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RULE 1130

Graphic Arts

(A) General

(1) Purpose

- (a) To reduce emissions of Volatile Organic Compounds (VOC) from Graphic Arts Printing Operations and Digital Printing Operations, and Paper, Film, Foil or Fabric Coating Operations.

(2) Applicability

- (a) This rule is applicable to any Graphic Arts Printing Operations, Digital Printing Operations, Paper, Film, Foil or Fabric Coating Operations and to the Solvent Cleaning materials and processes associated with such operations in the District.
- (b) The drying and curing processes applicable to Paper, Film, Foil or Fabric Operations include, but are not limited to, heated, forced-air dried, and non-heated processes.
- (c) This rule is applicable to any person who solicits, specifies or manufactures any Ink, Coating or Adhesive containing VOC which is sold, offered for sale, or supplied for use in Graphic Arts and Paper, Film, Foil and Fabric Coating Operations in the District.
- (d) This rule does not apply to screen printing operations subject to the provisions of Rule 1130.1 – *Screen Printing*.
- (e) This Rule does not apply to the application of coatings to any plastic, rubber or glass products subject to the provisions of Rule 1145 – *Plastic, Rubber and Glass Coatings*.

(B) Definitions

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

- (1) “Adhesive” – A material that is applied for the primary purpose of bonding two surfaces together by surface attachment. Adhesives may be used to facilitate the attachment of two surfaces or substances in varying degrees of permanence.

- (2) “Aerosol Coating Product” – 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.
- (3) “Application Equipment” – A device, including, but not limited to, a spray gun, brush, roller, and a Printing press, used to apply Adhesives, Coatings or Inks.
- (4) “Application Process” – Any process where surface Coatings are applied and/or cured to Paper, Fabric, Foil and/or Film on a Coating Line. Such Coating Line shall include coating applicators, heating or drying ovens, any dryers, and any other equipment where VOC emissions occur.
- (5) “Bench Scale Project” – A project (other than at a Research and Development Facility) that is operated on a small scale, such as one capable of being located on a laboratory bench top.
- (6) “Blanket” – A synthetic rubber mat used to transfer or “offset” an image from a Printing plate to paper or other substrate, commonly used in Offset Lithography.
- (7) “Blanket Repair Material” – The material used in Offset Lithographic Printing to correct low spots in the press Blanket.
- (8) “Blanket Wash” – A Solvent used to remove Ink from the Blanket of a press.
- (9) “California Air Resources Board (CARB)” – The California State Air Resources Board, the Executive Officer of CARB and his or her authorized representative, the powers and duties of which are described in Part 2 of Division 26 of the California Health & Safety Code (commencing with section 39500).
- (10) “Capture Efficiency” – In percent, 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 Printing Operations, both measured simultaneously, and can be calculated by the following equation:

$$\text{Capture Efficiency} = \left(\frac{W_c}{W_e} \right) \times 100$$

Where:

W_c	=	weight of VOC entering Control Device
W_e	=	weight of VOC emitted

- (11) “Coating” – The application of a uniform layer of material across the entire width of a substrate. Those machines which have both Coating and Printing units should be considered as performing a Printing Operation. Coating applications that are not performed in association with a Printing Operation are considered Coating Operations and are not Graphic Arts Printing Operations.

- (12) “Coating Line” – A series of Coating applicators, flash-off areas, and any associated curing/drying equipment between one or more unwind/feed stations and one or more rewind/cutting stations.
- (13) “Control Device” – Equipment such as an incinerator or adsorber, or cooler/condenser filtration used to prevent air pollutants from being emitted into the atmosphere.
- (14) “Control Device Efficiency” – In percent, 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

- (15) “Conventional Printing Operations” – Those Printing Operations that utilize physical masters, stencils, screens or plates during the Printing process. Conventional Printing Operations use technologies including, but not limited to, Offset Lithographic, Flexographic, Gravure, and Letterpress Printing.
- (16) “Cured Adhesive, Cured Coating, or Cured Ink” – An Adhesive, Coating, or Ink that is dry to the touch.
- (17) “Die Coater (or Slit Coater)” – A type of Application Equipment that coats an object by flowing Coatings through a slit directly onto the object moving past the slit.
- (18) “Digital Printer” – A Printing device that uses a computer-driven machine to transfer an electronic image to a substrate through the use of Inks, toners, or other Graphic Arts Materials. Digital Printing technologies include, but are not limited to, various forms of Ink-Jet, Thermography, Electrophotography, Ionography, and Magnetography.
- (19) “Digital Printing Operation” – Those Printing Operations that do not use a physical master, stencils, or plates but use digital data to control the deposition of Ink, toner or dye to create images.
- (20) “Dip Coater” – A type of Application Equipment that coats objects by submerging the object in a vat of Coating, and subsequently withdrawing the object and draining off the excess Coating.
- (21) “Doctor Blade” – A steel blade used to scrape excess Ink from a Printing plate or inking cylinder.

- (22) “Dryer” – A hot air, high velocity system used to dry Inks on a printed or coated substrate.
- (23) “Dye Sublimation” – An imaging process that vaporizes colorant with heat and pressure, and deposits it onto a substrate in order to simulate a continuous tone image. Dye Sublimation is a Digital Printing technology.
- (24) “Electron Beam Ink” – Ink that, when exposed to electron energy, crosslinks or solidifies in milliseconds.
- (25) “Electron Charge Deposition Printing” – See Ionography.
- (26) “Electrophotography” – A Digital Printing technology that works by recording an image on a drum in the form of an electrostatic charge, which is then transferred to the substrate. Electrophotography includes such technologies as laser printers, xerography, and Liquid Electrophotography.
- (27) “Electrostatic Application” – A method of applying Coating whereby atomized paint droplets are charged and subsequently deposited on the substrate by electrostatic attraction.
- (28) “End-User” – A person who performs Graphic Arts Printing Operations.
- (29) “Exempt Compounds” – A compound identified as exempt in 40 CFR 51.100(s)(1).
- (30) “Fabric Coating” – Any decorative or protective Coating or reinforcing material applied on or impregnated into textile fabric, vinyl coated textile fabric, or vinyl sheets.
- (31) “Facility” – 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.
- (32) “Film Coating” – Any Coating applied in a Web Coating process on any film substrate other than paper or fabric, including, but not limited to typewriter ribbons, photographic film, magnetic tape, and metal foil gift wrap, but excluding coatings applied to packaging used exclusively for food and health care products for human or animal consumption.
- (33) “Fine Arts Painting” – Any unique visual representation, consisting of paint, Ink, or other media, hand applied to a substrate of canvas, wood, paper, metal, or other material.
- (34) “Flexible Packaging” – Any package or part of a package, the shape of which can readily be changed. Flexible Packaging includes, but is not limited to, bags,

pouches, liners and wraps utilizing paper, plastic, film, aluminum foil, metalized or coated paper or film, or any combination of these materials.

- (35) “Flexographic Printing” – The application of words, designs, or pictures to a substrate by means of a roll Printing technique in which the pattern is applied to an image carrier made of rubber or other elastomeric material. The image to be printed is raised above the carrier surface, while the non-image area is not raised.
- (36) “Flow Coater” – A Coating application system with no air supplied to the nozzle and where paint flows over the part and the excess Coating drains back into the collection system.
- (37) “Foam Coater” – A Coating application system that coats an object by flowing foam through holes or a slit directly onto the object moving underneath it.
- (38) “Foil Coating” – A Coating applied in a Web Coating process on any foil substrate other than paper or fabric, including, but not limited to typewriter ribbons, photographic film, magnetic tape, and metal foil gift wrap, but excluding Coatings applied to packaging used exclusively for food and health care products for human and animal consumption.
- (39) “Fountain Solution” – 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.
- (40) “Fugitive Emissions” – Uncollected emissions of VOC from any portion of the Printing, Coating or Laminating Operation other than from the Dryer.
- (41) “Grams of VOC per Liter of Adhesive, Coating, Ink or Wash Primer, Less Water and Less Exempt Compounds (VOC Content)” – The weight of VOC emitted during use, Coating, curing or drying per combined volume of VOC and of Adhesive, Coating Ink or Wash Primer solids and can be calculated by the following equation:

$$\text{Grams of VOC per Liter of Coating (or Adhesive, Ink or Wash Primer), Less Water and Less Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

- Where:
- W_s = weight of VOC, 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:

$$\text{Grams of VOC per Liter of Coating, (or Adhesive, Ink or Wash Primer) Less Water and Less Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where: W_s = weight of VOC 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

- (42) “Grams of VOC per Liter of Material” – 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 VOC, in grams
 W_w = weight of water, in grams
 W_{es} = weight of Exempt Compounds, in grams
 V_m = volume of material, in liters

- (43) “Graphic Arts Coating” – The application of a uniform layer of material across the entire width of a substrate. Those machines which perform both Coating and Printing should be considered as performing a Printing Operation. For purposes of this rule, Digital Printing is not considered a Graphic Arts Coating Operation.
- (44) “Graphic Arts Materials” – Any Adhesives, Coatings or Inks, including added Thinners or retarders, used in Printing or related Coating or Laminating processes.
- (45) “Graphic Arts Printing Operations” – Those Operations employing Conventional Printing Operations, or any Coating or Laminating process associated with Conventional Printing Operations to produce published products and packages. Solvent Cleaning Operations performed in order to produce published products and packages are considered to be part of Graphic Arts Printing Operations.
- (46) “Gravure Printing” – 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.
- (47) “Hand Application Method” – A method of applying a Coating to a substrate using manually held, non-mechanically operated equipment. Such equipment includes paint brushes, hand rollers, caulking guns, trowels, spatulas, syringe daubers, rags and sponges.

- (48) “Heatset Web Ink” – A quick-drying Ink in which the Solvents are vaporized by passing the printed surface through a device such as a Dryer or Oven.
- (49) “High-Volume, Low-Pressure (HVL) Spray Equipment” – Equipment used to apply materials by means of a spray gun which is designed and intended to be operated, and which is operated, between 0.1 and 10.0 psig of air atomizing pressure, measured dynamically at the center of the air cap and the air horns.
- (50) “Ink” – A pigmented and/or dyed liquid or paste used in a Graphic Arts Printing Operation typically for Printing, impressing, or transferring an image onto a substrate.
- (51) “Ink-Jet” – A Digital Printing technology in which Ink is ejected through printheads onto a substrate to create an image.
- (52) “Intaglio Printing” – Printing done from a plate or cylinder in which the image is sunk below (etched or engraved into) the surface.
- (53) “Ion Deposition Printing” – See Ionography.
- (54) “Ionography” – A Digital Printing technology that utilizes a directed array of ions to create a charge on a nonconductive surface to create an image. Ionography can also be known as Ion Deposition or Electron Charge Deposition Printing.
- (55) “Key System Operating Parameters” – Those parameters necessary to ensure compliance with subsection (C)(4), including, but not limited to, temperature, pressure drop, and air flow rate.
- (56) “Lamination” – A process of composing two or more layers of material to form a single, multiple-layer sheet by using an Adhesive.
- (57) “Letterpress Printing” – 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.
- (58) “Line” – The minimum equipment which is required for the application, drying, and/or curing of Inks, UV Inks, and/or Coatings on a substrate, including the Ink and/or Coating applicators and drying systems, and associated Ink and Coating agitation and delivery systems.
- (59) “Liquid Electrophotography (LEP)” – A Digital Printing technology that records a latent electrostatic image on a photoconductive surface, such as a drum or belt. The image created by applying toner to the charged areas of the photoconductor is electrically transferred to an intermediate surface. In the second transfer process, the image is released from the Blanket surface to the final substrate cooling rapidly as the substrate passes between the Blanket and the impression drum, causing the image to “peel off” the Blanket and be affixed to the substrate. This Operation repeats itself on the one Printing station for every color separation in the image.

- (60) “Liquid Leak” – A visible Solvent leak from a container at a rate of more than three (3) drops per minute, or a visible liquid mist.
- (61) “Lithographic Printing” – 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.
- (62) “Magnetography” – A Digital Printing technology whereby an image is printed using a magnetic toner, electromagnetic write heads, and magnetic fields on an imaging drum.
- (63) “Maintenance Cleaning” – A Solvent Cleaning Operation or activity carried out to keep tools, machinery, equipment (excluding Adhesive, Coating, or Ink Application Equipment) or general work areas in clean and good operational condition.
- (64) “Manufacturing Process” – The process of making goods or articles by hand or by machine.
- (65) “Matte Finish Ink” – A Specialty 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.
- (66) “Metallic Ink” – A Specialty Ink which is applied on Non-Porous substrates in Flexographic Printing Operations which contains at least 28 percent elemental metal powder, by weight.
- (67) “Non-Absorbent Container” – A container made of Non-Porous material that does not allow the migration of Solvents through it.
- (68) “Non-Atomized Solvent Flow” – Solvents in the form of a liquid stream without the introduction of any Propellant.
- (69) “Non-Heatset Web Ink” – An Ink which dries by oxidation and/or absorption into the substrate without use of heat from Dryers or Ovens.
- (70) “Non-Leaking Container” – A container without Liquid Leak.
- (71) “Non-Porous” – Any substrate whose surface prevents penetration by water, including but not limited to foil, polyethylene, polypropylene, cellophane, metalized polyester, nylon, and polyethylene terephthalate (mylar), paper or paperboard coated with Non-Porous surface. Clay coated Printing paper as defined by the American Paper Institute Classification System, and paperboard coated with clay to prevent water penetration, shall be considered Non-Porous.
- (72) “Offset Lithographic Printing” – A planographic method in which the image and non-image areas are on the same plane and where the Ink is transferred from an image plate on one cylinder to an image Blanket on a different cylinder. The Ink is finally transferred from the image Blanket to the surface to be printed.

- (73) “On-Press Component” – A part, component, or accessory of a press that is cleaned while still being physically attached to the press.
- (74) “Operation” – Any physical action resulting in a change in the location, form, or physical properties of a material, or any chemical action resulting in a change in the chemical composition or the chemical or physical properties of a material.
- (75) “Operator” – Includes, but is not limited to, any person who owns, leases, supervises, or operates a Facility and/or equipment.
- (76) “Oven” – A heating chamber which uses heat, UV radiation, or electron beam (EB) radiation to bake, cure, polymerize, or dry a surface Coating.
- (77) “Overall Capture and Control Efficiency” – In percent, 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 Printing Operations, both measured simultaneously, and can be calculated by the following equations:
- $$O.C.E = \left(\frac{(Capture\ Efficiency) \times (Control\ Device\ Efficiency)}{100} \right)$$
- (78) “Packaging Gravure” – Gravure Printing on paper, paperboard, foil, film or other substrates used to produce containers or packages.
- (79) “Pantone Ink” – An Ink created for color matching by combination of Process Inks.
- (80) “Paper Coating” – Any Coating applied on or impregnated into paper, including, but not limited to, adhesive tapes and labels, book covers, post cards, office copier paper, drafting paper, and pressure sensitive tapes.
- (81) “Plastisizer” – A material used to keep plastic material soft and viscous.
- (82) “Plastisol” – A Coating that is a liquid dispersion of small particles of resins and plastisizers that are fused to become a plastic.
- (83) “Porous” – A substrate whose surface does not prevent penetration by water, including but not limited to, paper, paperboard, and any paper product coated with a Porous material.
- (84) “Potential to Emit” – 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.
- (85) “Printing” – In the graphic arts, any operation that imparts color, design, alphabet, or numerals on a substrate.

- (86) “Process Ink” – The hues yellow, magenta, and cyan, plus black used in the four-color print process.
- (87) “Proof Press” – A press used only for printing a sample copy of a graphic art product to check the quality of print, color reproduction, and editorial content.
- (88) “Propellant” – Any gas, including air, in a pressure container for expelling the contents when the pressure is released.
- (89) “Publication Gravure” – 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.
- (90) “Reactive Diluent” – 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.
- (91) “Recycled Solvent” – Spent solvent that has been regenerated and which contains VOC levels comparable or lower than analogous un-used solvent, is stored in non-leaking containers, has documentation verifying the recycling legitimacy factors are met, and is pure enough for use in this application. The used solvent shall not have been used for cleaning or degreasing.
- (92) “Removable Press Component” – A part, component, or accessory of a press that is physically attached to the press but is disassembled and removed from the press prior to being cleaned. Rollers, Blankets, metering rollers, fountains, impression cylinders and plates shall not be considered as Removable Press Components.
- (93) “Repair” – The process of returning a damaged object or an object not operating properly to good condition.
- (94) “Research and Development” – A Facility or portion thereof used to further the development of useful materials, devices, systems, or methods, including, but not limited to, design, development, and improvement of prototypes and processes. Research and Development does not include the Manufacturing Process itself.
- (95) “Roll Coater” – A type of Application Equipment in which a series of mechanical rollers form a thin Coating film on the surface of a roller, which is subsequently applied to a substrate by moving the substrate underneath the roller.
- (96) “Roller Wash” – A Solvent used to remove Ink from the rollers of a press.
- (97) “Slit Coater” – See Die Coater.
- (98) “Solvent” – Any liquid containing a VOC or combination of VOCs, which is used as a diluent, Thinner, dissolver, viscosity reducer, cleaning agent, or for other similar uses.

- (99) “Solvent Cleaning” – The use of a Solvent to remove loosely held uncured Adhesives, uncured Coatings, uncured Inks, and contaminants from the internal surfaces and packaging passages of equipment including, but not limited to, dirt, soil, and grease from parts, products, tools, machinery, equipment and general work areas by flushing Solvent, by a Non-Atomized Solvent Flow, through the equipment.
- (100) “Specialty Ink” – An Ink that is applied only on Non-Porous Substrates in Flexographic Printing Operations, and is either:
- (a) A Metallic Ink that contains at least 28 percent elemental metallic powder, by weight; or
 - (b) A Matte Finish Ink containing at least five (5) percent silicon dioxide flattening agent, by weight.
- (101) “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.
- (102) “Stripping” – The use of Solvent to remove material such as Cured Adhesives, Cured Coatings, Cured Inks, cured or dried paint, cured or dried paint residue or temporary protective Coating.
- (103) “Substrate Retention Factor” – A fraction, expressed in percent, of VOCs in lithographic Inks which is retained in the substrate when the Inks dry by adsorption or absorption.
- (104) “Surface Preparation” – The removal of contaminants from a surface prior to the application of Adhesives, Coatings or Inks before proceeding to the next step of a Manufacturing Process.
- (105) “Thermography” – A Digital Printing technology that creates an image via a chemical reaction that occurs when portions of a thermal-coated substrate are subjected to heat. Thermographic technologies include but are not limited to thermal wax transfer, multi-bit thermal wax transfer, and Dye Sublimation.
- (106) “Thin Film Ultraviolet (UV) Ink” – A UV Ink for which <0.2 g will cover an area of $\geq 225 \text{ cm}^2$ (35 in^2), using the following formula:

$$C = F \times A \times D_c$$

Where:

- A = area of substrate, in cm^2 (or in^2)
- C = amount of Ink added to the substrate, in g
- D_c = density of Ink, in g/cm^3 (or g/in^3)
- F = manufacturer’s recommended film thickness, in cm (or in)

- (107) “Thinner” – A Solvent that is used to dilute Coatings or Inks to reduce viscosity, color strength, and/or solids, or to modify drying conditions.
- (108) “Transfer Efficiency” – Ratio of the weight or volume of Coating solids adhering to an object to the total weight or volume, respectively, of coating solids used in the application process expressed as a percentage.
- (109) “Ultraviolet (UV) Ink” – An Ink which dries by polymerization reaction by UV or electron beam radiation.
- (110) “United States Environmental Protection Agency (USEPA)” – The United States Environmental Protection Agency, the Administrator of the USEPA and his or her authorized representative.
- (111) “Volatile Organic Compound (VOC)” – Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions and those compounds listed in 40 CFR 51.100(s)(1).
- (112) “Wash Primer” – A material used to clean and/or to activate surfaces of paper or fabric that contains no more than five (5) percent, by weight, solid materials.
- (113) “Waste Solvent Material” – Any Solvent which may contain dirt, oil, metal particles, sludge, and/or waste products, or wiping material containing VOCs including, but not limited to, paper, cloth, sponge, rag, or cotton swab used in Solvent Cleaning.
- (114) “Web” – A continuous sheet of substrate.
- (115) “Web Splicing Adhesive” – An adhesive used to join two (2) continuous rolls of substrate material.
- (116) “Wipe Cleaning” – A Solvent Cleaning activity performed by hand rubbing an absorbent material such as a rag, paper, sponge, brush or cotton swab containing Solvent.

(C) Requirements

(1) VOC Content of Graphic Arts Materials

An Operator performing a Graphic Arts Printing Operation, not subject to (C)(2) or (C)(3), shall not apply any Graphic Arts Material, including any VOC-containing materials added to the original Graphic Arts Materials supplied by the manufacturer, which contains a total VOC in excess of the limits specified in Table 1 and Table 2 in accordance with the specified date:

Table 1

VOC Content Limits for Adhesives, Coatings and Inks		
Material	Grams of VOC per Liter (lb/gal) Less Water and Less Exempt Compounds, as applied, effective through 11/30/2014	Grams of VOC per Liter (lb/gal), Less Water and Less Exempt Compounds, as applied, effective on and after 12/01/2014
Flexographic Ink on Porous Substrates	n/a	225 (1.88)
Printing Ink	300 (2.5)	300 (2.5)
Coating	300 (2.5)	300 (2.5)
Adhesive	300 (2.5)	150 (1.25)
Web Splicing Adhesive	n/a	150 (1.25)

Table 2

VOC Content Limits for Fountain Solutions		
Fountain Solution used in:	Total Grams of VOC per Liter (lb/gal) including any VOC containing materials added to the original Fountain Solution, effective through 11/30/2014	Percent VOC by volume, effective on and after 12/01/2014
Heatset Web Offset Lithographic Printing	100 (0.83)	1.6
Non-Heatset Web Offset Lithographic Printing	100 (0.83)	5.0
Sheet-fed Offset Lithographic Printing with maximum sheet size no greater than 11 x 17 inches	100 (0.83)	5.0
All other presses	100 (0.83)	8.0

- (a) On and after 12/01/2014, an Operator performing Non-Heatset Web Offset Lithographic Printing shall use Fountain Solution that is five percent (5%) alcohol substitute or less, by weight, and shall have no alcohol in the Fountain Solution.
- (2) Flexographic Specialty Ink
- (a) An Operator using a Flexographic Printing Operation shall not use a Specialty Ink in excess of the VOC limit in Table 3, and shall not use more than two (2) gallons of Specialty Inks in a calendar day and 120 gallons of Specialty Ink in a calendar year.

Table 3

VOC Content Limits for Flexographic Specialty Ink	
Material	Grams of VOC per Liter (lb/gal), Less Water and Less Exempt Compounds, as applied, effective on and after 12/01/2014
Metallic Ink	460 (3.8)
Matte Finish Ink	535 (4.5)
Metallic Ink and Matte Finish Ink on Flexible Package Printing	383 (3.2)

- (b) On and after 12/01/2014, facilities with the Potential to Emit or with actual emissions of at least ten (10) tons VOC in any calendar year shall not use Specialty Inks with VOC content greater than 300 grams VOC per liter, less water and less Exempt Compounds, as applied.
- (3) Paper, Film, Foil or Fabric Coating Operations
- (a) An Operator shall not use any Coating in any Paper, Film, Foil or Fabric Coating Application Process, with or without Ovens, unless:
- (i) The Coating contains less than 265 Grams of VOC Per Liter (2.2 lb/gal), Less Water and Less Exempt Compounds, as applied, as applied; or
 - (ii) VOC emissions are collected and reduced by an approved emission control system pursuant to subsection (C)(4).
- (b) An Operator shall not use or apply any Plastisol to any paper, film, foil or fabric substrate unless the Coating contains less than 20 Grams of VOC Per Liter (0.16 lb/gal), Less Water and Less Exempt Compounds, as applied.
- (c) An Operator shall not use any Wash Primer on any paper, film, foil or fabric used in any Paper, Fabric, Foil or Fabric Coating Application Process, with or without Ovens, unless:
- (i) The Wash Primer contains less than 265 Grams of VOC Per Liter (2.2 lb/gal) of Material used; or
 - (ii) VOC emissions are collected and reduced by an approved emission control system pursuant to subsection (C)(4).
- (4) Approved VOC Emission Control System
- (a) In lieu of the requirements of subsections (C)(1), (C)(2) or (C)(3), emissions of VOC may be controlled by an emission capture and control system, which reduces emissions of VOCs to the atmosphere, provided that:

- (i) The VOC emission control system is approved by the APCO.
- (ii) During continuous operation, not to exceed 24 hours, the VOC emission control system shall have a minimum Overall Capture and Control Efficiency as specified in Table 4, in accordance with the corresponding effective date.
- (iii) 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.
- (iv) During any period of operation of a thermal incinerator, combustion temperature shall be continuously monitored.
- (v) During any period of operation of a catalytic incinerator, exhaust Gas temperature shall be continuously monitored.
- (vi) Appropriate permit(s) for the emission capture and control system are obtained pursuant to District regulations.
- (vii) The VOC emission control system shall reduce VOC emissions, at all times, to a level that is not greater than the emissions which would have been achieved through the use of compliant materials, compliant equipment or compliant work practices in subsections (C)(1), (C)(2), (C)(3) and(C)(7).

Table 4

VOC Emission Control System Overall Capture and Control Efficiency		
Process or Solution	Overall VOC Capture and Control Efficiency %, by weight, effective through 11/30/2014	Overall VOC Capture and Control Efficiency %, by weight, effective on and after 12/01/2014
Flexography	67%	(See Flexible Package Printing)
Publication Gravure	75%	85%
Packaging Gravure	67%	75%
Lithography	67%	75%
Letterpress	67%	75%
Flexible Package Printing (All Technologies)	n/a	80%
Fountain Solution	67%	75%

The required minimum overall efficiency of an emission control system at which an equivalent VOC emission will be achieved, compared to the emissions achieved through compliance with subsections (C)(1), (C)(2) and/or (C)(3), shall be calculated by the following equation:

$$M.C..E. = \left[1 - \left\{ \frac{(VOC_{LWc})}{(VOC_{LWn,Max})} \times \left(\frac{1 - \left(\frac{VOC_{LWn,Max}}{D_{n,Max}} \right)}{1 - \left(\frac{(VOC_{LWc})}{880 \text{ g / L}} \right)} \right) \right\} \times 100 \right]$$

Where: MCE	=	Minimum Control Device Efficiency, percent.
VOC _{LWc}	=	VOC Limit of Rule 1130, less water and less Exempt Compounds, pursuant to paragraphs (C)(1), (C)(2) and/or (C)(3).
VOC _{LWn,Max}	=	Maximum VOC content of non-compliant Graphic Arts Materials used in conjunction with a Control Device, less water and Exempt Compounds, in g/L.
D _{n,Max}	=	Density of VOC Solvent, reducer, or Thinner contained in the non-compliant graphic arts materials containing the maximum VOC, in g/L.

(b) Paper, Film, Foil or Fabric

An Operator may comply with the requirements (C)(3)(a), (C)(3)(c) or (C)(4)(a) through (C)(4)(c) by using an Approved VOC Emission Control System consisting of collection and control devices, which are approved, in writing, by the APCO and operated subject to the following:

- (i) The emission collection system shall collect at least 90 percent, by weight, of the emissions generated by the source of emissions.
- (ii) The control device shall reduce emissions from an emission collection system by at least 95 percent, by weight, or the output of the control device is 50 ppm, by volume, calculated as carbon, with no dilution.

(c) Heatset Web Offset Lithographic or Letterpress

On or after 12/01/2014, an Operator performing Heatset Web Offset Lithographic or Letterpress Printing that has a Potential to Emit greater than 25 ton per year prior to controls shall use an add-on Control Device on the Dryers as follows:

- (i) Heatset Web Offset Lithographic or Letterpress printer Control Devices installed on or prior to 11/30/2014 shall have an Overall Capture and Control Efficiency of 90 percent.
- (ii) Heatset Web Offset Lithographic or Letterpress printer Control Devices installed on or after 12/01/2014 shall have an Overall Capture and Control Efficiency of 95 percent.

(5) Coating Application Equipment

No Operator shall apply Coatings unless Coatings are applied with equipment operated according to manufacturer's specifications, and only by the use of one of the following types of Coating Application Equipment:

- (a) Flow Coater;
 - (b) Roll Coater;
 - (c) Dip Coater;
 - (d) Foam Coater;
 - (e) Die Coater;
 - (f) Hand Application Methods; or
 - (g) HVLP spray for air dried coatings.
 - (i) For HVLP spray guns manufactured prior to January 1, 1996, the End-User shall demonstrate that the gun meets HVLP spray equipment standards. Satisfactory proof will be either in the form of manufacturer's published technical material or by a demonstration using a certified air pressure tip gauge, measuring the air atomizing pressure dynamically at the center of the air cap and at the air horns.
 - (ii) A person shall not sell or offer for sale for use within the District any HVLP spray gun without a permanent marking denoting the maximum inlet air pressure in psig at which the gun will operate within the parameters specified in subsection (B)(49).
 - (h) Such other alternative spray application methods as are demonstrated in accordance with the provisions of subsection (H)(8), to be capable of achieving equivalent or better Transfer Efficiency than the application method in subsection (C)(5)(g), and for which written approval of the APCO has been obtained.
 - (i) Other Coating application methods which are demonstrated to the APCO to be capable of achieving at least 65 percent Transfer Efficiency as determined in accordance with Section (H)(8). Prior written approval from the APCO shall be obtained for each alternative method used.
 - (j) In lieu of complying with subsections (C)(5)(a) through (C)(5)(i), an Operator may control emissions from the Coating Application Equipment with a VOC emission control system that meets the requirements of subsection (C)(4).
- (6) Alternative Emission Control Plan
- A person may comply with the provisions of subsections (C)(1), (C)(2) or (C)(3) by means of an Alternative Emission Control Plan (AECPP) pursuant to District Rule 108 – *Alternative Emission Control Plans*.
- (7) Solvent Cleaning Operations and 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 exempt from all or a portion of this rule shall comply with the provisions of Rule 1171 – *Solvent Cleaning Operations*.

- (a) An Operator shall not use Solvents for Cleaning Operations that exceed the VOC content limits specified in Table 5 in accordance with the corresponding effective date.

Table 5

VOC Content Limits for Solvent Cleaning	
Type of Solvent Cleaning Operation	VOC Content Limit Grams of VOC per liter of material (lb/gal), effective on and after 12/01/2014
A. Product cleaning during Manufacturing Process; or Surface Preparation for Adhesive, Coating or Ink application	25 (0.21)
B. Repair and Maintenance Cleaning	25 (0.21)
C. Cleaning of Adhesive or Coating Application Equipment	25 (0.21)
D. Cleaning of Ink Application Equipment	25 (0.21)
1. General	25 (0.21)
2. Flexographic Printing	25 (0.21)
3. Specialty Flexographic Printing	100 (0.83)
4. Gravure Publication	
a. Publication	100 (0.83)
b. Packaging	25 (0.21)
5. Lithographic (Offset) or Letterpress Printing	
a. Roller Wash – Step 1	100 (0.83)
b. Roller Wash – Step 2; Roller wash – not specified; Blanket Wash, and On - press components	100 (0.83)
c. Removable Press Components	25 (0.21)
6. UV Ink/Electron Beam Ink Application Equipment	100 (0.83)

- (b) The following Solvent Cleaning Operations may be performed outside of an APCO-approved VOC emission control system and using a Solvent with VOC content greater than 25 g/L, so long as the VOC content is not greater than the limit in Table 5:

- (i) Wipe Cleaning;
 - (ii) Application of Solvent from hand-held spray bottles from which Solvents are dispensed without a propellant induced force;
 - (iii) Non-Atomized Solvent Flow method in which the cleaning Solvent is collected in a container or a collection system which is closed except for Solvent collection openings and, if necessary, openings to avoid excessive pressure build-up inside the container; or
 - (iv) Solvent Cleaning method in which the Cleaning Solvent is discharged into a container that is closed except for Solvent collection openings and, if necessary, openings to avoid excessive pressure build-up inside the container. The discharge Solvent from the equipment must be collected into containers without atomizing into the open air. The Solvent may be flushed through the system by air or hydraulic pressure, or by pumping.
- (c) Solvent shall not be atomized into the open air unless it is vented to a VOC emission control system that complies with subsection (C)(4). This provision shall not apply to printing Operations where the roller of Blanket Wash is applied automatically and the cleaning of nozzle tips of automated spray equipment systems, except for robotic systems, and cleaning with spray bottles or containers described in subsection (C)(7)(b)(ii).
- (d) An Operator shall not use VOC-containing materials to clean spray equipment used for the application of Adhesives, Coatings or Ink unless an enclosed system or equipment that is proven to be equally effective at controlling emissions is used for cleaning. If an enclosed system is used, it must totally enclose spray guns, cups, nozzles, bowls and other parts during washing, rinsing and draining procedures, and it must be used according to the manufacturer's recommendations and must be closed when not in use.
- (e) In lieu of complying with the provisions of subsections (C)(7)(a) through (C)(7)(d), an Operator may control emissions from Solvent Cleaning Operations with an APCO-approved VOC emission control system that meets the requirements of subsection (C)(4).
- (8) An Operator shall store or dispose of fresh or spent Solvents, Waste Solvent Materials, Coatings, Adhesives, catalysts, Thinners and Ink in Non-Absorbent, Non-Leaking Containers, which shall be kept closed except when adding or removing material, during cleaning Operations, or when the container is empty.
- (9) VOC material wastes (including but not limited to liquid wastes, rags and packaging) shall be disposed of in a manner consistent with federal, state and local hazardous waste regulations.
- (10) The manufacturer of any Coating, Adhesive or Ink, except Thin Film UV Ink, which is sold, offered for sale or supplied for use in Packaging Gravure, Publication Gravure or Flexographic Printing Operations in the District shall

include the following information on the product container or Material Safety Data Sheets (MSDS) supplied with the product:

- (a) Material name; manufacturer identification; specific mixing instructions; density; and, VOC content, as applied.
- (b) The VOC content of Inks (except Thin Film UV Ink), Coatings and Adhesives expressed as defined in subsection (B)(41).

(11) Work Practices

- (a) An Operator shall properly use and properly operate all graphic arts printing technologies as directed and/or specified by the manufacturer of the printer or Graphic Arts Material.
- (b) Solvent containers and mixing tanks must be kept closed or covered except when filling, draining, or conducting cleaning operations.
- (c) Used shop towels, rags and wipes shall be kept in closed containers.
- (d) Spray guns shall be cleaned in an enclosed system.
- (e) Recycled Solvents shall be used for cleaning if available and practical.
- (f) Cleaning materials shall be conveyed from one location to another in closed containers or pipes.

(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 subsection (C)(1), (C)(2), (C)(3) or subsection (I)(3)(s)(iii) for the specific application.
- (2) On and after 12/01/2014, 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 subsection (C)(1), (C)(2), (C)(3) or subsection (I)(3)(s)(iii) for the specific application.

(E) Recordkeeping Requirements

Unless otherwise noted or as required pursuant to District Rule 109 – *Recordkeeping for Volatile Organic Compound Emissions*, all VOC content and density values recorded pursuant to the requirements of this rule shall be for the material as applied. Graphic Arts Printing Operations subject to this rule shall maintain the following records and information:

- (1) For each Ink, Coating, Adhesive, Fountain Solution, Wash Primer, and Solvent in use and in storage:
 - (a) A Material Safety Data Sheet (MSDS) or product data sheet giving material name, manufacturer identification, specific mixing instructions, and density; and
 - (b) VOC content, as applied.

(2) Compliant Materials Records

If only Inks, Coatings, and Adhesives meeting the specification found in Section (C) are used:

- (a) Records on a daily basis showing the amount of Ink used. Ink use records shall be maintained using one of the following options:
 - (i) Group the quantity of all Inks used and identify the maximum VOC content figure and use the minimum density of 1,010 grams per liter (8.44 lb/gal);
 - (ii) Itemize Process Inks and Pantone Inks separately and use the specific VOC content and density value for each Process Ink, and the highest VOC content and the maximum density of 1,010 gram per liter (8.44 lb/gal) for Pantone Inks;
 - (iii) Report Process Inks and Pantone Inks separately and use the maximum VOC content and minimum density value for both process and Pantone Inks, or use the density of 1,010 gram per liter (8.44 lb/gal) for Pantone Inks; or
 - (iv) Itemize each Ink and Pantone Ink and use the specific VOC content and density value for each.
- (b) Records on a daily basis showing the amount of Coating, Adhesive, Wash Primer, and Solvent (including cleaning Solvent) used. Itemize each Coating, Adhesive, Wash Primer, and Solvent and use the specific VOC content and density value for each.
- (c) Record, on a daily basis, the type, amount, and percent VOC by volume of Fountain Solution used.

(3) Non-Compliant Materials Records

If Inks, Coatings, Adhesives, Fountain Solutions, Wash Primers, and Solvents (including non-compliant cleaning Solvent) which do not meet the specifications found in Section (C) are used and compliance is achieved through the use of add-on emission control equipment pursuant to subsection (C)(4):

- (a) Records on a daily basis showing the type and amount of Inks, Coatings, Adhesives, Fountain Solutions, Wash Primers, and Solvents (including non-compliant cleaning Solvent) used and itemized using the specific VOC content and density value for each.

- (b) Daily records of Key System Operating Parameters which will demonstrate continuous Operation and compliance of the emission Control Device during periods of emission producing activities. Key System Operating Parameters are those necessary to ensure compliance with VOC capture and control requirements pursuant to subsection (C)(4) (including but not limited to temperatures, pressures, and flow rates). Such records shall be kept in the form and manner as prescribed by the APCO.
- (4) Records for Flexographic Specialty Inks
- If flexographic Specialty Inks are used pursuant to subsection (C)(2), record, on a daily basis, the type and amount of each Specialty Ink used.
- (5) Digital Printing Records
- (a) On or after 12/01/2014, Digital Printing Operations shall keep records in accordance with subsection (E)(5)(b) for each Digital Printer that:
 - (i) Uses Solvent-based Inks and has a print capacity of 1,000 ft²/hr or more; or
 - (ii) Uses water-based Inks, or UV Inks and has a print capacity of 10,000 ft²/hr or more,
 - (b) Operators with printers Subject to subsection (E)(5)(a) shall keep the following records:
 - (i) A current file of Inks, Coatings, Adhesives, and Solvents in use and in storage. The file shall include a MSDS or product data sheet showing the material name, manufacturer's name, VOC content as applied, specific mixing instructions, and density.
 - (ii) Monthly records of the type, and amount of each Ink, Coating, and/or Adhesive used.
 - (iii) Monthly records of the type, and amount of Solvent used for thinning the Ink, Coating, or Adhesive, and for cleaning.
- (6) If the Facility is claiming exempt status pursuant to Section (I), the Facility shall maintain adequate records on a daily or as-used basis to demonstrate the exempt status. The Operator who becomes subject to the emission limits/standards of this rule through loss of exemption in Section (I) shall not operate the subject equipment, except as required for obtaining a new or modified Permit-to-Operate, until the Operator demonstrates that the Operation is in full compliance with the requirements of this rule.
- (7) Any record required or produced pursuant to this rule shall be retained on site for a minimum of five (5) years and shall be made available to the APCO, CARB, or USEPA upon request.

(8) Determination of VOC Emissions from Inks Used in a Lithographic Printing Operation

For the purposes of determining compliance with emissions limits, and determining eligibility for exemption under subsections (I)(1), (I)(3)(h) and (I)(3)(m) of this rule, the amount of VOC emitted from Heatset Web and Non-Heatset Web Inks used shall be discounted by the following Substrate Retention Factors: 20 percent for Heatset Web Inks and 95 percent for Non-Heatset Web Inks. These Substrate Retention Factors shall not be used when determining compliance of Inks with applicable VOC content limits specified in this rule, and Heatset Web and Non-Heatset Web Inks shall meet the VOC content limits specified in subsection (C)(1), Table 2.

(F) Rule 442 Applicability

Any Graphic Arts Printing Operation 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 – *Usage of Solvents*.

(G) Emission Reduction Credits

The calculations for emission reduction credits issued pursuant to District Rule 1309 – *Emission Reduction Credits* for Matte Finish and Metallic Inks shall be based on a maximum VOC limits specified in subsection (C)(2) Table 3 (less water and less Exempt Compounds) irrespective of the VOC limits specified in subsection (I)(3)(s)(iii).

(H) Test Methods

The VOC content of materials subject to the provisions of this rule and Overall Capture and Control Efficiency of VOC emission control systems shall be determined by the following test methods specified in Sections (H)(1) through (H)(9), District Rule 109 – *Recordkeeping for Volatile Organic Compound Emissions*, or alternative test methods approved by the APCO, USEPA, and CARB.

- (1) Except for UV Inks, the VOC content of Inks, Adhesives, Fountain Solutions, Solvents and Coatings shall be determined by using EPA Method 24 or 24A as applicable; or South Coast Air Quality Management District (SCAQMD) Laboratory Methods of Analysis for Enforcement Samples, February 1997, Method 304-91 – *Determination of Volatile Organic Compounds (VOC) in Various Materials*, February 1, 1996.
- (2) The VOC content of UV Inks, except for Thin Film UV Inks, shall be determined by using American Society of Testing and Materials (ASTM) D5403-93 (2013) (Test Methods for Volatile Content of Radiation Curable Materials).
- (3) Exempt Compound Content: Exempt compound content shall be determined by using ARB Method 432, “Determination of Dichloromethane and 1,1,1-Trichlorethane in Paints and Coatings,” September 12, 1989; ARB Method 422

“Determination of Volatile Organic Compounds in Emission from Stationary Sources,” September 12, 1990; or, SCAQMD Method 303-91 “Determination of Exempt Compounds,” August 1, 1996.

(4) 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 Section (C) and subsection (I)(3)(s)(iii), 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.

(5) The content of silicon dioxide as a flattening agent in a Matte Finish Ink shall be determined by using ASTM D717-86 (2008) (Standard Test Methods for Analysis of Magnesium Silicate Pigment).

(6) The metal content of Metallic Inks shall be determined by SCAQMD Test Method 318-95 -- Determination of Weight Percent Elemental Metal In Coatings by X-Ray Diffraction, July 1, 1996.

(7) Determination of emissions of VOC from spray gun cleaning systems shall be made using SCAQMD method “General Test Method for Determining Solvent Losses from Spray Gun Cleaning Systems”, October 3, 1989.

(8) The Transfer Efficiency of alternative Coating Application Equipment shall be determined in accordance with the SCAQMD method “Spray Equipment Transfer Efficiency Test Procedure for Equipment User,” May 24, 1989.

(9) Determination of Overall Capture and Control Efficiency of VOC Emission Control Systems.

(a) The Capture Efficiency of a VOC emission control system’s collection device(s) shall be determined according to EPA’s “Guidelines for Determining Capture Efficiency,” January 9, 1995 and 40 CFR 51, Appendix M, Test Methods 204-204F, as applicable. Individual Capture Efficiency test runs subject to the USEPA technical guidelines shall be determined by:

- (i) SCAQMD “Protocol for Determination of Volatile Organic Compounds (VOC) Capture Efficiency, May 1995”; or
- (ii) Any other method approved by the USEPA, CARB, and the APCO.

(b) The Control Device Efficiency of a VOC emission control system’s VOC Control Device(s) as and the VOC content in the Control Device exhaust

gases, measured and calculated as carbon, shall be determined by USEPA Test Methods 2, 2A, or 2D for measuring flow rates and EPA Method 25, 25A, 25B or SCAQMD Method 25.1 – “Determination of Total Gaseous Non-Methane Organic Emissions as Carbon, February 26, 1991” as applicable. USEPA Test Method 18, or ARB Method 422 shall be used to determine emissions of Exempt Compounds.

- (c) For VOC emission control systems that consist of a single VOC emission collection device connected to a single VOC emission Control Device, the Overall Capture and Control Efficiency shall be calculated by using the following equation:

$$CE_{\text{Capture,Control}} = \left[CE_{\text{Capture}} \times CE_{\text{Control}} \right] / 100$$

Where:

- $CE_{\text{Capture,Control}}$ = Overall Capture and Control Efficiency, in percent
 CE_{Capture} = Capture Efficiency of the collection device, in percent, as determined in subsection (H)(9)(a)
 CE_{Control} = Control Efficiency of the Control Device, in percent, as determined in subsection (H)(9)(b).

- (d) The following equation shall be used to determine if the minimum required Overall Capture and Control Efficiency of an emission control system is at an equivalent or greater level of VOC reduction as would be achieved using compliant materials, equipment, or work practices, as stated in subsection (C)(4)(a).

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

Where:

CE	=	Minimum Required Overall Capture and Control Efficiency, percent
VOC _{LWc}	=	VOC Limit, less water and less Exempt Compounds
VOC _{LWn,Max}	=	Maximum VOC content of noncompliant Ink (or Coating or Adhesive) used in conjunction with a Control Device, less water and less Exempt Compounds
D _{n,Max}	=	Density of Solvent, reducer, or Thinner contained in the noncompliant Ink (or Coating or Adhesive), containing the maximum VOC content of the multi-component Ink (or Coating, or Adhesive) printing Line
D _c	=	Density of corresponding Solvent, reducer, or Thinner used in the compliant Ink (or Coating, or Adhesive) system = 880 gm/liter

(10) 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 APCO may also be used.

(11) 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.

(12) Test Methods Dates

All test methods referenced in this section shall be the most recent approved versions. The APCO 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) The requirements of this rule, except for the recordkeeping requirements of subsection (E)(6), shall not apply to the following Operations except for Paper, Film, Foil or Fabric Coating Operations:

(a) Effective through 11/30/2014, any Graphic Arts Printing Operation which emits less than 400 pounds of VOC per calendar month.

- (b) On or after 12/01/2014, any Graphic Arts Printing Operation that emits less than 200 pounds of VOC per 12 rolling consecutive calendar months.
- (2) The following exemptions apply to Paper, Film, Foil or Fabric Coating Operations only:
- (a) The provisions of subsection (C)(5) shall not apply to the application of materials that contain less than 20 g/L of VOC per liter of material.
 - (b) The provisions of subsection (C)(3) shall not apply to laboratories which apply less than two (2) gallons per day of coatings to test specimens for purposes of testing for production-related operations, Research and Development, or quality control.
 - (c) The provisions of subsection (C)(3) shall not apply to laboratories located at facilities that manufacture reinforced plastic, structural materials which apply less than three (3) gallons per day of coatings to test specimens for either testing for production-related operations, Research and Development, or quality control.
- (3) The requirements of this rule shall not apply to:
- (a) All Proof presses.
 - (b) Any Facility which emits eight (8) pounds or less of VOC per day from Graphic Arts Printing Operations and related Solvent Cleaning Operations subject to Rule 1171 - *Solvent Cleaning Operations*.
 - (c) Coating operations subject to other rules of Regulation XI – *Source Specific Standards*.
 - (d) Solar-control window film.
 - (e) Heat-applied transfer decals.
 - (f) Graphic arts on ceramic materials.
 - (g) Circuitry printing.
 - (h) Blanket Repair Material used in containers of four (4) ounces or less.
 - (i) Sterilization Indicating Inks.
 - (j) The application of Coatings and use of cleaning Solvents in creating Fine Art Paintings, or to scenic or theatrical backgrounds for motion pictures, television and theater.
 - (k) Stripping of Cured Adhesives, Cured Coatings, and Cured Inks, except the Stripping of such materials from spray Application Equipment.

- (l) Cleaning Operations in printing pre-press or graphic arts pre-press areas, including the cleaning of film processors, color scanners, plate processors, films, and plates.
- (m) Digital Printers and Digital Printing Operations except for recordkeeping requirements in Section (E)(5).
- (n) This rule shall not apply to laboratory tests or analyses, Bench Scale, or Research and Development Projects.
- (o) This rule shall not limit the VOC content of Thin Film UV Inks.
- (p) Cleaning materials with a VOC composite vapor pressure less than 8 mm Hg at 20° C are exempt from subsection (C)(7)(a) of this rule.
- (q) The prohibition specified in subsections (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 subsection (C)(4), or complying under subsection (C)(6).
- (r) The prohibition specified in Section (D) shall not apply to Graphic Arts Materials which will be used solely outside of the District.
- (s) The provisions of subsection (C)(2) shall not apply to Matte Finish and Metallic Inks provided that:
 - (i) The usage of Matte Finish or Metallic Inks each shall not exceed two (2) gallons per day and 120 gallons per calendar year at a Facility; and
 - (ii) 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, but 300 grams per liter after 12/01/2014; and
 - (iii) The VOC content of Matte Finish and Metallic Inks on non-flexible substrates do not exceed 535 and 460 grams per liter (less water and less Exempt Compounds) respectively; and
 - (iv) 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
 - (v) Facilities operating under the provisions of subsection (I)(3) whose actual emissions exceed ten (10) tons in any calendar year shall henceforth be subject to the requirements of subsection (C)2; and

- (vi) In addition to the requirements of Section (E), Facilities shall retain records of purchase orders and invoices of VOC-containing materials for a minimum of five (5) years.
- (t) The provisions of this rule shall not apply to Aerosol Coating Products.

See SIP Table at <http://www.avaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=921>

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