent to carry out solvent cleaning operations. Degreasers include, by way of illustration, and not limitation, remote reservoir cold cleaners, batch-loaded cold cleaners, open-top vapor degreasers, and conveyORIZED degreasers.
- (10) DRYING TUNNEL is an add-on enclosure extending from the exit area of a conveyORIZED degreaser which reduces drag-out losses by containing evaporating solvent.
- (11) EMULSION CLEANER is a liquid which contains a VOC-containing solvent suspended in water.
- (12) EXEMPT COMPOUNDS are any of the following compounds:
- (A) Group I (General)
 - chlorodifluoromethane (HCFC-22)
 - dichlorotrifluoroethane (HCFC-123)
 - tetrafluoroethane (HFC-134a)
 - dichlorofluoroethane (HCFC-141b)
 - chlorodifluoroethane (HCFC-142b)
 - (B) Group II (Under Review)
 - methylene chloride
 - 1,1,1-trichloroethane (methyl chloroform)
 - trifluoromethane (FC-23)
 - trichlorotrifluoroethane (CFC-113)
 - dichlorodifluoromethane (CFC-12)
 - trichlorofluoromethane (CFC-11)
 - dichlorotetrafluoroethane (CFC-114)
 - chloropentafluoroethane (CFC-115).
- (13) FREEBOARD HEIGHT
- (A) Is the distance from the top of the solvent to the top of the tank for BATCH-LOADED COLD CLEANERS; or
 - (B) Is the distance from the air-vapor interface to the top of the tank for OPEN-TOP VAPOR DEGREASERS; or

- (C) Is the distance from either the air-solvent or air-vapor interface to the top of the tank for conveyORIZED degreasers.
- (14) FREEBOARD RATIO is the freeboard height divided by the smaller of either the inside length or inside width of the degreaser.
- (15) HIGH VOLATILITY SOLVENT is a solvent which is not classified as a low volatility solvent.
- (16) LIQUID LEAK is a VOC-containing liquid leak from the degreaser at a rate of more than three drops per minute or a visible liquid mist.
- (17) LOW VOLATILITY SOLVENT is a solvent which has an initial boiling point greater than 120°C (248°F) and whose initial boiling point exceeds the maximum operating temperature of the solvent cleaning operation by at least 100°C (180°F).
- (18) OPEN-TOP VAPOR DEGREASER is any batch-loaded, boiling solvent degreaser.
- (19) PERSON is any firm, business establishment, association, partnership, corporation or individual, whether acting as principal, agent, employee, or other capacity, including any governmental entity or charitable organization.
- (20) REFRIGERATED CONDENSER is an emission control device consisting of primary coils which carry a refrigerant to condense solvent vapor from the degreaser bath.
- (21) REFRIGERATED FREEBOARD CHILLER is an emission control device which is mounted above the water jacket or primary condenser coils, consisting of secondary coils which carry a refrigerant to provide a chilled air blanket above the solvent vapor to reduce emissions from the degreaser bath.
- (22) REMOTE RESERVOIR COLD CLEANER is any device in which liquid solvent is pumped through a sink-like work area which drains back into an enclosed container while parts are being cleaned.
- (23) ROTATING BASKET is a perforated or wire mesh cylinder containing parts to be cleaned that is slowly rotated while proceeding through the degreaser.
- (24) SOLVENT CLEANING OPERATION is the removal of adhesives, inks, uncured coatings, and contaminants, which include, by way of illustration and not limitation, dirt, soil, and grease from parts, products, tools, machinery, and equipment.
- (25) SOLVENT CONTAINER is that part of the degreaser that is intended to hold the cleaning solvent.

- (26) SPRAY PUMP CONTROL SWITCH is a safety switch that prevents the spray pump from operating without an adequate vapor level.
- (27) VAPOR LEVEL CONTROL SWITCH is a safety switch that turns off the sump heat when the solvent vapor level rises above the design operating level.
- (28) VOLATILE ORGANIC COMPOUND (VOC) is any chemical compound which contains the element carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, exempt compounds, and halogenated hydrocarbons.
- (29) WORKLOAD AREA means:
 - (A) the plane geometric surface area of the top of the submerged parts basket, or
 - (B) the combined plane geometric surface area(s) displaced by the submerged part(s), if no parts basket is used.

(c) General Requirements

Any person owning or operating a batch-loaded cold cleaner, an open-top vapor degreaser, or any type of conveyORIZED degreaser with a VOC-containing solvent shall meet the basic equipment and operating requirements as set forth below.

- (1) Basic Equipment Requirements
 - (A) One of the following types of covers shall be used for open-top vapor degreasers and batch-loaded cold cleaners which are heated, agitated, or use high volatility solvents:
 - (i) Roll-Top Cover;
 - (ii) Canvas Curtain Cover;
 - (iii) Guillotine (Biparting) Cover;
 - (iv) Any other cover that slides off the degreaser in a horizontal motion and is designed such that it can be opened or closed without disturbing the vapor layer or the solvent surface.
 - (B) All degreasers shall be fitted with an apparatus or cover which prevents escape of solvent vapors when the degreaser is not in operation.
 - (C) Use a facility or device for draining cleaned parts such that the drained solvent or drag-out is returned to the degreaser.

- (2) Basic Operating Requirements
- (A) The degreaser cover shall be operated in accordance with the manufacturer's specifications and shall be closed at all times except while processing work or performing maintenance on the degreaser.
 - (B) The parts to be cleaned shall be racked in a manner that will minimize the drag-out losses.
 - (C) Parts shall be drained immediately after the cleaning, until one of the following conditions exists:
 - (i) At least 15 seconds have elapsed; or
 - (ii) Dripping of solvent ceases; or
 - (iii) The parts become visibly dry.
 - (D) The water separator shall be maintained in order to prevent water from returning to the surface of the boiling solvent sump or from becoming visibly detectable in solvent exiting the water separator.
 - (E) The solvent container shall be free of all liquid leaks. Auxiliary degreaser equipment, such as pumps, water separators, steam traps, or distillation units shall not have any liquid leaks, and visible tears and cracks. Any liquid leak, visible tear, or crack detected pursuant to the provisions of this subparagraph shall be repaired within one (1) calendar day, or the degreaser shall be drained of all solvent and shut down until replaced or repaired.
 - (F) All waste solvents shall be stored in properly identified, sealed containers and handled and disposed of in accordance with local, state, and federal regulations.
 - (G) Solvent flow cleaning shall be done within the vapor zone and consist of a liquid stream rather than a fine, atomized, or shower-type spray. Solvent flow shall be directed downward to avoid turbulence at the air-vapor or air-solvent interface and to prevent liquid solvent from splashing outside of the degreaser.
 - (H) Degreasing of porous or absorbent materials, such as cloth, leather, wood, or rope, is prohibited.
 - (I) Solvent agitation, where necessary, shall be carried out only by pump recirculation, ultrasonics, a mixer, or by air agitation. Air agitation shall be carried out under the following conditions:
 - (i) The air agitation unit shall be equipped with a gauge and a device that limits air pressure into the degreaser to less than two pounds per square inch gauge; and

- (ii) The cover must remain closed while the air agitation system is in operation.
- (J) The vertical speed of a powered hoist or conveyor, if one is used, shall not be more than 3.4 meters per minute (11.2 feet per minute) when lowering and raising parts into the degreaser.
- (K) The average draft rate in the work room, as measured parallel to the plane of the degreaser opening, shall not exceed 9.1 meters per minute (30 feet per minute), unless necessary to meet Occupational Safety and Health Administration (OSHA) requirements.
- (L) Ventilation fans shall not be positioned in such a way as to direct air flow near the degreaser openings.
- (M) The air ventilation rate in a hood, enclosure, or from a lip exhaust to a hood or enclosure shall not exceed 20 cubic meters per minute per square meter of air-vapor or air-solvent interface surface area, unless necessary to meet OSHA requirements.

(d) **Batch-Loaded Cold Cleaners**

In addition to the General Requirements of section (c), any person owning or operating a batch-loaded cold cleaner shall also meet all of the following:

- (1) The applicable operating requirements of section (d) and paragraph (c)(2) shall be legibly written, and permanently and conspicuously posted on or near the degreaser in such a manner that it is conveniently available to the operator for reference purposes;
- (2) A degreaser loaded with a low volatility solvent must have a freeboard ratio of at least 0.50,
- (3) A degreaser loaded with a high volatility solvent shall be fitted with a drainage facility inside the degreaser and have either:
 - (A) a water cover over the surface of the solvent if the solvent has a negligible solubility in water and has a density greater than that of water; or
 - (B) a freeboard ratio of at least 0.75.

(e) **Open-Top Vapor Degreasers**

In addition to the General Requirements of section (c), any person owning or operating an open-top vapor degreaser shall also meet all of the following:

- (1) The applicable operating requirements of paragraph (e)(6) and paragraph (c)(2) shall be legibly written, and permanently and conspicuously posted on or near the degreaser in such a manner that it is conveniently available to the operator for reference purposes;
- (2) Installation of the following safety switches on the degreaser:
 - (A) Vapor level control switch;
 - (B) Condenser water flow switch, for water-cooled degreasers; and
 - (C) Spray pump control switch, for solvent flow cleaning.
- (3) A freeboard ratio of:
 - (A) at least 0.75, for degreasers with an inside length or width equal to or greater than 10 feet,
 - (B) at least 1.0, for all other open-top vapor degreasers.
- (4) Open-top vapor degreasers which have air-vapor interface surface areas of more than 1.0 square meter (10.8 square feet) shall be equipped with:
 - (A) A refrigerated freeboard chiller, designed such that the refrigerant temperature at the degreaser outlet does not exceed 4.4°C (40°F), or
 - (B) A carbon adsorption system pursuant to the provisions of section (g), or
 - (C) An enclosed batch-type design, with a programmable hoist, and a freeboard ratio of at least 1.0 regardless of the requirements of subparagraph (c)(1)(A) and paragraph (e)(5).
- (5) In addition to the requirements in paragraph (e)(4) above, an open-top vapor degreaser which has an air-vapor interface surface area of more than 2.0 square meters (21.5 square feet) shall have automated, powered, or mechanically-assisted covers that slide off the degreaser in a horizontal motion.
- (6) Specific Operating Requirements for Open-Top Vapor Degreasers:
 - (A) When equipped with a lip exhaust system, the exhaust fan shall be off whenever the degreaser is covered;
 - (B) The workload area shall not exceed more than half of the degreaser's air-vapor interface surface area. If the inside length or width of the degreaser is equal to or greater than 10 feet, the workload area may exceed half of the degreaser's open-top area provided the hoist speed, notwithstanding (c)(2)(J), while lowering and raising parts, does not exceed 1.7 meters per minute (5.5 feet per minute);

- (C) At start up, the refrigerated condenser and the refrigerated freeboard chiller shall be turned on either simultaneously or before the sump heater is turned on. At shutdown, the sump heater shall be turned off, either simultaneously or before the condenser water and refrigerated freeboard chiller are turned off. The degreaser must be covered whenever the primary condenser is turned off;
- (D) The workload shall be decreased in the vapor zone until condensation ceases.

(f) ConveyORIZED Degreasers

In addition to the General Requirements of section (c), any person owning or operating a conveyORIZED degreaser shall meet all of the following requirements:

- (1) The applicable operating requirements of section (f) and paragraph (c)(2) shall be legibly written, and permanently and conspicuously posted on or near the degreaser in such a manner that it is conveniently available to the operator for reference purposes;
- (2) Install a high vapor cutoff thermostat with manual reset;
- (3) A freeboard ratio of at least 0.75;
- (4) Use of a drying tunnel that is connected to the main control enclosure, or use of other means such as a rotating or tumbling basket, that reduces drag-out losses;
- (5) Construct entrances and exits that have an average clearance between each part and the edge of the degreaser opening of less than 10 centimeters (3.9 inches) or less than 10 percent of the width of the opening;
- (6) ConveyORIZED degreasers which have air-vapor or air-solvent interface surface areas of more than 1.0 square meter (10.8 square feet), but less than or equal to 2.0 square meters (21.6 square feet), shall have either:
 - (A) Refrigerated freeboard chiller, designed such that the refrigerant temperature at the degreaser outlet does not exceed 4.4°C (40°F); or
 - (B) A carbon adsorption system pursuant to the provisions of section (g).
- (7) ConveyORIZED degreasers which have air-vapor or air-solvent interface surface areas of more than 2.0 square meters (21.6 square feet) shall have either:
 - (A) A carbon adsorption system pursuant to the provisions of section (g); or
 - (B) A below-freezing refrigerated freeboard chiller, designed such that the refrigerant temperature at the degreaser outlet does not exceed -20°C (-4°F).

(g) Remote Reservoir Cold Cleaners

Any person owning or operating a remote reservoir cold cleaner shall meet the following requirements:

- (1) The solvent vapors shall be prevented from escaping from the solvent container by means of closing a cover or a device, such as a valve, when the remote reservoir is not being used, cleaned, or repaired,
- (2) The average draft rate in the work room, as measured parallel to the plane of the degreaser opening, shall not exceed 9.1 meters per minute (30 feet per minute), unless necessary to meet Occupational Safety and Health Administration (OSHA) requirements,
- (3) The solvent container shall be free of all liquid leaks,
- (4) Solvent flow cleaning shall be done within the vapor zone and consist of a liquid stream rather than a fine, atomized, or shower-type spray. Solvent flow shall be directed downward to avoid turbulence at the air-vapor or air-solvent interface and to prevent liquid solvent from splashing outside of the container;
- (5) Degreasing of porous or absorbent materials, such as cloth, leather, wood, or rope, is prohibited;
- (6) All waste solvents shall be stored in properly identified, sealed containers and handled and disposed of in accordance with local, state, and federal regulations;
- (7) The solvent container shall be free of all liquid leaks. Auxiliary equipment, such as pumps or distillation units, shall not have any liquid leaks, and visible tears and cracks. Any liquid leak, visible tear, or crack detected pursuant to the provisions of this paragraph shall be repaired within one (1) calendar day, or the degreaser shall be drained of all solvent and shut down until replaced or repaired.

(h) Carbon Adsorption System Requirements

Any person owning or operating a carbon adsorption system, in association with any degreaser covered under this rule, shall meet the following requirements:

- (1) The carbon adsorption system shall have a hood or enclosure with a delivery system or ductwork designed to collect degreaser emissions and to vent them to a carbon adsorption system with a control efficiency of at least 90 percent in terms of organic input to the bed;
- (2) The output from the carbon adsorption system shall not be more than 25 parts per million (ppm), calculated as carbon;

- (3) The hood or enclosure shall have a ventilation rate between 15 to 20 cubic meters per minute per square meter of air-vapor or air-solvent interface surface area (49.2 to 65.6 cubic feet per minute per square foot of air-vapor or air-solvent interface surface area), unless otherwise required to meet OSHA standards.

(i) Compliance Test Methods

- (1) The VOC content of materials subject to the provisions of this rule shall be determined by the EPA Reference Method 24 (Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coatings, Code of Federal Regulations Title 40, Part 60, Appendix A). The exempt compounds' content shall be determined by South Coast Air Quality Management District (SCAQMD) Laboratory Methods of Analysis for Enforcement Samples - Section III, Method 22.
- (2) The efficiency of the control device and the VOC content measured and calculated as carbon in the control device exhaust gases shall be determined by EPA Test Methods 25 and 25A, or SCAQMD Method 25.1 (Determination of Total Gaseous Non-Methane Organic Emissions as Carbon).
- (3) The initial boiling point of solvents shall be determined by ASTM Method D-1078-78, "Standard Test Method for Distillation Range of Volatile Organic Liquids."
- (4) Measurements of ventilation rate in a hood or enclosure shall be done according to EPA Test Methods 2, 2A, 2C, or 2D. SCAQMD Method 1.1 shall be used to measure the number of traverse points.
- (5) Measurements of average workroom draft rate shall be done parallel to the plane of the degreaser opening with a thermistor anemometer with an accuracy within ± 2 feet per minute and a calibration traceable to the National Institute of Standards and Technology.

(j) Effective Date

All provisions of this rule, as **Amended** on May 5, 1989, shall remain in effect until May 5, 1991. All persons subject to this rule shall comply with the applicable provisions on May 5, 1991, except equipment modifications, which require a permit to construct, shall comply with the applicable provisions no later than July 1, 1992.

(k) Recordkeeping

Records shall be maintained pursuant to Rule 109 for all applications subject to this rule, including those exempted under section (l).

(1) Exemptions

The provisions of this rule shall not apply to:

- (1) Cleaning solvents that have a VOC content of 2 percent or less by volume, based on the total volume of the material as used.
- (2) Notwithstanding the provisions of this paragraph, use of emulsion cleaners shall not be subject to the requirements of subparagraph (c)(2)(C) provided the parts are immediately rinsed with water.
- (3) Except for subparagraphs (c)(1)(B), (c)(2)(A), and (c)(2)(F), solvent cleaning operations carried out in batch-loaded cold cleaners with open-top surface areas less than 0.1 square meter (1 square foot) and solvent usage less than one (1) gallon per day, shall not be subject to the provisions of this rule.
- (4) Degreaser units using exempt solvent blends that contain less than 10 percent VOC by volume.

[SIP: See AV Full SIP Table at <https://avaqmd.ca.gov/rules-plans>]

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