

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

PREAMBLE

- 1. Rule affected** **Rulemaking action**
Rule 337 Amend

- 2. Statutory authority for the rulemaking:**
Authorizing statutes: A.R.S. §§ 49-474, 49-479, and 49-480
Implementing statute: A.R.S. § 49-112

- 3. List of all previous notices appearing in the register addressing the proposed rule:**
Notice of Rulemaking Docket Opening: 15 A.A.R. 1860, November 6, 2009.

- 4. The name and address of department personnel with whom persons may communicate regarding the rulemaking:**
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- 5. An explanation of the rule, including the department’s reasons for initiating the rulemaking:**
Summary: The Maricopa County Air Quality Department (department) regulates emissions of volatile organic compounds (VOCs) from graphic arts operations through Maricopa County Air Pollution Control Regulation III, Rule 337: Graphic Arts. Rule 337 is an industry-specific rule whose purpose is to limit emissions of VOCs to the ambient air from the use of inks, coatings, adhesives, fountain solutions, and cleaning materials at graphic arts operations. This rule applies to all VOC-containing materials associated with graphic arts operations involving the preparation, handling, mixing and application of VOC-containing materials. The processes include, but are not limited to, the prepress and press operations; the cleaning materials; and any other processes associated with a graphic arts operation.

The department is proposing amendments to the current rule to include reasonably achievable control technology (RACT) recommendations from the recently issued United States Environmental Protection

Agency (EPA) Control Techniques Guidelines (CTGs) for graphic arts operations. Specifically, the department is proposing to: expand the definition of “graphic arts” to include digital printing; establish control efficiencies of 90% for an emission control system (ECS) installed before the effective date of this rule revision and 95% for ECS’s installed thereafter; and determine rule applicability by defining a VOC emission limit, rather than using a press size limit.

The department also proposes other revisions such as: addition, revision or deletion of certain terms defined in Section 200; defining rule applicability in Section 300 by type of graphic arts operation (vs. by materials used) in the entire industry; addition of a “best work practices” section (proposed Section 306); correcting and updating other provisions including modifications to recordkeeping requirements (Section 502) and test methods (Section 503) that would facilitate compliance verification and enhance the enforceability of the rule.

The proposed amendments to Rule 337 are not expected to impact the graphic arts industry in a negative way. Maricopa County Emissions Inventory data from 1999, 2001 and 2004 indicate a downward trend in VOC emissions per employee in the graphic arts industry. This downward trend in VOC emission intensity can be attributed to graphic arts process changes such as the use of low-VOC inks, alcohol substitute fountain solutions and the industry movement towards digital printing processes. The proposed ECS efficiencies and VOC-content limits are expected to have little impact on graphic arts operations within the county because these existing processes can already comply with these requirements.

Background:

Section 183(e) of the Clean Air Act (CAA) requires the EPA to regulate categories of products that account for at least 80% of VOC emissions from consumer and commercial products in areas that violate the national ambient air quality standard (NAAQS) for ozone. The EPA promulgates regulations applicable to manufacturers, processors, distributors or importers of solvents, materials or products supplied to the customer or industry. By law, the EPA cannot directly regulate end users of products, but can issue a CTG recommending RACT measures for the end users of consumer or commercial products. The EPA defines RACT as “the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.” (44 FR 53761, September 17, 1979). A CTG is intended to provide state and local air pollution control authority’s information to assist in determining RACT to reduce VOC emissions in ozone nonattainment areas (971FR58747, October 5, 2010).

In 2004, the EPA designated over 98% of Maricopa County as an 8-hour ozone nonattainment area (69 FR 23858, April 30, 2004). On June 14, 2005, the EPA [70 FR 34362] redesignated the Phoenix metropolitan area to attainment of the 1-hour ozone NAAQS and approved the attainment demonstration and maintenance plan showing maintenance of the 1-hour ozone NAAQS through 2015. The NAAQS 1-hour ozone standard was revoked by EPA effective June 15, 2005, under the anti-backsliding provisions of the

Clean Air Act (CAA), Sections 110(1) and 193. However, certain control measures developed and implemented for the 1-hour NAAQS were required to remain in place to ensure continued progress toward attainment of the 8-hour NAAQS. In addition, EPA strengthened the air quality standards for ground-level ozone by reducing the ozone standard from 0.84 ppm to 0.075 ppm to improve public health protection (73 FR 16436; March 27, 2008).

Clean Air Act Section 172(c)(1) provides that State Implementation Plans (SIPs) for nonattainment areas include reasonably available control measures (RACM) including RACT for sources of emissions. Section 182(b)(2)(A) provides that for certain nonattainment areas, states revise their SIPs to include RACT for each category of VOC sources covered by a CTG document issued between November 15, 1990 and the date of attainment.

Revisions to Maricopa County Regulation III, Rule 337: Graphic Arts, are necessary to meet the SIP requirements; ensure continued progress toward attainment of the 1-hour and 8-hour ozone NAAQS; and to meet the minimum CTG RACT recommendations issued by the EPA (71 FR 58745, October 5, 2006) in CTG for Flexible Package Printing (EPA 453/R-06-003, September 2006) and CTG for Offset Lithographic Printing and Letterpress Printing (EPA 453/R-06-002, September 2006).

In September 2008, the department began the graphic arts rulemaking process. Public workshops and conference calls with stakeholders were conducted. To date, the department has received written comments from four different stakeholders regarding the proposed rulemaking. The issues that have been raised and discussed during this rulemaking process can be categorized as follows:

- Clarification of definitions in relationship to graphic arts processes.
- Rule applicability.
- Fountain solution monitoring and recordkeeping.
- Recordkeeping requirements.
- Options for cleaning solutions.

Each of these issues is described in further detail below. Following that discussion is a list of specific amendments being proposed to Rule 337.

Issues Raised and Discussed During This Rulemaking Process:

Clarification of definitions in relationship to graphic arts processes: One commenter requested the addition and revision of several definitions. As a result of the department review, 17 definitions were added and seven definitions were revised.

Rule applicability:

- a. Two commenter's requested a total exemption be included for "office and personal" copiers and printers. Both commenter's expressed concerns that the proposed recordkeeping requirements for this type of equipment were unreasonable.

A review of the material safety data sheets for three different brands of inkjet printer inks indicated the inks had a specific gravity between 1.0 and 1.2. The capacity of an inkjet cartridge was typically 10 to 15 ml for personal printers, but up to 350 ml for an inkjet printer plotter cartridge. Volatile fraction by weight for inks ranged from 3% to over 70%. Assume a quantity of one gallon of inkjet ink weighs 10 pounds per gallon (weight of water as 8.3454 multiplied by specific gravity of inkjet ink as 1.2). Using a volatile fraction by weight percentages of 3% and 70%, the VOC weight of the inkjet ink would be range between 0.3 to 7 pounds per gallon. Using a retention factor of 95%, the VOC emissions would range between 0.015 and 0.35 pounds per gallon of inkjet ink. Assuming a larger quantity of personal printers are used compared to printer plotters, approximately 720 ink cartridges (15 ml capacity) would have to be consumed to emit the equivalent of one pound VOC. The department considers this a de minimus amount.

Due to the de minimus amount of VOC emissions from these sources, no emission controls are recommended in the CTG or in other agency rules concerning the regulation of office and personal printer inks at this time. Maintaining records of the purchase and use of the business and personal printer cartridges use does nothing to contribute to the overall reduction of VOCs. The intent of the department is not to create a burden to small businesses by including office and personal copiers and printers as graphic arts operations. To clarify this position, the department added a total exemption for office and personal copiers and printers in (proposed) Section 103.3.

- b. The department was requested to establish exemptions for fountain solutions reservoirs one gallon or less; press sizes of 11x17 or less; lithographic printing operations with actual annual VOC emissions of less than 3 tons per year (tpy); any letterpress or heatset web offset press less than 22 inches; and letterpress or heatset web offset presses used to print books. In addition, the commenter cited material use factors approved by EPA to allow printers to track material usage instead of actual emissions to determine exemption status. The material usage exemptions proposed by the commenter were 768 gallons annual use of cleaning solvent and fountain solution for sheet-fed and non-heatset web presses. For heatset web presses, an annual material use threshold of 5,400 pounds of ink, cleaning solvent, and fountain solution additives was proposed by the commenter.

In a separate comment, the department was requested to increase the rule applicability threshold to 3 tpy of VOC emissions to be consistent with the 2006 CTG for Offset Lithography and Letterpress. Per the commenter, the 3 tpy threshold was established by EPA to prevent overregulation of very small businesses and provide consistency in the CTGs across many industries, including printing. A 3 tpy threshold equates into a monthly emission threshold of 500 pounds VOC.

The existing Rule 337, Section 306.2(b) totally exempts “Any printing operation in which no printing press has over two units, and the combined impression area of all presses together does not exceed 500 square inches...”. Press size was used in the rule to provide an easier method of determining rule applicability for small operations. In March, 2010, the Printing Industries of America (PIA) provided calculations using EPA’s model plant and nominal press material use and emission factors for a 2-unit, 500 square-inch impression size press (G. Jones, Printing Industries of America, Mar. 22, 2010, personal communication.) The emissions were estimated to be 3.99 tpy for coldset presses and 79.63 tpy for heatset presses. Both of these emissions exceed the threshold of 3 tpy recommended by the CTG for Offset Lithography and Letterpress. The proposed rulemaking removes the press size exemption and applies a VOC emission threshold.

In an EPA memorandum, Potential to Emit (PTE) Guidance for Specific Source Categories, April 14, 1998, Table 3 Guidance for Printing, Publishing and Packaging Operations, a VOC material usage of 1,425 gallons for cleaning solvent and fountain solution additives was equated to 10 tpy emissions. Using the ratio of 1,425 gallons to 10 tpy emissions, the commenter’s proposed threshold limits would equate to approximately:

- (1) Sheetfed 768 gallons = approximately 5.4 tpy.
- (2) Non-heatset Web 768 gallons = approximately 5.4 tpy.
- (3) Heat-set web 5,400 pounds = approximately 2.7 tpy before controls.

The threshold limits suggested by the commenter are also greater than current Rule 337 press size limit of 500 square inches emission as calculated by the PIA. The commenter’s suggested limits would thus make the proposed rule less stringent than the current rule. When a proposed rule is less stringent than the current rule, it is considered as “backsliding” by the EPA. As backsliding is not permitted under the anti-backsliding provisions of the Clean Air Act, Sections 110(1) and 193, therefore the change was not made.

- c. A commenter requested a separate provision that allows the use of adhesives that contain greater than 2.5 pounds VOC per gallon, and suggested a total limit of 110 gallons over a consecutive 12-month period.

The existing rule includes the commenter’s proposed 110-gallon exemption in the overall total emissions from the graphic arts operation. This VOC limit does not apply to any graphic arts operation emitting less than the threshold amounts of 25 tpy (22,680 kg/year) and 4200 pounds (1909 kg) per month of VOC from all graphic arts and related coating operations prior to control. The existing rule limits VOC content of material equal to or less than 2.5 pounds per gallon (300 grams per liter), less water and non-precursor organic compounds after the thresholds have been met. Any further exemption would be considered backsliding by the EPA, therefore the change was not made.

Fountain solution monitoring and recordkeeping:

A commenter requested an allowance for a printer to use a thermometer to measure the temperature of the fountain solution once per day and record the results in a log. This approach is recognized by EPA in the CTG for Offset Lithography and Letterpress and was reflected in the model rule, as verified by the department.

Existing Rule 337 requires weekly monitoring of fountain solution containing alcohol using a refractometer, a hydrometer or a conductivity meter. Log sheets must include a weekly entry of the results of an instrument reading. The proposed amendments include a requirement for daily temperature monitoring and recording of data for refrigerated fountain solutions. The use of thermometers for fountain solutions measurement is proposed to be added in the test method section.

Recordkeeping requirements:

One commenter requested that monthly threshold values be calculated on a 12-month rolling or annual monthly average for smaller operations.

The existing rule requires monthly recordkeeping and does not allow for exceptions with respect to the capacity of the operation. A change from monthly recordkeeping to annual monthly average or rolling 12-month average would be considered backsliding by the EPA, therefore the change was not made.

Options for cleaning solutions:

One commenter requested additional alternatives to the VOC composite vapor pressure limit for cleaning solutions.

Alternatives are proposed in Section 302.4, Cleaning Materials. Two options are provided: the use of cleaning solutions with a VOC composite vapor pressure less than 10 mm Hg at 20°C, or the use of cleaning materials containing less than 70 percent VOC by weight.

Description of Proposed Amendments

The amendments being proposed for Rule 337 can be categorized as follows:

- To add new Section 102, Applicability.
- To add new Section 103, Exemptions.
- To add, revise, or delete various definitions in Section 200.
- To revise Section 300 to specify rule requirements for specific types of graphic arts operations.
- To update the compliance schedule in Section 400.
- To revise the monitoring, recordkeeping and test methods in Section 500.
- To correct typographical or other clerical errors throughout the document.

To add new Section 102, Applicability:

The department is proposing to add that the rule is applicable to all VOC-containing materials associated with graphic arts operations.

To add new Section 103, Exemptions:

The department is proposing to add a new Section 103 to clarify total and partial exemptions in the general section (Section 100) of the rule instead in the body of the rule. The proposal is to move the exemptions currently in Section 306 to the beginning of the rule (Section 100). Two additional total categorical exemptions are also proposed to be added. One total categorical exemption proposed is for coating applications not performed in association with printing operations. The second categorical exemption proposed is for office and personal printers.

Partial exemptions proposed in this new section include the requirement of a graphic arts operation to comply with the proposed work practices in new Section 306 and the recordkeeping requirements in new Section 502.5. Additional proposed revisions include identifying retention factors to be used for calculating VOC content of inks; partial exemption of graphic arts operations not exceeding 250 pounds of VOC emissions per month and partial exemptions for any radiation-cured inks and coatings. The exemption for graphic arts operations emitting less than the threshold amount of 25 tpy is proposed to be moved in its entirety from existing Section 306.1 to this new section.

To add, revise and delete definitions in Section 200:

The department is proposing to add 17 definitions, revise seven definitions and delete seven definitions to improve the clarity and applicability of the rule. The definitions proposed to be added are: adhesive, batch, digital printing, extreme performance ink/coating, fountain solution, heatset, non-heatset, non-porous substrate, offset lithographic printing, overall control efficiency, porous substrate, radiation-cured inks and coatings, sheet-fed, solvent, specialty coating, VOC-containing material, and web. The definitions proposed to be revised are: flexographic printing, graphic arts, graphic arts coating, gravure printing, lithographic printing, vapor pressure, and VOC composite vapor pressure. The definitions proposed to be deleted from the rule are: coating, graphic arts varnish, lamination, non-precursor organic compound, units per printing press, volatile organic compound, and web-feed.

To revise Section 300 to specify rule requirements for specific types of graphic arts operations:

The department is proposing to revise Section 300 by reorganizing the standards to delineate the various printing processes to improve clarity and applicability in the rule. Proposed revisions include:

- **Section 301** to apply to manufacturers and suppliers of graphic arts materials. The requirements are comparable to the requirements in Section 304 of the present rule. An additional requirement of providing mixing instructions and material VOC content is also proposed.
- **Section 302** would apply specifically for lithographic and letterpress graphic arts operations. The proposed revisions include VOC limits for the following: materials used; fountain

solutions; and cleaning solutions. Requirements for work practices described in (proposed) Section 306; emission control system (ECS) limits; and Operation and Maintenance (O&M) plan requirements are also proposed to be included.

- **Section 303** to apply to rotogravure and flexographic operations that include material VOC content limits; requirements to follow work practices described in (proposed) Section 306 when using cleaning solutions; ECS limits; and O&M Plan requirements. Proposed ECS requirements in (new) Table 337-4 that specify overall capture and control efficiencies, capture efficiencies and control efficiencies for ECS equipment installed before or after specific dates.
- **Section 304** to apply to screen print operations that include material VOC content limits and requirements to follow work practices described in (proposed) Section 306 when using cleaning solutions.
- **Section 305** to apply to any other types of graphic arts operations not specifically listed elsewhere in the rule. The proposed section will include material VOC content limits, requirements to follow work practices described in (proposed) Section 306 when using cleaning solutions; and O&M plan requirements.
- **Section 306** to apply to work practices. The proposed changes would clarify requirements for labeling of containers; use of VOC-containing materials; storage and disposal; add language concerning clean up of spills; and add language on the conveyance of VOC-containing materials.
- **Section 307** to apply to the requirements of an O&M plan. The proposed changes include listing out the general requirements of an O&M Plan; the approval process; and the process of revising and modifying an O&M Plan.

To update the compliance schedule in Section 400:

The department proposes changes in this section to remove the effective date of the rule because the date has already passed. A compliance schedule for graphic arts operations that are required to come into compliance with Rule 337 is also proposed.

To revise the monitoring, recordkeeping and test methods in Section 500: Proposed revisions include:

- **Section 501:** The department proposes to divide Section 501 into separate sections, one for the ECS device and one for the fountain solution systems. This will clarify the requirements for each device.
- **Section 502:** The department proposes to clarify the recordkeeping requirements for current materials, usage records, fountain solutions and ECSs by separating out each group of

records. In addition, the department listed some, but is not limiting, types of acceptable records. The department is proposing that the records are allowed to be maintained in either electronic or paper format. (New) Section 502.5 is proposed to specify recordkeeping requirements for the owner or operator claiming an exemption under (proposed) Section 103.

- **Section 503:** The department proposes to include the full title of each reference method referenced in the text and incorporate by reference additional EPA Reference Methods. In addition, the proposed amendments will also correct typographical or other clerical errors; make minor grammatical changes to improve readability or clarity; modify the format, numbering, order, capitalization, punctuation, or syntax of certain text to increase standardization within and among rules; or make various other minor changes of a purely editorial nature. As these changes do not alter the sense, meaning, or effect of the rule, they are not described in detail here, but can be readily discerned in the “strikeout and underline” version of the rule contained in Item 14 of this notice.

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

A.R.S. § 49-112(A)

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.
 - (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.

Revisions to Maricopa County Regulation III, Rule 337: Graphic Arts are necessary to address the EPA-designated (69 FR 23858, April 30, 2004) 8-hour ozone nonattainment area within Maricopa County. On June 14, 2005, EPA [70 FR 34362] redesignated the Phoenix metropolitan area to attainment of the 1-hour ozone NAAQS and approved the attainment demonstration and maintenance plan showing maintenance of the 1-hour ozone National Ambient Air Quality Standards (NAAQS) through 2015. The 1-hour ozone NAAQS was revoked by EPA effective June 15, 2005, under the anti-backsliding provisions of the Clean Air Act, Sections 110(1) and 193. However, certain control measures developed and implemented for the 1-hour NAAQS were required to remain in place to ensure continued progress toward attainment of the 8-hour NAAQS. In addition, EPA strengthened the air quality standards for ground-level ozone by reducing the ozone level from 0.84 ppm to 0.075 ppm to improve public health protection (73 FR 16436; March 27,

2008). Rule 337 meets A.R.S. § 49-112(A)(1), demonstrating the rule is necessary to address a peculiar local condition, in that Maricopa County fails to meet the 8-Hour NAAQS for ozone.

Revisions to Maricopa County Regulation III, Rule 337: Graphic Arts, are necessary to meet the SIP requirements; ensure continued progress toward attainment of the 1-hour and 8-hour ozone NAAQS; and to meet the minimum RACT. Section 182(b)(2)(A) of the Clean Air Act provides that for certain nonattainment areas, states revise their SIPs to include RACT for each category of VOC sources covered by a CTG document issued between November 15, 1990 and the date of attainment. A notice of final determination and availability of final CTGs was issued by the EPA (71 FR 58745, October 5, 2006.) This notice included two CTGs relating to graphic arts: CTG for Flexible Package Printing (EPA 453/R-06-003, September 2006) and the CTG for Offset Lithographic Printing and Letterpress Printing (EPA 453/R-06-002, September 2006). Rule 337 meets the requirements of A.R.S. § 49-112(A)(2)(b), in that Maricopa County is required by federal law to revise current rules to address RACT for the graphic arts industry.

The department affirms that Rule 337 Graphic Arts meets the requirements of A.R.S. § 49-112 (A)(1) and A.R.S. § 49-112 (A)(2).

7. 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:

The following documents were referenced by the department during this revision;

US EPA's "CTG" Guidance's:

"Control Techniques Guidelines for Paper, Film and Foil Coatings," Rep. EPA 453/R-07-003. US EPA, Office of Air Quality Planning and Standards, September 2007. Internet address: http://www.epa.gov/ttn/caaa/t1/ctg/20070928_paper_film_ctg.pdf

"Control Techniques Guidelines for Offset Lithographic Printing and Letterpress Printing," EPA-453/R-06-002, September 2006. Internet address: http://www.epa.gov/ttncaaa1/t1/ctg/litho_print_ctg_092906.pdf

"Control Techniques Guidelines for Flexible Package Printing," EPA 453/R-06-003, September 2006. Internet address: http://pubweb.epa.gov/ttn/oarpg/t1/ctg/flex_pack_print_ctg_092906.pdf

"National Emission Standards for the Printing and Publishing Industry Paper and Other Web Coating." 40 CFR 63, Subpart JJJJ. December 4, 2002. Internet address: <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&rgn=div6&view=text&node=40:12.0.1.1.1.17&idno=40>

U.S. Environmental Protection Agency. National Emission Standards for Hazardous Air Pollutants:

Printing and Publishing Industry NESHAP (40 CFR 63, Subpart KK). Internet address:

<http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=ff2846d70a9b1e68603ced4a15531ea0&rgn=div6&view=text&node=40:10.0.1.1.1.11&idno=40>

MAG, 2007. Eight-Hour Ozone Plan for the Maricopa Nonattainment Area. Maricopa Association of Governments, Phoenix, AZ, June 2007. Internet address:

http://www.mag.maricopa.gov/pdf/cms.resource/ES_2007_8-HourOzonePlan.pdf

MCAQD, 2008. 2005 Periodic Emissions Inventory for Ozone Precursors for the Maricopa County, Arizona, Nonattainment Area. Emissions Inventory Unit, Maricopa County Air Quality Department, Phoenix, AZ. Sept. 2008. Internet address:

http://www.maricopa.gov/aq/divisions/planning_analysis/docs/2005_Ozone/Ozone%202005PEI%20entire%20rpt%20w%20appendices.pdf

MCESD, 2004. 2002 Periodic Emissions Inventory for Ozone Precursors for the Maricopa County, Arizona, Nonattainment Area. Emissions Inventory Unit, Maricopa County Environmental Services Department, Phoenix, AZ. June 2004. Internet address:

http://www.maricopa.gov/aq/divisions/planning_analysis/docs/02OzoneChap3-Area.pdf

MCESD, 2002. 1999 Periodic Ozone Emissions Inventory for the Maricopa County, Arizona, Nonattainment Area. Emissions Inventory Unit, Maricopa County Environmental Services Department, Phoenix, AZ. Revised August 2002. Internet address:

http://www.maricopa.gov/aq/divisions/planning_analysis/docs/2005_Ozone/2005%20Ozone%20Chap%203.pdf

14 A.A.R. 2838-2839, July 18, 2008, Notice of Final Rulemaking Title 18. Environmental Quality Chapter 2. Department of Environmental Quality Air Pollution Control

http://www.azsos.gov/public_services/rulemakingmanual/section2.pdf

8. 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

9. The preliminary summary of the economic, small business, and consumer impact:

a. Rule Identification

This rulemaking is proposing to revise Rule 337: Graphic Arts.

b. Executive Summary

The entities potentially affected by the proposed rule revisions are lithographic, letterpress, rotogravure, flexographic, screen printing operations and any other graphic arts operations. Recent trends in graphic arts processes such as the use of low-VOC inks, alcohol substitute fountain solutions and the industry movement towards digital printing processes have already resulted in cost savings as well as reduced VOC emissions to the environment. The department expects the additional costs associated with the proposed increase in recordkeeping requirements, to be minimal.

Maricopa County is the implementing government entity for the proposed rule. No additional County inspectors are expected to be hired. The amount or frequency of inspections currently being conducted is not expected to increase or decrease due to this rule revision. The department does not expect an increase or decrease in revenue generated from these rule changes, as no additional graphic arts operations will be subject to this rule as a result of the proposed changes.

Maricopa County residents and businesses will benefit by decreased medical treatment costs, health related illness, and missed work days. Reducing the number of ozone-related illnesses results in a cost-benefit saving to individuals and business. Although Maricopa County cannot provide an estimate of how many individuals will experience fewer of the health related illness, staff maintains the benefits of this rulemaking will exceed any costs associated with this rulemaking.

c. Background

Clean Air Act (CAA) Section 172(c)(1) provides that SIPs for nonattainment areas include RACM that include RACT for sources of emissions. Section 182(b)(2)(A) provides that for certain nonattainment areas, states revise their SIPs to include RACT for each category of VOC sources covered by a CTG document issued between November 15, 1990 and the date of attainment.

A notice of final determination and availability of final CTGs was issued by the EPA (71 FR 58745, October 5, 2006.) This notice included two CTGs relating to graphic arts: CTG for Flexible Package Printing (EPA 453/R-06-003, September 2006) and the CTG for Offset Lithographic Printing and Letterpress Printing (EPA 453/R-06-002, September 2006). Maricopa County is proposing to amend Rule 337 include revisions recommended in these CTGs.

d. Entities Directly Affected

The entities that may be directly affected by the proposed rule revisions are lithographic, letterpress, rotogravure, flexographic, screen printing operations and any other graphic arts operations.

e. Potential Costs and Benefits

The department does not expect an increase or decrease in revenue generated from these rule changes.

Costs:

The Maricopa County Air Quality Department is funded by permit fees. Three types of operating permits are issued by the department: General Permit; Non-Title V Permit; and Title V Permit. Specific criteria is used to determine the type of permit issued to an operation. Over 70% of the graphic arts operations are issued a general. The general permit allows for streamlining the permitting process. The internal permit process time is reduced resulting in less expense to the source. The non-title V and title V permits typically apply to larger operations and require additional investigation when reviewing the permit application. The department does not anticipate an increase or decrease in the costs associated with the permitting process for this rule.

As of March 2010, approximately 107 facilities have been issued for graphic art operations within Maricopa County. No Title V permits are currently issued in Maricopa County for only graphic arts operations, although there are facilities that hold a Title V operating permit with graphic arts operations as a part of the overall facility operation. Approximately 37 non-Title V and synthetic minor permits have been issued to graphic arts operations; the remaining 70 facilities hold general permits. The department does not anticipate an increase or decrease in the number of graphic arts operations that would become subject to this rule due to the proposed changes.

Maricopa County will be the implementing government entity for Rule 337. No other significant impacts on public-sector employment of other agencies or political subdivisions of the state are anticipated. It is not expected to require the hiring of more County personnel to perform the task of inspecting a graphic arts operation according to Rule 337. The department does not anticipate the amount or frequency of inspections to increase or decrease the quantity of inspections currently being conducted by the department.

On December 4, 2002, the EPA issued National Emission Standards for Hazardous Air Pollutants: Paper and Other Web Coating (40 CFR Part 63, subpart JJJJ). Costs associated with compliance to the NESHAP were related to the use of thermal oxidizers to achieve a 95 percent HAP overall control. A 95-percent HAP emission reduction also achieves a 95-percent VOC emission reduction which is higher than the CTG recommended 90-percent emission reduction. The department assumes that all of the permitted facilities are already in compliance with the 2002 NESHAP through limited VOC product usage or the use of previously installed emissions capture and control system required by the current Maricopa County Rule 337. No Maricopa County graphic arts operation is projected to be required to install an emissions capture and control system due to this rulemaking and therefore would have no additional annual costs. Note: A graphic arts operation may be required to meet the requirement for installation of an emissions capture and control system if VOC emissions increased due to production changes not due to rule revisions.

EPA used the 2002 NESHAP model plant emissions to estimate the aggregate reduction in VOC emissions due to the use of thermal oxidizers. Estimated VOC emissions from facilities in ozone nonattainment areas are approximately 21,000 Mg/yr (23,100 tpy). Applying the 90-percent emission reduction to facilities located in ozone nonattainment yielded an emission reduction of approximately 18,900 Mg/yr (20,800 tpy). The cost effectiveness was estimated to be \$1,300 per Mg (\$1,200 per ton) of VOC (CTG for Paper, Film and Foil Coatings, EPA 453/R-07-003, September 2007).

In the 1993 draft CTG, EPA estimated baseline emissions from the offset lithographic printing industry in ozone nonattainment areas, based on 1990 data, to be 820,000 tpy (with 62,000 tpy coming from ink, 631,000 tpy from fountain solution and 126,000 tpy from cleaning). Based on limited data, EPA estimated the VOC emissions from the letterpress printing industry as of 1990 were about 28,000 tpy.

Because of the similarities between offset lithographic printing and letterpress printing in terms of the nature of the processes at issue, the sources of VOC emissions and available control approaches, EPA considered it reasonable to assume that the cost-effectiveness estimates for control of VOC from heatset inks and control of VOC from cleaning materials apply equally to the letterpress printing industry.

Maricopa County Emissions Inventory data from 1999, 2001 and 2004 indicate a downward trend in the quantity of VOC emissions reported from graphic arts operations. This trend is illustrated below in Table 1. This downward trend in VOC emissions is attributed, in part, to changes in the graphic arts process such as the use of low-VOC inks, alcohol substitute fountain solutions and the industry movement towards digital printing processes.

Table 1. Annual VOC Emissions from Graphic Arts Facilities in Maricopa County

Emission Inventory Year	Total VOC Emissions from Graphic Arts Operations	Pounds of VOC per Employee-yr
1999	348.43 tons per year	125.39 pounds
2002	460.58 tons per year	86.23 pounds
2005	208.71 tons per year	43.85 pounds

The cost effectiveness values for the recommended control approaches for offset lithographic and letterpress printing were estimated to be as follows: Control of VOC from heatset inks was estimated to be \$2,010 per ton VOC removed. Reduction in alcohol use or conversion to alcohol substitutes resulting in savings to the company. Control of VOC from cleaning materials was estimated to be \$855 per ton VOC removed. Due to the changes already made by graphic arts operations located within Maricopa County, the VOC reductions and the cost savings have already been realized.

EPA believes the work practice recommendations in the CTGs will result in a net cost savings. Implementing the work practices is expected to reduce the amount cleaning materials used by reducing the amount that evaporates and is wasted. Maricopa County has included the recommended work practices in the proposed rulemaking.

The proposed ECS efficiencies and VOC-containing material content are expected to have little impact on the graphic arts industry within the county due to the fact that the graphic arts owners or operators have already implemented some or all of the recommended processes for the graphic arts operations. The department expects the insignificant additional costs to regulated community from additional recordkeeping required for daily temperature monitoring of refrigerated fountain solutions.

Benefits:

Environmental regulations are promulgated to reduce the magnitude of the impact of pollutants on public health and the environment. In this case, Maricopa County expects the proposed rulemaking to help internalize the damages from VOC emissions which can be classified as a negative externality. When a person's actions impose uncompensated costs on another, it is called a negative externality. Damage occurs because people and businesses do not pay the true social costs for using resources, and the result is a malfunctioning market. From the society's perspective, externalities result in an undesirable level of pollution, namely, excess VOCs emitted from sources in Maricopa County.

Ozone, a metabolic poison and the main cause of eye irritation in photochemical smog, can cause or aggravate bronchitis, asthma, and other lung diseases. Ozone can result in minor restricted activity days, asthma emergency room visits, school absences, asthma attacks, and respiratory hospital emissions. The studies summarized below illustrate these ozone impacts (Hall et al., 2006).

Minor Restricted Activity Days. Minor restricted activity days (MRADs) represent days when various respiratory symptoms reduce normal activities, but not enough to prevent going to work or attending school. The combination of symptoms inducing an MRAD is more restrictive than any individual symptom.

The Ostro and Rothschild study (1989) used a national sample of the adult population (18-65) over a six-year time period (1976-1981) to determine some of the health consequences of ozone and fine particles. The authors found an association between ozone and minor restrictions in activity, after controlling for fine particles which could be used to derive an exponential ozone concentration response function. Using a weighted average of the coefficients reported in the analysis, EPA (2003) developed a best estimate coefficient. An annual baseline number of 7.8 MRADs per person also was derived from the study. Following Ostro and Rothschild, Hall et al., applied this function to the "working" adult portion of the population. EPA (2003) notes that this application is likely to produce a somewhat conservative health outcome estimate, since elderly adults are probably at least as susceptible to ozone pollution as are individuals under 65 years of age.

Asthma Emergency Room Visits. Several studies have established a relationship between increases of ozone and a variety of asthmatic symptoms. Weisel et al. (1995) conducted a five-year retrospective study of the relationship between summer ozone concentrations and asthma-induced emergency room (ER) visits. They examined the relationship between ambient ozone levels and ER visits by asthmatics in central and northern New Jersey (1986-1990). Cody et al. (1992) did a similar study for the same geographical area during the summer months of 1988 and 1989. Although Weisel et al.'s results derive from a single-pollutant equation, the Cody et al. study included SO₂ as a copollutant.

Multiple linear regression analyses were conducted for each year, generating positive and significant coefficients of daily ER visits with ozone concentrations. From these studies' coefficients, EPA (2003)

derived slope coefficients for a linear concentration-response function. Hall et al. (2006) averaged these two linear coefficients, forming the basis for their calculation of reductions in asthma-related ER visits from improved ozone levels.

School Absences. Ozone-related school absence is a health outcome that has been examined in two published health studies. The first, by Chen et al. (2000), considered the association between air pollution and daily elementary school absenteeism in Washoe County, Nevada (1996-1998). Hall et al. (2006) regressed student absenteeism on three air pollutants (ozone, PM10, and CO), weather variables, and other confounding factors, using autoregression analysis. The second, by Gilliland et al. (2001), examined 1996 school absences for 12 southern California communities with differing concentrations of multiple pollutants (ozone, NO₂, and CO).

These researchers used a two-stage, time series regression model, controlling for day of the week and temperature to assess whether there were any associations between pollution levels and absences. The studies found ozone to be statistically associated with daily absenteeism. Chen et al. (2000) predicted that for every 50 ppb increase in ozone the overall absence rate increased by 13.01%. In contrast, Gilliland et al. found that a 20 ppb increase in eight-hour average ozone concentrations was associated with a 16.3% increase in the all-absence rate. From these results, Hall et al. (2006) derived exponential values that were averaged together, resulting in an ozone-related school absence concentration-response value of 0.004998. EPA (2003) reports a daily school absence rate of 0.055 that was obtained from the U.S. Department of Education.

Asthma Attacks. In a widely cited study, Whittemore and Korn (1980) examined daily asthma attack diaries from 16 panels of asthmatics living in six communities in southern California during the mid-1970s. They used multiple logistic regression analysis to test for relationships between daily attacks and daily levels of two types of pollutants (photochemical oxidants and total suspended particulates), and a variety of weather variables. Results for the two pollutant models showed significant relationships between daily levels of both pollutants and reported asthma attacks. EPA (2003) adjusted the model's oxidant results so that they could be used with ozone data. A daily incidence rate of wheezing attacks for adult asthmatics of 0.055 was assumed to be the baseline rate, based on an analysis of the 1999 National Health Interview Survey (EPA 2003).

Respiratory Hospital Admissions. For the non-elderly ages (0-64) ozone-related respiratory hospital admissions, Hall et al. used a report by Thurston and Ito (1999), which summarized an extensive literature on hospital admissions that included ozone as one of the explanatory variables. This was the same approach adopted by CARB (2005). In this report, a statistical synthesis of three Canadian studies (Burnett et al. 1994, Thurston et al. 1994, and Burnett et al. 1997) yielded a quantitative estimate of the respiratory hospital admission effect associated with ozone exposures for the non-elderly general population. They calculate a relative risk factor of 1.18 per 100 ppb increase in daily

one-hour maximum ozone levels. To estimate ozone-related avoided incidences of respiratory hospital admissions for patients 65 and older, Hall et al. (2006) generated a pooled value using several health studies referenced by the EPA (2003). All of these studies found significant associations between ozone and various categories of respiratory hospital admissions according to Schwartz (1995), who analyzed the relationship between ozone and all respiratory admissions for the cities of New Haven, Connecticut and Tacoma, Washington; and Moolgavkar et al. (1997), Schwartz (1994a), and Schwartz (1994b), who considered pneumonia and chronic obstructive pulmonary disease admissions in Minneapolis and Detroit.

Health benefits resulting from reduced air pollution can be expressed as avoided cases of ozone-related health effects and assigned dollar values. Table 2 shows monetized values of specific adverse health effects. If these health endpoints were avoided, cost-benefit savings could accrue to individuals. The information provided and monetized values are included in this EIS to provide a basis for potential human health benefits from reducing VOCs emitted by vehicles. Although Maricopa County cannot provide an estimate of how many individuals will experience fewer of the health endpoints contained in Table 2, the department maintains that benefits of this rulemaking will exceed costs.

Table 2. Monetized Values of Health Endpoints

Health Endpoint (avoided health effect)	Value per Incidence 2005 \$ unless noted	Notations
Premature Mortality (VSL)	6,500,000	EPA's value of \$5.5 million converted to 2005 dollars
Chronic Bronchitis (onset)	374,000	Estimated in two CV studies (Krupnick and Cooper 1989; Viscussi et.al.1991) updated from the value used by EPA (2003b, 2004, 2005).
Respiratory Hospitalizations (applies to adults and children)	32,000	CA-based value (Chestnut et al 2006).
Emergency Room Visit	335	Based on two combined COI studies (EPA 2005); excludes time lost at work or school and value of pain avoidance.
Work Loss Day (WLD)	141	Daily wage rates in Kern and San Joaquin counties.
Work Loss Day (WLD)	123	Daily wage rates in Merced counties.
Acute Bronchitis (six-day	110	Computed from Loehman et al.

period)		(1979) values for chest discomfort and cough, adjusted to 2005 dollars.
School Absent Day (SAD)	79	San Joaquin County.
School Absent Day (SAD)	65	Tulare County.
Minor Restricted Activity Day (MRAD)	61	Based on WTP (Tolley et al. 1986) and reported by EPA 2005 (\$51 in 1999), and converted to current dollars and adjusted for income (CARB 2005).
School Absent Day (SAD)	54	Computed from an indirect cost of 3.6 million school loss days to be \$194.5 million in 1994 dollars (Smith et al. 1997).
Asthma Attack (per event)	50	Adjusted from EPA's peer-reviewed value and updated to current dollars and income; value is based on a 1986 CV study conducted in Los Angeles that estimated WTP to avoid a "bad asthma day" (Rowe and Chestnut).
Upper Respiratory Symptom Day (URS)	32	Adjusted from the value EPA adopted (2005) to account for inflation and income
Lower Respiratory Symptom Day (LRS)	20	Adjusted from the value EPA adopted (2005) to account for inflation and income.
Acute Bronchitis (single day)	18	Computed from Loehman et al. (1979) values for chest discomfort and cough, adjusted to 2005 dollars.

*Source: Hall et.al. (2006), pp.69-71. VSL =value of a statistical life; CV= contingent valuation; WTP= willingness-to-pay; MRAD =minor restricted activity day; COI =cost of illness.

f. Potential Impacts to Small Businesses

A large portion of the graphic arts operations in Maricopa County have already changed their printing processes to include the use of low-VOC inks and alcohol substitute fountain solutions. In addition,

some graphic arts operations have moved into digital printing processes. Graphic arts operations currently over the 25 tpy threshold have already installed the ECS and are currently in compliance, per inspection records. The proposed ECS efficiencies and VOC-containing material content are expected to have little impact on current graphic arts processes within the county due to the fact that the owners or operators or both have already implemented the processes at their operations.

Recordkeeping for all graphic arts operations remain consistent with the current Rule 337 recordkeeping requirements. The exception is the proposed requirement of daily recording of the refrigerated alcohol solution in use. Per discussions with graphic arts stakeholders, the temperature of the fountain solution is critical to the quality of the print. This would imply that the fountain solution is currently being monitored in some manner. The proposed rule is adding the requirement that this measurement be recorded.

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

The department welcomes all interested parties to provide additional relevant information and documentation on the anticipated costs and benefits resulting from the proposed rule revisions.

To submit or request additional data on the information included in the economic, small business and consumer impact statement, please contact:

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

11. The time, place and nature of the proceedings for the amendment of the rule:

Written oral proceeding requests or written comments or both will be accepted until the record is closed on August 23, 2010, 5:00 pm. Written oral proceeding requests or written comments or both may be mailed, e-mailed, or hand delivered to the department (see Item #4 of this notice). An oral proceeding will be scheduled only upon receipt of a written request before the record is closed on August 23, 2010, 5:00 pm. Written comments received during the comment period and before the record is closed on August 23, 2010, 5:00 pm will be considered formal comments to the Notice of Proposed Rulemaking and will be responded to in the Notice of Final Rulemaking.

12. 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

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

EPA Reference Methods, American Society for Testing and Materials (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 - 05 Standard Specification for ASTM Hydrometers.
- ASTM E126 - 05a Standard Test Method for Inspection, Calibration, and Verification of ASTM Hydrometers.

Section 503.2:

- ASTM E1 - 07 Standard Specification 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.
- EPA Reference Method 25 - Determination of Total Gaseous Nonmethane Organic Emissions as Carbon, 40 CFR 60, Appendix A; 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.

14. 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 MM/DD/YY

**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, ~~and associated coating processes.~~

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 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:** 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:

a. The total emissions from graphic arts operations, including surface preparation and cleanup solvent, does not exceed threshold limit of 225 pounds (100 kg) of VOC per month before controls.

b. Any radiation cured inks and coatings.

c. Sections 302.1, 303.1, 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.

201 202 **ALCOHOL** – A volatile organic compound – such as isopropanol, normal-propanol, and or ethanol – of alkane structure consisting of fewer than 6 carbon atoms and having a single OH- (hydroxyl) group and no other non-alkane attachments.

- 202 203** **ALCOHOL SUBSTITUTE** – A wetting agent, used to replace some or all of the alcohol in fountain solutions, and usually containing ~~inorganic phosphates and~~ 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 purposes of this rule, this term may apply to solutions prepared in either discrete solutions or solutions that are continuously blended with automatic mixing units.
- 203 205** **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.
- 204 206** **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.
- 205** **COATING** – ~~A layer of material applied to a substrate. in a relatively unbroken film.~~
- 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.
- 206 208** **EMISSION CONTROL SYSTEM (ECS)** – A system for reducing emissions of organic compounds, consisting of both collection and control devices which are approved in writing by the Control Officer and are designed and 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 of the following:
- a.** more than two years of outdoor exposure; or
 - b.** exposure to industrial-grade chemicals, solvents, acids, or detergents, oil products, cosmetics, temperatures exceeding 170^o F, vacuum-forming, embossing or molding.

- 207 210 FLEXOGRAPHIC PRINTING** – The application of words, designs or pictures by 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 area free from ink.
- 208 212 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.
- 209 214 GRAPHIC ARTS FACILITY 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).
- 240 215 GRAPHIC ARTS MATERIAL** – Any ink, varnish, coating or adhesive, including added thinner or retarder, used in printing or related coating or laminating processes.
- 211 GRAPHIC ARTS VARNISH** – ~~A transparent material, applied by printing press, that is used to adjust gloss, to adjust color, or to protect printed material or printing substrate.~~
- 212 216 GRAVURE PRINTING** – An intaglio process in which the ink is carried in minute, etched or engraved wells on a roll or cylinder, ~~excess ink being removed from the surface by a doctor blade.~~ 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.

- 213** ~~**LAMINATION** – A process of fusing two or more layers of material together to form a single sheet by using adhesive.~~
- 214 218** **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.
- 215 219** **LITHOGRAPHIC PRINTING** – A planographic method of printing process 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 purposes 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. Clay coated printing paper as defined by the American Paper Institute Classification System, and paperboard coated with clay to prevent water penetration, are considered non-porous substrates.
- 216** ~~**NON-PRECURSOR ORGANIC COMPOUND** – Any of the organic compounds, listed in subsection a. of Appendix A, which have been designated by the EPA as having negligible photochemical reactivity.~~
- 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.
- 217 225** **PRINTING** – 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.

- ~~218~~ 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.
- ~~219~~ 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.
- 220 **UNITS PER PRINTING PRESS** – The number of printing surfaces per printing press.
- ~~221~~ 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. ~~Example: At 68°F the vapor pressure of toluene vapor in equilibrium with undiluted liquid toluene is 23 millimeters of mercury.~~
- ~~222~~ 233 **VOC COMPOSITE VAPOR PRESSURE** – The total vapor pressure exerted by VOC at an even temperature. It distinguishes the vapor pressure of VOC from the vapor pressures of other fluids when a liquid contains both VOC and non-VOC fluids.
- 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 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.
- ~~223~~ **VOLATILE ORGANIC COMPOUND (VOC)** – Any organic compound which participates in atmospheric photochemical reactions, except a non-precursor organic compound.

235 WEB – A continuous substrate capable of being rolled at any point during the coating process.

224 WEB FEED—An automatic system which supplies substrate from a continuous roll or from a continuous extrusion process.

SECTION 300 – STANDARDS

301 GRAPHIC ARTS MATERIALS: ~~VOC emissions from graphic arts materials shall be limited as follows:~~

~~301.1 Limits of VOC Content: No person shall apply any inks, varnishes, coatings, or adhesives unless the VOC content as applied is equal to or less than 2.5 pounds per gallon (300 grams per liter), less water and non-precursor organic compounds.~~

~~301.2 Emission Control System for Offset Lithographic Printing: As an alternative to the provisions of subsection 301.1, a person may comply by using an Emission Control System with a control device efficiency which reduces the VOC emissions from the dryer exhaust vent by at least 90 percent by weight. 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.~~

~~301.3 Emission Control System for All Other Graphic Arts Printing: As an alternative to the provisions of subsection 301.1, a person may comply by using an Emission Control System which reduces the VOC emissions from the dryer exhaust vent by at least 90 percent by weight, and an overall capture and control efficiency of at least 65 percent by weight.~~

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 applied.

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 shall not apply any inks, varnishes, coatings, or adhesives unless the VOC content as applied is equal to or less than 2.5 pounds per gallon (300 grams per liter), less water and non-precursor organic compound. VOC emissions from materials shall be controlled by following the work practices described in Section 306 of this rule or by an ECS as described in Section 302.4 of this rule.

302 302.2 FOUNTAIN SOLUTION VOC LIMITS: ~~After March 27, 1997, an~~ An owner or operator of an ~~offset~~ 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 ~~limits~~ percentages specified in ~~column A of Table 1-337-1, whenever the press is on;~~ except that a fountain solution source refrigerated below 60°F and having a properly indicating temperature monitor is subject to the limits in column B of Table I.

**TABLE 1
VOC LIMITS BY VOLUME FOR FOUNTAIN SOLUTION ***

Column A	Column B	Column C
	Limit for a Source Refrigerated	
General Limit	Below 60°F	Compliance Date
15 percent	25.5 percent	March 28, 1997
10 percent	17 percent	March 28, 1998
5 percent	8.5 percent	March 28, 1999

*(Appendix A Table AP I gives equivalent limits)

TABLE 337-1.

VOC Limits by Percent by Weight (as Applied) for Fountain Solutions for Lithographic Printing

	<u>Fountain Solutions Containing Alcohol</u>	<u>Fountain Solutions Containing Alcohol Refrigerated at or Below 60°F (15.5°C)</u>	<u>Fountain Solutions Containing Alcohol Substitutes</u>
<u>Heatset Web</u>	Current <u>5.0 %</u> Effective: (DATE OF ADOPTION OF THIS RULE) <u>1.6 %</u>	Current <u>8.5 %</u> Effective: (DATE OF ADOPTION OF THIS RULE) <u>3.0%</u>	<u>5%</u>
<u>Sheet-Fed</u>	<u>5%</u>	<u>8.5%</u>	<u>5%</u>
<u>Cold-Set Web</u>	<u>None</u>	<u>None</u>	<u>5%</u>

303 302.3 CLEANING SOLUTIONS: ~~Any person who owns or operates~~ 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: ~~by~~ using cleaning solutions with a vapor pressure at 20°C compliant with the standards in Table 2. In

addition, all VOC containing materials used for cleaning and cleanup, including rags and towels, shall be stored in closed containers when not in use.

- 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.

TABLE 2
VOC VAPOR PRESSURE LIMITS FOR CLEANING SOLUTIONS

<u>Vapor Pressure</u>	<u>Compliance Date</u>
33 mm Hg	March 28, 1997
25 mm Hg	March 28, 1998
10 mm Hg	March 28, 1999

304 LABELING REQUIREMENT: No person shall sell, offer for sale, or manufacture for sale within Maricopa County any ink, coating, adhesive, fountain solution or fountain solution concentrate for use in graphic arts operations unless such material includes a designation of VOC content on data sheet(s), expressed in pounds per gallon or grams per liter.

302.4 EMISSION CONTROL SYSTEM (ECS):

- a. The 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. ECS Control Efficiencies for Lithographic and Letterpress Printing Operations.

<u>ECS Installation Date</u>	<u>Control Efficiency</u>
<u>ECS installed prior to (DATE OF ADOPTION OF THIS RULE)</u>	<u>90 percent by weight control efficiency for VOC emissions from the dryer exhaust vent.</u>
<u>ECS installed on or after (DATE OF ADOPTION OF THIS RULE)</u>	<u>95 percent by weight control efficiency for VOC emissions from the dryer exhaust vent.</u>
<u>Any installation date</u>	<u>Maintain VOC emissions from the dryer exhaust vent at a concentration at or below 20 ppmv as hexane on a dry basis.</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, adhesives and cleaning materials as listed in Table 337-3 and by following the work practices described in Section 306 of this rule or by an ECS as described in Section 303.3 of this rule.

Table 337-3. VOC Limits for Materials used in Rotogravure and Flexographic Operations.

<u>GRAPHIC ARTS MATERIAL</u>	<u>VOC CONTENT LIMIT</u>	<u>VOC CONTENT LIMIT</u>
	<u>less water and non-precursor organic compounds</u>	<u>less water and non-precursor organic compounds</u>
	<u>lbs/gal</u>	<u>grams/liter</u>
<u>Ink</u>	<u>2.5</u>	<u>300</u>
<u>Flexographic Ink Porous Substrate</u>	<u>2.5</u>	<u>300</u>
<u>Effective (1 yr after (DATE OF ADOPTION OF THIS RULE)</u>	<u>1.9</u>	<u>225</u>
<u>Flexographic Ink Non-Porous Substrate</u>	<u>2.5</u>	<u>300</u>
<u>Coating</u>	<u>2.5</u>	<u>300</u>
<u>Adhesive</u>	<u>2.5</u>	<u>300</u>
<u>Effective (DATE OF ADOPTION OF THIS RULE)</u>	<u>1.25</u>	<u>150</u>

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 meets either:

- a. One of the requirements listed in Table 337-4; or
- b. Reduces the VOC emissions from the dryer exhaust vent by at least 90 percent by weight, and 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. ECS Efficiencies for Rotogravure and Flexographic Printing Operations.

<u>Press and ECS Installation Dates</u>	<u>Overall Capture and Control Efficiency</u>	<u>Capture Efficiency</u>	<u>Control Efficiency</u>
<u>Press installed prior to March 14, 1995 and controlled by an add-on ECS installed prior to (DATE OF ADOPTION OF THIS RULE)</u>	<u>65 %</u>	<u>75 %</u>	<u>90 %</u>
<u>Press installed prior to March 14, 1995 and controlled by an add-on ECS installed on or after (DATE OF ADOPTION OF THIS RULE)</u>	<u>70 %</u>	<u>75 %</u>	<u>95 %</u>
<u>Press installed on or after March 14, 1995 and that is controlled by an add-on ECS whose first installation date was prior to (DATE OF ADOPTION OF THIS RULE)</u>	<u>75 %</u>	<u>85 %</u>	<u>90 %</u>
<u>Press installed on or after March 14, 1995 and controlled by an add-on ECS whose first installation date was on or after (DATE OF ADOPTION OF THIS RULE)</u>	<u>80 %</u>	<u>85 %</u>	<u>95 %</u>

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 by using screen printing inks, coatings and adhesives that meet the VOC content limits as applied in Table 337-5 and by following the work practices described in Section 306 of this rule.

TABLE 337-5. VOC Content Limits for Screen Printing Inks, Coatings, and Adhesives

<u>Material</u>	<u>Pounds of VOC per gallon (grams/liter), less water and less</u>
-----------------	--

	<u>non-precursor organic compounds</u>	
	<u>lb/gal</u>	<u>grams/liter</u>
<u>Inks and Coatings</u>	<u>3.3</u>	<u>400</u>
<u>Adhesives</u>	<u>1.25</u>	<u>150</u>
<u>Special Purpose, Extreme Performance</u>	<u>6.7</u>	<u>800</u>

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.

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

305.1 **Limits of VOC Content:** Any graphics arts operation which has the potential to emit 25 tons per calendar year and 4200 pounds per month of VOC from all graphic arts and related coating operations shall:

- a.** Limit the VOC content as applied of any inks, varnishes, coatings, or adhesives to a maximum of 2.5 pounds per gallon (300 grams per liter), less water and non-precursor organic compounds; or
- b.** Install, operate and maintain an ECS according to requirements to maintain an overall capture and control efficiency of at least 65 percent by weight; and
- c.** 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 purposes 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 purposes 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 VOC or VOC-containing material in

a way to prevent the evaporation of VOC 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 legibly labeled with their contents. The label shall be constructed such that the ink is insoluble in solvents so that the label is readable at all times.

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 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.

305 **307**

OPERATION AND MAINTENANCE (O&M) PLAN REQUIREMENTS FOR AIR POLLUTION CONTROL EQUIPMENT AND APPROVED EMISSION CONTROL SYSTEM (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.

306 EXEMPTIONS:

306.1 Exemption from Section 301: ~~The provisions of Section 301 of this rule shall not apply to any graphic arts facility which emits less than the threshold amounts of 25 tons (22,680 kg) per calendar year and 4200 pounds (1909 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 facility that becomes subject to the provisions of Section 301 by exceeding either threshold~~

amount will remain subject to these provisions even if annual emissions later fall below these thresholds.

306.2 Total Exemption:

- a. Circuitry printing is exempt from this rule. This exemption includes 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. Any printing operation in which no printing press has over two units, and the combined impression area of all presses together does not exceed 500 square inches (3226 cm²) is exempt from this rule.

SECTION 400 – ADMINISTRATIVE REQUIREMENTS

401 ~~EFFECTIVE DATE:~~ This rule is effective May 3, 1996. **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 303.3 of this rule shall meet the following milestones:

401.1 Submit a compliance plan, by (3 months after DATE OF THIS RULE) 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 THIS RULE) or within twelve (12) months of becoming subject to the rule.

SECTION 500 – MONITORING AND RECORDS

501 ~~PROVIDING AND MAINTAINING MONITORING DEVICES:~~ Any person operating 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.

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.

502-501.2 MONITORING FOUNTAIN SOLUTION CONTAINING ALCOHOL:

- a. ~~The~~ An owner or operator of any ~~printing press~~ graphic arts operation shall ~~monitor~~ determine the ~~alcohol~~ VOC-concentration of each fountain solution source containing any alcohol with a refractometer, a hydrometer or conductivity meter. The instrument shall:
- (1) ~~have~~ Have a visual readout (analog or digital) with an accuracy of ± 2 percent of the ~~meter's instrument's~~ meter's 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 manufacturers' instructions and the O&M Plan.
- b. The temperature of a refrigerated fountain solution shall be determined by the use of a temperature control device. Each temperature control device used for the purposes of this section, shall be calibrated and accurate to $\pm 0.5^{\circ}\text{F}$.

502.1 Weekly Entry of Monitoring Data if Any Alcohol Is Used:

- a. ~~A weekly entry shall be made of the results of an instrument reading, required by Section 502, for each fountain solution source containing any alcohol; and~~
- b. ~~Weekly, for each fountain solution source, record the names and the most current mixing ratio of all alcohol, alcohol substitutes, and water used in making fountain solution in that source.~~

502.2 Monthly Entries for Presses Which Never Use Any Alcohol: ~~Monthly, record the names of all alcohol substitutes and the mixing ratio of all alcohol substitutes to water, for each fountain solution source on a press which never uses alcohol.~~

503 502 RECORDKEEPING AND REPORTING: ~~Any~~ An owner, operator or person subject to this rule shall comply with the following 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.

~~503.1~~ **502.1 Current Materials List: Maintain** 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:** at the facility: state the VOC content of each in pounds per gallon or grams per liter. In addition, for each blanket wash and other cleaning solution, list the VOC vapor pressure at 20°C (68°F).

- 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.

~~503.2~~ **502.2 Usage Records of Graphic Arts Materials and Cleaning Solutions:** In compliance with the schedule in subsections 503.2 a. and 503.2.b. below, 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 according to the following schedule:

- a. Daily Records for 25 Ton Sources: Daily, an operator of a graphic arts facility shall update usage records of materials specified in subsection 503.2 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. However, the operator may maintain *monthly* records of materials complying with subsection 301.1 VOC limits or Section 303 vapor pressure limits, if each material served by a control device is identified as such.~~

~~**b.** Monthly Usage Records: Monthly records of materials' usage shall be maintained pursuant to subsection 503.2 by any facility except for the (≥ 25 TPY) facilities subject to subsection 503.2 a.~~

a. Daily Recordkeeping: Daily material usage records are required for the following:

(1) Facilities that emit 25 tons or more of VOC per calendar year; or

(2) Facilities that emit 4200 pounds or more per month of VOC from all graphic arts and related coating operations prior to controls using non compliant materials; or

(3) All facilities using heatset web presses; or

b. Monthly: In lieu of daily recordkeeping, the owner or operator may maintain *monthly* records of materials complying with Section 300 VOC or vapor pressure limits, if each VOC material served by a control device is identified as such. Monthly material usage records are required for the following:

(1) All facilities using non-heatset type presses.

(2) Facilities that emit 25 tons or more of VOC per calendar year prior to controls, of materials that are compliant with either subsections 301; 302, 303, 304 or 305 of this rule.

(3) Facilities that emit less than 25 tons per calendar year, prior to controls, of materials non compliant with either subsections 301; 302, 303 304 or 305 of this rule.

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 record the percentage of VOC for each different batch of fountain solution containing alcohol; and

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

(2) Maintain a current list of the names of all fountain solutions containing alcohol-substitutes.

~~503.3 ECS Operation and Maintenance:~~ ~~Maintain a continuous record of the times an Emission Control Device is used to comply with this rule. Maintain daily records of the O&M Plan's key system operating parameters. Maintain records of all maintenance performed according to the O&M Plan.~~

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 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 subsection 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.

504 503 **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 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 Avenue, Phoenix, AZ 85004 or by calling (602) 506-0169 for information.

504.1 503.1 ~~Sample Analysis~~ **VOC Content of Materials:**

a. The VOC content of graphic arts materials regulated by ~~Section 301 or Section 302, or~~ Sections 302, 303, 304 or 305 of this rule shall be determined using one of the following: ~~the applicable EPA Reference Method: 24 of 24A, Title 40, CFR, Part 60, Appendix A.~~ Methods.

(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; 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; 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 (~~reference Section 302~~) 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 purposes of this section shall be accurate within 2 percent of full scale and conform to ASTM requirements:

(1) ASTM E100 - 05 Standard Specification for ASTM Hydrometers

(2) ASTM E126 - 05a Standard Test Method for Inspection, Calibration, and Verification of ASTM Hydrometers.

504.2 ~~Test Method for Determining Minimum VOC Content of A Fountain Solution Via Density and Specific Gravity:~~ The test method procedure, which employs an ASTM rated hydrometer, is found in this rule's Appendix A, subsection b. ASTM is the American Society for Testing and Materials.

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 device. Each temperature control device used for the purposes of this section, shall be accurate to $\pm 0.5^{\circ}\text{F}$ and calibrated by one of the following methods:

- a. ASTM requirements (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.

~~504.3~~ 503.3 Emission Testing:

- a. ~~Capture and control~~Control efficiency of an emissions control device shall be determined according to: EPA Reference Method 25, 25A, or 25B, Title 40, CFR Part 60, Appendix A. ~~Capture efficiency of an Emissions Control System shall be determined according to "Guidelines for Determining Capture Efficiency" January 9, 1995, Candace Sorrell, Source Characterization Group A, Office of Air Quality Planning and Standards, US EPA. This document is incorporated by reference and is available at 2406 South 24 Street, Suite E 214, Phoenix, Arizona, or call (602) 506 6700 for information~~

(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.

(4) EPA Reference Method 25 - Determination of Total Gaseous Nonmethane Organic Emissions as Carbon, 40 CFR 60, Appendix A; or applicable Subparts 25A, or 25B.

504.4 503.4 Vapor Pressure: The total composite partial vapor pressure of all VOC in a ~~cleaning~~ solution shall be determined by ASTM D2879-92 or by calculations using certified data from a laboratory or manufacturer revealing the exact formulation. 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. Calculating VOC composite partial vapor pressure as follows:

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

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-mole

MW_w = Molecular weight of water, in g/g-mole

MW_c = Molecular weight of exempt compound, in g/g-mole

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.

APPENDIX A TO RULE 337

a. **Definition:**

NON-PRECURSOR ORGANIC COMPOUND - Any of the following organic compounds which have been designated by the EPA as having negligible photochemical reactivity: acetone; methane; ethane; methylene chloride (dichloromethane); 1,1,1 trichloroethane; trichlorofluoromethane (CFC 11); dichlorodifluoromethane (CFC 12); chlorodifluoromethane (CFC 22); 1,1,2 trichloro 1,2,2 trifluoroethane (CFC 113); 1,2 dichlorotetrafluoroethane (CFC 114); chloropentafluoroethane (CFC 115); trifluoromethane (HFC 23); 2,2 dichloro 1,1,1 trifluoroethane (HCFC 123); 2 chloro 1,1,1,2 tetrafluoroethane (HCFC 124); 1,1 dichloro 1 fluoroethane (HCFC 141b); 1 chloro 1,1 difluoroethane (HCFC 142b); pentafluoroethane (HFC 125); 1,1,2,2 tetrafluoroethane (HFC 134); 1,1,1,2 tetrafluoroethane (HFC 134a); 1,1,1 trifluoroethane (HFC 143a); 1,1 difluoroethane (HFC 152a); parachlorobenzotrifluoride (PCBTF); perchloroethylene (tetrachloroethylene); 3,3 dichloro 1,1,1,2,2 pentafluoropropane (HCFC 225ca); 1,3 dichloro 1,1,2,2,3 pentafluoropropane (HCFC 225cb); 1,1,1,2,3,4,4,5,5,5 decafluoropentane (HFC 43-10mcc); cyclic, branched, or linear completely methylated siloxanes; all completely fluorinated, completely saturated: alkanes, ethers and tertiary amines; sulfur containing perfluorocarbons with no unsaturations, no hydrogen, and with sulfur bonds only to carbon and fluorine.

b. **Test Method for Determining the Density and Specific Gravity of a Fountain Solution:**

- (1) **Procedure:** Gently invert or shake a covered container of fluid to be tested several times to assure adequate mixing. No foam should be present where hydrometers are inserted. Readings should be taken as quickly as is practicable to avoid unnecessary evaporation of VOC content. Conduct 6 successive readings with 2 different hydrometers, 3 readings apiece. Each hydrometer shall be accurate within 2 percent of full scale and conform to ASTM requirements. A thermometer, accurate to $\pm 0.5^{\circ}\text{F}$ and conforming to ASTM requirements, shall be used and the temperature of the fountain solution being tested shall be noted. The thermometer may be an integral part of a combined form hydrometer. The density of water at that temperature shall be obtained from a standard table such as is found in the CRC reference.
- (2) **Findings:** The quotient of the density of the fluid divided by the density of water shall be determined for each of the 6 pairs of numbers. If none of the 6 results equals or exceeds (is larger than) the applicable specific gravity limit in Table AP-1, then the percent of VOC in the tested fountain solution exceeds the limit. In other words, it is not a violation of the limit unless each of the total of six results is below the limit.

c. **Equivalent Expressions of VOC Limit:**

Table AP-1*

<u>VOC LIMIT</u> <u>(by volume)</u>	<u>Limit:</u> <u>Maximum pounds of VOC</u> <u>per gallon of fountain</u> <u>solution</u>	<u>Limit:</u> <u>Metric equivalent</u>	<u>Specific Gravity of IPA &</u> <u>water at VOC volume</u> <u>limit</u>
15%	1.1 lb/gal	130 g/liter	0.9800
10%	0.75 lb/gal	90 g/liter	0.9860
5%	0.43 lb/gal	52 g/liter	0.9920
25.5%	1.75 lb/gal	210 g/liter	0.9690
17%	1.16 lb/gal	140 g/liter	0.9790
8.5%	0.58 lb/gal	70 g/liter	0.9890

*(This table references Table 1, Section 302)