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VAPOR CLEANING MACHINES AND EMISSION CONTROL SYSTEMS

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MARICOPA COUNTY
AIR POLLUTION CONTROL REGULATIONS
REGULATION III – CONTROL OF AIR CONTAMINANTS

RULE 331
SOLVENT CLEANING

SECTION 100 – GENERAL

101 PURPOSE: To limit the emissions of volatile organic compounds (VOCs) from cleaning operations.

102 APPLICABILITY: This rule is applicable to operations using VOC-containing solvents to remove impurities from exterior or interior surfaces. Compliance with the provisions of this rule shall not relieve any person subject to the requirements of this rule from complying with any other federally enforceable requirements. In such case, the more stringent requirement shall apply. In any instance where more than one of the requirements set forth in this rule may be applicable, the most restrictive requirement shall apply.

102.1 Solvents regulated by this rule may also be regulated by New Source Performance Standards (NSPS) in Rule 360 of these rules and/or National Emission Standards for Hazardous Air Pollutants (NESHAPs) in Rule 370 of these rules.

102.2 This rule is not applicable to:

a. A solvent cleaning operation that is subject to or specifically exempted by an EPA approved version of another rule within Regulation III of these rules.

b. Janitorial cleaning.

c. Testing for surface cleanliness or the cleaning of laboratory equipment at the laboratory.

d. A cleaning-solvent that meets any of the following:

(1) Is composed of at least 98% water by either weight or volume; or

(2) Contains only water and material which is a dry solid before mixing with water; or

(3) Has a VOC content not exceeding 20 grams per liter (0.17 lb/gal).

102.3 Partial or conditional exemptions from this rule are set forth in Section 308 of this rule.

SECTION 200 – DEFINITIONS: For the purpose of this rule, the following definitions shall apply, in addition to those definitions found in Rule 100 (General Provisions and Definitions) of

these rules. In the event of any inconsistency between any of the Maricopa County Air Pollution Control Rules, the definitions in this rule take precedence.

201 **AGITATION, AGITATED:** A means or state that moves cleaning liquid continuously back and forth, or up and down. This includes such motion created by sound waves, and to the splashing of a rinse stream operated at a pressure that creates a trajectory exceeding 2 feet along the horizontal plane intersecting the nozzle when the nozzle is at a 45° angle above the plane. Liquid motion incidental to a continuous entrance or withdrawal of objects undergoing cleaning is not agitation.

202 **BATCH CLEANING MACHINE:** A solvent cleaning machine in which individual parts or a set of parts move through the entire cleaning cycle before new parts are introduced into the solvent cleaning machine. A solvent cleaning machine, such as a ferris wheel or a cross-rod degreaser, that cleans multiple batch loads simultaneously and is manually loaded, is a batch cleaning machine.

203 **BLASTING/MISTING WITH SOLVENT:** Cleaning with an applicator that propels cleaning-solvent through the air with a pressure exceeding 10 psig (516 mm Hg), or that atomizes the solvent into mist and/or droplets.

204 **CABINET STYLE CLEANING MACHINES:** Cleaning machines typically similar in design to domestic dishwashers that are completely enclosed except for optional stack, and have their own reservoir and sump.

205 **CARRY-OUT:** Solvent carried out of a cleaning machine along with a part being removed from the cleaning machine. The solvent may exist as a liquid coating the part or the part's hanger, or as a liquid entrapped in cavities and irregular surfaces, or entrapped by capillary action within or on the part.

206 **CLEANING-SOLVENT:** Solvent used for cleaning that contains more than 2.0% VOC by weight and more than 20 grams of VOC per liter (0.17 lb/gal).

207 **CONFORMING SOLVENT:** A cleaning-solvent having a total VOC vapor pressure at 68°F (20°C) not exceeding 1 millimeter of mercury column.

208 **DEGREASER:** See **SOLVENT CLEANING MACHINE.**

209 **DRY SOLID:** Any substance that appears and feels dry. Evaporating solids, all of which have a strong odor, are not included.

210 **EMISSION CONTROL SYSTEM (ECS):** A system for reducing emissions of volatile organic compounds, consisting of both a capture system and control device(s).

211 **FLUSHING WITH SOLVENT:** Introducing cleaning-solvent directly into the internal space(s) of an object or assembly using a hose or pipe. Rinsing the outside of an object or assembly and swishing an object or assembly in cleaning solvent are not considered flushing with solvent. Such activities must comply with Section 303.1 of this rule.

212 **FREEBOARD HEIGHT:**

212.1 **Batch Cleaning Machine:** The vertical distance from the solvent/air interface to the least elevated point of the top-rim when the cover is open or removed, measured during idling mode.

212.2 **In-Line Cleaning Machine:** The vertical distance from the solvent/air interface to the lowest entry/exit point, measured during idling mode.

213 **FREEBOARD RATIO:** The ratio of the solvent cleaning machine freeboard height to the smaller interior dimension (length, width, or diameter) of the solvent cleaning machine.

214 **HEATED SOLVENT:** Any cleaning-solvent which is heated by a device to a temperature exceeding 120°F (49°C).

215 **IMPERVIOUS:** Neither absorbing, adsorbing, nor allowing penetration through, by liquid or vapors.

216 **IN-LINE CLEANING MACHINE (CONTINUOUS CLEANING MACHINE):** A solvent cleaning machine that uses an automated handling system, typically a conveyor or automated arm(s), to automatically provide a continuous supply of items to be cleaned. The cleaned item leaves by a route different from its entry route.

217 **JANITORIAL CLEANING:** The cleaning of building or facility components to keep work areas in clean condition. Building or facility components include, but are not limited to, floors, ceilings, walls, windows, doors, stairs, bathrooms, furnishings, textiles, wash rags, uniforms, and exterior surfaces of office equipment.

218 **LEAK:** The state or condition in which a cleaning-solvent, excluding a Low-VOC Cleaner, is allowed to seep or drip, or otherwise enters or escapes, at either of the following rate or magnitude:

218.1 Three or more drops of liquid cleaning-solvent per minute; or

218.2 Any puddle of cleaning-solvent greater than 1 square inch.

219 **LOW-VOC CLEANER:** Any solution or homogeneous suspension that, as used, contains less than 50 grams of VOC per liter of material (0.42 lb VOC/gal) or is at least 95% water by weight or volume as determined by an applicable test method in Section 502 of this rule.

220 **MAKE-UP SOLVENT:** A cleaning-solvent that replaces solvent lost through evaporation or other means, and that is added to the solvent remaining in a cleaning machine (degreaser) to bring solvent quantity to the desired level.

221 **MATERIAL VOC CONTENT:** See **VOC CONTENT OF MATERIAL**.

222 **NON-CONFORMING SOLVENT:** A cleaning-solvent having a total VOC vapor pressure at 68°F (20°C) exceeding 1 millimeter of mercury column.

223 **ORGANIC COMPOUND:** Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.

224 REFRIGERATED FREEBOARD CHILLER: A control device which is mounted above any cooling-water jacket or primary condenser coils, consisting of secondary coils which carry a refrigerant to provide a chilled air blanket above the solvent vapor/air interface to reduce emissions from the cleaning machine (degreaser) bath.

225 REMOTE RESERVOIR CLEANING MACHINE (DEGREASER): Any non-vapor cleaning machine (degreaser) in which the reservoir for storing the cleaning-solvent is completely separated by impervious surfaces from the sink or basin where cleaning is performed, except for a connecting tube through which solvent returns to the reservoir when cleaning is stopped.

226 SEALED SYSTEM: An Air-tight or Airless Cleaning System that is operated and equipped pursuant to Section 304.3 of this rule.

227 SOLVENT: For the purpose of this rule, any liquid or vapor which is used to dissolve, clean, strip, or remove impurities, coatings, contaminants, or films from surfaces or from internal spaces and voids. In addition to VOC-containing solvents, this also includes plain water and mixtures containing water.

228 SOLVENT CLEANING MACHINE (CLEANING MACHINE) (DEGREASER): Any liquid container and ancillary equipment designed to clean surfaces and/or remove surface contaminants using cleaning-solvents.

229 SOLVENT/AIR INTERFACE:

229.1 Non-Vapor Cleaner: The location of contact between the liquid solvent and the air.

229.2 Vapor Cleaner: The location of contact between the concentrated layer of solvent vapor and the air.

230 SOLVENT/AIR INTERFACE AREA:

230.1 Non-Vapor Cleaner:

a. With Included/Integral Reservoir: The surface area of liquid cleaning-solvent that is exposed to the air.

b. With Remote Reservoir: The surface area of the solvent sink or work area.

230.2 Vapor Cleaner: The area of the horizontal plane that is located halfway between the highest and lowest points of the primary condenser coils and which contacts the interior walls of the cleaning machine.

231 TOTAL VOC VAPOR PRESSURE (VOC COMPOSITE PARTIAL PRESSURE): Within a solution or homogenous mixture, it is the sum of the partial pressures of all those components that are defined as VOCs, calculated according to the formula in Section 502.3 of this rule.

232 VAPOR CLEANING MACHINE: Any cleaning machine in which solvent-vapor from boiling cleaning solvent is utilized for cleaning object.

233 VOC CONTENT OF MATERIAL (MATERIAL VOC CONTENT):

$$\text{VOC CONTENT OF MATERIAL as a percent} = \frac{W_s - W_w - W_{es}}{W_m} \text{ X } 100\%$$

Using consistently either pounds or grams in the calculations:

Where:

W_s = weight of volatile material in pounds (or grams), including water, non-precursor organic compounds, and dissolved vapors.

W_w = weight of water in pounds (or grams)

W_{es} = total weight of non-precursor organic compounds in pounds (or grams)

W_m = weight of total material in pounds (or grams)

$$\text{VOC CONTENT OF MATERIAL in pounds per gallon (g/l)} = \frac{W_s - W_w - W_{es}}{V_m}$$

Using consistently either English or metric measures in the calculations

Where:

W_s = weight of all volatile material in pounds (or grams) including VOC, water, non-precursor organic compounds and dissolved vapors.

W_w = weight of water in pounds (or grams)

W_{es} = weight of all non-precursor compounds in pounds (or grams)

V_m = volume of total material in gallons (or liters)

234 WIPE CLEANING: That method of removing contaminants from a surface by physically rubbing or automatically rubbing with a porous or absorbent material, such as a rag, paper, sponge, or cotton swab, moistened with a solvent.

SECTION 300 – STANDARDS

301 SOLVENT HANDLING REQUIREMENTS: Any person to whom this rule applies must comply with all of the following:

301.1 All cleaning-solvent, including solvent soaked materials, shall be kept in closed, leak free, impervious containers that are opened only when adding or removing material.

a. Porous or absorbent materials used for wipe cleaning shall be stored in closed containers when not in use.

b. Each container shall be clearly labeled with its contents.

301.2 If any cleaning-solvent escapes from a container:

a. Wipe up or otherwise remove immediately if in accessible areas.

b. For areas where access is not feasible during normal production, remove as soon as reasonably possible.

301.3 Unless records show that VOC-containing cleaning material was sent offsite for legal disposal, it will be assumed that it evaporated on site.

302 EQUIPMENT REQUIREMENTS FOR ALL CLEANING MACHINES: Any person operating a cleaning machine to which this rule applies must comply with all of the following:

302.1 Provide a leak free, impervious container (degreaser) for the solvents and the articles being cleaned.

a. The VOC-containment portion shall be impervious to VOC-containing liquid and vapors.

b. No surface of any freeboard required by this rule shall have an opening or duct through which VOC can escape to the atmosphere, except as controlled by an ECS, or as required by OSHA.

302.2 Properly maintain and operate all cleaning machine equipment required by this rule and any of its emission controls required by this rule.

303 SPECIFIC OPERATING & SIGNAGE REQUIREMENTS FOR CLEANING MACHINES: Any person who cleans with cleaning-solvent other than a Low-VOC Cleaner must conform to all of the following operating requirements:

303.1 Operating Requirements:

a. Fans: Do not locate nor position comfort fans in such a way as to direct airflow across the opening of any cleaning machine.

b. Cover: Do not remove any device designed to cover the solvent unless processing work in the cleaning machine or maintaining the machine.

c. Draining: Drain cleaned parts for at least 15 seconds after cleaning or until dripping ceases, whichever is later.

d. Spraying: If using a cleaning-solvent spray system,

(1) Use only a continuous, undivided stream (not a fine, atomized, or shower type spray).

(2) Pressure at the orifice from which the solvent emerges shall not exceed 10 psig and shall not cause liquid solvent to splash outside of the solvent container.

(3) In an in-line cleaning machine, a shower-type spray is allowed, provided that the spraying is conducted in a totally confined space that is separated from the environment.

(4) Exceptions to foregoing Sections 303.1d(1), (2), and (3) are provided for in Section 307 of this rule.

e. Agitation: No person shall cause agitation of a cleaning-solvent in a cleaning machine by sparging with air or other gas. Covers shall be placed over ultrasonic cleaners when the cleaning cycle exceeds 15 seconds.

f. No Porous Material:

(1) Do not clean nor use porous or absorbent materials to clean parts or products in a cleaning machine. For the purpose of this rule, porous or absorbent materials include, but are not limited to, cloth, leather, wood, and rope.

(2) Do not place an object with a sealed wood handle, including a brush, in or on a cleaning machine.

(3) Do not place porous or absorbent materials, including, but not limited to, cloth, leather, wood, and rope on a cleaning machine.

g. Vent Rates: The ventilation rate at the cleaning machine shall not exceed 65 cfm per square foot of evaporative surface (20 $m^3/min./m^2$), unless that rate must be changed to meet a standard specified and certified by a Certified Safety Professional, a Certified Industrial Hygienist, or a licensed professional engineer experienced in ventilation, to meet health and safety requirements.

h. Hoist Speed: Limit the vertical speed of mechanical hoists moving parts in and out of the cleaning machine to a maximum of 2.2 inches per second and 11 ft/min. (3.3 m/min.).

i. Contamination Prevention: Prevent cross contamination of solvents regulated by Section 304 of this rule with solvents that are not so regulated. Use signs, separated work-areas, or other effective means for this purpose. This includes those spray gun cleaning solvents that are regulated by another rule of these rules.

j. Filtration Devices: If a filtration device (e.g., to remove oils, greases, sludge, and fine carbon from cleaning solvent) is inherent in the design of the cleaning machine, then such filtration device shall be operated in accordance with manufacturer's specifications and in accordance with the following requirements:

(1) The filtration device shall be fully submerged in cleaning solvent at all times during filtration.

(2) When the filtration device is completely saturated and must be removed from the cleaning machine, the filtration device shall be drained until no liquid can flow from the filtration device. Draining and drying such filtration device shall be conducted in a sealed container with no exhaust to the atmosphere or work area.

(3) After the filtration device is dry, the filtration device shall be stored in a closed, leak free, impervious container that is legibly labeled with its contents and that remains covered when not in use. Disposal of the filtration device shall be done in a manner that inhibits VOC evaporation and that is in compliance with appropriate/legal methods of disposal.

303.2 Signage Requirements: Any person who uses cleaning-solvent, other than Low-VOC Cleaner, in any solvent cleaning machine (degreaser) or dip tank shall provide on the machine, or within 3¼ feet (1 meter) of the machine, a permanent, conspicuous label or placard which includes, at a minimum, each of the following applicable instructions, or its equivalent:

a. "Keep cover closed when parts are not being handled." (This is not required for remote reservoir cleaners.)

b. "Drain parts until they can be removed without dripping."

c. "Do not blow off parts before they have stopped dripping."

d. "Wipe up spills and drips as soon as possible; store used spill rags [or 'wiping material'] in covered container."

e. **"**Don't leave cloth or any absorbent materials in or on this tank."

f. For cleaning machines with moving parts such as hoists, pumps, or conveyors, post: "Operating instructions can be obtained from _____," listing a person or place where the instructions are available.

304 SOLVENT SPECIFICATIONS FOR NON-VAPOR CLEANING AND DEGREASING: [Operating requirements specifically for vapor cleaning machines are in the Appendix.] All cleaning solvents, except Low-VOC Cleaners, used in non-boiling cleaning machines shall comply with Section 304.1 or Section 304.2 or Section 304.3, as follows:

304.1 Use a cleaning-solvent having a total VOC vapor pressure at 68°F (20°C) not exceeding 1 millimeter of mercury column, as determined by the standards described in Section 500 of this rule.

304.2 ECS: Use an ECS to capture and process VOC emissions in accordance with Section IV of the Appendix within this rule; or

304.3 Sealed System: Use a Sealed System that is an Air-tight or Airless Cleaning System which is operated according to the manufacturer's specifications and, unless otherwise indicated by the manufacturer, meets all of the following requirements:

a. Has a door or other pressure-sealing apparatus that is shut during each cleaning and drying cycle; and

b. Has a differential pressure gauge that always indicates the pressure in the sealed chamber when occupied or in active use; and

c. Any associated pressure relief device(s) shall be so designed and operated as to prevent liquid cleaning-solvents from draining out.

305 NON-VAPOR BATCH CLEANING MACHINES: Equipment requirements for non-vapor batch cleaning machines with remote reservoirs are set forth in Section 305.1 of this rule. Equipment standards applicable to non-vapor batch cleaning machines with internal reservoirs (non-remote) are set forth in Section 305.2 of this rule. Non-vapor batch cleaning machines with either remote or internal reservoirs that use cleaning-solvents that are either

heated, agitated or non-conforming are subject to additional provisions set forth in Section 305.3 of this rule. Low-VOC Cleaners are exempt from this section.

305.1 With Remote Reservoir: A batch cleaning machine with remote reservoir, including cabinet type(s), shall be equipped with the following:

a. A sink-like work area or basin which is sloped sufficiently towards the drain so as to prevent pooling of cleaning-solvent.

b. A single, unimpeded drain opening or cluster of openings served by a single drain for the cleaning-solvent to flow from the sink into the enclosed reservoir. Such opening(s) shall be contained within a contiguous area not larger than 15.5 square inches (100 cm^2).

c. Solvent Return: Provide a means for drainage of cleaned parts such that the drained solvent is returned to the cleaning machine.

305.2 With Internal Reservoir (Non-Remote): A batch cleaning machine without a remote reservoir shall be equipped with all of the following:

a. Have and use an internal drainage rack or other assembly that confines within the freeboard all cleaning-solvent dripping from parts and returns it to the hold of the cleaning machine (degreaser); and

b. Have an impervious cover which when closed prevents cleaning-solvent vapors in the cleaning machine from escaping into the air/atmosphere when not processing work in the cleaning machine.

(1) A cover shall be fitted so that in its closed position the cover is between the cleaning-solvent and any lip exhaust or other safety vent, except that such position of cover and venting may be altered by an operator for valid concerns of flammability established in writing and certified to by a Certified Safety Professional or a Certified Industrial Hygienist to meet health and safety requirements.

(2) A cover is not required when an ECS is used in accordance with Section IV of the Appendix within this rule.

c. In the absence of additional applicable freeboard standards, freeboard height shall be not less than 6 inches (15.2 cm); and

d. The freeboard zone shall have a permanent, conspicuous mark that locates the maximum allowable solvent level which conforms to the applicable freeboard requirements.

305.3 Using Cleaning-Solvent that is Heated, Agitated, or is Non-Conforming: If a cleaning machine uses a cleaning-solvent at a temperature above 120°F (49°C), uses non-conforming solvent if allowed by Section 305.3(d) of this rule, or agitates the solvent, then comply with one of the following:

a. Remote Reservoir Cleaning Machines: For a remote reservoir cleaning machine, comply with Section 305.1 of this rule and one of the following:

(1) Use a stopper in the drain whenever the sink or cabinet is empty of solvent and nothing is being handled in the sink; or

(2) Cover the sink or cabinet whenever the sink or cabinet is empty of solvent and nothing is being handled in the sink.

b. Internal Reservoir Cleaning Machines: For an internal reservoir cleaning machine, comply with Section 305.2 of this rule and either Section (1) or (2) that follow:

(1) A Water Cover: A floating layer of water (insoluble in the solvent) at least 1 inch thick, and a freeboard at least 6 inches above the top of the solvent shall be present; or

(2) Freeboard and Cover:

(a) The basin shall have a freeboard ratio of 0.75 or greater and an impervious cover shall cover the basin whenever work is not being processed; and

(b) If a non-conforming solvent is used, the cover shall be of a sliding or rolling type which is designed to easily open and close in a horizontal plane without disturbing the vapor zone.

c. Cabinet Style: Keep a cabinet-style cleaning machine closed at all times that it contains cleaning-solvent, except when introducing or removing work from the machine. If blasting or misting with cleaning-solvent, also conform to the applicable requirements of Section 307 of this rule.

d. Non-Conforming Solvent: A non-conforming solvent may be used in operations to which this rule applies, if at least one of the following is met:

(1) The emissions from the operation shall be controlled by an ECS per Section 304.2 of this rule or by a Sealed System per Section 304.3 of this rule; or

(2) The operation is exempted per Section 308.2 of this rule; or

(3) The operation is both exempted per Section 308.3 of this rule and complies with Section 305.3 of this rule, or for in-line machines, complies with all of Section 306 of this rule except Section 306.4 of this rule.

305.4 ECS Alternative: An owner and/or operator is allowed to meet the requirements of any one or combination of the requirements of Sections 305.1, 305.2 and/or 305.3 of this rule by operating an ECS in accordance with Section IV of the Appendix within this rule whenever any requirement of Sections 305.1, 305.2 and/or 305.3 of this rule is not met.

306 NON-VAPOR IN-LINE CLEANING MACHINES: No person shall operate a non-vapor in-line cleaning machine using cleaning-solvent unless it complies with Sections 306.1, 306.2, and 306.3 of this rule:

306.1 Features:

a. Carry-Out Prevention: Equip the cleaning machine with either a drying tunnel or another means, such as a rotating basket, sufficient to prevent cleaned parts from carrying out cleaning-solvent liquid or vapor.

b. Enclosed Design: An in-line cleaning machine shall be fully enclosed except for entrance and exit portals.

c. Cover: During shutdown hours or if the cleaning machine is idle for more than 30 minutes, a cover shall be used to close the entrance and exit and any opening greater than 16 square inches (104 cm^2).

306.2 Minimized Openings: Entrances and exits should silhouette workloads so that the average clearance between parts and the edge of the cleaning machine opening is either less than four inches (10 cm), or less than 10% of the width of the opening.

306.3 The machine shall have a freeboard ratio greater than or equal to 0.75.

306.4 ECS Alternative: An owner and/or operator is allowed to meet the requirements of any one or combination of Sections 306.1(b), 306.1(c), 306.2, and/or 306.3 of this rule by operating an ECS that controls VOC vapor from processes addressed by the requirement(s). Such ECS shall be operated in accordance with Section IV of the Appendix within this rule.

307 SPECIAL NON-VAPOR CLEANING SITUATIONS:

307.1 Blasting/Misting with Conforming Solvent: Any person blasting or misting with conforming solvent shall operate and equip the device(s) as follows:

a. Equipment: The device shall have internal drainage, a reservoir or sump, and a completely enclosed cleaning chamber, designed so as to prevent any perceptible liquid from emerging from the device; and

b. Operation: The device shall be operated such that there is no perceptible leakage from the device except for incidental drops from drained, removed parts.

307.2 Blasting/Misting with Non-Conforming Solvent: Any person shall use a Sealed System pursuant to Section 304.3 of this rule for all blasting or misting with a non-conforming solvent.

307.3 High Pressure Flushing: Cleaning systems using cleaning-solvent that emerges from an object undergoing flushing with a visible mist or at a pressure exceeding 10 psig, shall comply as follows:

a. Conforming Solvent: For conforming solvent, use a containment system that is designed to prevent any perceptible cleaning-solvent liquid from becoming airborne outside the containment system, such as a completely enclosed chamber.

b. Non-Conforming Solvent: Use a Sealed System for non-conforming solvent.

307.4 ECS Alternative: An owner and/or operator is allowed to meet the requirement(s) of Section 307.1 and/or Section 307.2 of this rule by operating an ECS that controls VOC vapor from processes addressed by the requirement(s). The ECS shall be operated pursuant to Section IV of the Appendix within this rule.

308 EXEMPTIONS:

308.1 Categorical Exemptions:

a. Industries and cleaning operations that are not regulated by this rule include, but are not limited to, the following EPA approved versions of the VOC rules in Regulation III of these rules:

(1) Dry cleaning with petroleum solvents (Rule 333);

(2) Printing and graphic arts coating (Rule 337);

(3) Semiconductor manufacturing (Rule 338);

(4) Automotive windshield washer fluid (Rule 344); and

(5) Architectural Coating (Rule 335).

b. All operations regulated by the following NESHAPs are exempt from Rule 331:

(1) National Emission Standards for Halogenated Solvent Cleaning (40 CFR 63, subpart T). This includes the de minimis amounts of solvent VOCs that are exempted by subpart T.

(2) National Emission Standards for Perchloroethylene for Dry Cleaning Facilities, (40 CFR 63, subpart M).

c. Exemptions for Qualified Operations:

(1) Cleanup of Coating-Application Equipment: Operations involving the cleanup of coating-application equipment that are subject to or specifically exempted by an EPA approved version of another rule in Regulation III of these rules are exempt from Rule 331. Examples include Rule 336 (Surface Coating Operations), Rule 342 (Coating Wood Furniture and Fixtures), and Rule 346 (Coating Wood Millwork).

(2) Aerospace: Wipe cleaning of aerospace components is subject to Rule 348 of these rules, whereas the cleaning of aerospace components in a dip tank or a cleaning machine is subject to Rule 331.

308.2 Partial Exemption from Section 300: The following are exempt from sections of Section 300 of this rule as noted:

a. Wipe Cleaning: The provisions of Sections 302 through 307 of this rule do not apply to wipe cleaning. Recordkeeping provisions in Section 500 of this rule do apply to wipe cleaning.

b. Small Cleaners: The provisions of Sections 303 through 307 of this rule shall not apply to any non-vapor cleaning machine (degreaser) or dip-tank fitting either of the following descriptions, except that these shall be covered when work is not being processed:

(1) A small cleaner having a liquid surface area of 1 square foot (0.09 square meters) or less, or

(2) A small cleaner having a maximum capacity of one gallon (3.79 liters) or less.

308.3 Exemptions from Section 304: The U.S. Government Printing Office "Standard Industrial Classification Manual, 1987" (and no future editions) is incorporated by reference and is on file at the Maricopa County Air Quality Department. The following are exempt from Section 304 of this rule:

a. Non-furniture medical devices included in Standard Industrial Classification (SIC) codes 3841, 3843, 3844, or 3845, and products for internal use in 3842;

b. Electronic products for space vehicles and communications equipment in SIC codes 3661, 3663, 3669, 3677, 3678, 3679, and 3769; and

c. Production processes having clean-room standards equal to or more stringent than class 100,000 (particles/m^3); and

d. Low viscosity solvent used to clean an aerospace component if the Federal Aviation Authority, the US Department of Defense, or a US Military specification designates that the cleanliness of the component is critical to the flight safety of a complete aerospace vehicle. By January 1, 2001, any such solvents shall be listed in a Maricopa County air pollution permit, conditioned upon a sufficient demonstration by the user that no compliant substitute exists.

308.4 Comfort Fans: The Section 303.1(a) prohibition against fans and fan-drafts being close to cleaning machines does not apply to a totally enclosed cleaning machine that cannot be penetrated by drafts.

308.5 Vehicle Refinishing: Dip cleaning of vehicle or mobile equipment surfaces is subject to this rule.

308.6 Aerosol cans, squirt bottles, and other solvent containers intended for handheld use shall meet the requirements in Sections 301 and 500 of this rule.

308.7 A Low-VOC Cleaner is subject only to Sections 301, 302, 307.1, 501.1(a), and 501.2 of this rule.

309 REQUIREMENTS FOR AIR POLLUTION CONTROL EQUIPMENT AND ECS MONITORING EQUIPMENT: For the purpose of this rule, an ECS shall be approved in writing by the Control Officer and shall be designed and operated in accordance with good engineering practices.

309.1 Operation and Maintenance (O&M) Plan Required for ECS:

a. General Requirements: An owner and/or operator shall provide and maintain (an) O&M Plan(s) for any ECS, any other emission processing equipment, and any ECS monitoring devices that are used pursuant to this rule or pursuant to an air pollution control permit. An owner and/or operator shall comply with all the identified actions and schedules provided in each O&M Plan.

b. Approval by Control Officer of Initial O&M Plan(s): An owner and/or operator shall submit to the Control Officer for written approval the O&M Plan(s) of each ECS and each ECS monitoring device that is used pursuant to this rule. While the Control Officer is reviewing for approval the O&M Plan(s), an owner and/or operator shall comply with all the identified actions and schedules provided in each O&M Plan submitted for approval, unless notified otherwise by the Control Officer. After the Control Officer has issued written approval of the O&M Plan(s), an owner and/or operator shall continue to comply with all the identified actions and schedules provided in each O&M Plan.

c. **Owner and/or Operator Revisions to Initial O&M Plan(s):** If an owner and/or operator submits to the Control Officer revisions to the initial O&M Plan(s) and if such revisions have been approved in writing by the Control Officer, an owner and/or operator shall comply with the revisions to the initial O&M Plan(s).

d. **Control Officer Modifications to Initial O&M Plan(s):** After discussion with the owner and/or operator, the Control Officer may modify the O&M Plan(s) in writing prior to approval of the initial O&M Plan(s). An owner and/or operator shall then comply with the O&M Plan(s) that has been modified by the Control Officer.

309.2 Providing and Maintaining ECS Monitoring Devices: An owner and/or operator incinerating, adsorbing, or otherwise processing VOC emissions pursuant to this rule shall provide, properly install and maintain in calibration, in good working order and in operation, devices described in the facility's O&M Plan that indicate temperatures, pressures, rates of flow, or other operating conditions necessary to determine if air pollution control equipment is functioning properly and is properly maintained.

SECTION 400 – ADMINISTRATIVE REQUIREMENTS (NOT APPLICABLE)

SECTION 500 – MONITORING AND RECORDS

501 RECORDKEEPING AND REPORTING: Any person subject to this rule shall comply with the following requirements. Records shall be retained for five years and shall be made available to the Control Officer upon request.

501.1 Current List:

a. Maintain a current list of cleaning-solvents; state the VOC-content of each in pounds VOC per gallon of material or grams per liter of material.

b. A facility using any cleaning-solvent subject to the vapor-pressure limits of Section 304.1 of this rule shall have on site the written value of the total VOC vapor-pressure of each such solvent, in one of the following forms:

(1) A manufacturer's technical data sheet,

(2) A manufacturer's safety data sheet (MSDS), or

(3) Actual test results.

501.2 Usage Records:

a. Monthly: Records of the amount of cleaning-solvent used shall be updated by the end of month for the previous month. Show the type and amount of each make-up and all other cleaning-solvent to which this rule is applicable.

b. Annually:

(1) Certain Concentrates: Use of concentrate that is used only in the formulation of Low VOC Cleaner shall be updated at least annually.

(2) Low-VOC Cleaner: An owner and/or operator need not keep a record of a cleaning substance that is made by diluting a concentrate with water or non-precursor compound(s) to a level that qualifies as a Low VOC Cleaner if records of the concentrate usage are kept in accordance with this rule.

c. Grouping by VOC Content: For purposes of recording usage, an operator may give cleaning-solvents of similar VOC content a single group-name, distinct from any product names in the group. The total usage of all the products in that group is then recorded under just one name. (In such a case, the operator must also keep a separate list that identifies the product names of the particular solvents included under the group name). To the group name shall be assigned the highest VOC content among the members of that group, rounded to the nearest 10th of a pound of VOC per gallon of material, or to the nearest gram VOC per liter of material.

502 COMPLIANCE DETERMINATION AND TEST METHODS: When more than one test method is permitted for a determination, an exceedance of the limits established in the rule determined by any of the applicable test methods constitutes a violation of this rule.

502.1 Compliance Determination: The following means shall be used to determine compliance with this rule. For routine information collection, the Control Officer may accept a manufacturers' data sheet, data certified by an officer of the supplying company, or test data for the product model of inquiry.

a. VOC Content: The VOC content of solutions, dispersions, emulsions, and conforming solvents (reference Section 207 of this rule) shall be determined by one of the following methods:

(1) South Coast Air Quality Management District Method 313-91 as referenced in Section 502.2(f) of this rule; or

(2) Bay Area Air Quality Management District Method 31 as referenced in Section 502.2(e) of this rule; or

(3) Solids-free windshield washer solutions, in which all organic components are VOCs, may be tested using Maricopa County Reference Method #100, "Total Organic Carbon for Windshield Washer Fluids," Maricopa County Air Pollution Control Rule 344 (April 7, 1999). This method should only be used for water-based solutions containing less than 5% VOC by weight.

b. Vapor Pressure: Pursuant to Sections 304 and 207 of this rule, determination of the total VOC vapor-pressure (VOC composite partial-pressure) in a cleaning solution shall be performed as follows:

(1) For solutions known to be nearly or exactly 100% VOC, vapor pressure shall be determined by ASTM D2879-96 as referenced in Section 502.2(g) of this rule; or

(2) For solutions for which is known the exact quantity and chemical makeup of each evaporating component that is not a VOC, ASTM D2879-96 (referencing Section 502.2(g) of this rule) shall be used (to determine the gross composite vapor pressure) in conjunction with calculations using the vapor-pressure formula in Section 502.3 of this rule.

(3) When a solution's exact species and proportions are known for all ingredients, the Control Officer may use the formula in Section 502.3 of this rule in conjunction with standard reference texts or data-bases that provide the vapor pressure value of each constituent, or a combination of formula use and actual testing on real constituents (referencing Section 502.2(g) of this rule).

c. ECS Compliance:

(1) The VOC content of gaseous emissions entering and exiting an ECS shall be determined by either EPA Method 18 referred to in Section 502.2(b) of this rule, or EPA Methods 25, 25a, and 25b referred to in Section 502.2(c) of this rule.

(2) Capture efficiency of an emission control device used pursuant to Section 304.2, Section 305.4, Section 306.4, and/or Section 307.4 of this rule shall be determined either by the methods in Section 502.2(d) of this rule (EPA Methods 204, 204a, 204b, 204c, 204d, 204e, and 204f) or by using mass balance calculation methods in concert with the methods in Section 502.2(a) of this rule (EPA Methods 2, 2a, 2c, and 2d), and EPA guidance document, "Guidelines for Determining Capture Efficiency", January 9, 1995.

d. Temperature Measurement: Temperature measurements made pursuant to Section 214 of this rule to determine if a cleaning machine contains a "heated solvent" shall be done with an instrument having an accuracy and precision of no less than 1 degree Fahrenheit.

502.2 Test Methods Adopted by Reference: The EPA test methods as they exist in the Code of Federal Regulations (CFR) (July 1, 2003), as listed below, are adopted by reference. The other test methods listed here are also adopted by reference, each having paired with it a specific date that identifies the particular version/revision of the method that is adopted by reference. These adoptions by reference include no future editions or amendments. Copies of test methods referenced in this Section 502 are available at the Maricopa County Air Quality Department.

a. EPA Methods 2 ("Determination of Stack Gas Velocity and Volumetric Flow Rate"), 2a ("Direct Measurement of Gas Volume Through Pipes and Small Ducts"), 2c ("Determination of Stack Gas Velocity and Volumetric Flow rate in Small Stacks or Ducts"), and 2d ("Measurement of Gas volumetric Flow Rates in Small Pipes and Ducts"). All 4 of the foregoing methods are in 40 CFR 60, Appendix A.

b. EPA Method 18 ("Measurement of Gaseous Organic Compound Emissions by Gas Chromatography") (40 CFR 60, Appendix A).

c. EPA Methods 25 ("Determination of Total Gaseous Non-methane Organic Emissions as Carbon"), 25a, and 25b (40 CFR 60, Appendix A).

d. EPA Test Methods 204 ("Criteria for and Verification of a Permanent or Temporary Total Enclosure"), 204a, 204b, 204c, 204d, 204e, and 204f (40 CFR 51, Appendix M) and EPA guidance document, "Guidelines for Determining Capture Efficiency", January 9, 1995.

e. California's Bay Area Air Quality Management District (BAAQMD) Method 31 (April 15, 1992), "Determination of Volatile Organic Compounds in Paint Strippers, Solvent Cleaners, and Low Solids Coatings."

f. California's South Coast Air Quality Management District (SCAQMD) Method 313-91 (April 1997).

g. American Society for Testing and Materials (ASTM) Method D2879-96 (1996).

h. EPA guidance document, "Guidelines for Determining Capture Efficiency", January 9, 1995.

502.3 FORMULA FOR VOC COMPOSITE PARTIAL PRESSURE: Equivalent to: **TOTAL VOC VAPOR-PRESSURE.**

$$PP_c = \frac{\sum_{i=1}^{n} (W_i)(VP_i)/M_i}{\frac{W_w}{18} + \sum_{j=1}^{m} \frac{W_e}{M_e} + \sum_{i=1}^{n} \frac{W_i}{M_i}}$$

W_i = Weight of the "*i*"th VOC compound in grams

W_w = Weight of water in grams

We = Weight of the "*j*"th non-precursor compound in grams

M_i = Molecular weight of the "*i*"th VOC compound in grams per gram mole, e.g., one gram-mole of isopropyl alcohol weighs 60 grams

M_e = Molecular weight of the "*j*"th non-precursor compound, e.g., 1 gram-mole of acetone weighs 58 grams

PP_c = VOC composite partial pressure at 20°C in mm mercury (Hg)

VP_i = Vapor pressure of the "*i*"th VOC compound at 20°C in mm Hg

18 = Weight of one gram-mole of water

MARICOPA COUNTY
AIR POLLUTION CONTROL REGULATIONS
REGULATION III – CONTROL OF AIR CONTAMINANTS

RULE 331
SOLVENT CLEANING

APPENDIX
VAPOR CLEANING MACHINES AND EMISSION CONTROL SYSTEMS

I. DEFINITIONS:

(1) **VAPOR LEVEL CONTROL SYSTEM:** A combination of a coolant sensing system and a vapor sensing system consisting of the following three sets of features:

(A) A condenser flow switch and thermostat which shuts off the sump heat if either the condenser coolant stops circulating or becomes warmer than 85°F (29°C); and

(B) A manually-reset safety switch which turns off the sump heater if the temperature sensor senses that the temperature is rising above the designed operating level at the vapor/air interface; and

(C) A manually-reset switch which turns off the spray-system pump if the level of the vapor/air interface drops more than 4 inches (10 cm).

II. BATCH-LOADED VAPOR CLEANING MACHINES:

(1) No person shall operate a batch vapor cleaning machine, unless the machine meets National Emission Standards for Halogenated Solvent Cleaning (subpart T, Rule 370), as if the cleaning solvent in use were subject to subpart T standards.

(2) No person shall operate a batch vapor cleaning machine, unless the machine has a vapor/air interface Fahrenheit temperature no greater than 30% of the solvent's boiling point temperature or no greater than 40.0°F (4.4°C), whichever is lower.

(3) Sections II(1) and II(2) of this Appendix shall not apply, if a batch vapor cleaning machine is equipped with all of the following:

(A) **Cover:** An impermeable cover that is a sliding, rolling, fanning, or guillotine (bi-parting) type which is designed to easily open and close without disturbing the vapor zone.

(B) **A Vapor Level Control System.**

(C) **Primary Condenser:** A primary condenser that maintains an exit temperature not exceeding 85°F (29°C) or is equipped pursuant to Section II(3)(F)(ii) of this Appendix.

(D) **Freeboard Ratio:** A freeboard ratio that is greater than or equal to 0.75.

(E) **Lip Exhausts:** Vapor cleaning machines with lip exhausts shall be controlled by an ECS.

(F) **Refrigeration or ECS:** Batch vapor cleaning machines having any of the following descriptors shall comply with Sections II(3)(F)(i), II(3)(F)(ii), or II(3)(f)(iii) of this Appendix:

- an evaporative surface area equal to or greater than 10.75 ft^2 (1.0 m^2); or
- installed or subject to major modification after November 1, 1999; or
- having average monthly VOC emissions exceeding 31 pounds VOC per square foot of solvent surface area:

(i) A refrigerated freeboard chiller for which the chilled air blanket temperature in degrees Fahrenheit at the coldest point on the vertical axis through the horizontal center of the vapor/air interface either shall be no greater than 30% of the initial boiling point of the solvent in degrees Fahrenheit or no greater than 40.0°F (4.4°C); or

(ii) A refrigerated condenser coil (in place of an unrefrigerated coil) having a minimum cooling capacity of 100% of the boiling-sump heat input rate and conforming to the air blanket temperature requirements pursuant to Section II(3)(F)(i); or

(iii) An ECS operated in accordance with Section IV of this Appendix.

(G) **Water Separator:** Water should not be visually detectable in the VOC containing solvent exiting the water separator.

(4) Sections II(1) and II(2) of this Appendix shall not apply, if a batch vapor cleaning machine meets all of the following:

(A) **Workloads:**

(i) A workload shall not occupy more than half of the cleaning machine's open-top area.

(ii) The workload shall not be so massive that the vapor level drops more than 4 inches (10 cm), when the workload is removed from the vapor zone.

(iii) The workload shall not be sprayed with cleaning-solvent above the vapor/air interface level.

(B) **Carry-Out:** Minimize cleaning-solvent carry-out by the following measures:

(i) Orient the items being cleaned in such a way that the items drain easily after cleaning.

(ii) Degrease the workload in the vapor zone at least 30 seconds or until condensation ceases.

(iii) For manual loading/unloading, tip out any pools of solvent on the cleaned parts before removal.

(iv) Allow parts to dry within the batch vapor cleaning machine until visually dry.

(C) **Startup and Shutdown:** The following sequence shall be used for startup and shutdown:

(i) When starting the batch vapor cleaning machine, the cooling system shall be turned on before, or simultaneously with, the sump heater.

(ii) When shutting down the batch vapor cleaning machine, the sump heater shall be turned off before, or simultaneously with, the cooling system.

(D) **Blasting:** Blasting in a batch vapor cleaning machine shall be done within a Sealed System or be controlled by an ECS.

(E) **Records:** An owner and/or operator operating a batch vapor cleaning machine shall keep records pursuant to Section 501 of this rule.

III. IN-LINE VAPOR CLEANING MACHINES:

(1) No person shall operate an in-line vapor cleaning machine, unless the machine meets National Emission Standards for Halogenated Solvent Cleaning (subpart T, Rule 370), as if the cleaning-solvent in use were subject to subpart T standards.

(2) No person shall operate an in-line vapor cleaning machine, unless the machine has a vapor/air interface Fahrenheit temperature no greater than 30% of the solvent's boiling point temperature or no greater than 40.0°F (4.4°C), whichever is lower.

(3) Sections III(1) and III(2) of this Appendix shall not apply, if an in-line vapor cleaning machine is equipped with all of the following:

(A) **Cover:** Within 10 minutes of turning off the solvent heating system, cover the entrance and exit and any opening greater than 16 square inches (104 cm^2).

(B) **Vapor Level Control System.**

(C) **Primary Condenser:** Have a primary condenser that maintains an exit temperature not exceeding 85°F (29°C).

(D) **Freeboard Ratio:** Have a freeboard ratio greater than or equal to 0.75.

(E) **Refrigeration or ECS:** In-line vapor cleaning machines having any of the following descriptors shall comply with Sections III(3)(E)(i), III(3)(E)(ii), or III(3)(E)(iii) of this Appendix:

- An evaporative surface area equal to or greater than 10.75 ft^2 (1.0 m^2); or
- Installed or subject to major modification after November 1, 1999, or
- Having average monthly VOC emissions exceeding 31 pounds VOC per square foot of solvent surface area:

(i) A refrigerated freeboard chiller for which the chilled air blanket temperature in degrees Fahrenheit at the coldest point on the vertical axis through the horizontal center of the vapor/air interface either shall be no greater than 30% of the initial boiling point of the solvent in degrees Fahrenheit or no greater than 40.0°F (4.4°C); or

(ii) A refrigerated condenser coil (in place of an unrefrigerated coil) having a minimum cooling capacity of 100% of the boiling-sump

heat input rate and conforming to the air blanket temperature requirements pursuant to Section III(3)(E)(i) of this Appendix; or

(iii) An ECS operated in accordance with Section IV of this Appendix.

(F) **Water Separator:** Water should not be visually detectable in the VOC-containing solvent exiting the water separator.

(4) Sections III(1) and III(2) of this Appendix shall not apply, if the in-line vapor cleaning machine meets all of the following:

(A) **Workloads:** Entrances and exits should silhouette workloads so that the average clearance between parts and the edge of the in-line vapor cleaning machine opening is either less than 4 inches (10 cm) or less than 10% of the width of the opening.

(B) **Carry-Out:** Equip the in-line vapor cleaning machine with either a drying tunnel or another means, such as a rotating basket, sufficient to prevent cleaned parts from carrying out cleaning-solvent liquid or vapor.

(C) **Startup and Shutdown:** The following sequences shall be used for startup and shutdown:

(i) When starting the in-line vapor cleaning machine, the cooling system shall be turned on before, or simultaneously with, the sump heater.

(ii) When shutting down the in-line vapor cleaning machine, the sump heater shall be turned off before, or simultaneously with, the cooling system.

(D) **Records:** An owner and/or operator operating an in-line vapor cleaning machine shall keep records pursuant to Section 501 of this rule.

IV. EMISSION CONTROL SYSTEM REQUIREMENTS:

(1) An Emission Control System (ECS) used pursuant to this rule shall consist of a hood or enclosure to collect emissions, which are vented to a processing device. The overall control efficiency (capture plus processing) of the system shall not be less than 85%. The capture system shall have a ventilation rate no greater than 65 cfm per square foot of evaporative surface (20 $m^3/min./m^2$), unless that rate must be changed to meet a standard specified and certified by a Certified Safety Professional, a Certified Industrial Hygienist, or a licensed professional engineer experienced in ventilation-system design, that concerns health and safety requirements. The ECS shall be approved by the Control Officer.

(2) **Operation and Maintenance (O&M) Plan Required for ECS:** An owner and/or operator shall create and maintain an O&M Plan for any ECS required by this rule or pursuant to an air pollution control permit in accordance with Section 309 of this rule.

(3) **Recordkeeping:**

(A) **ECS Operation and Maintenance Records:** On each day that an ECS is used to comply with any provision of this rule, an owner and/or operator

shall make a permanent record of the operating parameters of the key systems described in the O&M Plan. For each day or period in which the O&M Plan requires that maintenance be performed, a permanent record shall be made of the maintenance actions taken, within 24 hours of maintenance completion. An explanation shall be entered for scheduled maintenance that is not performed during the period designated in the O&M Plan.

(B) Other Records Required when Complying via ECS: An owner and/or operator using an ECS pursuant to this rule shall maintain, in addition to the records required by Section 501.1 of this rule, daily documentation showing the VOC content of the solvent material and the amount added for makeup.

(4) Test Methods for Determining Emission Control System Compliance: Test methods and compliance procedures for an ECS are in Section 502 of this rule.