

REGULATION III – CONTROL OF AIR CONTAMINANTS

**RULE 337
GRAPHIC ARTS**

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

**RULE 337
GRAPHIC ARTS**

SECTION 100 – GENERAL

101 PURPOSE: To limit the emissions of volatile organic compounds (VOCs) to the ambient air from graphic arts operations.

102 APPLICABILITY: This rule applies to all VOC-containing materials associated with graphic arts operations. This includes, but is not limited to the prepress and press operations; and the cleaning materials and processes associated with such operations.

103 EXEMPTIONS:

103.1 Total Categorical Exemptions: This rule does not apply to the following operations:

- a. Circuitry printing and other associated printing performed for labeling, logo, or identification purposes on a printed circuit, its substrate, its immediate covering, or its immediate encapsulant by a circuitry printer.
- b. Coating applications that are considered coating operations but are not performed in association with a printing operation.
- c. Printing conducted on office and personal printers such as ink jet, bubble jet, and laser printers.

103.2 Partial Exemptions: Sections 302.1, 303.1, 304.1 and 305.1(a) of this rule do not apply to any graphic arts operation whose total VOC emissions from all graphic arts and related coating operations prior to control are less than 25 tons per calendar year and 4,200 pounds per month. Except as otherwise directed by air pollution permit, any graphic arts operation that becomes subject to the provisions of Section 302.1 of this rule by exceeding either the monthly or yearly threshold amounts shall remain subject to these provisions even if monthly or annual emissions later fall back below these thresholds. The following are exempt from the VOC limitations of this rule but shall comply with the work practices listed in

Section 306 of this rule and the recordkeeping requirements in Section 502.5 of this rule. For the purpose of determining exemptions, VOC substrate retention factors of not more than 20% (for heatset inks) or 95% (for non-heatset inks) shall be applied.

- a. Graphic arts operations, including surface preparation and cleanup solvents, which do not exceed a threshold limit of 225 pounds (100 kg) of VOC per month before controls.
- b. Any radiation-cured inks and coatings.
- c. Any digital printing operation.

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 ADHESIVE** – A material applied for the primary purpose of bonding two surfaces together by surface attachments. Adhesives may be used to facilitate the attachment of two surfaces or substances in varying degrees of permanence.
- 202 ALCOHOL** – A volatile organic compound – such as isopropanol, normal-propanol, or ethanol – of alkane structure consisting of fewer than six carbon atoms and having a single OH⁻ (hydroxyl) group and no other non-alkane attachments.
- 203 ALCOHOL SUBSTITUTE** – A wetting agent, used to replace some or all of the alcohol in fountain solutions, and usually containing volatile organic compounds such as glycols and glycol ethers.
- 204 BATCH** – A supply of fountain solution or cleaning solution that is prepared and used without alteration until completely used or removed from the printing process. For the purpose of this rule, this term may apply to solutions prepared in either discrete solutions or solutions that are continuously blended with automatic mixing units.
- 205 CIRCUITRY PRINTING** – Any graphic arts operation which either uses ink(s) with specific electrical properties to print an electrical circuit, or prints a circuit pattern that is made into an electrical circuit through further processing.
- 206 CLEANING SOLUTION** – Any liquid, including automatic blanket and roller wash system or manual blanket wash and roller wash, used to remove ink and debris from the operating surfaces of a printing press or from any of the attached parts of a press.
- 207 DIGITAL PRINTING** – A method of printing that does not use a physical master, stencils or plates but uses an electronic output device to transfer variable data, in the form of an image, from a computer to a variety of substrates. Digital printing methods include,

but are not limited to, inkjet printing, electrophotographic printing, dye sublimation printing, thermal wax printing and solid ink printing.

- 208 EMISSION CONTROL SYSTEM (ECS)** – A system for reducing emissions of organic compounds, consisting of both collection and control devices that are approved in writing by the Control Officer and are designed and that are operated in accordance with good engineering practice.
- 209 EXTREME PERFORMANCE** – An ink or coating used in screen printing on a non-porous substrate that is designed to resist or withstand either of the following:
- 209.1** More than two years of outdoor exposure; or
 - 209.2** Exposure to industrial-grade chemicals, solvents, acids, detergents, oil products, cosmetics, temperatures exceeding 170 °F, vacuum-forming, embossing or molding.
- 210 FLEXOGRAPHIC PRINTING** – The application of words, designs or pictures by a roll-printing technique in which the image-carrying surface is raised above the surface of the printing roll and the image carrier is made of flexible rubber or other elastomeric material. The image is transferred to the substrate through first applying ink to a smooth roller which in turn transfers the ink onto the raised pattern of the rubber or elastomeric image carrier fastened around a second roller, which then transfers the ink onto the substrate.
- 211 FOUNTAIN SOLUTION** – The solution applied to the image plate to maintain the hydrophilic properties of the non-image areas, and to keep the non-image areas free from ink.
- 212 GRAPHIC ARTS** – All printing processes including but not limited to digital, screen, gravure, letterpress, flexographic and lithographic printing processes, including related coating and laminating processes.
- 213 GRAPHIC ARTS COATING** – A relatively unbroken layer of material applied onto or impregnated into a substrate. A material applied after the application of inks to the substrate that serves to enhance or protect the printed substrate and includes graphic arts varnish, water-based, or radiation-cured formulation of resins, solvents, cosolvents and other additives. Equipment capable of both coating and printing is considered a “printing operation” for this rule. Coating applications that are not performed in association with a printing operation are considered coating operations and not “graphic arts operations.”
- 214 GRAPHIC ARTS MATERIAL** – Any ink, varnish, coating or adhesive, including added thinner or retarder, used in printing or related coating or laminating processes.

- 215 GRAPHIC ARTS OPERATION** – All the graphic arts processes and activities which are located on one or more contiguous or adjacent properties and are under the control of the same person (or persons under common control).
- 216 GRAVURE PRINTING** – An intaglio process in which ink is carried in minute, etched, or engraved wells on a roll or cylinder. Images are transferred onto a substrate through first applying ink to the etched roll or cylinder, wiping the lands between the cells free of ink with a doctor blade, and rolling the cylinder over the substrate so that the surface of the substrate is pressed into the cells, transferring the ink onto the substrate.
- 217 HEATSET** – A lithographic web printing process where heat is used to evaporate ink oils from the printing ink.
- 218 LETTERPRESS PRINTING** – A method in which the image area is raised relative to the non-image area and the ink is transferred to the paper directly from the image surface.
- 219 LITHOGRAPHIC PRINTING** – A planographic method of printing where the image and non-image areas of the printing plate are chemically differentiated; the image area is oil-receptive and the non-image area is water-receptive. This method differs from other printing methods, where the image is on a raised or recessed surface.
- 220 NON-HEATSET** – A lithographic printing process where the printing inks are set by absorption or oxidation of the ink oils. For the purpose of this rule, use of an infrared heater or printing conducted using radiation-cured inks is considered non-heatset.
- 221 NON-POROUS SUBSTRATE** – Any substrate whose surface prevents penetration by water.
- 222 OFFSET LITHOGRAPHIC PRINTING** – A planographic method of printing in which the image and non-image areas are on the same plane and the ink is transferred from a plate to an intermediary surface, typically a rubber blanket, which in turn transfers the image to the substrate. “Offset lithographic printing” includes the application of overprint coatings.
- 223 OVERALL CONTROL EFFICIENCY** – The overall control efficiency of an ECS is determined by multiplying the ECS efficiency by the destruction efficiency of the control device expressed as a percentage.
- 224 POROUS SUBSTRATE** – A substrate whose surface does not prevent penetration by water.
- 225 PRINTING OPERATION** – An operation that imparts color, design, pattern, alphabet or numerals onto a substrate. It differs from coating in that its principal intent is to accomplish such visual/spatial outcome(s) rather than for other purposes commonly accomplished by using coatings.

- 226 PRINTING INK** – A fluid or viscous formulation used in printing, impressing or transferring an image onto a substrate.
- 227 RADIATION-CURED INKS AND COATINGS** – A printing ink or graphic arts coating that dries by polymerization reaction by ultraviolet or electron beam radiation.
- 228 SCREEN PRINTING** – A process of passing printing ink through a screen (a taut web or fabric) to make an imprint on a substrate. A refined form of stencil has been applied to the screen such that the stencil openings determine the form and dimensions of the imprint.
- 229 SHEET-FED** – A lithographic printing process in which individual sheets of substrate are fed to the press sequentially.
- 230 SOLVENT** – Organic compounds that are used as diluents, thinners, dissolvers, viscosity reducers, cleaning agents or for a similar purpose.
- 231 SPECIAL PURPOSE** – Printing or coating on polyethylene, polyester and foil substrates for food packaging, health care products, fertilizer bags, or liquid-tight containers.
- 232 VAPOR PRESSURE** – The pressure exerted at a uniform temperature by the gas of a substance when the gas is in equilibrium with the liquid (or solid) phase of that substance.
- 233 VOC VAPOR PRESSURE (VOC COMPOSITE PARTIAL PRESSURE)** –The sum of the partial pressures of the compounds defined as VOCs, calculated according to the formula in Section 503.4 of this rule.
- 234 VOC-CONTAINING MATERIAL** – Any chemical or item that contains an organic compound that participates in atmospheric photochemical reactions, except the non-precursor organic compounds. “VOC-containing material” includes but is not limited to rags, waste coatings, waste brushes, waste rollers, waste applicators, waste solvents, and their residues are used in the surface preparation, cleanup, or removal of inks and surface coatings associated with graphic arts operations.
- 235 WEB** – A continuous substrate capable of being rolled at any point during the coating process.

SECTION 300 – STANDARDS

- 301 MANUFACTURERS AND SUPPLIERS:** A person selling, offering for sale, supplying for use, or manufacturing for sale within Maricopa County any VOC-containing material for use in graphic arts operations shall provide a material safety data sheet (MSDS) or product data sheet showing the material name, manufacturer's name, specific mixing instructions (if applicable) and VOC content as supplied. The VOC content requirement does not apply to radiation-cured inks and coatings.

302 LITHOGRAPHIC AND LETTERPRESS OPERATIONS: VOC emissions from all lithographic and letterpress operations are limited to the following:

302.1 Materials: An owner or operator of a lithographic press or letterpress shall limit VOC emissions from inks, varnishes, coatings, or adhesives, as applied, to less than or equal to 2.5 pounds per gallon (lbs/gal) (300 grams per liter [g/l]), less water and non-precursor organic compound unless VOC emissions are controlled by an ECS as described in Section 302.4 of this rule. In addition, the owner or operator shall follow the work practices described in Section 306 of this rule.

302.2 Fountain Solution: An owner or operator of a lithographic printing press shall limit the combined total volume of alcohol, alcohol substitute, and any other VOC in each fountain solution source to the percentages specified in Table 337–1.

Table 337–1. Maximum VOC Content in Percent by Weight (as Applied) for Fountain Solutions for Lithographic Printing.

Press Type	Maximum VOC Content for:		
	Fountain Solutions Containing Alcohol	Fountain Solutions Containing Alcohol Refrigerated at or Below 60 °F (15.5 °C)	Fountain Solutions Containing Alcohol Substitutes
Heatset Web			
– Prior to Jan. 12, 2012:	5.0 %	8.5 %	5%
– On or after Jan. 12, 2012:	1.6%	3.0%	5%
Sheet-Fed	5%	8.5%	5%
Cold-Set Web	None	None	5%

302.3 Cleaning Solutions: An owner or operator of a lithographic printing press or letterpress shall reduce VOC emissions from cleaning solutions by following the work practices described in Section 306 of this rule and one of the following:

- a. Use cleaning materials with a VOC composite vapor pressure less than 10 mm Hg at 20 °C; or
- b. Use cleaning materials containing less than 70 weight percent VOC.

302.4 Emission Control System (ECS):

- a. The VOC material limits of Section 302.1 of this rule do not apply when emissions of VOC to the atmosphere from the lithographic or letterpress printing operations are controlled by an ECS that meets one of the requirements listed in Table 337–2; and

- b. The dryer pressure shall be maintained lower than the press room air pressure such that air flows into the dryer at all times when the press is operating.

Table 337–2. Minimum ECS Control Efficiencies for Lithographic and Letterpress Printing Operations.

ECS Installation Date	Minimum Control Efficiency
ECS installed prior to January 12, 2011	90 percent by weight control efficiency for VOC emissions from the dryer exhaust vent.
ECS installed on or after January 12, 2011	95 percent by weight control efficiency for VOC emissions from the dryer exhaust vent
Any installation date	Concentration at or below 20 ppmv as hexane on a dry basis, as measured at the dryer exhaust vent.

302.5 Operation and Maintenance (O&M) Plan: The owner or operator of an ECS used to meet the requirements of this rule shall comply with the requirements in Section 307 of this rule.

303 ROTOGRAVURE AND FLEXOGRAPHIC OPERATIONS:

303.1 Inks, Coatings and Adhesives: The owner or operator of rotogravure or flexographic press shall limit VOC emissions from inks, coatings, and adhesives as listed in Table 337–3 or by an ECS as described in Section 303.3 of this rule. In addition, the owner or operator shall follow the work practices described in Section 306 of this rule.

Table 337–3. Maximum VOC Emissions for Materials Used in Rotogravure and Flexographic Operations.

Graphic Arts Material	Maximum VOC Emissions	
	lbs/gal	grams/liter
Ink	2.5	300
Flexographic Ink Porous Substrate:		
– Prior to Jan. 12, 2012	2.5	300
– On or after Jan. 12, 2012	1.9	225
Flexographic Ink Non-Porous Substrate	2.5	300
Coating	2.5	300
Adhesive:		
– Prior to Jan. 12, 2012	2.5	300
– On or after Jan. 12, 2012	1.25	150

303.2 Cleaning Solutions: An owner or operator of a rotogravure or flexographic press shall reduce VOC emissions from cleaning solutions by following the work practices as described in Section 306 of this rule.

303.3 Emission Control System (ECS): The limits of Section 303.1 of this rule do not apply when emissions of VOC to the atmosphere from the rotogravure or flexographic printing operations are controlled by an ECS that maintains a dryer pressure lower than the press room air pressure such that air flows into the dryer at all times when the press is operating. In addition, an ECS shall either:

- a. Meet one of the requirements listed in Table 337–4, or
- b. Reduce the VOC emissions from the dryer exhaust vent by at least 90 percent by weight, and maintain an overall capture and control efficiency of at least 65 percent by weight.

Table 337–4. Minimum ECS Efficiencies for Rotogravure and Flexographic Printing Operations.

Press and ECS Installation Dates	Minimum Overall Capture and Control Efficiency	Minimum Capture Efficiency	Minimum Control Efficiency
Press installed prior to March 14, 1995 and controlled by an add-on ECS installed prior to January 12, 2011	65 %	75 %	90 %
Press installed prior to March 14, 1995 and controlled by an add-on ECS installed on or after January 12, 2011	70 %	75 %	95 %
Press installed on or after March 14, 1995 and controlled by an add-on ECS whose first installation date was prior to January 12, 2011	75 %	85 %	90 %
Press installed on or after March 14, 1995 and controlled by an add-on ECS whose first installation date was on or after January 12, 2011	80 %	85 %	95 %

303.4 Operation and Maintenance (O&M) Plan: The owner or operator of an ECS used to meet the requirements of this rule shall comply with the requirements in Section 307 of this rule.

304 SCREEN PRINTING OPERATIONS:

304.1 An owner or operator of a screen printing operation shall limit the VOC emissions from screen printing inks, coatings and adhesives as listed in Table 337–5 or by an ECS as described in Section 304.3 of this rule. In addition, the owner or operator shall follow the work practices described in Section 306 of this rule.

Table 337–5. Maximum VOC Emissions for Screen Printing Inks, Coatings, and Adhesives.

Material	Maximum VOC Emissions	
	lbs/gal	grams/liter
Inks and Coatings	3.3	400
Adhesives	1.25	150
Special Purpose, Extreme Performance	6.7	800

304.2 Cleaning Solutions: An owner or operator of a screen printing press shall reduce VOC emissions from cleaning solutions by following the work practices as described in Section 306 of this rule.

304.3 Emission Control System (ECS):

- a. The VOC material limits of Section 304.1 of this rule do not apply when emissions of VOC to the atmosphere from the lithographic or letterpress printing operations are controlled by an ECS that meets one of the requirements listed in Table 337–4; and
- b. The dryer pressure shall be maintained lower than the press room air pressure such that air flows into the dryer at all times when the press is operating.

304.4 Operation and Maintenance (O&M) Plan: The owner or operator of an ECS used to meet the requirements of this rule shall comply with the requirements in Section 307 of this rule.

305 OTHER GRAPHIC ARTS OPERATIONS NOT COVERED BY SECTIONS 302, 303, OR 304 OF THIS RULE:

305.1 Limits of VOC Emissions: Any graphics arts operation which emits 25 tons per calendar year and 4200 pounds per month of VOC from all graphic arts and related coating operations shall: The owner or operator of any graphic arts operation whose VOC emissions from all graphic arts and related coating operations prior to control are at least 25 tons per calendar year or 4,200 pounds per month shall follow the work practices described in Section 306 of this rule. In addition, the owner or operator shall:

- a. Limit the VOC emissions from inks, varnishes, coatings, or adhesives, as applied to 2.5 lb/gal (300 g/l); or

b. Install, operate and maintain an ECS that maintains a dryer pressure lower than the press room air pressure such that air flows into the dryer at all times when the press is operating. In addition, an ECS shall:

(1) Meet one of the requirements listed in Table 337–4; or

(2) Reduce the VOC emissions from the dryer exhaust vent by at least 90 percent by weight, and maintain a minimum overall capture and control efficiency of at least 65 percent by weight.

305.2 Cleaning Solutions: An owner or operator of a graphic arts printing press shall reduce VOC emissions from cleaning solutions by following the work practices as described in Section 306 of this rule.

305.3 Operation and Maintenance (O&M) Plan: The owner or operator of an ECS used to meet the requirements of this rule shall comply with the requirements in Section 307 of this rule.

306 WORK PRACTICES – STORAGE, HANDLING AND DISPOSAL OF VOC-CONTAINING MATERIAL: For the purpose of this rule, “in use” is the active application of contents to a substrate by pouring, siphoning, brushing, rolling, padding, wiping or other methods. For the purpose of this rule, “containers” include but are not limited to drums, buckets, cans, pails, and trays. An owner or operator of any graphic arts printing operation shall store, handle, and dispose of VOCs or VOC-containing material in a way to prevent the evaporation of VOCs to the atmosphere. Work practices limiting VOC emissions include but are not limited to the following:

306.1 Labeling of Containers: All containers that are 1 gallon or larger used for collection of VOC-containing material shall be clearly identified with their contents.

306.2 Use of VOC-Containing Materials: An owner or operator shall not leave containers of ink, coating, adhesive or fountain solution or any other VOC-containing material open when not in use.

306.3 Storage and Disposal: An owner or operator shall not use open containers for the storage or disposal of VOC-containing materials.

306.4 Minimization of Spills: An owner or operator shall implement procedures to minimize spills of any VOC-containing material during handling and transfer to and from containers, enclosed systems, waste receptacles and other equipment.

306.5 Conveyance of VOC-Containing Materials: All VOC-containing materials including VOC-containing cleaning materials shall be conveyed from one location to another in labeled, closed containers or pipes.

307 OPERATION AND MAINTENANCE (O&M) PLAN REQUIREMENTS FOR AIR POLLUTION CONTROL EQUIPMENT AND APPROVED EMISSION CONTROL SYSTEMS (ECS): An owner, operator, or person subject to this rule must provide, properly install and maintain in calibration, in good working order, and in operation air pollution control equipment required by this rule.

307.1 An owner, operator, or person subject to this rule must provide and maintain readily available on-site at all times (an) O&M Plan(s) for any ECS and any ECS monitoring devices that are used under this rule or an air pollution control permit.

307.2 An owner, operator, or person subject to this rule must submit to the Control Officer for review every O&M Plan(s) for any ECS including any ECS monitoring device that is used under this rule or required under an air pollution control permit.

307.3 An owner, operator, or person subject to this rule operating an ECS must install, maintain, and accurately calibrate monitoring devices described in the O&M Plan(s) including, but not limited to, monitoring devices that measure pressure differentials and other operating conditions necessary to determine if control devices are functioning properly.

307.4 An owner, operator, or person who is required to have an O&M Plan for any ECS including any ECS monitoring devices must fully comply with all elements of an O&M Plan(s) including, but not limited to every action, schedule, and condition identified in each O&M Plan.

307.5 An O&M Plan for any ECS including any ECS monitoring devices must include all of the following information:

- a. ECS equipment manufacturer,
- b. ECS equipment model,
- c. ECS equipment identification number or identifier that owner, operator, or person subject to this rule assigns to such ECS equipment when the manufacturer's equipment identification number is unknown, and
- d. Information required by Section 502.4 of this rule.

307.6 The owner, operator, or person subject to this rule, who receives a written notice from the Control Officer that the O&M Plan is deficient or inadequate, must make written revisions to the O&M Plan for any ECS including any ECS monitoring devices and must submit such revised O&M Plan to the Control Officer within five working days of receipt of the Control Officer's written notice, unless such time period is extended by the Control Officer, upon written request, for good

cause. During the time that such owner, operator, or person subject to this rule is preparing revisions to the O&M Plan, such owner, operator, or person must still comply with all requirements of this rule.

SECTION 400 – ADMINISTRATIVE REQUIREMENTS

401 COMPLIANCE SCHEDULE: An owner or operator who chooses to, or is required to, comply with the new emission limits by installing or increasing the efficiency of an ECS under Section 302.4, 303.3, 304.3, or 305.1 of this rule, shall meet the following milestones:

401.1 Submit a compliance plan, by April 12, 2011, or within three (3) months of becoming subject to the rule, to the Control Officer for approval which describes the method(s) used to achieve full compliance with the rule. The compliance plan shall specify dates for completing increments of progress, such as the contractual arrival date of new control equipment. The Control Officer may require an owner or operator submitting the compliance plan to also submit subsequent reports on progress in achieving compliance; and

401.2 Attain full compliance with all of the standards in this rule by January 12, 2012, or within twelve (12) months of becoming subject to the rule.

SECTION 500 – MONITORING AND RECORDS

501 PROVIDING AND MAINTAINING MONITORING DEVICES:

501.1 ECS Monitoring Device(s): An owner or operator of an ECS pursuant to this rule shall install, maintain, and calibrate monitoring devices described in an O&M Plan. The monitoring devices shall measure temperatures, pressures, rates of flow, or other operating conditions necessary to determine if air pollution control equipment is functioning properly. Each ECS that is operated in compliance with this rule shall be equipped with monitoring device(s) capable of demonstrating that the ECS is operating in a manner that assures compliance with this rule. The monitoring device(s) shall be installed, calibrated, maintained, and operated according to their manufacturers' instructions and the O&M Plan.

501.2 Monitoring Fountain Solution:

a. An owner or operator of any graphic arts operation shall determine the VOC concentration of each fountain solution source containing any alcohol with a refractometer, a hydrometer, or conductivity meter. The instrument shall:

(1) Have a visual readout (analog or digital) with an accuracy of ± 2 percent of the instrument's full scale, or ± 0.5 percent absolute (such as for meter readings given in percent); and

(2) Be installed, calibrated, maintained, and operated according to the manufacturer's instructions and the O&M Plan.

- b. The temperature of a refrigerated fountain solution shall be determined by the use of a temperature monitoring device. Each temperature monitoring device used for the purpose of this section shall be calibrated and accurate to ± 0.5 °F.

502 RECORDKEEPING AND REPORTING: An owner, operator or person subject to this rule shall comply with the recordkeeping and reporting requirements of this section. Records can consist of but are not limited to purchase orders, invoices, receipts, usage records, MSDS, and hazardous wastes manifests. Any records required by this rule shall be retained for five (5) years and be made available to the Control Officer upon request. Records may be kept in either electronic or paper format.

502.1 Current Materials List: The owner or operator of a graphic arts operation shall maintain a current list of inks, coatings, adhesives, fountain-solution alcohol(s) and alcohol substitutes, thinners, cleaners, and any other VOC-containing materials used that includes at a minimum:

- a. **Material Name:** Record the name/code/manufacturer and the appropriate material type category of inks, coatings, adhesives, fountain-solution alcohol(s) and alcohol substitutes, thinners, cleaning solutions, and any other VOC-containing materials used in the graphic arts processes; and
- b. **VOC Content:** The VOC content of each material listed as pounds of VOC per gallon or grams of VOC per liter; and
- c. **Product Data Sheet:** Specific mixing instructions and the VOC content as applied for products requiring dilution.
- d. **VOC Vapor Pressure:** For each cleaning solution, list the VOC composite vapor pressure (VP) at 20 °C (68 °F) by providing one of the following:
 - (1) A current manufacturer's technical data sheet listing vapor pressure; or
 - (2) A current manufacturer's safety data sheet (MSDS) listing vapor pressure; or
 - (3) Actual vapor pressure test results.

502.2 Material Usage Records for Graphic Arts Materials and Cleaning Solutions: The owner or operator shall update records showing the type and amount consumed of each graphic-arts ink, varnish, coating, adhesive, fountain solution, blanket wash, and all other cleaning solutions from all graphic arts and related coating operations prior to any control according to one of the following schedules:

- a. **Any Graphic Arts Operation Whose Total VOC Emissions From All Graphic Arts and Related Coating Operations Prior to Control are at Least 25 Tons Per Calendar Year or 4,200 Pounds Per Month:** The owner or operator shall maintain material usage records:
 - (1) Daily, if noncompliant materials are used in conjunction with an emissions control system; or
 - (2) Monthly, if the facility uses materials complying with the limits in Sections 302, 303, 304, or 305 of this rule, and each material served by a control device is identified as such.
- b. **Any Graphic Arts Operation Whose Total VOC Emissions From All Graphic Arts and Related Coating Operations Prior to Control are Less Than 25 Tons Per Calendar Year or 4,200 Pounds Per Month:** The owner or operator shall maintain material usage records monthly.

502.3 Fountain Solutions:

a. Alcohol-Containing Fountain Solutions:

- (1) **Daily:** An owner or operator shall record the temperature of the refrigerated alcohol solution.
- (2) **Weekly:** An owner or operator shall:
 - (a) Record the percentage of VOC for each different batch of fountain solution containing alcohol; and
 - (b) Maintain a record of the names and the most current mixing ratio for each different batch of all alcohol, alcohol-substitutes, and water used in making each fountain solution for that source.

b. Fountain Solutions Containing Alcohol Substitutes:

- (1) **Monthly:** An owner or operator shall:
 - (a) Record the mixing ratio of all alcohol-substitutes to water, for each fountain solution source on a press which never uses alcohol; and
 - (b) Maintain a current list of the names of all fountain solutions used that contain alcohol-substitutes.

502.4 ECS Recordkeeping Requirements: The owner or operator of the facility shall document the installation, maintenance, and calibration of ECS monitoring devices described in an O&M Plan in the following manner:

- a. **Initial Installation:** Make a permanent record of the date of installation of the ECS.
- b. **Daily:** Make a permanent record of the operating parameters of the key systems as required by the O&M Plan. If the ECS was not operational due to equipment malfunction or not being used at any time during the day, record this fact in the permanent record; and
- c. Within 24 hours of a completed scheduled routine maintenance, make a permanent record of the maintenance actions taken for each day or period in which the O&M Plan requires that maintenance be done; or
- d. Enter an explanation for scheduled maintenance that is not performed during the period designated for it in the O&M Plan.

502.5 Facilities Claiming an Exemption: The owner or operator claiming an exemption under Section 103 of this rule shall document the quantity of VOC materials used and keep sufficient records of the basis of such calculations to justify the exemption status.

503 COMPLIANCE DETERMINATION – TEST METHODS: An exceedance of the limits established in this rule determined by any of the applicable test methods constitutes a violation of this rule. The EPA test methods, ASTM International (ASTM) standards and other documents as they exist in the Code of Federal Regulations (CFR) as listed below, are adopted and incorporated by reference in Appendix G of the Maricopa County Air Pollution Control Regulations. These documents are available Maricopa County Air Quality Department, 1001 N. Central Ave., Phoenix, AZ 85004; or by calling (602) 506-0169 for information. ASTM standards are also available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428, or from its website at www.astm.org.

503.1 VOC Content of Materials:

- a. The VOC content of graphic arts materials regulated by Sections 302, 303, 304 or 305 of this rule shall be determined using one of the following:
 - (1) EPA Reference Method 24 – Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings, 40 CFR 60, Appendix A-7; or
 - (2) EPA Reference Method 24A – Determination of Volatile Matter Content and Density of Publication Rotogravure Inks and Related Publication Rotogravure Coatings, 40 CFR 60, Appendix A-7; or

- (3) A material safety data sheet (MSDS) or product data sheet showing the material name and VOC content as applied.
- b. Calculation of the VOC content of fountain solutions shall place the entire volume of the sample in the denominator, e.g., including water, alcohol, non-precursors, and all other solutes, such that the entire volume of the sample is included in the calculations.
- c. Any hydrometer used for the purpose of this section shall be accurate within ± 2 percent of the meter's full scale or ± 0.5 percent absolute (such as for meter readings given in percent) and be calibrated using one of the following methods:
 - (1) ASTM E100 – 10 Standard Specification for ASTM Hydrometers.
 - (2) ASTM E126 – 05a Standard Test Method for Inspection, Calibration, and Verification of ASTM Hydrometers.
 - (3) A standard solution for the type of alcohol used in the fountain solution. The department is defining a standard solution as any solution that has a precisely known concentration.

503.2 Determining the Temperature of a Refrigerated Fountain Solution: The temperature of a refrigerated fountain solution shall be determined by the use of a temperature monitoring device. Each temperature monitoring device used for the purpose of this section shall be accurate to ± 0.5 °F and calibrated by one of the following methods:

- a. ASTM standards (ASTM E1-07 Standard Specification for ASTM Liquid-in-Glass Thermometers); or
- b. National Institute of Standards and Technology (NIST) traceable calibration certificate; or
- c. Manufacturer's recommended method of calibration.

503.3 Emission Testing:

- a. Capture and control efficiency of an emissions control device shall be determined according to:
 - (1) "Guidelines for Determining Capture Efficiency", January 9, 1995, Candace Sorrell, Source Characterization Group A, Office of Air Quality Planning and Standards, US EPA.

- (2) EPA Reference Method 204 – Criteria for and Verification of a Permanent or Temporary Total Enclosure, 40 CFR 51, Appendix M; or applicable Subparts 204A, 204B, 204C or 204D.
- (3) EPA Reference Method 18 – Measurement of Gaseous Organic Compound Emissions by Gas Chromatography, 40 CFR 60, Appendix A–6.
- (4) EPA Reference Method 25 – Determination of Total Gaseous Non-methane Organic Emissions as Carbon, 40 CFR 60, Appendix A–7; or applicable Subparts 25A or 25B.

503.4 Vapor Pressure: The total composite partial vapor pressure of all VOCs in a solution shall be determined by one of the following methods:

- a. ASTM D2879-97(2007) Standard Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope; or
- b. Calculations using certified data from a laboratory or manufacturer revealing the exact formulation; or
- c. A Material Safety Data Sheet (MSDS) or product data sheet showing the material name and VOC vapor pressure; or
- d. Calculating VOC composite partial vapor pressure as follows:

$$PP_c = \frac{\sum_{i=1}^n \frac{(W_i)(VP_i)}{MW_i}}{\frac{W_w}{MW_w} + \sum_{c=1}^n \frac{W_c}{MW_c} + \sum_{i=1}^n \frac{W_i}{MW_i}}$$

Where:

- W_i = Weight of the “*i*”th VOC compound, in grams
- W_w = Weight of water, in grams
- W_c = Weight of exempt compound, in grams
- MW_i = Molecular weight of the “*i*”th VOC compound, in g/g-mol
- MW_w = Molecular weight of water, in g/g-mol
- MW_c = Molecular weight of exempt compound, in g/g-mol
- PP_c = VOC composite partial vapor pressure at 20 °C, in mm Hg
- VP_i = Vapor pressure of the “*i*”th VOC compound at 20 °C, in mm Hg