

NOTICE OF FINAL RULEMAKING
MARICOPA COUNTY AIR POLLUTION CONTROL REGULATIONS
REGULATION III – CONTROL OF AIR CONTAMINANTS

PREAMBLE

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| <u>1.</u> | <u>Rule affected</u>
Rule 337: Graphic Arts | <u>Rulemaking action</u>
Amend |
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| <u>2.</u> | <u>Statutory authority for the rulemaking:</u>
Authorizing statutes: A.R.S. §§ 49-474, 49-479, and 49-480
Implementing statute: A.R.S. § 49-112 | |
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| <u>3.</u> | <u>The effective date of the rule:</u>
August 17, 2011 | |
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| <u>4.</u> | <u>List of all previous notices appearing in the Register addressing the rulemaking:</u>
Notice of Rulemaking Docket Opening: 17 A.A.R. 627, April 22, 2011
Notice of Proposed Rulemaking: 17 A.A.R. 627, April 22, 2011
Notice of Public Information: 17 A.A.R. 702, April 29, 2011 | |
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| <u>5.</u> | <u>The name and address of department personnel with whom persons may communicate regarding the rulemaking:</u>
Name: Cheri Dale
Address: Planning and Analysis Division
Maricopa County Air Quality Department
1001 N. Central Ave., Suite 595
Phoenix, AZ 85004
Telephone: (602) 506-0169
Fax: (602) 506-6179
E-mail: aqplanning@mail.maricopa.gov | |
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| <u>6.</u> | <u>An explanation of the rule, including the department’s reasons for initiating the rulemaking:</u>
The Maricopa County Air Quality Department regulates emissions of volatile organic compounds (VOCs) from graphic arts operations through Maricopa County Air Pollution Control Regulation III, Rule 337 (Graphic Arts). “Graphic arts” include, but are not limited to, any digital, screen, gravure, letterpress, flexographic and lithographic printing process, including any related coating and laminating processes. Rule 337 is an industry-specific rule designed to limit emissions of VOCs to the ambient air from the use of inks, coatings, adhesives, fountain solutions, and cleaning materials from graphic arts operations. | |
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The Maricopa County Board of Supervisors adopted a revised version of Rule 337 (Graphic Arts) on January 12, 2011 (17 A.A.R. 324, March 4, 2011). Thereafter, it was discovered that certain technical corrections (described below) were required.

Background:

The department made technical corrections to the rule adopted by the Maricopa County Board of Supervisors on January 12, 2011. These technical corrections did not change either the standards established by Rule 337, or the level of health protection provided to the community. In addition, the department clarified language describing the applicability of certain compliance standards.

Description of Amendments:

- Corrected the formula used to calculate VOC composite partial vapor pressure. The formula found in Section 503.4 of the previous rule did not take into account materials that contained multiple exempt component compounds. Only by considering all of the exempt compounds in a material, can a graphic arts operation accurately calculate the composite partial vapor pressure of a material. The department amended the formula to include a summation symbol in front of the second term in the denominator.
- Amended Section 503.2 to refer to a temperature “monitoring” device rather than a temperature “control” device. The amendment made the language in Section 503.2 of the rule consistent with that in Section 501.2(b) requiring the use of a “temperature monitoring device.”
- Amended Section 502.4(b) to read “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.” In the Notice of Final Rulemaking (17 A.A.R. 324, March 4, 2011), the department stated that Section 502.4(b) would be amended to reflect a comment received from the printing industry. However, through a clerical error, the amended language was not incorporated into the text of the rule adopted by the Board on January 12, 2011.
- Amended Section 305.1(a) to clarify that the intent of the section is to limit VOC emissions and not VOC content of a material. The amendment clarified that the use of a substrate retention factor can be applied when calculating emissions, as is provided in Section 103.2 of the rule.
- Amended Sections 103.2 and 502.2 to improve clarity.
- Corrected any typographical or other clerical errors; made minor grammatical changes to improve readability or clarity; modified the format, numbering, order, capitalization, punctuation, or syntax of certain text to increase standardization within and among rules; made various other minor changes of a purely editorial nature. As these changes did not alter the sense, meaning, or effect of the rule, they were not described in detail here, but are readily discerned in the “strikeout and underline” version of the rule contained in Item 17 of this notice.

7. Demonstration of compliance with A.R.S. § 49-112:

When authorized by law, a county may adopt a rule, ordinance, or other regulation that is more stringent than or in addition to a provision of this title or rule adopted by the director or any board or commission authorized to adopt rules pursuant to this title if all the following conditions are met:

- a. The rule, ordinance or other regulation is necessary to address a peculiar local condition.
- b. There is credible evidence that the rule, ordinance or other regulation is either:
 - (1) Necessary to prevent a significant threat to public health or the environment that results from a peculiar local condition and is technically and economically feasible, or
 - (2) Required under a federal statute or regulation, or authorized pursuant to an intergovernmental agreement with the federal government to enforce federal statutes or regulations if the county rule, ordinance, or other regulation is equivalent to federal statutes or regulations.

This rulemaking made technical corrections to the text of the rule adopted by the Board of Supervisors on January 12, 2011. The Notice of Final Rulemaking (17 A.A.R. 324, March 4, 2011) contains detailed information demonstrating the rule's compliance with A.R.S. § 49-112.

8. A reference to any study relevant to the rule that the department reviewed and either proposes to rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:

This rulemaking made technical corrections to the text of the rule adopted by the Board of Supervisors on January 12, 2011. The Notice of Final Rulemaking (17 A.A.R. 324, March 4, 2011) contains detailed information concerning the studies referenced in that rulemaking.

9. A showing of good cause why the rule is necessary to promote a statewide interest if the rule will diminish a previous grant of authority of a political subdivision:

Not applicable.

10. Summary of the economic, small business, and consumer impact:

The entities potentially affected by the rule revisions are lithographic, letterpress, rotogravure, flexographic, screen printing operations and any other graphic arts operations. Maricopa County is the implementing government entity for the proposed rule. These technical corrections did not change the standards established by the rule or the level of health protection provided. The Notice of Final Rulemaking (17 A.A.R. 324, March 4, 2011) contains detailed information concerning the economic, small business, and consumer impact of that rulemaking.

11. Name and address of department personnel with whom persons may communicate regarding the accuracy of the economic, small business, and consumer impact statement:

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12. Description of the changes between the proposed rules, including supplemental notices and final rules:

Since the notice of proposed rulemaking was published on April 22, 2011, (17 A.A.R. 627) and April 29, 2011 (17 A.A.R. 702), the department made the following additional amendments:

- **Section 103.1.b:** Revised the wording to read “Coating applications that are considered coating operations but are not performed in association with a printing operation.” to improve the clarity.
- **Section 302.1:** Re-inserted the phrase “less water and non-precursor organic compound” to clarify that water and non-precursor organic compounds are not included when determining the VOC content of materials applicable to this section.
- **Section 401.1:** Deleted the wording “(3 months after date of rule adoption)” that was inadvertently left unchanged in the Notice of Final Rulemaking (17 A.A.R. 353, March 4, 2011). Inserted the applicability date of April 12, 2011, which was three months after the date of the January 12, 2011, rule adoption.
- **Section 401.2:** Deleted the wording “(12 months after date of rule adoption)” that was inadvertently left unchanged in the Notice of Final Rulemaking (17 A.A.R. 353, March 4, 2011). Inserted the applicability date of January 12, 2012 which is 12 months after the date of the January 12, 2011, rule adoption.
- **Section 503:** Changed the organizational name of the “American Society for Testing and Materials” (ASTM) to “ASTM International” to reflect the current official name of the organization; and changed the wording “ASTM methods” to “ASTM standards.”
- **Section 503.1(c)(1):** Updated the ASTM standard from ASTM E100 – 05 Standard Specification for ASTM Hydrometers to the currently active standard, ASTM E100 – 10 Standard Specification for ASTM Hydrometers.
- **Section 503.1.a:** Corrected the appendix number for the EPA Reference from “Appendix A” to “Appendix A-7.”
- **Section 503.3.a(3):** Corrected the appendix number for the EPA Reference from “Appendix A” to “Appendix A-6.”
- **Section 503.3.a(4):** Corrected the appendix number for the EPA Reference from “Appendix A” to “Appendix A-7.”
- **Section 503.4(d):** Corrected the formula of VOC composite partial vapor pressure by deleting the summation sign from in front of the entire formula; inserted a summation sign in the numerator;

inserted a summation sign for the second term of the denominator; and changed the “ $i=1$ ” to “ $c=1$ ” because the summation is of the exempt compounds and not the summation of all the compounds. The original formula has a diagonal line through it to indicate a strikeout. The corrected formula is directly below the diagonal struck-out formula.

13. A summary of the comments made regarding the rule and the department response to them:

The department did not conduct any public workshops during the technical revision rulemaking process. No oral proceeding was requested prior to 5:00 pm, May 23, 2011. After the publication of the Notice of Proposed Rulemaking in the Arizona Administrative Register (17 A.A.R. 627, April 22, 2011), the department received formal comments on May 10, 2011, from one stakeholder, the Printing Industries of Arizona/New Mexico (PIAZ/NM).

Formal comments submitted to the department are summarized below. A copy of the complete text of the submitted comments can be obtained by contacting the department as indicated in Item 5 of this document. The department’s responses to the submitted comments to Rule 337 (Graphic Arts) are included below:

Comment #1 re: Section 103.2(a) Applicability: It is unclear how the Department determined that the 225 pounds per month is equivalent to the previous exemption, which is based on press size. In its previous comments, PIAZ/NM requested that the applicability threshold be set at 3 tons of actual VOC emissions per 12 month rolling period, which is consistent with the 2006 CTG. PIAZ/NM demonstrated in a March 22, 2010 supplemental letter submitted by Gary Jones of Printing Industries of America that a 3 ton per year or 500 pound per month threshold is more stringent than the previous exemption for presses with less than 2 units or 500 square inches. Therefore, PIAZ/NM respectfully repeats the request to change the exemption from 225 pounds per month to 500 pounds per month. This limit is stricter than the exemption in the previous rule at 306.2 (b).

Response #1: Rule 337 was re-opened to address technical corrections. Please refer to the Notice of Final Rulemaking (17 A.A.R. 324, March 4, 2011) response #3 for details concerning this comment.

Comment #2 re: Section 302.1 Lithographic and Letterpress Operations: PIAZ/NM supports the Department in the changes made to clarify this Section, but the removal of the phrase “less water and non-precursor organic compound” does not serve that purpose. Water and non-precursor organic compounds should not be included in the 2.5 lbs/gal VOC limit for inks, varnishes, coatings, or adhesives. These items do not contribute to ozone formation. The Department needs to make it clear that when assessing the VOC content of these materials, water and non-precursor organic compounds are not included.

Response #2: The department re-inserted the phrase “less water and non-precursor organic compound” to clarify that water and non-precursor organic compounds are not included when determining the VOC content of materials applicable to this section.

Comment #3 re: Table 337-2 ECS Control Efficiencies for Lithographic and Letterpress Printing

Operations: In the Department's response to PIAZ/NM's August 18, 2010 comment letter, it indicated that the previous rule does not allow for any exemptions from the 90% destruction efficiency of ECS systems used in the graphic arts. However, the recently approved rule created a 95% destruction efficiency requirement that is more stringent for presses installed after the rule becomes effective. Since the CTG recommends exemptions for heatset web presses that are less than 22 inches in width or are used to print books, the rule can and should allow for an exemption from the more stringent 95% destruction efficiency requirement for such presses. These presses would still be subject to the 90% destruction efficiency as required by the previous rule.

Response #3: Rule 337 was re-opened to address technical corrections. Please refer to the Notice of Final Rulemaking (17 A.A.R. 324, March 4, 2011) response #17 for details concerning this comment.

Comment #4 re: Section 306 Work Practices – Storage Handling and Disposal of VOC-Containing

Material: PIAZ/NM is concerned about the extent to which the Maricopa County Graphic Arts rule Section 306 Work Practices is applied. Significant penalties were issued for alleged violations that are impractical and inconsistent with the intent of the Section 306's requirements. As such, there are several changes that are needed in order to present practical work practices that prevent overly burdensome requirements which provide for little or no reduction of VOC emissions. PIAZ/NM requests:

- An exemption for empty containers that once contained a VOC-containing material, even if there is residual material remaining in the container.
- The adoption or reference of the definition of an "empty" container as defined by RCRA in 40 CFR 261.7.
- Recognizing floating lids as an approved cover for a container.
- An exemption from work practices for lithographic inks and materials with a vapor pressure below 0.1 mmHg at 20°C.

Response #4: Rule 337 was re-opened to address technical corrections. At this time, the department is addressing only the technical corrections to Rule 337. However, the department will note PIAZ/NM's concern regarding defining "empty containers" and will consider the issue in future rulemakings.

Comment #5 re: Section 502.2 Material Usage Records for Graphic Arts Materials and Cleaning

Solutions: PIAZ/NM appreciates the changes made to Sections 502.2 (a) and (b), as they greatly improve the clarity of the requirements of this section. However, PIAZ/NM would like to reiterate our concern that daily recordkeeping poses a significant and unacceptable administrative burden, is virtually impossible to achieve, and produces extremely inaccurate results.

Response #5: Rule 337 was re-opened to address technical corrections. Please refer to the Notice of Final Rulemaking (17 A.A.R. 324, March 4, 2011) response #28 for details concerning this comment.

Comment #6 re: Section 503.3 Emission Testing: In the Department's response to comments, it disagreed with modifying an approved EPA testing method. However, in the model rule, which EPA has found to be consistent with the CTG, EPA has acknowledged and approved the following modifications for the printing industry. Section 503.3 needs to be modified to clarify the conditions in which compliance tests need to be conducted.

Response #6: Rule 337 was re-opened to address technical corrections. Please refer to the Notice of Final Rulemaking (17 A.A.R. 324, March 4, 2011) responses # 34 and #35.

Comment #7 re: Additional Calculation Information: The Department explained in its response to comments that the material use information provided by PIAZ/NM was rejected because it allowed for further exemptions not included in the previous rule. PIAZ/NM appreciates that the department may not make the rule less stringent than the previous rule. The inclusion of material use factors commensurate with the emission threshold as an alternative would not make the rule less stringent and in fact, would in fact provide a level of conservatism that makes the material use approach more stringent than the current emission limits. Therefore, PIAZ/NM repeats its request for the inclusion of material use factors, based on the existing limits and exemptions in the current rule.

Response #7: Please refer to the Notice of Final Rulemaking (17 A.A.R. 324, March 4, 2011) response nos. 7, 13, 14 and 27 for details concerning this comment.

14. Any other matters prescribed by the statute that are applicable to the specific department or to any specific rule or class of rules:

Not applicable

15. Incorporations by reference and their location in the rules:

EPA Reference Methods, ASTM International (ASTM) standards and other documents incorporated by reference in Rule 337:

Section 503.1:

- Method 24 – Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings.
- Method 24A – Determination of Volatile Matter Content and Density of Publication Rotogravure Inks and Related Publication Rotogravure Coatings.
- ASTM E100 – 10 Standard Specifications for ASTM Hydrometers.
- ASTM E126 – 05a Standard Test Method for Inspection, Calibration, and Verification of ASTM Hydrometers.

Section 503.2:

- ASTM E1 – 07 Standard Specifications for ASTM Liquid-in-Glass Thermometers.

Section 503.3:

- "Guidelines for Determining Capture Efficiency" January 9, 1995, Candace Sorrell, Source Characterization Group A, Office of Air Quality Planning and Standards, US EPA.
- EPA Reference Method 18 – Measurement of Gaseous Organic Compound Emissions by Gas Chromatography, 40 CFR 60, Appendix A–6.
- EPA Reference Method 25 – Determination of Total Gaseous Nonmethane Organic Emissions as Carbon, 40 CFR 60, Appendix A–7; or applicable Subparts 25A, or 25B.
- 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.

Section 503.4:

- ASTM D2879 – 97(2007) Standard Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope.

16. Was this rule previously an emergency rule?

No

17. The full text of the rule follows:

REGULATION III – CONTROL OF AIR CONTAMINANTS

**RULE 337
GRAPHIC ARTS**

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Adopted 04/06/92
Revised 04/03/96
Revised 11/20/96
Revised 01/12/11
Revised 08/17/11

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 that are not performed in association with a printing operation, ~~and that are considered coating operations are not graphic arts printing operations.~~
- 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. For the purpose of determining exemptions, the following substrate retention factors shall be applied: 20% retention of the VOC content of heatset inks and 95% retention of the VOC content of non-heatset inks. 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. ~~The total emissions from graphic~~ Graphic arts operations, including surface preparation and cleanup solvent, ~~does not that 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.

- d. ~~Sections 302.1, 303.1, 304.1 and 305.1(a) of this rule do not apply to any graphic arts operation which emits less than the threshold amounts of 25 tons (22,680 kg) per calendar year and 4,200 pounds (1,909 kg) per month of VOC from all graphic arts and related coating operations prior to control. 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 amount shall remain subject to these provisions even if monthly or annual emissions later fall below the thresholds.~~

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, electro-photographic 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 ~~which 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 ~~any 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 ~~are~~ not “graphic arts ~~printing~~ operations”.
- 214 GRAPHIC ARTS OPERATION MATERIAL** – ~~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).~~ Any ink, varnish, coating or adhesive, including added thinner or retarder, used in printing or related coating or laminating processes.

- 215 **GRAPHIC ARTS MATERIAL OPERATION** – Any ink, varnish, coating or adhesive, including added thinner or retarder, used in printing or related coating or laminating processes. 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 the 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, solvers, 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. ~~This~~ “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, ~~and by following~~ In addition, the owner or operator shall follow the work practices described in Section 306 of this rule.

302.2 Fountain Solution ~~VOC Limits:~~ 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 Limits by~~ Content in Percent by Weight (as Applied) for Fountain Solutions for Lithographic Printing.

Press Type	Maximum VOC limits 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 – <u>Prior to Jan. 12, 2012:</u>	Current: 5.0 %	Current: 8.5 %	5%
– <u>On or after Jan. 12, 2012:</u>	Effective Jan. 12, 2012: 1.6 %	Effective Jan. 12, 2012: 3.0%	
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.

<u>ECS Installation Date</u>	<u>Minimum Control Efficiency</u>
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	Maintain VOC emissions from the dryer exhaust vent at a concentration <u>Concentration</u> at or below 20 ppmv as hexane on a dry basis, <u>as measured at the dryer exhaust vent.</u>

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 and by following~~ the work practices described in Section 306 of this rule.

Table 337-3. Maximum VOC ~~Limits~~ Emissions for Materials Used in Rotogravure and Flexographic Operations.

<u>Graphic Arts Material</u>	<u>Maximum VOC Content Limit Emissions</u> less water and non-precursor organic compounds	
	<u>lbs/gal</u>	<u>grams/liter</u>
Ink	2.5	300
Flexographic Ink Porous Substrate: - Prior to Jan. 12, 2012 Effective January 12, 2012: - On or after Jan. 12, 2012	2.5	300
	1.9	225
Flexographic Ink Non-Porous Substrate	2.5	300
Coating	2.5	300
Adhesive: - Prior to Jan. 12, 2012 Effective January 12, 2012: - On or after Jan. 12, 2012	2.5	300
	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 ~~that~~ ~~meets~~ either:

- a. ~~Meet one~~ ~~One~~ of the requirements listed in Table 337–4, or
- b. ~~Reduces~~ 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; ~~and~~
- c. ~~Maintains the dryer pressure lower than the press room air pressure such that air flows into the dryer at all times when the press is operating.~~

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

Press and ECS Installation Dates	<u>Minimum</u> Overall Capture and Control Efficiency	<u>Minimum</u> Capture Efficiency	<u>Minimum</u> 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 ~~and by following~~ the work practices described in Section 306 of this rule.

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

Material	<u>Maximum Pounds of VOC Emissions per gallon</u> (grams/liter) less water and non-precursor organic compounds	
	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, AND 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 content emissions from inks, varnishes, coatings, or adhesives, as applied to of 2.5 pounds per gallon lb/gal (300 grams per liter g/l), less water and non-precursor organic compounds;~~ 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: that meets either:~~
 - (1) Meet one of the requirements listed in Table 337-4; or
 - (2) ~~reduces~~ Reduce the VOC emissions from the dryer exhaust vent by at least 90 percent by weight, and ~~an~~ maintain a minimum overall capture and control efficiency of at least 65 percent by weight; ~~and:~~
 - (3) ~~Maintain the dryer pressure lower than the press room air pressure such that air flows into the dryer at all times when the press is operating.~~

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 manufacturer's equipment identification number is unknown, and
 - d. Information required by Section 502.4 of this rule. ~~(This is the recordkeeping section of the 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 ~~(3 months after date of rule adoption)~~ 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 ~~(12 months after date of rule adoption)~~ 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 ~~of~~ 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.

~~**a. Daily Material Usage Records for Sources Emitting 25 Tons or More:** Daily, an owner or operator of a graphic arts facility shall update usage records of materials specified in Section 502.2 of this rule if facility wide such facility uses noncompliant coating in conjunction with an emissions control system; or~~

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.

~~**b. Monthly Material Usage Records for Sources Emitting 25 Tons or More:** Monthly, an owner or operator of a graphic arts facility shall update usage records of materials specified in Section 502.2 of this rule if facility wide such facility emits 25 tons or more of VOC emissions per calendar year or 4200 pounds or more of VOC emissions per month from all graphic arts and related coating operations prior to any control and:~~

- ~~(1) The facility uses materials complying with the limits in Sections 302, 303, 304 or 305 of this rule; and~~
- ~~(2) Each material served by a control device is identified as such.~~

~~**c. Monthly Material Usage Records for Sources Emitting Less Than 25 Tons:** Monthly an owner or operator of a graphic arts facility shall update the usage records of materials specified in Section 502.2 of this rule, if facility wide, such facility emits less than 25 tons of VOC emissions per calendar year or less than 4200 pounds of VOC emissions per month from all graphic arts and related coating operations prior to any control.~~

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

~~(3)~~(b) Maintain a ~~weekly~~ 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~~ Record the mixing ratio of all alcohol-substitutes to water, for each fountain solution source on a press which never uses alcohol; and

~~(2)~~(b) Maintain a current list of the names of all fountain solutions used that contain ~~containing~~ 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 ~~and the American Society for Testing and Materials (ASTM)~~ 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 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 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 – ~~05~~ 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 ~~control~~ monitoring device. Each temperature ~~control~~ 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 ~~requirements~~ 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 ~~AA~~-6.

- (4) EPA Reference Method 25 – Determination of Total Gaseous Nonmethane Organic Emissions as Carbon, 40 CFR 60, Appendix ~~AA-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 Isotenoscope; 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
- e.d.** Calculating VOC composite partial vapor pressure as follows:

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

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

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 (~~68°F~~), in mm Hg

VP_i = Vapor pressure of the “i”th VOC compound at 20 °C (~~68°F~~), in mm Hg

- ~~d. A material safety data sheet (MSDS) or product data sheet showing the material name and VOC vapor pressure.~~