

RULE 1117

Graphic Arts and Paper, Film, Foil and Fabric Coatings

(A) General

(1) Purpose

- (a) To reduce emissions of Volatile Organic Compounds (VOC) from Graphic Arts Printing Operations, 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, and Paper, Film, Foil or Fabric Coating Operation and to the Solvent cleaning materials and processes associated with such Operations.
- (b) This rule is applicable to any person who 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.

(B) Definitions

For the purposes 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 Product” – A hand-held, non-refillable container that expels a pressurized Solvent-containing product by means of a Propellant induced force.
- (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) “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.
- (5) “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.

- (6) “Blanket Repair Material” – The material used in Offset Lithographic Printing to correct low spots in the press Blanket.
- (7) “Blanket Wash” – A Solvent used to remove Ink from the Blanket of a press.
- (8) “California Air Resources Board (CARB)” – The California State Air Resources Board the powers and duties of which are described in Part 2 of Division 26 of the California Health & Safety Code (commencing with Section 39500).
- (9) “Capture Efficiency (CE)” – 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 the Operation, 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 from the Operation

- (10) “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.
- (11) “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.
- (12) “Control Device” – Equipment such as an incinerator or adsorber, or cooler/condenser filtration used to prevent air pollutants from being emitted into the atmosphere.
- (13) “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:

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

Where:

W_c = Weight of VOC entering Control Device

W_d = Weight of VOC discharged from the Control Device

- (14) “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, Letterpress, and Screen Printing.
- (15) “Cured Adhesive, Cured Coating, or Cured Ink” – An Adhesive, Coating, or Ink that is dry to the touch.
- (16) “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.
- (17) “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 materials. Digital printing technologies include, but are not limited to, various forms of Ink Jet, Thermography, Electrophotography, Ionography, and Magnetography.
- (18) “Digital Printing Operations” – Those 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.
- (19) “Dip Coater” – A type of Application Equipment that coats an object by submerging the object in a vat of Coating, and subsequently withdrawing the object and draining off the excess Coating.
- (20) “Doctor Blade” – A steel blade used to scrape excess Ink from a printing plate or inking cylinder.
- (21) “Dryer” – A hot air, high velocity system used to dry Inks on printed or coated substrate.
- (22) “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.
- (23) “Electron Beam Ink” – Ink that, when exposed to electron energy, crosslinks or solidifies in milliseconds.
- (24) “Electron Charge Deposition Printing” – See Ionography
- (25) “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.

- (26) “Electrostatic Application” – A method of applying Coating whereby atomized paint droplets are charged and subsequently deposited on the substrate by electrostatic attraction.
- (27) “Exempt Compound” – Those compounds listed in 40 Code of Federal Regulations (CFR) 51.100(s)(1).
- (28) “Extreme Performance Ink/Coating” – An Ink or Coating used in Screen Printing on a Non-Porous Substrate that is designed to resist or withstand any of the following:
 - (a) More than two years of outdoor exposure; or
 - (b) Exposure to industrial-grade chemicals, Solvents, acids, detergents, oil products, cosmetics, temperatures exceeding 170°F, vacuum-forming, embossing or molding.
- (29) “Fabric Coating” – Any decorative or protective Coating or reinforcing material applied or impregnated into textile fabric, vinyl coated textile fabric, or vinyl sheets.
- (30) “Film Coating” – A 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.
- (31) “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.
- (32) “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.
- (33) “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.
- (34) “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.

- (35) “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.
- (36) “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.
- (37) “Fountain Solution” – Solution composed mainly of water and contains at least one of the following materials: etchants such as mineral salts; hydrophilic gums; or other additives, which is applied to the image plate to maintain the hydrophilic properties of the non-image areas.
- (38) “Fugitive Emissions” – Uncollected emissions of VOC from any portion of the printing, Coating or Laminating Operation other than from the Dryer.
- (39) “Grams of VOC per Liter of Ink, Coating, Adhesive, or Wash Primer Less Water and Less Exempt Compounds (VOC Content)” – The weight of VOCs emitted during use, Coating, curing or drying per combined volume of VOC and of Ink, Coating, Adhesive, or Wash Primer solids and can be calculated by the following equation:

$$\frac{\text{Grams VOC}_{(\text{less water and exempt compounds})}}{\text{Liter of Coating}} = \left[\frac{(W_s - W_w - W_{es})}{(V_m - V_w - V_{es})} \right]$$

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

- (40) “Grams of VOC Per Liter of Material” – The weight of VOC per volume of material and to be calculated by the following equation:

$$\text{Grams of VOC per Liter of Material} = \left[\frac{(W_s - W_w - W_{es})}{V_m} \right]$$

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 materials, in liters

- (41) “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.
- (42) “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.
- (43) “Gravure Printing” – An Intaglio Printing Operation in which the Ink is transferred from minute etched wells on a cylinder to the substrate, which is supported by an impression roller, with excess Ink removed from the cylinder by a Doctor Blade.
- (44) “Hand Application Method” – A method of applying a Coating to a substrate using manually held, non-mechanically operated equipment. Such equipment includes paintbrushes, hand rollers, caulking guns, trowels, spatulas, syringe daubers, rags, and sponges.
- (45) “Heatset Ink” – A quick-drying Ink in which the Solvents are vaporized by passing the printed surface through a heater or Oven.
- (46) “High-Volume, Low-Pressure (HVLP) 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.
- (47) “Ink” – A pigmented and/or dyed liquid or paste used in a graphic arts operation typically for printing, impressing, or transferring an image onto a substrate.
- (48) “Ink Jet” – A digital printing technology in which Ink is ejected through printheads onto a substrate to create an image.
- (49) “Intaglio Printing” – Printing done from a plate or cylinder in which the image is sunk below (etched or engraved into) the surface.
- (50) “Ion Deposition Printing” – See Ionography
- (51) “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.

- (52) “Key System Operating Parameters” – Those parameters necessary to ensure compliance with (C)(6), including, but not limited to, temperature, pressure drop, and air flow rate.
- (53) “Lamination” – A process of bonding two or more layers of material to form a single, multiple-layer sheet by using an Adhesive.
- (54) “Letterpress Printing” – A printing method where the image area is raised relative to the non-image area and the Ink is transferred to the paper directly from the image surface.
- (55) “Line” – The minimum equipment which is required for the application, drying, and/or curing of Inks, Ultraviolet 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.
- (56) “Liquid Leak” – A visible Solvent leak from a container at a rate of more than three drops per minute, or a visible liquid mist.
- (57) “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 a 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 an 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.
- (58) “Lithographic Printing” – Printing by a planographic method in which the image and non-image areas are on the same plane.
- (59) “Magnetography” – A digital printing technology whereby an image is printed using a magnetic toner, electromagnetic write heads, and magnetic fields on an imaging drum.
- (60) “Maintenance Cleaning” – A Solvent cleaning Operation or activity carried out to keep tools, machinery, equipment (excluding Ink, Coating, or Adhesive Application Equipment) or general work areas in clean and good operational condition.
- (61) “Manufacturing Process” – The process of making goods or articles by hand or by machine.

- (62) “Matte Finish Ink” – A Specialty Ink which is applied on Non-Porous Substrates in Flexographic Printing Operations and contains at least five percent by weight silicon dioxide flattening agent.
- (63) “Metallic Finish Ink” – A Ink which is applied on Non-Porous Substrates in Flexographic Printing Operations and contains at least 28 percent by weight elemental metal particles.
- (64) “Metallic Ink” – A Specialty Ink containing at least 50 grams of elemental metal particles per liter of Ink (0.4 lb/gal) as applied and which is not used in the manufacture of an electronic circuit.
- (65) “Non-Absorbent Container” – A container made of non-porous material that does not allow the migration of Solvents through it.
- (66) “Non-Atomized Solvent Flow” – Solvents in the form of a liquid stream without the introduction of any Propellant.
- (67) “Non-Heatset Ink” – An Ink which dries by oxidation and/or absorption into the substrate without use of heat from Dryers or Ovens.
- (68) “Non-Leaking Container” – A container without Liquid Leak.
- (69) “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.
- (70) “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.
- (71) “On-Press Component” – A part, component, or accessory of a press that is cleaned while still being physically attached to the press.
- (72) “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.
- (73) “Operator” – Includes but is not limited to any person who owns, leases, supervises, or operates a facility and/or equipment.
- (74) “Oven” – A heating chamber which uses heat, ultraviolet (UV) radiation, or electron beam (EB) radiation to bake, cure, polymerize, or dry a surface Coating.

- (75) “Packaging Gravure” – Gravure Printing on paper, paperboard, foil, film or other substrates which are to be used to produce containers or packages.
- (76) “Pantone Ink” – An Ink created for color matching by combination of Process Inks.
- (77) “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.
- (78) “Plastisizer” – A material used to keep plastic material soft and viscous.
- (79) “Plastisol” – A Coating that is a liquid dispersion of small particles of resins and Plastisizers that are fused to become a plastic.
- (80) “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.
- (81) “Process Ink” – The hues yellow, magenta, and cyan, plus black used in the four-color print process.
- (82) “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.
- (83) “Propellant” – Any gas, including air, in a pressure container for expelling the contents when the pressure is released.
- (84) “Publication Gravure” – Gravure Printing on a substrate which is subsequently formed into books, magazines, catalogues, brochures, directories, newspaper supplements or other types of printed material.
- (85) “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.
- (86) “Repair Process” – The process of returning a damaged object or an object not operating properly to good condition.
- (87) “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.
- (88) “Resists” – Inks that are Screen Printed to form the required patterns, alphabets, numerals, designs, or symbols on the surface of the substrate; protect the Screen

Printed or covered surface from the subsequent application of etching or plating solution; and are later removed from the substrate by a resist stripper. Resist applications include, but are not limited to, etched electronic circuits, display screens, chemical milling of parts, nameplates and signage.

- (89) “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.
- (90) “Roller Wash” – A Solvent used to remove Ink from the rollers of a press.
- (91) “Screen Printing” – A process where the Ink passes through a Web or a fabric to which a refined form of stencil has been applied. The stencil openings determine the form and dimensions of the imprint.
- (92) “Screen Printing Metallic Ink” – An Ink used in Screen Printing that contains greater than 50 grams of elemental metal per liter (0.4 lb/gal) of Ink as applied.
- (93) “Sign Ink/Coating” – An Ink or Coating used in Screen Printing indoor and outdoor signs (excluding structural components) and murals, including lettering enamels, poster colors, copy blockers, and bulletin enamels.
- (94) “Slit Coater” – See Die Coater
- (95) “Solvent” – Any liquid containing a volatile organic compound or combination of volatile organic compounds, which is used as a diluent, thinner, dissolver, viscosity reducer, cleaning agent, or for other similar uses.
- (96) “Solvent Flushing” – The use of a Solvent to remove uncured Adhesives, uncured Inks, uncured Coatings, or contaminants from the internal surfaces and passages of equipment by flushing Solvent, by a Non-Atomized Solvent Flow, through the equipment.
- (97) “Specialty Flexographic Printing” – A Flexographic Printing on polyethylene or polypropylene food packaging, fertilizer bags, or liquid-tight food containers.
- (98) “Specialty Gravure Printing” – Printing that uses the gravure process for production of wall and floor covering, decorated household paper products such as towels and tissues, cigarette filter tips, vinyl upholstery, woodgrains, and a wide variety of other products.
- (99) “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 5 percent silicon dioxide flattening agent, by weight.
- (100) “Stripping” – The use of Solvent to remove material such as Cured Adhesives, Cured Inks, cured or dried paint, cured or dried paint residue or temporary protective Coating.
- (101) “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.
- (102) “Surface Preparation” – The removal of contaminants from a surface prior to the application of Coatings, Inks, or Adhesives or before proceeding to the next step of a Manufacturing Process.
- (103) “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.
- (104) “Thin Film UV Ink” – An Ultraviolet Ink for which <0.2 g will cover an area of $\geq 225 \text{ cm}^2$ (35 in²), using the following formula:

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

Where:

- A = area of substrate in cm² (or in²)
 C = amount of Ink added to the substrate in g
 D_c = density of Ink in g/cm³ (or g/in³)
 F = manufacturer’s recommended film thickness in cm (or in)

- (105) “Thinner” – A Solvent that is used to dilute Coatings or Inks to reduce viscosity, color strength, and/or solids, or to modify drying conditions.
- (106) “Ultraviolet (UV) Ink” – An Ink which dries by polymerization reaction by ultraviolet or electron beam radiation.
- (107) “USEPA” – The United States Environmental Protection Agency, the Administrator of the USEPA and his or her authorized representative.
- (108) “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).

- (109) “Wash Primer” – A material used to clean and/or to activate surfaces of paper or fabric that contains no more than 5 percent, by weight, solid materials.
- (110) “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.
- (111) “Water Slide Decal” – A decal that is Screen Printed onto treated paper stock and is removable from the stock by the dissolution of an underlying water- soluble Adhesive or similar carrier.
- (112) “Web” – A continuous sheet of substrate.
- (113) “Web Feed” – An automatic system which supplies substrate from a Web.
- (114) “Web Splicing Adhesive” – An Adhesive used to join two continuous rolls of substrate materials.
- (115) “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) Graphic Arts Printing Operation
 - (a) An Operator performing a Graphic Arts Operation, not subject to (C)(2), (C)(3), (C)(4), and (C)(5), shall not use graphic arts materials containing VOC in excess of the limits in Table 1 and Table 2, in accordance with the effective date.

Table 1

VOC Content Limits for Inks, Coatings and Adhesives		
Material	Grams of VOC per liter (lb/gal), less water and less exempt compounds, as applied, effective through July 31, 2010	Grams of VOC per liter (lb/gal), less water and less Exempt Compounds, as applied, effective on and after August 1, 2010
Flexographic Ink on Porous Substrates	300 (2.5)	225 (1.88)
All other Inks	300 (2.5)	300 (2.5)
Coatings	300 (2.5)	300 (2.5)
Adhesives	300 (2.5)	150 (1.25)
Web Splicing Adhesives	300 (2.5)	150 (1.25)

Table 2

VOC Content Limits for Fountain Solutions	
Fountain Solution	Percent VOC by volume, effective on and after August 1, 2010
Heatset Web Offset Lithographic	1.6
Coldset Web Offset Lithographic	5.0
Sheet-fed Offset Lithographic with maximum sheet size greater than 11 x 17 inches	5.0
All other presses	8.0

- (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 Inks 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 August 1, 2010
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 August 1, 2010, facilities with the potential to emit or with actual emissions of at least 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 Exempt Compounds, as applied.
- (3) Coldset Web Offset Lithographic Fountain Solution
- (a) On and after August 1, 2010, an Operator performing coldset Web Offset Lithographic Printing shall use Fountain Solution that is five percent alcohol substitute or less, by weight, and shall have no alcohol in the Fountain Solution.
- (4) Screen Printing Operation
- (a) An Operator using a Screen Printing Operation shall not use graphic arts materials in excess of the VOC content limits, as applied, in Table 4.

Table 4

VOC Content Limits for Screen Printing Inks, Coatings, and Adhesives	
Material	Grams of VOC per liter (lb/gal), less water and less Exempt Compounds on and after August 1, 2010
Inks and Coatings, including Extreme Performance, Metallic and Sign/Ink	400 (3.3)
Adhesives	150 (1.25)
Resists	600 (5.0)

- (5) Paper, Film, Foil, or Fabric Coating Operations
- (a) An Operator using a Paper, Film, Foil, or Fabric Coating Operation shall not use any Coating or Wash Primer in excess of the VOC content limits, as applied, in Table 5.

Table 5

VOC Content Limits of Paper, Film, Foil, or Fabric Coating and Wash Primer		
Material	VOC Content Limit, effective through July 31, 2010	VOC Content Limit, effective on and after August 1, 2010
Coating	300 gm/liter (2.5 lb/gal) of Coating, less water and less Exempt Compounds	265 gm/liter (2.2 lb/gal) of Coating, less water and less Exempt Compounds
Wash Primer	300 gm/liter (2.5 lb/gal) of Coating, less water and less Exempt Compounds	265 gm/liter (2.2 lb/gal) of Coating, less water and less Exempt Compounds
Plastisols	—	20 gm/liter (0.16 lb/gal)

(b) On and after August 1, 2010, an Operator performing pressure sensitive tape and label surface Coating Operations shall not use any VOC content materials or combinations of materials that exceed a VOC content of either 0.20 kg of VOC/kg of solids (0.20 lb VOC/lb of solids), as applied, or an additional limit of 0.067 kg VOC/kg of Coating (0.067 lb of VOC/lb of Coating), as applied.

(6) Approved VOC Emission Control System

(a) Heatset Web Offset Lithographic or Letterpress

On or after August 1, 2010, an Operator performing Heatset Web Offset Lithographic or Letterpress Printing that has greater than 25 tpy potential to emit prior to controls shall use an add-on Control Device on the Dryers, as follows:

- (i) Heatset Web offset lithographic or letterpress printer Control Device installed on or prior to July 31, 2010 shall have an overall capture and control efficiency of 90 percent.
- (ii) Heatset Web offset lithographic or letterpress printer Control Device installed on or after August 1, 2010 shall have an overall capture and control efficiency of 95 percent.

(b) In lieu of the requirements of Subsection (C)(1), (C)(2), (C)(3), (C)(4) and (C)(5), emissions of VOC may be controlled by an emission capture and control system, which reduces VOC emissions to the atmosphere, provided that:

- (i) The VOC emission control system is approved, in writing, by the Air Pollution Control Officer (APCO).

- (ii) During continuous operation, not to exceed 24 hours, the VOC emission control system shall have a minimum overall VOC capture and control efficiency as specified in Table 6, in accordance with the corresponding effective date;

Table 6

VOC Emission Control System Overall Capture and Control Efficiency		
Process	Overall VOC capture and control efficiency %, by weight, effective through July 31, 2010	Overall VOC capture and control efficiency %, by weight, effective on and after August 1, 2010
Flexible Package Printing (All Technologies)	65%	80%
Publication Gravure	75%	85%
Flexographic Printing Operations	60%	n/a
Other Printing Operations	n/a	75%
Paper, Film, Foil, or Fabric Coating Operations	n/a	90%

- (c) 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,
 - (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) Appropriate permit(s) for the emission capture and control system are obtained pursuant to District regulations.
 - (g) 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 Sections (C)(1), (C)(2), (C)(3), (C)(4), (C)(5), and (C)(8).
- (7) 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) High-volume, low-pressure (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 (B)(46).
 - (h) 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 (F). Prior written approval from the APCO shall be obtained for each alternative method used.
 - (i) In lieu of complying with Section (C)(7)(a) through (C)(7)(h), an Operator may control emissions from the Coating Application Equipment with a VOC emission control system that meets the requirements of Section (C)(6).
- (8) Solvent Cleaning
- (a) An Operator shall not use Solvents for cleaning Operations that exceed the VOC content limits specified in Table 7 in accordance with the corresponding effective date.

Table 7

VOC Content Limits for Solvent Cleaning

Type of Solvent Cleaning Operation	VOC Content Limit grams of VOC/liter of material (Lb/gal), effective on and after July 1, 2011
A. Product Cleaning During Manufacturing Process; or Surface Preparation for Coating, Ink, or Adhesive Application	25 (0.21)
B. Repair and Maintenance Cleaning	25 (0.21)
C. Cleaning of Coating or Adhesive Application Equipment	25 (0.21)
D. Cleaning of Ink Application Equipment	
1. General	25 (0.21)
2. Flexographic Printing	25 (0.21)
3. Specialty Flexographic Printing	100 (0.83)
4. Gravure Printing	
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. Screen Printing	100 (0.83)
7. Ultraviolet Ink/Electron Beam Ink Application Equipment (except Screen Printing)	100 (0.83)

- (b) The following cleaning Operations may be performed outside of an APCO-approved VOC emission control system and using Solvent with VOC content greater than 25 g/L:
- (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 Flushing 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 discharged 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 Section (C)(6). This provision shall not apply to printing Operations where the roller or 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 Section (C)(8)(b)(ii).
 - (d) An Operator shall not use VOC-containing materials to clean spray equipment used for the application of Coatings, Adhesives, 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 Sections (C)(8)(a) through (C)(8)(d), an Operator may control emissions from cleaning Operations with an APCO-approved VOC emission control system that meets the requirements of Section (C)(6).
- (9) 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.
 - (10) 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.
 - (11) The manufacturer of any Ink, Coating, or Adhesive, 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 Sheet (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)(39).

(12) 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) Exemptions

- (1) The requirements of this rule, except for the recordkeeping requirements of Section (E)(6), shall not apply to the following Operations except for Paper, Film, Foil, or Fabric Coating Operations:
 - (a) Effective through July 31, 2010, any Graphic Arts Printing Operation which emits less than 400 pounds of VOC per calendar month.
 - (b) On or after August 1, 2010, any Graphic Arts Printing Operation that emits less than 200 pounds of VOC per 12 rolling consecutive calendar months.
- (2) The requirements of this rule shall not apply to:
 - (a) Proof Presses;
 - (b) The application of Coatings and use of cleaning Solvents in creating Fine Art Paintings;
 - (c) Stripping of Cured Coatings, Cured Adhesives, and Cured Inks, except the Stripping of such materials from spray Application Equipment;
 - (d) 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.
 - (e) Blanket Repair Materials used in containers of four (4) fluid ounces or less.

- (f) Digital Printers and Digital Printing Operations except for recordkeeping requirements in Section (E)(5).
- (g) Screen Printing of Waterslide Decals.
- (3) The provisions of Section (C) shall not apply to the application of Adhesives and Coatings via Aerosol Products.
- (4) This rule shall not apply to laboratory tests or analyses, Bench Scale, or Research and Development Projects.
- (5) This rule shall not limit the VOC content of Thin Film UV Inks.
- (6) Cleaning materials with a VOC composite vapor pressure less than 8 mm Hg at 20° C are exempt from Section (C)(8)(a) of this rule.

(E) Monitoring and Records

Unless otherwise noted, all VOC content and density values recorded pursuant to the requirements of this rule shall be for the material as applied. Graphic Arts and Paper, Film, Foil and Fabric Coating Operations subject to this rule shall maintain the following records and information:

- (1) For each Ink, Coating, and 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 Subsection (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 gm/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 gm/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 gm/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 Subsection (C) are used and compliance is achieved through the use of add-on emission control equipment pursuant to (C)(6):
- (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 (C)(6) (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 Section (C)(2), record, on a daily basis, the type and amount of each Specialty Ink used.
- (5) Digital Printing Records
- (a) On or after August 1, 2010, Digital Printing Operations shall keep records in accordance with (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 Section (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 Subsection (D), the facility shall maintain adequate records on a monthly 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 (D) 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 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 Section (D)(1) of this rule, the amount of VOC emitted from Heatset and Non-Heatset Inks used shall be discounted by the following Substrate Retention Factors: 20 percent for Heatset Inks and 95 percent for Non-Heatset 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 and Non-Heatset lithographic Inks shall meet the VOC content limits specified in Section (C)(1), Table 1.

(F) 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 (F)(1) through (F)(7), 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. 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 (2007) (Test Methods for Volatile Content of Radiation Curable Materials).
- (2) Exempt Compound Content: Exempt compound content shall be determined by using ARB Method 432, "Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings," September 12, 1989; ARB Method 422 "Determination of Volatile Organic Compounds in Emission from Stationary Sources," January 22, 1987; or, South Coast Air Quality Management District (SCAQMD) Method 303-91 "Determination of Exempt Compounds," August 1, 1996.
- (3) The content of silicon dioxide as a flattening agent in a Matte Finish Ink shall be determined by using the latest EPA approved revision of ASTM D717-86 (Standard Test Methods for Analysis of Magnesium Silicate Pigment).
- (4) The metal content of Metallic Inks shall be determined by SCAQMD Test Method 318, (Determination of Weight Percent Elemental Metal In Coatings by X-Ray Diffraction).
- (5) 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.
- (6) The transfer efficiency of alternative Coating application methods shall be determined in accordance with the SCAQMD method "Spray Equipment Transfer Efficiency Test Procedure for Equipment User," May 24, 1989.
- (7) 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.
 - (b) The control efficiency of a VOC emission control system's VOC Control Device(s) shall be determined using EPA Test Methods 2, 2A, or 2D for measuring flow rates and EPA Test Methods 25, 25A, or 25B for measuring total gaseous organic concentrations at the inlet and outlet of

the Control Device(s). EPA Method 18 or ARB Method 422 shall be used to determine the 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_{Capture,Control} = Overall Capture and Control Efficiency, in percent
 CE_{Capture} = Capture Efficiency of the collection device, in percent, as determined in Section (F)(7)(a)
 CE_{Control} = Control Efficiency of the Control Device, in percent, as determined in Section (F)(7)(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 Section (C)(6)(g).

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

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-

D_c = component Ink (or Coating, or Adhesive) printing
Line
Density of corresponding Solvent, reducer, or
Thinner used in the compliant Ink (or Coating, or
Adhesive) system = 880 gm/liter.

- (8) When one or more 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.

[SIP: Submitted as amended mm/dd/yy on mm/dd/yy; Approved: 4/30/96, 61 FR 18962, 40 CFR 52.220(c)(198)(I)(E)(2)]