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RULE 1130. GRAPHIC ARTS

(a) Purpose and Applicability

The purpose of this rule is to reduce emissions of volatile organic compounds (VOC) from graphic arts operations. The rule applies to persons performing graphic arts operations or who solicit, specify, offer for sale, sell, or distribute graphic arts materials for use in the District.

(b) Definitions

For the purpose of this rule, the following definitions shall apply:

- (1) AEROSOL COATING PRODUCT is a pressurized coating product containing pigments or resins that dispenses product ingredients by means of a propellant, and is packaged in a disposable can for hand-held application, or for use in specialized equipment for ground traffic/marketing applications.
- (2) COATING is a layer of material applied to a substrate in a relatively unbroken film.
- (3) CAPTURE EFFICIENCY, in percent, is the ratio of the weight of the VOC in the effluent stream entering the control device to the weight of VOC emitted from graphic arts operations, both measured simultaneously, and can be calculated by the following equation:

$$\text{Capture Efficiency} = [W_c/W_e] \times 100$$

Where: W_c = weight of VOC entering control device

W_e = weight of VOC emitted

- (4) CONTROL DEVICE EFFICIENCY, in percent, is the ratio of the weight of the VOC removed by the control device from the effluent stream entering the control device to the weight of the VOC in the effluent stream entering the control device, both measured simultaneously, and can be calculated by the following equation:

$$\text{Control Device Efficiency} = \left[\frac{W_c - W_a}{W_c} \right] \times 100$$

Where: W_c = Weight of VOC entering control device
 W_a = Weight of VOC discharged from the control device

- (5) END-USER is a person who performs graphic arts operations.
- (6) EXEMPT COMPOUNDS (See Rule 102-Definition of Terms).
- (7) FACILITY is any permit unit or grouping of permit units or other air-contaminant-emitting activities which are located on one or more contiguous properties within the District, in actual physical contact or separated solely by a public roadway or other public right-of-way, and are owned or operated by the same person (or by persons under common control). Such above-described groupings, if non-contiguous, but connected only by land carrying a pipeline, shall not be considered one facility.
- (8) FLEXOGRAPHIC PRINTING is a printing method utilizing a flexible rubber or other elastomeric plate in which the image area is raised relative to the nonimage area.
- (9) FLUORESCENT INK is a printing ink that emits electromagnetic radiation as a result of the absorption of energy from radiation.
- (10) FOUNTAIN SOLUTION is the solution used in lithographic printing which is applied to the image plate to maintain the hydrophilic properties of the nonimage areas. It is primarily water and contains at least one of the following materials: etchants such as mineral salts; hydrophilic gums; or VOC additives to reduce the surface tension of the solution.
- (11) GRAMS OF VOC PER LITER OF COATING (OR INK OR ADHESIVE), LESS WATER AND LESS EXEMPT COMPOUNDS, is the weight of VOC 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

$$\text{and Less Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

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

For coatings that contain reactive diluents, the grams of VOC per Liter of Coating (or ink or adhesive), Less Water and Less Exempt Compounds, shall be calculated by the following equation:

Grams of VOC per Liter of Coating (or Ink or Adhesive), Less Water

$$\text{and Less Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

- Where:
- W_s = weight of volatile compounds evolved during curing and analysis in grams
 - W_w = weight of water evolved during curing and analysis in grams
 - W_{es} = weight of exempt compounds evolved during curing and analysis in grams
 - V_m = volume of material prior to reaction in liters
 - V_w = volume of water evolved during curing and analysis in liters
 - V_{es} = volume of exempt compounds evolved during curing and analysis in liters

- (12) GRAMS OF VOC PER LITER OF MATERIAL is the weight of VOC per volume of material and can be calculated by the following equation:

$$\text{Grams of VOC per Liter of Material} = \frac{W_s - W_w - W_{es}}{V_m}$$

- 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

- (13) GRAPHIC ARTS OPERTIONS are gravure, letterpress, flexographic, and lithographic printing processes or related coating or laminating processes.

- (14) GRAPHIC ARTS MATERIALS are any inks, coatings, or adhesives, including added thinners or retarders, used in printing or related coating or laminating processes.
- (15) GRAVURE PRINTING is an intaglio printing 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.
- (16) HEATSET INK is a printing ink used on continuous web-feed printing presses that are equipped with dryers or ovens. The ink dries or sets by heat induced evaporation of the ink oils and subsequent chilling of the ink by chill rolls.
- (17) LAMINATION is a process of composing two or more layers of material to form a single, multiple-layer sheet by using an adhesive.
- (18) LETTERPRESS PRINTING is a printing process in which the image area is raised relative to the nonimage area and the ink is transferred to the substrate directly from the image surface.
- (19) LITHOGRAPHIC PRINTING is a planographic printing process in which the image and nonimage areas are on the same plane and are chemically differentiated. This printing process differs from other printing processes where the image is typically printed from a raised or recessed surface.
- (20) MATTE FINISH INK is a printing ink which is applied on non-porous substrates in flexographic printing operations and contains at least five (5) percent by weight silicon dioxide flattening agent.
- (21) METALLIC INK is a printing ink which is applied on non-porous substrates in flexographic printing operations and contains at least 28 percent by weight elemental metal particles.
- (22) NON-HEATSET INK is a printing ink that sets and dries by absorption into the substrate, and hardens by ambient air oxidation that may be accelerated by the use of infrared light sources. For the purposes of this definition ultraviolet and electron-beam curable inks are examples of non-heatset inks.
- (23) NON-POROUS SUBSTRATE is a substrate whose surface prevents penetration by water, including but not limited to foil, polyethylene, polypropylene, cellophane, paper or paperboard coated with a non-porous material, metalized polyester, nylon, and mylar.
- (24) OVERALL CONTROL EFFICIENCY (C.E.), in percent, is the ratio of the weight of the VOC removed by the emission control system from the

effluent stream entering the control device to the total VOC emitted from graphic arts operations, both measured simultaneously, and can be calculated by the following equations:

$$\text{C.E.} = [(W_c - W_a) / W_e] \times 100$$

$$\text{C.E.} = [(\text{Capture Efficiency}) \times (\text{Control Device Efficiency}) / 100]$$

Where: W_c = Weight of VOC entering control device

W_a = Weight of VOC discharged from the control device

W_e = Weight of VOC emitted

- (25) PACKAGING GRAVURE is gravure printing on paper, paperboard, foil, film or other substrates used to produce containers or packages.
- (26) POROUS SUBSTRATE is a substrate whose surface does not prevent the penetration by water, including but not limited to paper, paperboard, and any paper product that is coated with a porous material.
- (27) POTENTIAL TO EMIT is the maximum capacity of a stationary source to emit a regulated air pollutant based on its physical or operational design. Any physical or operational limitation on the capacity of the stationary source to emit a pollutant, including air pollution control equipment and restrictions on hours of operations or on the type of material combusted, stored, or processed, shall be treated as part of the design only if the limitation is federally enforceable.
- (28) PRINTING in the graphic arts is any operation that imparts color, design, alphabet, or numerals on a substrate.
- (29) PRINTING INK is a pigmented fluid or viscous material used in printing.
- (30) PROOF PRESS is a press used only to check the quality of print, color reproduction, and editorial content.
- (31) PUBLICATION GRAVURE is gravure printing on paper subsequently formed into books, magazines, catalogues, brochures, directories, newspaper supplements or other types of printed materials not classified as packaging gravure.
- (32) REACTIVE DILUENT is a liquid which is a VOC during application and one in which, through chemical reaction or physical actions, such as adsorption or retention in the substrate, 20 percent or more of the VOC becomes an integral part of a finished product.

- (33) REFRIGERATED CHILLER is a device that continuously maintains and supplies fountain solution to a holding tray at a temperature of 55 degrees Fahrenheit or less measured at the supply tank, thereby reducing evaporative emissions of VOCs in fountain solutions.
- (34) SOLVENT CLEANING is the removal of loosely held uncured adhesives, uncured inks, uncured coatings, and contaminants including, but not limited to, dirt, soil, and grease from parts, products, tools, machinery, equipment and general work areas.
- (35) STERILIZATION INDICATING INKS are 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.
- (36) VOLATILE ORGANIC COMPOUND (VOC) is as defined in Rule 102.
- (37) WEB-FEED is an automatic system which supplies substrate from a continuous roll, or from an extrusion process.

(c) Requirements

(1) VOC Content of Graphic Arts Materials

No person shall apply any graphic arts material, including any VOC-containing materials added to the original graphic arts materials, which contains a total VOC in excess of the limits specified below:

<u>GRAPHIC ARTS MATERIAL</u>	VOC LIMIT	
	Grams per Liter of	
	Coating (or Ink or Adhesive), Less Water and Less Exempt Compounds	
	<u>(October 8, 1999)</u>	<u>Effective January 1, 2000</u>
Lithographic Ink	300	300
Letterpress Ink	300	300
Gravure Ink	300	300
Flexographic Ink Non-Porous Substrate	300	300
Flexographic Ink Porous Substrate	300	225
Flexographic Fluorescent Ink	300	300
Coating	300	300
Adhesive	300	150

(2) VOC Content of Fountain Solution

Through December 31, 1999, no person shall apply in any graphic arts operation any fountain solution, including any VOC-containing materials added to the original fountain solution, which contains a total VOC in excess of 100 grams per liter of material. Effective January 1, 2000, the VOC content of fountain solution, including any VOC containing material added to the original fountain solution as applied, shall be:

- (A) no greater than 80 grams per liter of material, or
- (B) no greater than 100 grams per liter of material, if a refrigerated chiller is used.

(3) Solvent Cleaning Operations; Storage and Disposal of VOC-containing Materials.

Solvent cleaning of application equipment, parts, products, tools, machinery, equipment, general work areas, and the storage and disposal of VOC-containing materials used in cleaning operations shall be carried out pursuant to Rule 1171 - Solvent Cleaning Operations.

(4) Approved Emission Control System

A person may comply with the provisions of paragraphs (c)(1) or (c)(2) by using an emission control system, consisting of a collection and a control device, which is approved, in writing, by the Executive Officer for reducing emissions of volatile organic compounds.

(A) Graphic Arts Materials

The Executive Officer shall approve an emission control system to be used in conjunction with graphic arts materials only if its overall control efficiency will reduce the VOC emissions from the use of non-compliant graphic arts materials to a level equal to or lower than that which would have been achieved through compliance with the terms of paragraphs (c)(1) or meets the applicable limits listed below, whichever results in lower emissions.

<u>Type of Printing</u>	<u>Overall Efficiency</u>	
	<u>(October 8, 1999)</u>	<u>Effective January 1, 2000</u>
Flexography	67%	75%
Publication gravure	75%	85%
Packaging gravure	67%	75%
Lithography	67%	75%
Letterpress	67%	75%

The required overall efficiency of an emission control system at which an equivalent VOC emission will be achieved, compared to the emissions achieved through compliance with paragraphs (c)(1), shall be calculated by the following equation:

$$C.E. = \left[1 - \left\{ \frac{VOC_{LWc}}{VOC_{LWn,Max}} \times \frac{1 - (VOC_{LWn,Max} / D_{n,Max})}{1 - (VOC_{LWc} / D_c)} \right\} \right] \times 100$$

Where: C.E. = Overall Control Efficiency, percent

VOC_{LWc} = VOC Limit of Rule 1130, less water and less exempt compounds, pursuant to paragraphs (c)(1).

VOC_{LWn,Max} = Maximum VOC content of non-compliant graphic arts materials used in conjunction with a control device, less water and exempt compounds, g/L.

D_{n,Max} = Density of VOC solvent, reducer, or thinner contained in the non-compliant graphic arts materials containing the maximum VOC, g/L.

D_c = Density of corresponding VOC solvent, reducer, or thinner used in the compliant graphic arts materials = 880 g/L.

(B) Fountain Solution

Through December 31, 1999, the Executive Officer shall approve an emission control system to be used in conjunction with fountain solutions only if its overall control efficiency is at least 67%. Effective January 1, 2000, the overall control efficiency shall be at least 75%.

(5) Alternative Emission Control Plan

A person may comply with the provisions of paragraphs (c)(1) or (c)(2) by means of an Alternative Emission Control Plan (AECP) pursuant to Rule 108.

(d) Prohibition of Specification and Sale

(1) No person shall solicit from, or require any other person to use in the District any graphic arts material which, when applied as supplied or thinned or reduced according to the manufacturer's recommendation for application, does not meet the applicable VOC limits in paragraph (c)(1) or subparagraph (i)(11)(C) for the specific application.

(2) No person shall offer for sale, sell, or distribute directly to an end-user for use in the District any graphic arts material which, when applied as supplied or thinned or reduced according to the manufacturer's recommendation for application, does not meet the applicable VOC limits in paragraph (c)(1) or subparagraph (i)(11)(C) for the specific application.

(e) Recordkeeping and Reporting Requirements

Records shall be maintained pursuant to Rule 109. For emissions reporting purposes, the following substrate retention factors shall be applied to the lithographic oil content of the inks: 20 percent retention for heatset inks and 95 percent retention for non-heatset inks.

(f) Rule 442 Applicability

Any graphic arts operations subject to this rule which is exempt from all or a portion of the VOC limits of this rule shall comply with the provisions of Rule 442.

(g) Emission Reduction Credits

The calculations for emission reduction credits issued pursuant to District Rule 1309 for matte finish and metallic inks shall be based on a maximum VOC limit of 300 grams per liter (less water and less exempt compounds) irrespective of the VOC limits specified in subparagraph (i)(11)(C).

(h) Test Methods

(1) VOC Content of Graphic Arts Materials

The VOC content of graphic arts materials except publication rotogravure inks shall be determined by:

- (A) United States Environmental Protection Agency (USEPA) Reference Method 24, (Title 40 Code of Federal Regulations, Part 60, Appendix A). The exempt compounds' content shall be determined by District Method 303 (Determination of Exempt Compounds) contained in the District "Laboratory Methods of Analysis for Enforcement Samples" manual; or
- (B) District Method 304 [Determination of Volatile Organic Compounds (VOCs) in Various Materials] contained in the District "Laboratory Methods of Analysis for Enforcement Samples" manual.

(2) VOC Content and Density of Publication Rotogravure Ink:

The VOC content and density of publication rotogravure inks shall be determined by:

- (A) United States Environmental Protection Agency (USEPA) Reference Method 24A, (Title 40 Code of Federal Regulations, Part 60, Appendix A). The exempt compounds' content shall be determined by District Method 303 (Determination of Exempt Compounds) contained in the District "Laboratory Methods of Analysis for Enforcement Samples" manual; or
- (B) District Method 304 [Determination of Volatile Organic Compounds (VOCs) in Various Materials] contained in the District "Laboratory Methods of Analysis for Enforcement Samples" manual.

(3) Exempt Perfluorocarbon Compounds

The following classes of compounds: cyclic, branched, or linear, completely fluorinated alkanes; cyclic, branched, or linear, completely fluorinated ethers with no unsaturations; cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and sulfur-containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine, will be analyzed as exempt compounds for compliance with subdivision (c) and subparagraph (i)(11)(C), only at such time as manufacturers specify which individual compounds are used in the

coating formulations and identify the test methods, which, prior to such analysis, have been approved by the USEPA and the District, that can be used to quantify the amounts of each exempt compound.

- (4) Determination of Efficiency of Emission Control Systems
- (A) The capture efficiency of an emission control system as defined in paragraph (b)(2) shall be determined by a minimum of three sampling runs subject to the data quality objective (DQO) presented in the USEPA technical guideline document, "Guidelines for Determining Capture Efficiency, January 9, 1995". Individual capture efficiency test runs subject to the USEPA technical guidelines shall be determined by:
- (i) Applicable USEPA Methods 204, 204A, 204B, 204C, 204E, and/or 204F; or
 - (ii) The District "Protocol for Determination of Volatile Organic Compounds (VOC) Capture Efficiency"; or
 - (iii) any other method approved by the USEPA, the California Air Resources Board, and the District Executive Officer.
- (B) The control device efficiency of an emission control system as defined in paragraph (b)(3) and the VOC content in the control device exhaust gases, measured and calculated as carbon, shall be determined by USEPA Test Methods 25, 25A, or District Method 25.1 (Determination of Total Gaseous Non-Methane Organic Emissions as Carbon) as applicable. USEPA Test Method 18, or ARB Method 422 shall be used to determine emissions of exempt compounds.
- (5) Equivalent Test Methods
- Other test methods determined by the staffs of the District, ARB, and USEPA, to be equivalent to the test methods specified in this rule, and approved in writing by the District Executive Officer may also be used.
- (6) Multiple Test Methods
- When more than one test method or set of test methods are specified for any testing, a violation of any requirement of this rule established by any one of the specified test methods or set of test methods shall constitute a violation of the rule.

(7) Test Methods Dates

All test methods referenced in this section shall be the most recent approved versions. The Executive Officer may update test methods as necessary to reflect the most accurate method available, provided the method does not affect the stringency of the rule.

(i) Exemptions

- (1) Fountain solutions used on proof presses.
- (2) Coating operations subject to other rules of Regulation XI.
- (3) Solar-control window film.
- (4) Heat-applied transfer decals.
- (5) Graphic arts on ceramic materials.
- (6) Circuitry printing.
- (7) Blanket repair material used in containers of four ounces or less.
- (8) Sterilization indicating inks.
- (9) The prohibition specified in paragraphs (d)(1) or (d)(2) shall not apply to persons offering graphic arts materials for sale to, selling graphic arts materials to, distributing graphic arts materials to, or requiring the use of graphic arts materials from, persons who are operating an approved emission control system under paragraph (c)(4), or complying under paragraph (c)(5), or operating pursuant to paragraphs (i)(1), (i)(2), (i)(3), (i)(4), (i)(5), (i)(6), (i)(7), (i)(8), (i)(11)(C), (i)(12), or (i)(13).
- (10) The prohibition specified in subdivision (d) shall not apply to graphic arts materials which will be used solely outside of the District.
- (11) The provisions of paragraph (c)(1) shall not apply to metallic and matte finish inks provided that:
 - (A) The usage of matte finish or metallic inks each as supplied shall not exceed two (2) gallons on any one day and 125 gallons per calendar year at a facility; and
 - (B) The potential to emit and the actual VOC emissions from a facility which applies matte finish or metallic inks does not exceed ten (10) tons per calendar year from all VOC emission sources; and
 - (C) The VOC content of matte finish and metallic inks do not exceed 535 and 460 grams per liter (less water and less exempt compounds) respectively, including any VOC containing materials added to the original ink, as applied; and

- (D) The owner or operator of the facility certifies in writing to the Executive Officer that they shall not emit VOCs in excess of ten (10) tons per calendar year. Such a certification shall be considered an agreement by the facility to limit the facility's potential to emit; and
 - (E) Facilities operating under the provisions of paragraph (i)(11) whose actual emissions exceed ten (10) tons in any calendar year shall henceforth be subject to the requirements of paragraph (c)(1); and
 - (F) In addition to the requirements of subdivision (e), facilities shall retain records of purchase orders and invoices of VOC-containing materials for a minimum of two (2) years.
- (12) The provisions of this rule shall not apply to aerosol coating products.
- (13) The provisions of paragraph (c)(1) shall not apply to postal cancellation inks provided the VOC emissions from these inks, at a facility, do not exceed 60 pounds per calendar month.