

RULE 354. GRAPHIC ARTS. (Adopted 6/28/1994)

A. Applicability

The provisions of this rule apply to:

1. Any person who uses any ink, coating, adhesive, or solvent containing Volatile Organic Compounds (VOC) as part of a graphic arts operation or graphic arts line.
2. Any person in the District who manufactures any ink, coating, adhesive, or solvent containing VOC sold for use in a graphic arts operation or graphic arts line in the District.
3. The owner or operator of graphic arts operations subject to this rule shall apply for a District Permit to Operate by [ninety days from rule adoption] in accordance with District Rule 201.

B. Exemptions

1. The requirements of Subsections D.1, and D.2 shall not apply to graphic arts facilities which have emitted less than 301 pounds of VOC per month from graphic arts printing, coating, adhesive, and solvent cleaning operations.
2. The requirements of Section D. shall not apply to graphic arts operations used exclusively for graphic arts research, graphic arts classroom instruction in schools, laboratory analysis, or determination of product quality and commercial acceptance provided total facility emissions of VOC from such equipment do not exceed 300 pounds per month from printing, coating, adhesive, and solvent cleaning operations. Facilities qualifying for this exemption shall comply with recordkeeping requirements specified in Subsections G.1, G.2, and G.3.
3. Operations which apply any VOC containing ink, coating, or adhesive on ceramic materials.
4. Circuit Board Printing.
5. Operations which apply inks used to indicate that sterilization has occurred.
6. Lithographic, Letterpress, or Screen Printing.
7. Any graphic arts operation or graphic arts line subject to the requirements of this rule shall be exempt from the requirements of Rule 317, Organic Solvents.

C. Definitions

1. "**Blower**": A unit, mounted on a web printing press, that sets and dries nonheatset ink by using unheated ambient air to accelerate the oxidation of the solvent components.
2. "**Coating**": A thin layer of material applied to a substrate in a relatively unbroken film.
3. "**Composite Partial Vapor Pressure**": The sum of the partial pressures of the compounds defined as VOC.
4. "**Exempt Organic Compounds**": Those organic compounds listed and excluded from the definition of "Reactive Organic Compounds" as defined in Rule 102 of these rules.

5. **"Flexographic Printing"**: The application of words, designs, or pictures by roll printing technique in which the pattern to be applied is raised above the printing roll and the image carrier is made of rubber or other elastomeric material.
6. **"Fugitive Emissions"**: Uncollected emissions of VOC from any portion of the printing, coating or laminating operation.
7. **"Grams of VOC per Liter of Coating (or Ink or Adhesive), Excluding Water and Exempt Compounds"**: The weight of VOC that are emitted during use, coating, curing or drying per combined volume of VOC and coating (or ink or adhesive) solids and can be calculated by the following equation:

Grams of VOC per Liter of Coating (or Ink or Adhesive), Less Water and Less Exempt Compounds =

$$(W_s - W_w - W_{es}) / (V_m - V_w - V_{es})$$

Where: W_s = weight of volatile compounds in grams
 W_w = weight of water in grams
 W_{es} = weight of exempt compounds in grams
 V_m = volume of material in liters
 V_w = volume of water in liters
 V_{es} = volume of exempt compounds in liters

8. **"Grams of VOC per Liter of Material"**: The weight of VOC per volume of material can be calculated by the following equation:

$$\text{Grams of VOC per liter of material} = (W_s - W_w - W_{es}) / V_m$$

Where: W_s = Weight of volatile compounds in grams
 W_w = Weight of water in grams
 W_{es} = Weight of exempt compounds in grams
 V_m = Volume of material in liters

9. **"Graphic Arts"**: All packaging rotogravure, publication rotogravure and flexographic processes or related coating or laminating processes.
10. **"Graphic Arts Line"**: Printing application equipment, coating equipment, laminating equipment, flash-off areas, ovens, conveyors or other equipment in an uninterrupted series in a graphic arts operation.
11. **"Graphic Arts Operation"**: Any packaging or publication rotogravure or flexographic printing operation.
12. **"Heater or Dryer"**: A device utilizing an infrared radiation source to vaporize heatset inks.
13. **"Heatset Ink"**: A quick-drying ink in which the solvents are vaporized by passing the printed surface through a heater or oven.
14. **"Ink Additive"**: That solvent which is added to printing inks to reduce viscosity.
15. **"Lamination"**: A process of bonding two or more layers of material to form a single multiple layer sheet by using adhesive.

16. "**Nonheatset Ink**": An ink which dries by oxidation and absorption into the substrate without the use of the heat from heaters or ovens.
17. "**Oven**": A heating chamber which uses heat, ultraviolet (UV) radiation, or electron beam (EB) radiation to bake, cure, polymerize, or dry a surface coating.
18. "**Packaging Rotogravure**": Rotogravure printing on paper, paperboard, foil, film or other substrates which are to be used to produce containers or packages, and other non-publication rotogravure printing.
19. "**Pantone Color**": A printing ink created for color matching by combination of process inks.
20. "**Per Month**": For sources using quarterly recordkeeping per month means average monthly emissions per calendar year quarter. For sources using daily or monthly recordkeeping per month means emissions per calendar month. If VOC emissions from a graphic arts facility exceed 300 pounds per month during any month the facility is from then on always subject to rule provisions applicable to facilities with emissions greater than 300 pounds per month.
21. "**Printing Ink**": Any fluid or viscous composition used in printing, impressing, or transferring an image onto a substrate.
22. "**Process Ink**": The hues: yellow, magenta, and cyan, plus black used in the four-color print process.
23. "**Publication Rotogravure**": Rotogravure printing on paper which is subsequently formed into books, magazines, catalogues, brochures, directories, newspaper supplements or other types of printed material.
24. "**Radiation Curing Inks**": Inks which dry by polymerization reaction induced by either ultraviolet or electron beam radiation.
25. "**Reactive Diluent**": A liquid which is a VOC during application and one in which, through chemical reaction, a portion of the VOC becomes an integral part of a finished product.
26. "**Remote Reservoir Cold Cleaner**": A device in which solvent is pumped through a sink-like work area for cleaning parts and drains immediately, without forming a pool, through a single drain hole less than 100 square centimeters (15.5 square inches) in area into an enclosed container which is not accessible for soaking parts.
27. "**Repair and Maintenance Cleaning**": Cleaning of equipment parts as part of a repair operation or as part of a scheduled maintenance procedure during which the parts are not removed from the equipment and power to the printing equipment has been secured.
28. "**Rotogravure Printing**": A printing method where the image area is etched or engraved relative to the surface of the image cylinder. Ink is transferred from minute etched wells on a plate cylinder to a substrate, which is supported by an impression roller, with excess ink removed by a doctor blade. The substrate is fed through the printing press in continuous rolls.
29. "**Solvent**": Means a VOC-containing liquid used to perform solvent cleaning operations.

30. **"Solvent Flushing"**: The use of a solvent to remove uncured adhesives, uncured inks, uncured coatings, or contaminants from the internal surfaces and passages of the equipment by flushing solvent through the equipment.
31. **"Sterilization Indicating Inks"**: Inks that change color to indicate that sterilization has occurred. Such inks are used to monitor the sterilization of medical instruments, autoclave efficiency and the thermal processing of foods for prevention of spoilage.
32. **"Surface Preparation"**: The removal of contaminants such as cured coatings, cured inks, cured adhesives, dust, soil, oil, grease, etc., prior to coating, adhesive, or ink applications.
33. **"Volatile Organic Compounds (VOC)"**: Shall have the same meaning as Reactive Organic Compounds (ROC) as defined in Rule 102 of these Rules.
34. **"VOC Materials"**: Inks, coatings, adhesives, materials used for cleanup or ink, coating, or adhesive removal, solvent, paper and cloth, and waste containing, impregnated with, coated with, or mixed with Volatile Organic Compounds.
35. **"Wipe Cleaning"**: The method of cleaning which utilizes a material such as a rag dampened, not saturated, with a solvent, coupled with a physical rubbing process to remove contaminants from surfaces.

D. Requirement - Graphic Arts Operators

1. No person shall use any inks, coatings, or adhesives unless the VOC content, as applied, is less than 300 Grams per Liter (g/l) (2.5 pounds per gallon), less water and less exempt organic compounds.
2. No person shall use a solvent as an ink additive or to perform cleaning operations unless the solvent has a VOC composite partial vapor pressure of 33 mm Hg or less at 20°C (68°F) and the solvent VOC content is less than the following limits:

LIMITS

	g/l	(lb/gal)
Surface Preparation	450	(3.75)
Repair and Maintenance Cleaning	750	(6.25)
Coatings and Adhesives Application Equipment Cleaning	950	(7.92)
Radiation Curing Ink Removal Cleaning	800	(6.67)
Ink Application Equipment Cleaning:		
Printing	450	(3.75)
Other, not listed	200	(1.67)

3. No person shall perform cleaning operations unless one of the following cleaning devices or methods is used:
 - a. Wipe cleaning;
 - b. Remote reservoir cold cleaner;
 - c. Spray bottles or containers with a maximum capacity of 16 fluid ounces from which solvents are applied without propellant-induced force;

- d. Cleaning equipment utilizing a closable solvent container. The solvent container shall remain closed during cleaning operations, except when depositing and removing objects to be cleaned, and during nonoperation, except when performing maintenance and repair to the cleaning equipment.
 - 1) If a solvent flow method is used, the solvent shall not be atomized.
 - 2) If a solvent flushing method is used, the solvent shall be flushed through the system by pumping.
- 4. In lieu of the requirements of Subsection D.1, emissions of VOC, excluding emissions from clean up operations, may be controlled by an emission capture and control system, which reduces VOC emissions to the atmosphere, provided that:
 - a. During any period of continuous operation not to exceed 24 hours, the capture and control system shall have a combined efficiency of at least 75 percent, by weight, for publication rotogravure and at least 67 percent, by weight, for other types of printing operations; and,
 - b. The collection system shall vent all drying oven exhaust to the control device and shall have one or more inlets for collection of fugitive emissions; and,
 - c. VOC emissions are no greater than emissions if compliant inks, coatings, and adhesives as per Subsection D.1 were used; and,
 - d. During any period of operation of a thermal incinerator, combustion temperature shall be continuously monitored; and,
 - e. During any period of operation of a catalytic incinerator, exhaust gas temperature shall be continuously monitored; and,
 - f. Written approval for such equipment, in the form of an Authority to Construct and Permit to Operate, is received from the Air Pollution Control Officer (APCO).
- 5. VOC materials shall be stored in nonabsorbent, nonleaking containers, which shall be kept closed except when adding or removing material or during cleaning operations.
- 6. VOC material wastes shall be disposed of in a manner consistent with Federal, State, and local hazardous waste regulations.

E. Requirement - Graphic Art Manufactures

The manufacturer of any ink, coating, adhesive, or solvent subject to this rule shall include the following information on the product container or a data sheet supplied with the product:

- a. Material name, manufacturer identification, specific mixing instructions, and VOC content, as applied.
- b. The VOC content of inks, coatings, and adhesives expressed as defined in Subsection C.7.
- c. The VOC content of solvents expressed as defined in Subsection C.8. The VOC composite partial vapor pressure, if required, expressed as specified in Subsection F.3.

F. Test Methods

1. Measurement of the VOC content of inks, coatings, adhesives, and solvents, except as specified in subsection F.2, shall be conducted and reported in accordance with EPA Reference Method 24 and ARB Method 432 for determination of exempt compounds as necessary.
2. Measurement of the VOC content of publication rotogravure inks shall be conducted and reported in accordance with EPA Reference Method 24A and ARB Method 432 for determination of exempt compounds as necessary.
3. The VOC composite partial vapor pressure of a blended solvent shall be determined by quantifying the amount of each VOC compound in the blend using gas chromatographic analysis (ASTM D2306-81) and by calculating the composite partial vapor pressure of the solvent by summing the partial pressures of each VOC compound at 20°C. For the purpose of this calculation, the blend shall be assumed to be an ideal solution where Raoult's Law applies. Composite partial vapor pressure may be calculated using product formulation data or may be determined using ASTM D2306-81.
4. Emissions of VOC as specified in Subsection D.4, shall be measured as prescribed by either EPA Reference Method 25 or EPA Reference Method 25A, for determining total organic emissions, and EPA Reference Method 18, for quantifying emissions of exempt compounds.
5. The capture and control efficiency of air pollution control equipment, as specified in Subsection D.4, shall be determined using applicable methods in 40 CFR 52.741.

G. Recordkeeping

Any person subject to this rule shall:

1. Maintain a current file for each ink, coating, and adhesive in use and in storage. The file shall include a data sheet or material list giving material name, manufacturer identification, specific mixing instructions, and VOC content as applied.
2. Maintain a current file for each solvent in use and in storage. The file shall include a data sheet or material list giving material name, manufacturer identification, specific mixing instructions, VOC content and, if required, composite partial vapor pressure.
3. If VOC emissions from a graphic arts facility do not exceed 300 pounds per month and such facility uses only compliant inks, coatings, adhesives, and solvents:
 - a. Maintain records on a calendar quarter basis showing the type and amount of ink used. Ink usage records shall be maintained using one of the following options:
 - 1) Group the quantity of all inks used and use the highest VOC content and the minimum density.
 - 2) Report process inks and pantone colors separately and:
 - a) Use the specific VOC content and density values for each process ink and the highest VOC and the minimum density for pantone inks;
or

- b) Use the highest VOC content and minimum density for both process and pantone inks.
 - 3) Itemize each ink and pantone color and use the specific VOC content and density value for each.
 - b. Maintain records on an calendar quarter basis showing the type and amount of coatings, adhesives, and solvents used. Itemize each coating, adhesive, and solvent and use the specific VOC content and density value for each.
- 4. If VOC emissions from a graphic arts facility exceeds 300 pounds per month and such facility uses only compliant inks, coatings, adhesives, or solvents; or if VOC emissions from a graphic arts facility does not exceed 300 pounds per month and such facility uses any non-compliant ink, coating, adhesive, or solvent:
 - a. Maintain records on a monthly basis showing the type and amount of all inks used. Ink usage records shall be maintained using one of the following options:
 - 1) Group the quantity of all inks used and use the highest VOC content and the minimum density.
 - 2) Report process inks and pantone colors separately and:
 - a) Use the specific VOC content and density values for each process ink and the highest VOC and the minimum density for pantone inks; or
 - b) Use the highest VOC content and minimum density for both process and pantone inks.
 - 3) Itemize each ink and pantone color and use the specific VOC content and density value for each.
 - b. Maintain records on a monthly basis showing the type and amount of all coatings, adhesives, and solvents used. Itemize each coating, adhesive, fountain solution, and solvent and use the specific VOC content and density value for each.
- 5. If any non-compliant ink, coating, adhesive, or solvent is used, and compliance is achieved through the use of emission control equipment:
 - a. Maintain records on a daily basis showing the type and amount of inks, coatings, and adhesives used. Itemize each ink, coating, adhesive and use the specific VOC content and density value for each.
 - b. Any person using an emission control system as a means of complying with this rule shall maintain daily records of key system operating maintenance procedures which will demonstrate continuous operation and compliance of the emission control device during periods of emission producing activities. Key system parameters are those necessary to ensure compliance with VOC content of coating requirements such as temperatures, pressures, and flow rates.
 - c. Maintain records on a daily basis showing the types of solvents used. Maintain records on a monthly basis showing the amount of fountain solutions and solvents

used. Itemize each fountain solution and solvent and use the specific VOC content and density value for each.

6. Records required by this rule shall be retained for a minimum of two years and shall be made available to Air Pollution Control Officer upon request.

H. Reporting

Any person subject to the rule that is using quarterly recordkeeping specified in Subsection G.3 shall submit an annual report to the Air Pollution Control Officer. The annual report shall contain the quarterly records required by Subsection G.3, and shall be due March 1 for the preceding calendar year.

I. Enforcement

If a person subject to this rule is using quarterly recordkeeping and is found to have used any noncompliant ink, coating, adhesive, or solvent, the person shall be considered in violation of this rule for every day during the preceding 12 month period, unless the person can demonstrate with daily records to the satisfaction of the Air Pollution Control Officer that the duration of the violation occurred within a shorter period.

J. Compliance Schedule

The provisions of this rule shall become effective on December 28, 1994.