

**METROPOLITAN HEALTH DEPARTMENT
POLLUTION CONTROL DIVISION**

REGULATION NO. 7

Regulation for Control of Volatile Organic Compounds

As provided for in Section 10.56.090, Chapter 10.56, of the Nashville and Davidson County Air Pollution Control Ordinance of the Code of the Metropolitan Government of Nashville and Davidson County, Tennessee

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By the Metropolitan Board of Health
Nashville and Davidson County**

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REGULATIONS FOR CONTROL OF VOLATILE ORGANIC COMPOUNDS

This Regulation establishes emission standards for stationary sources of volatile organic compounds located in Metropolitan Nashville and Davidson County, Tennessee. This Regulation is promulgated as provided for in Section 10.56.090, "Board-Powers and Duties," Chapter 10.56, "Air Pollution Control" of the Metropolitan Code of Laws.

SECTION 7-1: Definitions

As used in this Regulation, all terms not defined herein shall have the meaning given them in Chapter 10.56, "Air Pollution Control Ordinance," Section 10.56.010, "Definitions" of the Metropolitan Code of Laws.

- (a) "**Approved**" - means approved by the designated air pollution control official.
- (b) "**Capture system**" - means the equipment (including hoods, ducts, fans, etc.) used to contain, capture, or transport a pollutant to a control device.
- (c) "**Coating**" - is a decorative, functional, or protective thin layer applied to surface.
- (d) "**Coating applicator**" - means an apparatus used to apply a surface coating.
- (e) "**Coating line**" - means one or more apparatus or operations which include a coating applicator, flash-off area, and/or oven wherein a surface coating is applied, dried, and cured.
- (f) "**Commenced**" - means that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, continuous program of construction or modification.
- (g) "**Construction**" - means commencement of on-site fabrication, erection, or installation of an emission source, air pollution control equipment, or a facility.
- (h) "**Control device**" - means equipment (incinerator, adsorber, or the like) used to destroy or remove air pollutant(s) prior to discharge to the ambient air.
- (i) "**Continuous vapor control system**" - means a vapor control system that treats vapors displaced from tanks during filling on a demand basis without intermediate accumulation.
- (j) "**Day**" - means a 24-hour period beginning at midnight.
- (k) "**Director**" - means the chief administrative officer of the Metropolitan Board of Health or his designated representative.
- (l) "**Emission**" - means the release or discharge whether directly or indirectly, of any air pollutant into the ambient air from any source.
- (m) "**Existing process**" - is any process in existence or having a state or local agency's construction permit prior to the effective date of this Chapter.

- (n) **“Facility”** - means any building, structure, installation, activity, or combination thereof which contains one or more stationary sources of air contaminants.
- (o) **“Flashoff area”** - means the space between the application area and the oven.
- (p) **“Incinerator”** - means a combustion apparatus designed for high temperature operation in which solid, semisolid, liquid, or gaseous combustible wastes are ignited and burned efficiently and from which the solid and gaseous residues contain little or no combustible material.
- (q) **“Intermittent vapor control system”** - means a vapor control system that employs an intermediate vapor holder to accumulate vapors displaced from tanks during filling. The control device treats the accumulated vapors only during automatically controlled cycles.
- (r) **“Legally enforceable”** - means all limitations and conditions which are enforceable by the Director and Administrator, which includes all provisions of Chapter 10.56, “Air Pollution Control” of the Metropolitan Code of Laws, this Regulation, any provisions of the State Implementation Plan, and any permit conditions.
- (s) **“Loading rack”** - means an aggregation or combination of gasoline loading equipment arranged so that all loading outlets in the combination can be connected to a tank truck or trailer parked in a specified loading space.
- (t) **“New source”** - is all other processes not defined in definition (m) as an existing process.
- (u) **“Organic material”** - means a chemical compound of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.
- (v) **“Oven”** - means a chamber within which heat is used to bake, cure, polymerize, and/or dry a surface coating.
- (w) **“Owner or operator”** - means any person who owns, leases, controls, operates or supervises a facility, emission source, or air pollution control equipment.
- (x) **“Person”** - means any individual, natural person, trustee, court appointed representative, syndicate, association, partnership, firm, club, company, corporation, business trust, institution, agency, government corporation, municipal corporation, city, county, municipality district or other political subdivision, department, bureau, agency or instrumentality of Federal, State, or local government, or other entity recognized by law as the subject of rights and duties. The masculine, feminine, singular, or plural is included in any circumstances.
- (y) **“Petroleum liquid”** - means crude oil, condensate, and any finished or intermediate products manufactured or extracted in a petroleum refinery.
- (z) **“Potential to emit”** - means the capability at maximum capacity to emit a pollutant in the absence of air pollution control equipment. Air pollution control equipment includes control equipment, which is not, aside from air pollution control laws and regulations, vital to production of the normal product of the source or its normal operation.
- (aa) **“Prime coat”** - means the first film of coating applied in a multi-coat operation.

- (bb) “**Reasonable available control technology (RACT)**” - means the lowest emission limit that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.
- (cc) “**Reid vapor pressure**” - means the absolute vapor pressure of volatile crude oil and volatile nonviscous petroleum liquids except liquefied petroleum gases as determined by American Society for Testing and Materials, Part 17, 1973, D-323-72 (Reapproved 1977).
- (dd) “**Shutdown**” - means the cessation of operation of any air pollution control equipment or process equipment for any purpose, except routine phasing out of process equipment.
- (ee) “**Solvent**” - means organic materials which are liquid at standard conditions and which are used as solvers, viscosity reducers, or cleaning agents.
- (ff) “**Standard conditions**” - means a temperature of 20° C (68° F) and pressure of 760 millimeters of mercury (29.92 inches of mercury).
- (gg) “**Startup**” - means the setting into operation of any air pollution control equipment or process equipment for any purpose, except routine phasing in or process equipment.
- (hh) “**Stationary source**” - means any structure, building facility, or installation which emits or may emit any air pollutant subject to regulation under the Clean Air Act.
- (ii) “**Topcoat**” - means the final film of coating applied in a multiple coat operation.
- (jj) “**True vapor pressure**” - means the equilibrium partial pressure exerted by a petroleum liquid as determined in accordance with methods described in American Petroleum Institute Bulletin 2517, “Evaporation Loss From Floating Roof Tanks”, 1962.
- (kk) “**Vapor collection system**” - means a vapor transport system which used direct displacement by the liquid loaded to force vapors from the tank into a vapor control system.
- (ll) “**Vapor control system**” - means a system approved by the Director that prevents release to the atmosphere of organic compounds in the vapors displaced from a tank during the transfer of gasoline.
- (mm) “**Volatile Organic Compounds**” - means volatile organic compound as defined by Title 40, Code of Federal Regulation, Part 51, Subpart F.

SECTION 7-2: General Provisions and Applicability

- (a) It is the purpose of this Regulation to establish emission standards and requirements for certain sources of volatile organic compounds for which applicability is specified in this Regulation. In determining whether the sources of a source category at a facility satisfy the applicability standard of a specific rule, the potential VOC emissions from all sources of the source category shall be totaled.
- (b) Upon mutual agreement of any air contaminant source and the Director, an emission limit more restrictive than that otherwise specified in this Regulation may be established. These restrictions may include operating hours, process flow rates, or other operating parameters.

Any items mutually agreed to shall be stated as special conditions for any permit or order concerning the source.

- (c) These regulations do not apply to any equipment used exclusively for chemical or physical analysis or determination of product quality and commercial acceptance provided the operation of the equipment is not an integral part of a production process and the total actual emissions from all such equipment at the facility do not exceed 204 kilograms (kg) (450 pounds (lb) in any calendar month. Any facility availing of this exemption shall maintain the following records for at least 3 years and shall make those records available to the Director upon request.
 - (1) Records to document the purpose of the equipment for which the exemption is claimed; and
 - (2) Records to document the amount of each volatile organic compound (VOC)-containing material used in the equipment each calendar month and the VOC content of each material such that emissions can be determined for each calendar month.
- (d) At any facility which contains sources subject to volatile organic compound content standards of this Regulation, there shall be allowed a nonrenewable exemption from these standards for the use in these sources of a facility-wide aggregate of 55 gallons, as applied, of coatings and inks which exceed these standards during any rolling 12 month period if the following conditions are satisfied:
 - (1) No more than 55 gallons of these coatings and inks is used during any rolling 12 month period;
 - (2) The owner or operator of the facility makes application to the Director for such exemption identifying the composition or percentage of solid and liquid components for each coating and ink to be included in the exemption;
 - (3) The exemption has been made a condition on a permit which is legally enforceable;
 - (4) Monthly recordkeeping, consistent with the procedures published in Recordkeeping Guidance Document for Surface Coating Operations and the Graphic Arts Industry, EPA 340/1-88-003, July 1989, is maintained; and
 - (5) After the exemption becomes effective, there is no instance of exceedance of the 55 gallon per rolling 12 month period limit.
- (e) No owner or operator subject to these regulations may build, erect, install, or use any article, machine, equipment, process, or other method, the use of which conceals emissions that would otherwise constitute noncompliance with an applicable regulation. This includes, but is not limited to, the use of gaseous diluents to achieve compliance, and the piecemeal carrying out of an operation to avoid coverage by a regulation that applies only to operations larger than a specified size.
- (f) Source-specific standards and requirements, such as reasonably available control technology standards and requirements, may be established which differ from the standards and requirements specified in this Regulation. Source-specific standards and requirements must be incorporated as revisions to the State Implementation Plan, unless otherwise provided for in this Regulation.

- (g) The owner or operator of any facility which has actual emissions from stationary sources of 25 tons or more of either nitrogen oxides (NO_x) or volatile organic compounds (VOCs) during a calendar year shall report to the Director information and data concerning these emissions. This information and data shall be in the form prescribed by the Director, and shall be submitted before March 31, of the year following the calendar year for which the information and data is reported. The first report shall be for the 1993 calendar year, and shall be submitted before March 31, 1994. Each report shall be signed by an official, certifying that the information and data contained in the report is accurate to the best knowledge of the individual certifying the report.
- (h) Multiple lines or operations of a source category which are served by a common control system may be treated as a single line or operation for the purposes of determining compliance with the standards of this Regulation. In this case, the most stringent standard applicable to any of the lines or operations shall be the applicable standard for the purpose of compliance determination.
- (i) Any facility that becomes or is currently subject to the provisions of this Regulation by exceeding an applicability threshold will remain subject to these provisions even if its emissions, throughput, or capacity later fall below the applicability threshold.
- (j) All existing facilities with potential volatile organic compound emissions of one hundred (100) tons/year or greater shall utilize reasonable available control technology (RACT). To encourage the use of the most cost effective control strategies for sources covered by this paragraph, an alternative emission reduction plan may be utilized which allows compliance to be demonstrated by equivalent emission reductions from a combination of stationary sources at a given facility. In order for an alternative plan to be utilized, each stationary source must have a specific emission. The alternative plan must be approved by the Director. The alternative plan shall only become effective after approval by the United States Environmental Protection Agency.

SECTION 7-3: Petition for Alternative Controls

If the owner or operator of any stationary source of volatile organic compounds can demonstrate that compliance with the provisions of this Regulation would be technologically infeasible, he may petition the Director to allow the use of alternative operational (such as improved transfer efficiency, bubbling or cross-line averaging) and/or equipment controls, which results in the same or greater net reduction in VOC emissions as provided by this Regulation. Equivalency calculations for coating should be performed in units of lbs. VOC/gallon solids as applied rather than lbs. VOC/gallon coating when bubbling, cross-line averaging, or achieving compliance with add-on control equipment. Compliance with the emission limit under this Section is on a twenty-four (24) hour average. An alternative operational and/or equipment control shall only become effective after approval by the United States Environmental Protection Agency. Any alternative control or amendment thereof that has approval by the United States Environmental Protection Agency prior to May 14, 1991, will not be reopened unless there is an amendment to the

alternative control. These alternative operational and/or equipment controls shall be a condition on any permit issued for said stationary source. Such a permit or order may contain an alternate test method and/or averaging time.

SECTION 7-4: Compliance Certification, Recordkeeping and Reporting Requirements

- (a) Certification of compliance with this Regulation, including numerical emission, limits the volatile organic compound (VOC) content of each “as applied” coating or ink, and the efficiency of each capture system and control device, shall be determined by the test method and procedure specified in Section 7-24 of this Regulation.
- (b) The following data must be maintained on site and made available for inspection upon request for the purpose of demonstrating facility wide compliance with an applicable emission limit or for the purpose of demonstrating that an otherwise subject coating or printing line is exempt from this Regulation:
 - (1) Coating formulation and analytical data in the form needed to demonstrate compliance with the applicable emission limit;
 - (2) Coating consumption data in pounds or gallons per day or daily coating consumption records;
 - (3) Capture and control equipment performance data;
 - (4) Spray applicator transfer efficiency data; and
 - (5) Process information needed to demonstrate compliance with any applicable Section of this Regulation.
- (c) All records must be maintained for a minimum of three (3) years.
- (d) Certification, recordkeeping, and/or reporting requirements specified in category specific Sections of this Regulation shall take precedence over the requirements of this Section.

SECTION 7-5: Emission Standards for Coil Coating

- (a) For the purpose of this Section, the following definitions apply:
 - (1) “**Coil**” - means any continuous metal strip with thickness of 0.15 millimeter (mm) (0.006 inch (in)) or more that is packaged in a roll or coil.
 - (2) “**Coil coating line**” - means a web coating line where the coating is applied to coil.
 - (3) “**Coil coating operation**” - means a coating application station and its associated flashoff area, drying area, and/or drying oven wherein coating is applied and dried or cured on a coil coating line. A coil coating line may include more than one coil coating operation.

- (b) This Section applies to the coating applicator(s), oven(s), and quench area(s) of coil coating lines involved in prime and topcoat or single coat operations.
- (c) This Section applies to any coil coating line whose actual emissions without control devices are 6.8 kilograms (15 pounds) of volatile organic compounds per day or whose potential from all coil coating lines within the facility is equal to greater than 10 tons of volatile organic compounds per year.
- (d) No owner or operator of a coil coating line subject to this Section may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of 0.31 kilograms per liter of coating (2.6 pounds per gallon), excluding water, delivered to the coating applicator from prime and topcoat or single coat operations.
- (e) Proof of compliance with this Section shall be:
 - (1) By method of Section 7-24; or
 - (2) By certification by the manufacturer of the composition of coating, if supported by batch formulation records.

SECTION 7-6: Emission Standards for Paper Coating

- (a) For the purpose of this Section, the following definitions apply:
 - (1) “**Knife coating**” - means the application of a coating material to a substrate by means of drawing the substrate beneath a knife that spreads the coating evenly over the full width of the substrate.
 - (2) “**Paper coating**” - means coatings put on paper and pressure sensitive tapes regardless of substrate. Related web coating processes on plastic film and decorative coatings on metal foil are included in this definition.
 - (3) “**Roll coating**” - means the application of a coating material to a substrate by means of hard rubber or steel rolls.
 - (4) “**Rotogravure coating**” - means the application of a coating material to a substrate by means of a roll coating technique in which the pattern to be applied is etched on the coating roll. The coating material is picked up in these recessed areas and is transferred to the substrate.
- (b) This Section applies to roll, knife or rotogravure coater(s) and drying oven(s) of paper coating lines. This Section also applies to a saturation operation(s).
- (c) This Section applies to any paper coating operation whose actual emissions without control devices are 6.8 kilograms (15 pounds) of volatile organic compounds per day or whose potential from all paper coating operations within the facility is equal to greater than 10 tons of volatile organic compounds per year.
- (d) No owner or operator of a paper coating line subject to this Section may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of

0.35 kilograms per liter of coating (2.9 pounds per gallon), excluding water, delivered to the coating applicator from a paper coating line.

- (e) Proof of compliance with this Section shall be:
 - (1) By method of Section 7-24; or
 - (2) By certification by the manufacturer of the composition of coating, if supported by batch formulation records.

SECTION 7-7: Emission Standards for Fabric and Vinyl Coating

- (a) For the purpose of this Section, the following definitions apply:
 - (1) “**Fabric coating**” - means the coating of a textile substrate with a knife roll or rotogravure coater to impart properties that are not initially present, such as strength, stability, water or acid repellency, or appearance.
 - (2) “**Knife coating**” - means the application of a coating material to a substrate by means of drawing the substrate beneath a knife that spreads the coating evenly over the full width of the substrate.
 - (3) “**Roll coating**” - means the application of a coating material to a substrate by means of hard rubber or steel rolls.
 - (4) “**Rotogravure coating**” - means the application of coating material to a substrate by means of a roll coating technique in which the pattern to be applied is etched on the coating roll. The coating material is picked up in these recessed areas and is transferred to the substrate.
- (b) This Section applies to roll, knife, or rotogravure coater(s) and drying oven(s) of fabric and vinyl coating lines. This Section also applies to a saturation operation(s).
- (c) This Section applies to any fabric or vinyl coating operation whose actual emissions without control devices are 6.8 kilograms (15 pounds) of volatile organic compounds per day or whose potential from all fabric or vinyl coating operations within the facility is equal to greater than 10 tons of volatile organic compounds per year.
- (d) No owner or operator of a fabric coating line or a vinyl coating line subject to this Section may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of:
 - (1) 0.35 kilograms per liter of coating (2.9 pounds per gallon), excluding water, delivered to the coating applicator from a fabric coating line.
 - (2) 0.45 kilograms per liter of coating (3.8 pounds per gallon), excluding water, delivered to the coating applicator from a vinyl coating line.
 - (3) Organosols and plastisols shall not be excluded from compliance calculations, however they shall not be used to bubble emissions from vinyl printing and topcoating.
- (e) Proof of compliance with this Section shall be:

- (1) By method of Section 7-24; or
- (2) By certification by the manufacturer of the composition of coating, if supported by batch formulation records.

SECTION 7-8: Emission Standards for Metal Furniture Coating

- (a) For the purpose of this Section, the following definitions apply:
 - (1) “**Application area**” - means the area where the coating is applied by spraying, dipping, or flowcoating techniques.
 - (2) “**Metal furniture coating**” - means the surface coating of any furniture made of metal or any metal part which will be assembled with other metal, wood fabric, plastic or glass parts to form a furniture piece.
 - (3) “**Metal furniture**” - means any furniture piece made of metal or any metal part that will be assembled with other metal, wood, fabric, plastic, or glass parts to form a furniture piece including, but not limited to, tables, chairs, waste baskets, beds, desks, lockers, benches, shelving, file cabinets, and room dividers. This definition shall not apply to the coating of miscellaneous metal parts or products.
 - (4) “**Metal furniture coating line**” - means a coating line in which a protective, decorative, or functional coating is applied onto the surface of metal furniture.
- (b) This Section applies to the application area(s), flashoff area(s), and oven(s) of metal furniture coating lines involved in prime and topcoat or single coating operations.
- (c) This Section applies to any metal furniture coating line operation whose actual emissions without control devices are 6.8 kilograms (15 pounds) of volatile organic compounds per day or whose potential from all metal furniture coating line operations within the facility is equal to greater than 10 tons of volatile organic compounds per year.
- (d) No owner or operator of a metal furniture coating line subject to this Section may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of 0.36 kilograms per liter of coating (3.0 pounds per gallon), excluding water, delivered to the coating applicator from prime, and topcoat or single coat operations.
- (e) This Section does not apply to the use of quick-drying lacquers for repair of scratches and nicks that occur during assembly, provided that the volume of coating does not exceed 3.8 liters (1 gallon) in any one 8-hour period.
- (f) Proof of compliance with this Section shall be:
 - (1) By method of Section 7-24; or
 - (2) By certification by the manufacturer of the composition of coating, if supported by batch formulation records.

SECTION 7-9: Emission Standards for Surface Coating of Large Appliances

- (a) For the purpose of this Section, the following definitions apply:
 - (1) “**Application area**” - means the area where the coating is applied by spraying, dipping or flowcoating techniques.
 - (2) “**Single coat**” - means a single film of coating applied directly to the metal substrate omitting the primer application.
 - (3) “**Large appliances**” - means doors, cases, lids, panels and interior support parts of residential and commercial washers, dryers, ranges, refrigerators, freezers, water heaters, dishwashers, trash compactors, air conditioners and other similar products.
 - (4) “**Large appliance coating line**” - means a coating line in which any protective, decorative, or functional coating is put onto the surface of component metal parts (including, but not limited to, doors, cases, lids, panels, and interior parts) of large appliances.
- (b) This Section applies to application area(s), flashoff area(s), and oven(s) of large appliance coating lines involved in prime, single or topcoat coating operations.
- (c) This Section does not apply to:
 - (1) The use of quick-drying lacquers for repair or scratches and nicks that occur during assembly, provided that the volume of coating does not exceed 3.8 liters (1 gallon) in any one 8-hour period; or
 - (2) This Section applies to any large appliance coating line operation whose actual emissions without control devices are 6.8 kilograms (15 pounds) of volatile organic compounds per day or whose potential from all large appliance coating line operations within the facility is equal to greater than 10 tons of volatile organic compounds per year.
- (d) No owner or operator of a large appliance coating line subject to this Section may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of 0.34 kilograms per liter of coating (2.8 pounds per gallon), excluding water, delivered to the coating applicator from prime, single or topcoating operations.
- (e) Proof of compliance with this Section shall be:
 - (1) By method of Section 7-24; or
 - (2) By certification by the manufacturer of the composition of coating, if supported by batch formulation records.

SECTION 7-10: Volatile Organic Liquid Storage

- (a) For the purpose of this Section, the following definitions apply:

- (1) “**Condensate**” - means hydrocarbon liquid separated from natural gas, which condenses due to changes in the temperature and/or pressure and remains liquid at standard conditions.
- (2) “**Crude oil**” - means a naturally occurring mixture which consists of hydrocarbons and/or sulfur, nitrogen and/or oxygen derivatives of hydrocarbons and which is a liquid at standard conditions.
- (3) “**Custody transfer**” - means the transfer of produced crude oil and/or condensate, after processing and/or treating in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.
- (4) “**External floating roof**” - means a storage vessel cover in an open top tank consisting of a double deck or pontoon single deck which rests upon and is supported by the volatile organic liquid being contained and is equipped with a closure seal or seals to close the space between the roof edge and tank shell.
- (5) “**Internal floating roof**” - means a cover or roof in a fixed roof tank which rests upon or is floated upon the volatile organic liquid being contained, and is equipped with a closure seal or seals to close the space between the roof edge and tank shell.
- (6) “**Petroleum refinery**” - means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of crude oils, or through redistillation, cracking, extraction, or reforming of unfinished petroleum derivatives.
- (7) “**Storage Vessel**” - means any tank, reservoir or container used for storage of volatile organic liquids but does not include:
 - (i) Frames, housing, auxiliary supports, or other components that are not directly included in the containment of liquids or vapors; or
 - (ii) Subsurface caverns or porous rock reservoirs.
- (8) “**True vapor pressure**” - means the equilibrium partial pressure exerted by the stored VOL, at the temperature equal to the highest calendar month average of the VOL storage temperature for VOLs stored above or below the ambient temperature or at the local maximum monthly average temperature as reported by the National Weather Service for VOLs stored at the ambient air temperature, as determined:
 - (i) In accordance with methods described in American Petroleum institute Bulletin 2517, Evaporation Loss From External Floating Roof Tanks;
 - (ii) As obtained from standard reference texts;
 - (iii) As determined by ASTM Method D2879-83; or
 - (iv) Any other method approved by the Director.
- (9) “**Volatile organic liquid (VOL)**” - means any organic liquid which can emit volatile organic compounds into the atmosphere except those VOLs that emit only those compounds which the Administrator has determined do not contribute appreciably to the formation of ozone.

- (b) This Section applies to all fixed roof storage vessels with capacities greater than 151,400 liters (40,000 gallons) containing volatile organic liquids whose true maximum vapor pressure is greater than 10.5 kilo Pascals (1.52 psia).
- (c) This Section does not apply to volatile organic liquid storage vessels:
 - (1) Equipped with external floating roofs or internal floating roofs before January 1, 1979; or
 - (2) Having capacities less than 1,586,970 liters (420,000 gallons) used to store produced crude oil and condensate prior to lease custody transfer.
- (d) Except as provided under Paragraph (c) of this Section, no owner or operator of an affected stationary source under Paragraph (b) of this Section shall permit the use of such stationary source unless:
 - (1) The stationary source has been retrofitted with an internal floating roof, equipped with a closure seal or seals to close the space between the roof edge and tank wall; or
 - (2) The stationary source has been retrofitted with equally effective alternative control, approved by the Director; and
 - (3) The stationary source is maintained such that there are no visible holes, tears, or other openings in the seal or any seal fabric or materials;
 - (4) All openings, except for leg sleeves, automatic bleeder vents, rim spore vents, column wells, ladder wells, sample wells and stub drains are equipped with covers, lids, or seals such that:
 - (i) The cover, lid, or seal is equipped with a gasket and maintained in the closed position at all times except when in actual use;
 - (ii) Automatic bleeder vents are equipped with a gasket and are closed at all times except when the roof is being floated off or being landed on the roof leg supports;
 - (iii) Rim vents, if provided, are equipped with a gasket and set to open when the roof is being floated off the roof leg supports or the manufacturer's recommended setting;
 - (iv) Each penetration of the internal floating roof for the purpose of sampling is a sample well equipped with a fabric cover that covers at least 90 percent of the opening; and
 - (v) Each penetration of the internal floating roof that allows for the passage of a ladder is equipped with a gasketed sliding cover;
 - (5) Each opening in a non contact internal floating roof except for automatic bleeder vents (vacuum breaker vents) and the rim space vents should provide a projection below the liquid surface;
 - (6) The internal floating roof shall be floating on the liquid surface at all times except during those intervals when the storage vessel is completely emptied or subsequently emptied and refilled. When the roof is resting on the leg supports, the process of filling,

emptying or refilling shall be continuous and shall be accomplished as rapidly as possible;

- (7) Routine inspections are conducted through roof hatches once per month;
- (8) A complete inspection of all covers and seals conducted whenever the tank is emptied for nonoperational reasons; and
- (9) Records are maintained that shall include:
 - (i) Reports of results of inspections conducted under Paragraphs (d)(7) and (d)(8) of this Section;
 - (ii) A record of the average monthly storage temperatures and true vapor pressures of volatile organic liquids stored; and
 - (iii) Records of the throughout quantities and types of volatile organic liquids for each storage vessel.

SECTION 7-11: Bulk Gasoline Plants

- (a) For the purpose of this Section, the following definitions apply:
 - (1) “**Bottom filling**” - means the filling of a tank truck or stationary storage tank through an opening near the tank bottom.
 - (2) “**Bulk gasoline plant**” - means a gasoline storage and distribution facility with an annual average daily throughput of less than 76,000 liters (20,000 gallons) which receives gasoline from bulk terminals by trailer transport, stores it in tanks, and subsequently dispenses it via account trucks to local farms, businesses, and service stations.
 - (3) “**Gasoline**” - means any petroleum distillate having a Reid vapor pressure of 27.6 kPa (4 psia) or greater.
 - (4) “**Splash filling**” - means the filling of a tank truck or stationary storage tank through a pipe or hose whose discharge opening is above the surface level of the liquid in the tank being filled.
 - (5) “**Submerged filling**” - means the filling of a tank truck or stationary tank through a pipe or hose whose discharge opening is entirely submerged when the liquid level is six inches above the bottom of the container.
 - (6) “**Vapor balance system**” - means a combination of pipes or hoses which create a closed system between the vapor spaces of an unloading tank and a receiving tank such that vapors displaced from the receiving tank are transferred to the tank being unloaded.
- (b) This Section applies to the unloading, loading, and storage facilities of all bulk gasoline plants and all tank trucks or trailers delivering or receiving gasoline at bulk gasoline plants.
- (c) This Section does not apply to:

- (1) Stationary storage tanks of less than 2,000 gallons capacity; and
 - (2) Bulk plants with an annual average working daily throughput of less than 4,000 gallons, provided that records of throughput are maintained and reported to the Director annually, and provided all stationary storage tanks and tank trucks or trailers are equipped with submerged fill pipes.
- (d) Except as provided under Paragraph (c) of this Section, no owner or operator of a bulk gasoline plant (tank truck or trailer) shall load or unload gasoline unless each tank is equipped with a vapor balance system as described under Paragraph (g) of this Section and approved by the Director.
- (1) Each tank is equipped with a submerged fill pipe, approved by the Director; or
 - (2) Each tank is equipped with a fill line whose discharge opening is entirely submerged when the liquid level is eighteen inches above the bottom of the tank.
- (e) Except as provided under Paragraph (c) of this Section, no owner or operator of a bulk gasoline plant, tank truck or trailer shall load or unload a tank truck or trailer at a bulk gasoline plant unless each tank truck or trailer is equipped with a vapor balance system as described under Paragraph (g) of this Section and approved by the Director.
- (1) Equipment is available at the bulk gasoline plant to provide for the submerged filling of each tank truck or trailer; or
 - (2) Each tank truck is equipped for bottom filling.
- (f) No owner or operator of a bulk gasoline plant, tank truck or trailer shall permit the transfer of gasoline between tank truck or trailer and stationary storage tank unless:
- (1) The transfer is conducted in accordance with Paragraphs (d) and (e) of this Section;
 - (2) The vapor balance system is in good working order and is connected and operating;
 - (3) Tank truck or trailer hatches are closed at all times during loading operations;
 - (4) There are no leaks in the tank trucks' or trailers' pressure/vacuum relief valves and hatch covers, nor the truck tanks or storage tanks associated vapor and liquid lines during loading and unloading; and
 - (5) The pressure relief valves on storage vessels and tank trucks or trailers are set to release at no less than 4.8 kPa (0.7 psi) or the highest possible pressure (in accordance with state or local fire codes, or the National Fire Prevention Association Guidelines).
- (g) Vapor balance systems required under Paragraphs (d) and (e) of this Section shall consist of the following major components:
- (1) A vapor space connection on the stationary storage tank equipped with fittings which are vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material;
 - (2) A connecting pipe or hose equipped with fittings which are vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material; and

- (3) A vapor space connection on the tank truck or trailer equipped with fittings which are vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material.
- (h) No owner or operator of a bulk gasoline plant may permit gasoline to be spilled, discharged in sewers, stored in open containers or handled in any other manner that would result in evaporation.

SECTION 7-12: Bulk Gasoline Terminals

- (a) For the purpose of this Section, the following definitions apply:
 - (1) “**Bulk gasoline terminal**” - means a gasoline storage facility which receives gasoline from refineries primarily by pipeline, ship or barge, and delivers gasoline to bulk gasoline plants or to commercial or retail accounts primarily by tank truck; and has an average daily throughput of more than 76,000 liters (20,000 gallons) of gasoline.
 - (2) “**Gasoline**” - means a petroleum distillate having a Reid vapor pressure of 27.6 kPa (4 psi) or greater.
- (b) This Section applies to bulk gasoline terminals and appurtenant equipment necessary to load the tank truck or trailer compartments.
- (c) No person may load gasoline into any tank truck or trailer from any bulk gasoline terminal unless:
 - (1) The bulk gasoline terminal is equipped with a vapor control system, capable of complying with Paragraph (d) of this Section, properly installed, in good working order, in operation and consisting of one of the following:
 - (i) An absorption, condensation, or incineration system which processes and recovers vapors and gases from the equipment being controlled; or
 - (ii) A vapor collection system which directs all vapors to a fuel gas system.
 - (2) All displaced vapors and gases are vented only to the vapor control system;
 - (3) A means is provided to prevent liquid drainage from the loading device when it is not in use or to accomplish complete drainage before the loading device is disconnected; and
 - (4) All loading and vapor lines are equipped with fittings which make vapor-tight connections and which close automatically when disconnected.
- (d) Sources affected under Paragraph (c)(1) may not allow mass emissions of volatile organic compounds from control equipment to exceed 80 milligrams per liter (4.7 grains per gallon) of gasoline loaded.
- (e) Sources affected under Paragraph (b) may not:
 - (1) Allow gasoline to be discarded in sewers or stored in open containers or handled in any manner that would result in evaporation; nor

- (2) Allow the pressure in the vapor collection system to exceed the tank truck or trailer pressure relief settings.
- (f) Proof of compliance with this Section shall be by the method of Section 7-24, Paragraph (e).

SECTION 7-13: Gasoline Dispensing Facilities, Stage I and Stage II

- (a) For the purpose of this Section, the following definitions apply:
 - (1) **“Stage II vapor recovery system”** - means a system that transfers gasoline vapor from the motor vehicle to the motor vehicle fuel service station’s stationary storage tank(s) at least ninety five (95) percent by volume, of the gasoline vapors that are generated during motor vehicle refueling.
 - (2) **“Storage tank or storage vessel”** – means any stationary tank, reservoir or container used for the storage of a volatile organic liquid.
 - (3) **“Vacuum assist-type system”** – means the gasoline vapor recovery system that employs a vacuum generating device to effect transfer of gasoline vapor displaced in fueling a vehicle tank to a gasoline storage tank, vapor storage tank, or vapor processing unit.
 - (4) **“Volatile organic liquid”** - means any substance which is liquid at storage conditions and which contains volatile organic compounds.
- (b) The provisions of 40 CFR Part 63, Subpart CCCCCC (National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities) are hereby adopted by reference as published in the July 1, 2014 edition of the Code of Federal Regulations (CFR), except as provided in subparagraphs (1) through (4) of this paragraph.
 - (1) Any reference contained in 40 CFR Part 63, Subpart CCCCCC to the:
 - (i) Administrator shall instead be a reference to the Director;
 - (ii) Applicable EPA Regional Office shall instead be a reference to the EPA Region IV office; and
 - (iii) Delegated State Authority shall instead be a reference to the Metro Public Health Department of Nashville and Davidson County.
 - (2) If your gasoline dispensing facility (GDF) has a monthly throughput of less than 10,000 gallons of gasoline, you must also comply with the requirements in 40 CFR §63.11117(b) and (c).
 - (3) If your GDF has a monthly throughput of 10,000 gallons of gasoline or more, you must comply with the requirements in 40 CFR §63.11118.
 - (4) For any GDF claiming an exemption from subparagraph (3) of this paragraph based on monthly throughput, if the GDF has a monthly throughput of 10,000 gallons or more during any month, it shall be subject to the requirements of subparagraph (3) of this

paragraph, even if its throughput later falls below the threshold. The owner or operator shall inform the Director within 30 days following the exceedance.

(c) Stage II Vapor Recovery.

- (1) Any GDF with an existing Stage II vapor recovery system shall decommission and remove the system no later than July 14, 2019, and no GDF shall install a Stage II vapor recovery system on or after such date.
- (2) On and after July 14, 2016, no GDF shall be required to install a Stage II vapor recovery system, and a GDF may decommission and remove any existing Stage II vapor recovery system.
- (3) Any GDF that decommissions and removes a Stage II vapor recovery system shall conduct the decommissioning and removal in accordance with Petroleum Equipment Institute (PEI) guidance, “Recommended Practices for Installation and Testing of Vapor Recovery Systems at Vehicle Fueling Sites, PEI/RP300-09” for removal, notification, and certification.
- (4) Any GDF that has a Stage II vapor recovery system must comply with all applicable provisions of subparagraphs (5) through (12) of this paragraph until the system is decommissioned and removed.
- (5) The Stage II vapor recovery system must be permitted pursuant to Section 10.56.020, “Construction Permits” and 10.56.040, “Operating Permit” of the Metropolitan Code of Laws.
 - (i) The construction permit application shall include at a minimum:
 - (A) A plan showing all underground piping;
 - (B) The manufacturer’s plans and specifications;
 - (C) The manufacturer’s maintenance requirements;
 - (D) The CARB Stage II system certification with all exhibits; and
 - (E) Information required by Section 10.56.020 of the Metropolitan Code of Laws.
 - (ii) Liquid blockage testing and leak check testing must be conducted on all new systems, when applicable, and results submitted to the Metro Public Health Department, Pollution Control Division before an operating permit can be issued in accordance with Section 10.56.040. Each affected facility must retest at least once every year or immediately after major system replacement or modification of the Stage II system. The Metro Public Health Department, Pollution Control Division must be notified at least two weeks prior to the conducting of any compliance tests.
- (6) The Stage II vapor recovery system shall be ninety five (95) percent efficient in the recovery by volume of vapors produced by motor vehicle refueling and include, at a minimum, the following components:

- (i) A high hang coaxial hose equipped with a break-away to conduct the vapors displaced from the vehicular fuel tank to the gasoline dispensing facility storage tank and liquid removal system to evacuate liquid from the vapor passages of the hose if the mounting does not insure drainage of liquid during normal dispensing. The break-away must close off both the liquid and vapor lines;
 - (ii) A seal or a vacuum to prevent the escape of vapors into the atmosphere from the interface between the vapor recovery nozzle and the filler neck of the vehicular fuel tank;
 - (iii) For Stage II systems with vapor recovery nozzles that seal to the vehicle inlet pipe, the vapor recovery nozzle shall include a built-in feature designed to automatically shut off the flow of gasoline when the gauge pressure in the vehicle fuel tank exceeds 2500 pascals (10 inches of water);
 - (iv) A vapor recovery nozzle equipped with a device that will automatically shut off the flow of gasoline when liquid in the fuel tank reaches the fill nozzle to prevent spillage and to prevent circulation of liquid gasoline back from the fill nozzle through the vapor hose to the motor vehicle fuel service station's storage tank(s);
 - (v) When required, a dispensing system must be equipped with a device designed to limit the dispensing of gasoline to a maximum rate (gallons per minute) that will not impair the attainment of at least ninety five (95) percent recovery efficiency; and
 - (vi) Maintain vapor tightness throughout the vapor recovery system, except during the facility storage tank loading, gauging or sampling.
 - (vii) There shall be no remote vapor check valves on Stage II systems.
 - (viii) For vacuum assisted systems the processor must be on when the dispensers are on. If the processor fails the dispenser should lock out.
- (7) All tank gauging and sampling sites or ports on the Stage II Vapor Recovery Collection System shall be vapor-tight so as to prevent emissions except when gauging or sampling takes place. All pressure and vacuum test ports shall be above grade but not more than thirty-six (36) inches above grade.
- (8) A daily visual inspection to verify that all equipment is present and maintains a certified system configuration and is in proper working order. The equipment includes but is not limited to, nozzles and nozzle parts (faceplate or facecone, bellows, springs, latches, check valves), hoses, hose hangers/retractors, flow limiters, swivels, collection units, control panels, system pumps, processing units, vent pipes, and any and all other system-related parts.
- (9) Operating Instructions.
- (i) The owner or operator of each affected gasoline dispensing facility shall conspicuously post operating instructions in the gasoline dispensing area for the system in use at the facility. The instructions shall clearly describe how to fuel vehicles correctly with vapor recovery system nozzles. The operating

instructions shall include a warning that repeated attempts to continue dispensing fuel after the system has indicated that the vehicle fuel tank is full may result in spillage or recirculation of gasoline and is prohibited. The instructions shall also include a telephone number for the Metropolitan Health Department, Pollution Control Division office for the public to report problems with the system.

(10) System Maintenance.

- (i) All systems shall be maintained in proper working order in accordance with the manufacturer's specifications to ensure the integrity and efficiency of the system. If the vapor recovery collection system or a component of the system contains a defect which could impair the effectiveness of the system to recover ninety-five (95) percent by volume of the gasoline vapors, the system shall be taken out of service. No person shall use or permit the use of that system or component until it has been repaired, replaced or adjusted. Any defect noted in Paragraph (iii) shall be deemed to significantly impair collection system efficiency. Minor defects, which do not significantly reduce the effectiveness of the system below ninety-five (95) percent vapor recovery, such as very small holes, cracks or gashes, must be repaired within seven (7) days.
- (ii) Defects which could significantly impair the effectiveness of the system shall be reported to the Metro Public Health Department, Pollution Control Division immediately.
- (iii) Equipment defects that require that the system be taken out of service are:
 - (A) Absence or disconnection of any component required to be used in the CARB Executive Order(s) that certified the system;
 - (B) A vapor hose which is crimped or flattened such that the vapor passage is blocked or the pressure drop through the vapor hose exceeds the system certified in the CARB Executive Order(s) applicable to the system or a torn coaxial hose;
 - (C) A nozzle boot which is torn in one or more of the following manner:
 - (I) Triangular-shaped or similar tear 1/2 inch or more to a side, or hole 1/2 inch or more in diameter; or
 - (II) Slit one (1) inch or more in length.
 - (D) Faceplate or flexible cone which is damaged in the following manner:
 - (I) For balance nozzles and for nozzles for aspirator and vacuum assist-type systems, damage shall be such that the capability to achieve a seal with a fill pipe interface is affected for 1/4 of the circumference of the faceplate (accumulated); or
 - (II) For nozzles for vacuum assist-type systems, more than 1/4 of the flexible cone is missing.
 - (E) Nozzle shutoff mechanisms which malfunction in any manner;

- (F) Vapor return lines, including such components as swivels and underground piping, which malfunction or which are blocked or restricted such that pressure drops through the lines, exceeds by factor of two or more requirements specified in the CARB Executive Order(s) that certified the system;
- (G) Vapor processing unit which is inoperative;
- (H) Vacuum producing device which is inoperative;
- (I) Pressure vacuum relief valve, vapor check valves, or Stage I dry breaks which are inoperative;
- (J) Any other defect which could impair the effectiveness of the system to recover ninety five (95) percent by volume of the gasoline vapors displaced; or
- (K) Any equipment defect which is identified in a CARB Executive Order certifying system pursuant to the Certification Procedures incorporated in *Section 94001 of Title 17 California Code of Regulations*, as substantially impairing the effectiveness of the system in reducing air contaminants.

(11) Test methods.

- (i) Determination of vapor-tightness for Paragraph (c)(3)(vi) shall be the method found in Appendix J.1, *Technical Guidance - Stage II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities*, Volume II, EPA - 450/3-91-022B.

(12) Reporting and record keeping requirements.

- (i) The following data must be maintained on site and made available for inspection upon request:
 - (A) Permitting records and operating license; and
 - (B) Stage II operating instructions and maintenance schedules.
- (ii) The following records must be maintained and made available for inspection within seven (7) calendar days after request has been received for these records:
 - (A) Daily inspection records required by Paragraph (c)(5);
 - (B) Test report required by Paragraph (c)(2)(ii);
 - (C) Monthly records showing the quantity of gasoline dispensed each month at the facility; and
 - (D) A copy of all maintenance records.
- (iii) Except as noted, these records must be maintained for a minimum of three (3) years.
- (iv) Copies of the monthly throughput records must be submitted to the Metropolitan Health Department, Pollution Control Division, by March 31, of each year, for the previous calendar year.

SECTION 7-14: Solvent Metal Cleaning

- (a) For the purpose of this Section, the following definitions apply:
- (1) “**Cold cleaning**” - means the batch process of cleaning and removing soils from metal surfaces by spraying, brushing, flushing or immersion while maintaining the solvent below its boiling point. Wipe cleaning is not included in this definition.
 - (2) “**Conveyorized degreasing**” - means the continuous process of cleaning and removing soils from metal surfaces by operation with either cold or vaporized solvents.
 - (3) “**Freeboard height**” - means the distance from the top of the vapor zone to the top of the degreaser tank for vapor degreasers and from the liquid surface to the top of the degreaser toner for cold cleaners.
 - (4) “**Freeboard ration**” - means the freeboard height divided by the width of the degreaser.
 - (5) “**Open top vapor degreasing**” - means the batch process of cleaning and removing soils from metal surfaces by condensing hot solvent vapor on the colder metal parts.
 - (6) “**Solvent metal cleaning**” - means the process of cleaning soils from metal surfaces by cold cleaning or open top vapor degreasing or conveyorized degreasing.
- (b) This Section applies to cold cleaning, open top vapor degreasing and conveyorized degreasing operations, with the following exceptions:
- (1) Open top vapor degreasers with an open area smaller than one square meter (10.8 square feet) shall be exempt from Paragraphs (d)(4)(ii) and (d)(4)(iv) of this Section; and
 - (2) Conveyorized degreasers with an air/vapor interface smaller than 2.0 square meters (21.6 square feet) shall be exempt from Paragraph (e)(2) of this Section.
- (c) Except as provided under Paragraph (b) of this Section, the owner or operator of a cold cleaning facility shall:
- (1) Equip the cleaner with a cover that can be easily operated with one hand. Covers for larger cleaners may require mechanical assistance, by spring loading, counter weighting, or power systems;
 - (2) Equip the cleaner with a facility for draining parts. For solvent with a volatility greater than 4.3 kPa (32 mmHg or 0.6 psi) measured at 38° C (100° F), the drainage facility must be internal, so that parts are enclosed under the cover while draining. The drainage facility may be external for applications where an internal type cannot fit into the cleaning system;
 - (3) Provide a permanent conspicuous label, summarizing the operating requirements;
 - (4) Provide, if used, a solid, fluid stream of solvent spray at a pressure which does not cause excessive splashing;
 - (5) Provide one of the following control devices if the solvent volatility is greater than 4.3 kPa (33 mmHg or 0.6 psi) measured at 38° C (100° F) or if the solvent is heated above 50° C (120° F):

- (i) A freeboard that gives a freeboard ratio equal to or greater than 0.7;
 - (ii) A water cover, provided that the solvent is insoluble in and heavier than water; or
 - (iii) Other system of equivalent control, such as a refrigerated chiller or carbon adsorption.
- (6) Store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere;
- (7) Close the cover whenever parts are not being handled in the cleaner; and
- (8) Drain the cleaned parts for at least 15 seconds or until dripping ceases.
- (d) Except as provided under Paragraph (b) of this Section, the owner or operator of an open top vapor degreaser shall:
- (1) Equip the vapor degreaser with a cover that can be opened and closed easily without disturbing the vapor zone;
 - (2) Keep the cover closed at all times except when processing work loads through the degreaser;
 - (3) Equip the vapor degreaser with:
 - (i) A condenser flow switch and thermostat that shuts off sump heat if condenser coolant is not circulating or becomes too warm; and
 - (ii) A spray safety switch shuts off the spray pump if the vapor level drops excessively, approximately 10 cm (4 inches).
 - (4) Equip the vapor degreaser with one of the following:
 - (i) A freeboard ratio greater than or equal to 0.75, and if the degreaser opening is greater than one square meter (10 square feet), the cover must be powered;
 - (ii) A refrigerated chiller;
 - (iii) An enclosed design whereas the door or cover opens only when the parts are actually entering or exiting the degreaser;
 - (iv) A carbon adsorption system, with ventilation equal to or greater than 15 cubic meters/min/m² (50 cfm/ft²) of air/vapor area (when cover is open), and exhausting less than 25 PPM solvent average over one complete adsorption cycle; or
 - (v) A control system, demonstrated to have control efficiency equivalent to or greater than any of the above.
 - (5) Provide a permanent conspicuous label, summarizing the operating requirements;
 - (6) Minimize solvent carryout by:
 - (i) Racking parts to allow complete drainage;

- (ii) Moving parts in and out of the degreaser at less than 3.3 meters per minute (11 feet per minute);
 - (iii) Holding the parts in the vapor zone at least 30 seconds or until condensation ceases;
 - (iv) Tipping out any pools of solvent on the cleaned parts before removal from the vapor zone; and
 - (v) Allowing parts to dry within the degreaser for at least 15 seconds or until visually dry.
- (7) Not degreasing porous or absorbent materials, such as cloth, leather, wood or rope;
 - (8) Not occupy more than half of the degreaser's open top area with a workload;
 - (9) Not load the degreaser to the point where the vapor level would drop more than 10 centimeters (4 inches) when the workload enters the vapor zone;
 - (10) Always spray below the vapor level;
 - (11) Repair solvent leaks immediately, or shutdown the degreaser;
 - (12) Store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere;
 - (13) Not allow water to be visually detectable in solvent exiting the water separator; and
 - (14) Not allow exhaust ventilation to exceed $20 \text{ m}^3/\text{min}$ per m^2 (65 cfm per ft^2) of degreaser area, unless required to meet OSHA requirement. Ventilation fans shall not be used near the degreaser opening.
- (e) Except as provided under Paragraph (b) of this Section, the owner or operator of a conveyORIZED degreaser shall:
 - (1) Equip the vapor degreaser with covers for both entrance and exit and close them when the degreaser is not in operation; and
 - (2) Equip the vapor degreaser with one of the following:
 - (i) A freeboard ratio greater than or equal to 0.75, and if the degreaser opening is greater than one square meter (10 square feet), the cover must be powered;
 - (ii) A carbon adsorption system, with ventilation equal to or greater than 15 cubic meters/min ($50 \text{ cfm}/\text{ft}^2$) of air/vapor area (when cover is open), and exhausting less than 25 PPM solvent average over one complete adsorption cycle; or
 - (iii) A control system, demonstrated to have control efficiency equivalent to or greater than any of the above.
 - (3) Equip the vapor degreaser with either a drying tunnel, or another means such as rotating (tumbling) basket, sufficient to prevent cleaned parts from carrying out solvent liquid or vapor;
 - (4) Equip the vapor degreaser with:

- (i) A condenser flow switch and thermostat that shuts off sump heat if condenser coolant is not circulating or becomes too warm;
 - (ii) A spray safety switch which shuts off spray pump if the vapor level drops excessively, approximately 10 cm (4 inches); and
 - (iii) A vapor level control thermostat that shuts off sump heat when vapor level rises too high.
- (5) Silhouette entrances and exits so that the average clearance between parts and edges of degreaser openings is either less than 10 cm (4 in) or less than 10 percent of the width of the opening;
- (6) Not allow exhaust ventilation to exceed 20 m³/min per m² (65 cfm per ft²) of degreaser area, unless required to meet OSHA requirement. Ventilation fans shall not be used near the degreaser opening;
- (7) Minimize carryout emissions by:
- (i) Racking parts for best drainage; and
 - (ii) Maintaining the vertical conveyor speed at less than 3.3 meters per minute (11 feet per minute);
- (8) Store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere;
- (9) Repair solvent leaks immediately, or shut down the degreaser; and
- (10) Not allow water to be visually detectable in solvent exiting the water separator.
- (f) Proof of compliance with this Section shall be by the method of Section 7-24, Paragraph (d).

SECTION 7-15: Prohibition of Cutback Asphalt

- (a) For the purpose of this Section, the following definitions apply:
- (1) “**Asphalt**” - means a dark-brown to black cementitious material (solid, semisolid, or liquid in consistency) in which the predominating constituents are bitumens which occur in nature as such or which are obtained as residue in refining petroleum.
 - (2) “**Cutback asphalt**” - means asphalt cement which has been liquefied by blending with petroleum solvents (diluent). Upon exposure to atmospheric conditions the diluents evaporate, leaving the asphalt cement to perform its function.
 - (3) “**Penetrating prime coat**” - means an application of low viscosity liquid asphalt to an absorbent surface. It is used to prepare an untreated base for an asphalt surface. The prime penetrates the base and plugs the voids, hardens the top, and helps bind it to the overlying asphalt course. It also reduces the necessity of maintaining an untreated base course prior to placing the asphalt pavement.

- (4) No person may cause, allow, or permit the use or application of cutback asphalts for paving purposes except for:
 - (i) Long-term stockpile storage;
 - (ii) Application when the ambient temperature is less than 50° F within 4 hours after the time of application; or
 - (iii) Use as a penetrating prime coat.

SECTION 7-16: Emission Standards for Surface Coating of Miscellaneous Metal Parts and Products

- (a) For the purpose of this Section, the following definitions apply:
 - (1) “**Aerospace component**” - means the fabricated parts, assembly of parts or completed unit of any aircraft, helicopter, missile, or space vehicle.
 - (2) “**Air dried coating**” - means a coating which is dried by the use of air or forced warm air at temperatures up to 90° C (194° F).
 - (3) “**Clear coating**” - means a coating which lacks color and opacity or is transparent and uses the undercoat as a reflectant base or undertone color.
 - (4) “**Coating operation**” - means all equipment which applies, conveys, and dries a surface coating, including but not limited to, spray booths, flow coaters, flashoff areas, air dryers and ovens.
 - (5) “**Drum**” - means any cylindrical metal shipping container of 13 to 110 gallon capacity.“
 - (6) “**Extreme environmental conditions**” - means exposure to outdoor conditions most all of the time, temperatures consistently above 95° C, detergents, abrasive and scouring agents, solvents, corrosive atmospheres, or similar environmental conditions.
 - (7) “**Extreme performance coating**” - means a coating designed for extreme environmental conditions.
 - (8) “**Heavy-duty truck touchup**” - means air-dried coatings used to repair scratches and/or blemishes in the coating of newly manufactured heavy-duty trucks.
 - (9) “**High performance architectural coating**” - means a coating:
 - (i) Applied to extruded aluminum architectural subsections intended for use on exteriors of buildings of more than one story; and
 - (ii) Satisfying the *Architectural Aluminum Manufacturer’s Association* publication number AAMA 605.2-1980.
 - (10) “**Miscellaneous parts and products**” - means any metal part or metal product, even if attached to or combined with a nonmetal part or product. Miscellaneous metal parts and products include, but are not limited to:

- (i) Large farm machinery (harvesting, fertilizing and planting machines, tractors, combines, etc.);
 - (ii) Small farm machinery (lawn and garden tractors, lawn mowers, rototillers, etc.);
 - (iii) Small appliances (fans, mixers, blenders, crock pots, dehumidifiers, vacuum cleaners, etc.);
 - (iv) Commercial machinery (office equipment, computers and auxiliary equipment, typewriters, calculators, vending machines, etc.);
 - (v) Industrial machinery (pumps, compressors, conveyor components, fans, blowers, transformers, etc.);
 - (vi) Fabricated metal products (metal covered doors, frames, etc.);
 - (vii) Any other industrial category that coats metal parts or products under the Standard Industrial Classification Codes of Major Group 33 (primary metal industries), Major Group 34 (fabricated metal products), Major Group 35 (nonelectric machinery), Major Group 36 (electrical machinery), Major Group 37 (transportation equipment), Major Group 38 (miscellaneous instruments), Major Group 39 (miscellaneous manufacturing industries); and
 - (viii) Application of underbody antichip materials (e.g., underbody plastisol) and coating application operations other than prime, primer surfacer, topcoat, and final repair operations at automobile and light-duty truck assembly plants.
- (11) “**Pail**” - means any cylindrical metal shipping container of 1 to 12 gallon capacity and constructed of 29-gauge and heavier material.
- (12) “**Refinishing**” - means the repainting of used equipment.
- (b) This Section applies to the application area(s), flashoff area(s), air and forced air drier(s) and oven(s) used in the surface coating of miscellaneous metal parts. This Section also applies to prime coat, topcoat, and single coat operations. Miscellaneous parts and products include any industrial category which coats metal. Parts or products under The Standard Industrial Classification Code of Major Groups 33 (Primary Metal Industries, 34 (Fabricated Metal Products), 35 (Non-electric Machinery), 36 (Electrical Machinery), 37 (Transportation Equipment), 38 (Miscellaneous Instruments), and 39 (Miscellaneous Manufacturing Industries).
- (c) This Section applies to any miscellaneous metal parts and products coating line operation whose actual emissions without control devices are 6.8 kilograms (15 pounds) of volatile organic compounds per day or whose potential from all miscellaneous metal parts and products coating line operations within the facility is equal to greater than 10 tons of volatile organic compounds per year. This Section is not applicable to the surface coating of the following metal parts and products:
- (1) Surface coating operation covered by Sections 7-5, 7-8 and 7-9 of this Regulation;
 - (2) Automobiles and light duty trucks;
 - (3) Metal cans;

- (4) Magnet wire for use in electrical machinery;
 - (5) Coating the exterior of completely assembled aircraft;
 - (6) Coating the exterior of major aircraft subassemblies, if approved as revisions to the State Implementation Plan;
 - (7) Automobile and truck refinishing;
 - (8) Customized top coating of automobiles and trucks, if production is less than 35 vehicles per day;
 - (9) Coating the exterior of completely assembled marine vessels;
 - (10) Coating the exterior of major marine vessel subassemblies if approved as revisions to the State Implementation Plan; and
- (d) No owner or operator of a facility engaged in the surface coating of miscellaneous metal parts and products subject to this Section may cause, allow or permit the discharge into the atmosphere of any volatile organic compound in excess of:

	<u>kg/L^a</u>	<u>lb/gal^a</u>
(1) High performance architectural coating	0.75	6.2
(2) Clear coating	0.52	4.3
(3) Steel pail and drum interior	0.52	4.3
(4) Air-dried coating	0.42	3.5
(5) Extreme performance coating	0.42	3.5
(6) Heavy-duty truck touchup	0.58	4.8
(7) All other coatings	0.36	3.0

^a VOC content values are expressed in units of mass of VOC (kg, lb) per volume of coating (liter (L), gallon (gal)), excluding water and/or exempt compounds, as applied.

- (e) If more than one emission limitation in Paragraph (d) applies to a specific coating, then the least stringent emission limitation shall apply.
- (f) As an alternative to compliance with Paragraph (d) of this Section, no owner or operator of a miscellaneous metal parts coating line that applies multiple coatings during the same day shall apply coatings on that line during any day whose weighted average VOC content exceeds a weighted VOC content limit calculated using the VOC content factors from Paragraph (d) of this Section.
- (g) All volatile organic compound emissions from solvent washings shall be considered in the emission limitations in Paragraph (d), unless the solvent is directed into containers that prevent evaporation into the atmosphere.
- (h) Proof of compliance with this Section shall be:
 - (1) By method of Section 7-24; or

- (2) By certification by the manufacturer of the composition of coating, if supported by batch formulation records.

SECTION 7-17: Manufacture of Pneumatic Rubber Tires

- (a) For the purpose of this Section, the following definitions apply:
 - (1) “**Bead dipping operation**” - is the dipping of an assembled tire bead into a solvent-based cement.
 - (2) “**Green tires**” - are assembled tires before molding and curing.
 - (3) “**Green tire spraying operation**” - is the spraying of green tires, both inside and outside, with release compounds which help remove air from the tire during molding and prevent the tire from sticking to the mold.
 - (4) “**Passenger type tires**” - are agricultural, airplane, industrial, mobile home, light and medium duty truck, and passenger vehicle tires with a bead diameter up to 20.0 inches and cross Section dimension up to 12.8 inches.
 - (5) “**Pneumatic rubber tire manufacture**” - is the production of pneumatic rubber, passenger type tires on a mass production bases.
 - (6) “**Tread end cementing operation**” - is the application of a solvent-based cement to the tire tread ends.
 - (7) “**Undertread cementing operation**” - is the application of a solvent-based cement to the underside of a tire tread.
 - (8) “**Water based sprays**” - are release compounds, sprayed on the inside and outside of green tires in which solids, water, and emulsifiers have been substituted for a portion of the organic solvents.
 - (9) “**Sidewall cementing operation**” - means the system used to apply cement to a continuous strip of sidewall component or any other continuous strip component (except combined tread/sidewall component) that is incorporated into the sidewall of a finished tire. A sidewall cementing operation consists of a cement application station and all other equipment, such as the cement supply system and feed and take away conveyors, necessary to allow evaporation of solvent from the cemented rubber.
- (b) This Section does not apply to the production of specialty tires for antique or other vehicles when produced on an irregular basis and when produced on equipment other than normal production line equipment for passenger tires.
- (c) This Section applies to the undertread cementing, tread end cementing, bead dipping, and green tire spraying operation.
 - (1) The owner or operator of a subject operation shall install and operate:
 - (i) A capture system which includes an enclosure or enclosures of the operation and its conveyors for the purpose of achieving maximum reasonable capture of

evaporated volatile organic compound. This system shall be designed consistent with good ventilation practice such as specified in *Industrial Ventilation Manual of Recommended Practice* - ACGIH - 14th Edition, and *Handbook of Ventilation for Contaminant Control*, McDermatt. This system shall be operated and maintained to assure that openings to an enclosure shall have an indraft during normal operation; and

- (ii) A control device having at least 90.0 percent reduction efficiency, as measured across the control device.
- (2) The owner or operator of a tread-end cementing operation may, in lieu of using a vapor capture and control system such as specified in (c)(1), employ tread-end cementing by manual application, if it can be demonstrated to the satisfaction of the Director that the employment of manual application results in emissions which are equal to or less than would be achieved in automatic spraying application with emission controls as specified in (c)(1).
- (3) The owner or operator of a subject operation may, in lieu of a vapor capture and control system such as specified in (c)(1), make process changes which result in an emission reduction which is as much or more than the reduction which would be achieved with emission controls as specified in (c)(1).
- (4) The owner or operator of a subject operation may, in lieu of using a vapor capture and control system such as specified in (c)(1), demonstrate to the satisfaction of the Director that average emissions of volatile organic compounds are no greater than the following:
 - (i) For undertread cementing, 25.0 grams/tire;
 - (ii) For tread end cementing, 10 grams/tire;
 - (iii) For bead dipping, 5 grams/bead; and
 - (iv) For green tire spraying, use only water base sprays containing no volatile organic compounds as determined by the test methods outlined in this Regulation.
- (d) Proof of compliance with this Section shall be:
 - (1) By method of Section 7-24(d) or an equivalent method approved by the Director.
 - (2) Compliance for Paragraph (c)(4)(iv) may be by certification by the manufacture of the composition of the green tire spray, if supported by batch formulation records.

Adopted: January 14, 1981

By the Metropolitan Board of Health

Nashville and Davidson County, Tennessee

SECTION 7-18: Graphic Arts - Rotogravure and Flexography

- (a) For the purpose of this Section, the following definitions apply:

- (1) **“Coating”** - means the application of a uniform layer of material across the width of the substrate surface.
 - (2) **“Flexographic printing”** - means the application of words, designs, and pictures to a substrate by means of a roll printing technique in which the pattern to be applied is raised above the printing roll and the image carrier is made of rubber or other elastomeric materials.
 - (3) **“Packaging rotogravure printing”** - means rotogravure printing upon paper, paper board, metal foil, plastic film, and other substrates, which are, in subsequent operations, formed into packaging products and labels for articles to be sold.
 - (4) **“Printing operation”** - means all printing, coating, oven, and drying units in a printing line.
 - (5) **“Publication rotogravure printing”** - means rotogravure printing upon paper which is subsequently formed into books, magazines, catalogues, brochures, directories, newspaper supplements, and other types of printed materials intended for either external or in-house use.
 - (6) **“Roll printing”** - means the application of words, designs and pictures to a substrate usually by means of a series of hard rubber or steel rolls each with only partial coverage.
 - (7) **“Rotogravure printing”** - means the application of words, designs, and pictures to a substrate by means of a roll printing technique which involves an intaglio or recessed image area in the form of cells.
- (b) This Section applies to all packaging rotogravure, publication rotogravure, and flexographic printing operations from a facility having a potential to emit 25 tons per year or greater volatile organic compound emissions from subject printing operations.
- (c) No owner or operator of a printing facility subject to this Section may cause, allow, or permit the discharge into the atmosphere of any volatile organic compounds from a printing operation unless:
- (1) The volatile fraction of the ink, as it is applied to the substrate, contains 25.0 percent by volume or less of organic compounds and 75.0 percent by volume or more of water;
 - (2) The ink, less its water content, as it is applied to the substrate, contains 60.0 percent by volume or more non-volatile material; or
 - (3) Install and operate an emission reduction system demonstrated to provide an overall reduction in volatile organic compound emissions of at least:
 - (i) 75.0 percent where a publication rotogravure process is employed;
 - (ii) 65.0 percent where a packaging rotogravure process is employed; and
 - (iii) 60.0 percent where a flexographic printing process is employed.
- (d) Proof of compliance with this Section shall be:
- (1) By methods of Section 7-24; or

- (2) By certification by the ink manufacturer of the composition of the ink, if supported by batch formulation records.

SECTION 7-19: Reserved

SECTION 7-20: Petroleum Solvent Dry Cleaners

- (a) For the purpose of this Section, the following definitions apply:
 - (1) “**Filter cartridge**” - means a replaceable filter unit containing filtration paper and carbon or carbon only.
 - (2) “**Perceptible leaks**” - means any petroleum solvent vapor or liquid leaks that are conspicuous from visual observation or that bubble after application of a soap solution, such as pools or droplets of liquid, open containers of solvent, or solvent-laden waste standing open to the atmosphere.
 - (3) “**Petroleum solvent cartridge filtration system**” - means a process in which soil-laden solvent is pumped under pressure from a washer through a sealed vessel containing filter cartridges that remove entrained solids and impurities from the solvent.
 - (4) “**Petroleum solvent dry cleaning facility**” - means a facility engaged in the cleaning of fabrics, clothing, and other articles in a petroleum solvent by means of one or more washes in the solvent, extraction of excess solvent by spinning, and drying by tumbling in an airstream. Equipment at the facility includes, but is not limited to, any petroleum solvent washer, dryer, solvent filter system, settling tank, vacuum still, and any other containers or conveyor of petroleum solvent.
 - (5) “**Settling tank**” - means a container, and any associated piping and ductwork, that gravimetrically separates oils, grease, and dirt from petroleum solvent.
 - (6) “**Solvent filter**” - means a discrete solvent filter unit containing a porous medium that traps and removes contaminants from petroleum solvent, together with the piping and ductwork used in the installation of this device.
 - (7) “**Solvent recovery dryer**” - means a class of dry cleaning dryers that employs a condenser to condense and recover solvent vapors evaporated in a closed-loop stream of heated air, together with the piping and ductwork used in the installation of this device.
 - (8) “**Standard dryer**” - means a device that dries dry-cleaned articles by tumbling in a heated airstream.
 - (9) “**Still**” - means a device used to volatilize, separate, and recover petroleum solvent from contaminated solvent, together with the piping and ductwork used in the installation of this device.

- (10) “**Washer**” - means a machine which agitates fabric articles in a petroleum solvent bath and spins the articles to remove the solvent, together with the piping and ductwork used in the installation of this device.
- (b) This Section applies to all petroleum solvent dry cleaning facilities. Any petroleum solvent dry cleaner (P.S.D.C.) that consumes less than 32,500 gallons of petroleum solvent per year is only subject to the recordkeeping requirement of Paragraph (e)(1).
- (c) Standards as follow apply:
- (1) The owner or operator of a petroleum solvent dry cleaning facility subject to this Section shall ensure that:
 - (i) There are no perceptible leaks from any portion of the equipment; and
 - (ii) All washer lint traps, button traps, access doors, and other parts of the equipment where solvent may be exposed to the atmosphere are kept closed at all times except when opening is required for proper operation or maintenance.
 - (2) The owner or operator of a petroleum solvent dry cleaning facility subject to this Regulation shall repair any perceptible leaks in any portion of the dry cleaning equipment within 3 working days after the leak is detected. If necessary repair parts are not on hand, the owner or operator shall order these parts within 3 working days and repair the leaks no later than 3 working days after the parts arrive.
 - (3) The owner or operator of a petroleum solvent dry cleaning facility subject to this Section shall:
 - (i) Limit the volatile organic compound (VOC) emissions from each standard dryer to 1.6 kilograms (kg) (3.5 pounds (lb)) VOC per 45 kg (100 lb) dry weight of articles dry cleaned, or
 - (ii) Install, maintain, and operate a solvent-recovery dryer such that the dryer remains closed and recovery phase continued until a final recovered solvent flow rate of no greater than 50 milliliters per minute (ml/min) (0.013 gallons per minute (gal/min)) is attained.
 - (4) The owner or operator of a petroleum solvent filtration system subject to this Section shall:
 - (i) Reduce the VOC content in filtration waste to 1 kg (2.2 lb) VOC per 100 kg (220 lb) dry weight of articles dry cleaned, or
 - (ii) As an alternative:
 - (A) Install, maintain, and operate a cartridge filtration system according to the manufacturer’s instructions, and
 - (B) Drain all filter cartridges in their sealed housings for 8 hours or more before their removal.
- (d) Test methods and procedures as follow apply:

- (1) To be in compliance with Paragraph (c)(3)(ii) of this Section, each owner or operator of a petroleum solvent dry cleaning facility subject to this Regulation shall:
 - (i) Calculate the weight of VOCs vented from the dryer emission control device calculated by using Reference Methods 1, 2, and 25A with the following specifications:
 - (A) Field calibration of the flame ionization analyzer with propane standards;
 - (B) Laboratory determination of the ratio of the flame ionization analyzer response to a given parts per million (ppm) by volume concentration of propane to the response to the same ppm concentration of the VOCs to be measured; and
 - (C) Determination of the weight of VOCs vented to the atmosphere by:
 - (I) Multiplying the ratio determined in Subpart (b) of this paragraph by the measured concentration of VOC gas (as propane) as indicated by the flame ionization analyzer response output record;
 - (II) Converting the ppm by volume value calculated in Item (I) of this Subpart into a mass concentration value of the VOCs present; and
 - (III) Multiplying the mass concentration value calculated in Paragraph (II) of this Subpart by the exhaust flow rate determined by using Reference Methods 1 and 2.
 - (ii) Calculate the dry weight of articles dry cleaned; and
 - (iii) Repeat Paragraphs (i) and (ii) of this subparagraph for normal operating conditions that encompass at least 30 dryer loads, which total not less than 1,800 kg (4,000 lb) dry weight and represent a normal range of variations in fabrics, solvents, load weights, temperatures, flow rates, and process deviations.
- (2) To determine initial compliance with Paragraph (c)(3)(ii) of this Section, the owner or operator of a petroleum solvent dry cleaning facility shall:
 - (i) Verify that the flow rate of recovered solvent from the solvent-recovery dryer at the termination of the recovery phase is no greater than 50 ml/min (0.013 gal/min) by using the following procedure:
 - (A) Determine the appropriate location for measuring the flow rate of recovered solvent; the suggested point is at the outlet of the solvent-water separator;
 - (B) Near the end of the recovery cycle, divert the flow of recovered solvent to a graduated cylinder;
 - (C) Continue the cycle until a flow rate of solvent no greater than 50 ml/min (0.013 gal/min) is reached; and
 - (D) Record the type of articles dry cleaned and the length of the cycle.

- (ii) To determine initial compliance with paragraph (c)(3)(ii) of this Section, conduct the procedure in Paragraph (i) above for at least 50 percent of the dryer loads over a period of no less than 2 consecutive weeks.
 - (3) To be in compliance with Paragraph (c)(4) of this Section, the owner or operator of a petroleum solvent dry cleaning facility subject to this Section shall:
 - (i) Calculate the weight of volatile organic compounds contained in each of at least five 1-kg (2.2 lb) samples of filtration waste material taken at intervals of at least 1 week, by employing ASTM D322-80 (Standard Test Method for Gasoline Diluent in Used Gasoline Engine Oils by Distillation);
 - (ii) Calculate the total dry weight of articles dry cleaned during the intervals between removal of filtration waste samples, as well as the total mass of filtration waste produced in the same period; and
 - (iii) Calculate the weight of VOCs contained in filtration waste material per 100 kg (220 lb) dry weight of articles dry cleaned.
 - (4) Compliance with Paragraph (c) of this Section requires that each owner or operator of a petroleum solvent dry cleaning facility subject to this Section make weekly inspections of washers, dryers, solvent filters, settling tanks, vacuum stills, and all containers and conveyors of petroleum solvent to identify perceptible VOC vapor or liquid leaks.
- (e) Recordkeeping requirements as follow apply:
- (1) The owner or operator of a petroleum solvent dry cleaning facility claiming exemption from this Section by the provisions of Paragraph (b) shall maintain records of annual solvent consumption for at least 3 years to document whether the applicability threshold in Paragraph (b) of this Section has been exceeded.
 - (2) The owner or operator of a petroleum solvent dry cleaning facility subject to this Section shall maintain the following records for at least 3 years.
 - (i) Records of the weight of VOCs vented from the dryer emission control device calculated according to Paragraph (d)(1)(i) of this Section;
 - (ii) Records of the dry weight of articles dry cleaned for use in the calculations required in Paragraphs (d)(1), (d)(2) and (d)(3) of this Section;
 - (iii) Records of the weight of VOCs contained in the filtration waste samples required by Paragraph (d)(3)(i) of this Section; and
 - (iv) Records of the weight of VOCs in filtration waste material per 100 kg (220 lb) dry weight of articles dry cleaned.
- (f) Regardless of the specific emission standards of this Regulation, all new or modified facilities which have the potential to emit greater than 100 tons per year of volatile organic compounds shall utilize LAER.

SECTION 7-21: Volatile Organic Liquid Storage in External Floating Roof Tanks

- (a) For the purpose of this Section, the following definitions apply:
- (1) “**Condensate**” - means hydrocarbon liquid separated from natural gas which condenses due to changes in the temperature and/or pressure and remains liquid at standard conditions.
 - (2) “**Crude oil**” - means a naturally occurring mixture which consists of hydrocarbons and/or sulfur, nitrogen and/or oxygen derivatives of hydrocarbons and which is a liquid at standard conditions.
 - (3) “**Custody transfer**” - means the transfer of produced crude oil and/or condensate, after processing and/or treating in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.
 - (4) “**External floating roof**” - means a storage vessel cover in an open top tank consisting of a double deck or pontoon single deck which rests upon and is supported by the volatile organic liquid being contained and is equipped with a closure seal or seals to close the space between the roof edge and tank shell.
 - (5) “**Liquid-mounted seal**” - means a primary seal mounted in continuous contact with the liquid between the tank wall and the floating roof around the circumference of the tank.
 - (6) “**Vapor-mounted seal**” - means a primary seal mounted so there is an annular vapor space beneath the seal. The annular vapor space is bounded by the bottom of the primary seal, the tank wall, the liquid surface, and the floating roof.
 - (7) “**Volatile organic liquid (VOL)**” - means any organic liquid which can emit volatile organic compounds into the atmosphere except those VOLs that emit only those compounds which the Administrator has determined do not contribute appreciably to the formation of ozone.
 - (8) “**Waxy, heavy pour crude oil**” - means a crude oil with a pour point of 50° F or higher as determined by the American Society for Testing and Materials Standard D97-66, “Test for Pour Point of Petroleum Oils”.
- (b) This Section applies to all volatile organic liquid storage vessels equipped with external floating roofs, with capacities greater than 150,000 liters (40,000 gallons), containing volatile organic liquids whose maximum true vapor pressure is greater than 10.5 kilo pascals (1.52 psia).
- (c) This Section does not apply to volatile organic liquid storage vessels which:
- (1) Are used to store waxy, heavy pour crude oil;
 - (2) Have capacities less than 1,600,000 liters (420,000 gallons) and are used to store produced crude oil and condensate prior to lease custody transfer;
 - (3) Contain a volatile organic liquid with a maximum true vapor pressure less than 27.6 kPa (4.0 psia):
 - (i) Are of welded construction; and

- (ii) Presently possess a metallic-type shoe seal, a liquid-mounted foam seal, a liquid-mounted liquid filled type seal, or other closure device of demonstrated equivalence approved by the Director.
- (4) Are of welded construction, equipped with a metallic-type shoe primary seal and has a secondary seal from the top of the shoe seal to the tank wall (shoe-mounted secondary seal).
- (d) Except as provided under Paragraph (c) of this Section, no owner or operator of an affected volatile organic liquid storage vessel shall store a volatile organic liquid in that vessel unless:
 - (1) The vessel has been fitted with:
 - (i) A continuous secondary seal extending from the floating roof to the tank wall (rim-mounted secondary seal); or
 - (ii) A closure or other device which controls volatile organic compound emissions with an effectiveness equal to or greater than a seal required under Part (d)(1)(i) of this Section and approved by the Director.
 - (2) All seal closure devices meet the following requirements:
 - (i) There are no visible holes, tears, or other openings in the seal(s) or seal fabrics;
 - (ii) The seal(s) are intact and uniformly in place around the circumference of the floating roof between the floating roof and the tank wall; and
 - (iii) For vapor mounted primary seals, the accumulated area of gaps exceeding 0.32 cm (1/8 in.) in width between the secondary seal and the tank wall shall not exceed 21.1 cm² per meter of tank diameter (1.0 in.² per foot of tank diameter).
 - (3) All openings in the external floating roof, except for automatic bleeder vents, rim space vents, and leg sleeves are:
 - (i) Equipped with covers, seals, or lids in the closed position except when the openings are in actual use; and
 - (ii) Equipped with projections into the tank which remain below the liquid surface at all times.
 - (4) Automatic bleeder vents are to be gasketed and closed at all times except when the roof is being floated off or being landed on the roof leg supports;
 - (5) Rim vents are to be gasketed and set to open when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting; and
 - (6) Emergency roof drains are provided with slotted membrane fabric covers or equivalent covers which cover at least 90 percent of the area of opening.
- (e) The owner or operator of a volatile organic liquid storage vessel with an external floating roof subject to this Section shall:
 - (1) Measure the secondary seal gap, when the floating roof is equipped with a vapor-mounted primary seal, annually;

- (2) Conduct routine inspection for other components semi-annually; and
- (3) Maintain records of the types of volatile organic liquid stored and the results of the inspections performed in (1) and (2).
- (f) The owner or operator of a volatile organic liquid storage vessel with an external floating roof exempted from this Section, but containing a petroleum liquid with a true vapor pressure greater than 7.0 kPa (1.0 psia), shall maintain records of the average monthly storage temperature and the true vapor pressures of volatile organic liquids stored.
- (g) Copies of all records under Paragraphs (e) and (f) of this Section shall be retained by the owner or operator for a period of two years after the date on which the record was made. These records must be made available to the Director, upon request.
- (h) Compliance with Paragraph (d)(2)(iii) shall be determined by physically measuring the length and width of all gaps around the circumference of the secondary seal in each place where a 0.32 cm (1.8 in.) uniform diameter probe passes freely (without forcing or binding against the seal) between the seal and tank wall; and summing the area of the individual gaps.

SECTION 7-22: Leaks from Synthetic Organic Chemical, Polymer, and Resin Manufacturing Equipment

- (a) For the purpose of this Section, the following definitions apply:
 - (1) “**(In) gas/vapor service**” - means that the piece of equipment in VOC service contains process fluid that is in the gaseous state at operating conditions.
 - (2) “**(In) heavy liquid service**” - means that the piece of equipment in VOC service is not in gas/vapor service or in light liquid service.
 - (3) “**(In) light liquid service**” - means that the piece of equipment in VOC service contains a liquid that meets the following conditions:
 - (i) The vapor pressure of one or more of the components is greater than 0.3 kPa (0.044 in Hg) at 20°C (68°F) (standard reference texts or ASTM D2879 shall be used to determine the vapor pressures);
 - (ii) The total concentration of the pure components having a vapor pressure greater than 0.3 kPa (0.044 in Hg) at 20°C (68°F) is equal to or greater than 10 percent by weight; and
 - (iii) The fluid is a liquid at operating conditions.
 - (4) “**Process unit**” - means components assembled to produce, as intermediate or final products, one or more of the chemicals listed in 40 CFR 60.489 as of July 1, 1991. A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for product.

- (5) “**(In) vacuum service**” - means that the equipment in VOC service is operating at an internal pressure which is at least 5 kPa (0.733 in Hg.) below ambient pressure.
 - (6) “**(In) VOC service**” - means that the piece of equipment contains or contacts a process fluid that is at least 10 percent VOC by weight. The provisions of Paragraph (b)(2) of this Section specify how to determine that a piece of equipment is not in VOC service.
- (b) (1) This Section applies to all equipment in VOC service in any process unit at a synthetic organic chemical, polymer and resin manufacturing facility.
 - (2) A piece of equipment is not in VOC service if the VOC content of the process fluid can never be reasonably expected to exceed 10 percent by weight. For purposes of this demonstration, the following methods and procedures shall be used:
 - (i) Procedures that conform to the general methods in ASTM E260, E168 and E169 shall be used to determine the percent VOC content in the process fluid that is contained in or contacts a piece of equipment; and
 - (ii) Organic compounds that are not volatile organic compounds, including exempt compounds, may be excluded from the total quantity of organic compounds in determining the VOC content of the process fluid.
 - (c) This Section does not apply to any synthetic organic chemical, polymer, or resin manufacturing facility whose annual design production capacity is less than 1,000 megagrams (Mg) (1,100 tons) of product.
 - (d) The owner or operator of a synthetic organic chemical, polymer, or resin manufacturing facility subject to this Section shall ensure that:
 - (1) Any open-ended line or valve is sealed with a second valve, blind flange, cap, or plug except during operations requiring process fluid flow through the open-ended line or valve;
 - (2) When a second valve is used, each open-ended line or valve equipped with a second valve is operated in such a manner that the valve on the process fluid end is closed before the second valve is closed; and
 - (3) When a double block-and-bleed system is used, the bleed valve or line is open only during operations that require venting of the line between the block valves and is closed at all other times.
 - (e) The owner or operator of a synthetic organic chemical, polymer, or resin manufacturing facility shall conduct the equipment inspection program described in Subparagraphs (1) through (3) of this paragraph using the test methods specified in this Regulation, leak determination, and tagging procedure as follow:
 - (1) The owner or operator of a synthetic organic chemical, polymer, or resin manufacturing facility shall conduct quarterly monitoring of each:
 - (i) Compressor;
 - (ii) Pump in light liquid service;

- (iii) Valve in light liquid service, except as provided in Paragraphs (f) and (g) of this Section;
 - (iv) Valve in gas/vapor service, except as provided in Paragraphs (f) and (g) of this Section; and
 - (v) Pressure relief valve in gas/vapor service, except as provided in Paragraphs (f) and (g) of this Section.
- (2) The owner or operator of a synthetic organic chemical or resin manufacturing facility shall conduct a weekly visual inspection of each pump in light liquid service.
 - (3) The owner or operator of a synthetic organic chemical, polymer, or resin manufacturing facility shall inspect each pressure relief valve immediately after each overpressure relief to ensure that the valve has properly reseated and is not leaking.
 - (4) Leak determination is as follows:
 - (i) When an instrument reading of 10,000 parts per million (ppm) or greater is measured, it shall be determined that a leak has been detected.
 - (ii) If there is liquid dripping from the equipment, it shall be determined that a leak has been detected.
 - (5) When a leak is detected, the owner or operator shall affix a weatherproof, readily visible tag in a bright color such as red or yellow, bearing the equipment identification number and the date on which the leak was detected. This tag shall remain in place until the leaking equipment is repaired. The requirements of this subparagraph apply to any leak detected by the equipment inspection program and to any leak from any equipment that is detected on the basis of sight, sound, or smell.
 - (6) The requirements of this paragraph do not apply to:
 - (i) Any equipment in vacuum service;
 - (ii) Any pressure-relief valve that is connected to an operating flare header or vapor recovery device;
 - (iii) Any liquid pump that has a dual mechanical pump seal with a barrier fluid system; or
 - (iv) Any compressor with a degassing vent that is routed to an operating VOC control device.
- (f) An owner or operator shall comply with the requirements for valves in gas/vapor service and valves in light liquid service as described in Paragraph (e) of this Section except as follows:
- (1) If the percent of valves leaking is equal or less than 2.0 for two consecutive quarters, an owner or operator may skip alternate quarterly leak detection periods for the valves in gas/vapor and light liquid service;
 - (2) If the percent of valves leaking is equal to or less than 2.0 for five consecutive quarters, an owner or operator may skip three of the quarterly leak detection periods per year for

the valves in gas/vapor and light liquid service, provided that each valve shall be monitored once a year;

- (3) If at any time the percent of valves leaking is greater than 2.0, the owner or operator shall resume compliance with the requirements in Paragraph (e) of this Section but may again elect to comply with the alternative standards in this paragraph;
 - (4) The percent of valves leaking shall be determined by dividing the sum of valves found leaking during current monitoring and previously leaking valves for which repair has been delayed by the total number of valves subject to the requirements of this Section ; and
 - (5) An owner or operator shall keep a record of the percent of valves found leaking during each leak detection period.
- (g) Alternative standards for unsafe-to-monitor valves and difficult-to-monitor valves apply as follows:
- (1) Any valve is exempt from the requirements of Paragraph (e) as an unsafe-to-monitor valve if:
 - (i) The owner or operator of the valve demonstrates that the valve is unsafe-to-monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with Paragraph (e); and
 - (ii) The owner or operator of the valve adheres to a written plan that requires monitoring of the valve as frequently as practicable during safe-to-monitor times.
 - (2) Any valve is exempt from the requirements of Paragraph (e) as a difficult-to-monitor valve if:
 - (i) The owner or operator of the valve demonstrates that the valve cannot be monitored without elevating the monitoring personnel more than 2 meters (m) (6.6 feet (ft)) above a support surface; and
 - (ii) The owner or operator of the valve follows a written plan that requires monitoring of the valve at least once per calendar year.
 - (3) The alternative standards of Paragraph (f) are not available to valves subject to the requirements of this paragraph.
- (h) The owner or operator of synthetic organic chemical, polymer, or resin manufacturing facility shall:
- (1) Make a first attempt at repair for any leak not later than 5 calendar days after the leak is detected; and
 - (2) Repair any leak as soon as practicable, but not later than 15 calendar days after it is detected except as provided in Paragraph (i) of this Section.
- (i) Delay of repair standards apply as follows:

- (1) Delay of repair of equipment for which a leak has been detected will be allowed if repair is technically infeasible without a process unit shutdown. Repair of such equipment shall occur before the end of the first process unit shutdown after detection of the leak.
 - (2) Delay of repair of equipment will also be allowed for equipment that is isolated from the process and that does not remain in VOC service after detection of the leak.
 - (3) Delay of repair beyond a process unit shutdown will be allowed for a valve, if valve assembly replacement is necessary during the process unit shutdown, and if valve assembly supplies have been depleted, where valve assembly supplies had been sufficiently stocked before the supplies were depleted. Delay of repair beyond the first process unit will not be allowed unless the next process unit shutdown occurs sooner than 6 months after the first process unit shutdown.
- (j) The test methods and procedures apply as follow:
- (1) In conducting the monitoring required to comply with Paragraph (e) of this Section, the owner or operator shall use the test methods specified in this Regulation.
 - (2) The owner or operator shall demonstrate that a piece of equipment is in light liquid service by showing that all of the following conditions apply:
 - (i) The vapor pressure of one or more of the components is greater than 0.3 kiloPascal (kPa) (0.044 inches of mercury (in Hg) at 20°C (68°F) with standard reference texts or ASTM D2879 used to determine the vapor pressures;
 - (ii) The total concentration of the pure components having a vapor pressure greater than 0.3 kPa (0.044 in Hg) at 20°C (68°F) is equal to or greater than 20 percent by weight; and
 - (iii) The fluid is a liquid at operating conditions.
 - (3) Samples shall be representative of the process fluid that is contained in or contacts the equipment.
- (k) Recordkeeping requirements apply as follow:
- (1) Each owner or operator subject to the provisions of this Section shall comply with the recordkeeping requirements of this Section.
 - (2) An owner or operator of more than one facility subject to the provisions of this Section may comply with the recordkeeping requirements for these facilities in one recordkeeping system if the system identifies each record by each facility.
 - (3) When each leak is detected as specified in Paragraph (e) of this Section, the following information shall be recorded in a log and shall be kept for 3 years:
 - (i) The instrument and operator identification numbers and the equipment identification number;
 - (ii) The date the leak was detected and the dates of each attempt to repair the leak;
 - (iii) The repair methods employed in each attempt to repair the leak;

- (iv) The notification of and the reason for the delay if a leak is not repaired within 15 calendar days after discovery of the leak and the expected date of successful repair;
 - (v) The signature of the owner or operator (or designate) whose decision it was that repair could not be effected without a process shutdown;
 - (vi) The dates of process unit shutdowns that occur while the equipment is unrepaired; and
 - (vii) The date of successful repair of the leak.
- (4) A list of identification numbers of equipment in vacuum service shall be recorded in a log that is kept for 3 years.
- (5) The following information for valves complying with Paragraph (f) of this Section shall be recorded in a log that is kept for 3 years:
- (i) A schedule of monitoring; and
 - (ii) The percent of valves found leaking during each monitoring period.
- (6) The following information pertaining to all valves subject to the requirements of Paragraph (g) of this Section shall be recorded in a log that is kept for 3 years:
- (i) A list of identification numbers for valves that are designated as unsafe to monitor, an explanation for each valve stating why the valve is unsafe to monitor, and the plan for monitoring each valve; and
 - (ii) A list of identification numbers for valves that are designated as difficult to monitor, an explanation for each valve stating why the valve is difficult to monitor, and the schedule for monitoring each valve.
- (7) The following information shall be recorded in a log that is kept for 3 years for use in determining exemptions as provided in Paragraph (c) of this Section:
- (i) An analysis demonstrating the design capacity of the affected facility; and
 - (ii) Information and data used to demonstrate that a piece of equipment is not in VOC service.
- (1) The owner or operator of any facility containing sources subject to this Section shall submit to the Director an initial compliance certificate by November 9, 1994.

SECTION 7-23: Air Oxidation Processes in the Synthetic Organic Chemical Manufacturer's Industry

- (a) For the purposes this Section, the following definitions apply:
- (1) “**Air oxidation facility**” - means a product recovery system and all associated air oxidation process reactors discharging directly into that system or any such reactors discharging directly into the atmosphere.

- (2) “**Air oxidation process**” - means a reactor in which air is used as an oxidizing agent to produce an organic chemical.
 - (3) “**Air oxidation reactor**” - means any device or process vessel in which one or more organic reactants are combined with air or a combination of air and oxygen to produce one or more organic compounds. Ammoxidation and oxychlorination are included in this definition.
 - (4) “**Air oxidation reactor recovery train**” - means an individual recovery system receiving the vent stream from at least one air oxidation reactor, along with all air oxidation reactors feeding vent streams into this system.
 - (5) “**Product recovery system**” - means any equipment used to collect volatile organic compounds (VOCs) for use, reuse, or sale. Such equipment includes, but is not limited to, absorbers, adsorbers, condensers, and devices that recover non-VOCs such as ammonia and HCl.
 - (6) “**Synthetic organic chemical manufacturing industry**” - means the industry that produces, as intermediates or final products, one or more of the chemicals listed at 40 CFR 60.489, as of July 1, 1991.
 - (7) “**Total resource effectiveness index value**” or “**TRE index value**” - means a measure of the supplemental total resource requirement per unit of VOC emission reduction associated with an individual air oxidation vent stream, based on vent stream flow rate, emission rate of VOC, net heating value, and corrosive properties, as quantified by the equation given under Subparagraph (f)(1) of this Section.
 - (8) “**Vent stream**” - means any gas stream containing nitrogen that was introduced as air to the air oxidation reactor, released to the atmosphere directly from any air oxidation reactor recovery train or indirectly, after diversion through other process equipment.
- (b) This Section applies to the following oxidation facilities in the synthetic organic chemical manufacturing industry:
- (1) Each air oxidation reactor not discharging its vent stream into a recovery system;
 - (2) Each combination of an air oxidation reactor and the recovery system into which its vent stream is discharged; and
 - (3) Each combination of two or more air oxidation reactors and the common recovery system into which their vent streams are discharged.
- (c) This Section is not applicable to any air oxidation reactor vent stream that has a total resource effectiveness (TRE) index value greater than one (1.0) except the requirements in Paragraph (d) and Subparagraph (f)(2) and (g)(10).
- (d) For each vent stream from an air oxidation reactor or combination air oxidation reactor and recovery train subject to this Section, the owner or operator shall comply with Subparagraph (1), (2), or (3) as follows:
- (1) Reduce total VOC emissions by 98 weight percent or 20 parts per million volumetric (ppmv) on a dry basis corrected to 3 percent oxygen, whichever is less stringent. If a

boiler or process heater is used to comply with this subparagraph, the vent stream shall be introduced into the flame zone of the boiler or process heater;

- (2) Combust the emissions in a flare that meets the requirements of 40 CFR 60.18, as of July 1, 1991; or
 - (3) Maintain a TRE index value greater than 1.0 without the use of VOC emission control devices.
- (e) Monitoring requirements as follow apply:
- (1) The owner or operator of an air oxidation facility that uses an incinerator to seek to comply with the VOC emission limit specified under Subparagraph (d)(1) of this Section, shall install, calibrate, maintain, and operate according to manufacturer's specifications the following equipment:
 - (i) A temperature monitoring device equipped with a continuous recorder and having an accuracy of +1 percent of the temperature being monitored expressed in degrees Celsius or +0.5° C, whichever is greater.
 - (A) Where an incinerator other than a catalytic incinerator is used, a temperature monitoring device shall be installed in the firebox.
 - (B) Where a catalytic incinerator is used, temperature monitoring devices shall be installed in the gas stream immediately before and after the catalyst bed.
 - (ii) A flow indicator that provides a record of vent stream flow to the incinerator at least once every hour for each air oxidation facility. The flow indicator shall be installed in the vent stream from each air oxidation facility at a point closest to the inlet of each incinerator and before being joined with any other vent stream.
 - (2) The owner or operator of an air oxidation facility that uses a flare to seek to comply with Subparagraph (d)(2) of this Section shall install, calibrate, maintain, and operate according to manufacturer's specifications the following equipment:
 - (i) A heat sensing device, such as an ultra-violet sensor or thermocouple, at the pilot light to indicate the continuous presence of a flame; and
 - (ii) A flow indicator that provides a record of vent stream flow to the flare at least once every hour for each air oxidation facility. The flow indicator shall be installed in the vent stream from each air oxidation facility at a point closest to the flare and before being joined with any other vent stream.
 - (3) The owner or operator of an air oxidation facility that uses a boiler or process heater to seek to comply with Subparagraph (d)(3) of this Section shall install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment:
 - (i) A flow indicator that provides a record of vent stream flow to the boiler or process heater at least once every hour for each air oxidation facility. The flow indicator shall be installed in the vent stream from each air oxidation reactor within a facility at a point closest to the inlet of each boiler or process heater and before being joined with any other vent stream.

- (ii) A temperature monitoring device in the firebox equipped with a continuous recorder and having an accuracy of +1 percent of the temperature being measured expressed in degrees Celsius or $+0.5^{\circ}$ C, whichever is greater, for boilers or process heaters of less than 44 MW (150 million BTU/hr) heat input design capacity.
 - (iii) Monitor and record the periods of operation of the boiler or process heater if the design input capacity of the boiler or process heater is 44 MW (150 million BTU/hr) or greater. The records shall be readily available for inspection.
- (4) The owner or operator of an air oxidation facility that seeks to demonstrate compliance with the TRE index value limit specified under Subparagraph (d)(3) of this Section shall install, calibrate, maintain, and operate according to manufacturer's specifications the following equipment:
- (i) Where an adsorber is the final recovery device in a recovery system:
 - (A) A scrubbing liquid temperature monitoring device having an accuracy of +1 percent of the temperature being monitored, expressed in degrees Celsius or $+0.5^{\circ}$ C, whichever is greater, and a specific gravity monitoring device having an accuracy of +0.02 specific gravity unit, each equipped with a continuous recorder; and
 - (B) An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared, photoionization, or thermal conductivity, each equipped with a continuous recorder.
 - (ii) Where a condenser is the final recovery device in a recovery system:
 - (A) A condenser exit (product site) temperature monitoring device equipped with a continuous recorder and having an accuracy of +1 percent of the temperature being monitored expressed in degrees Celsius or $+0.5^{\circ}$ C, whichever is greater; and
 - (B) An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared, photoionization, or thermal conductivity, each equipped with a continuous recorder.
 - (iii) Where a carbon adsorber is the final recovery device in a recovery system:
 - (A) An integrating steam flow monitoring device having an accuracy of +10 percent, and a carbon bed temperature monitoring device having an accuracy of +1 percent of the temperature being monitored expressed in degrees Celsius or $+0.5^{\circ}$ C, whichever is greater, both equipped with a continuous recorder; and
 - (B) An organic monitoring device used to indicate the concentration level of organic compounds exiting the recovery device based on a detection principle such as infrared, photoionization, or thermal conductivity, each equipped with a continuous recorder.

(f) The following methods shall be used to demonstrate compliance with Paragraph (d) of this Section:

(1) The following equation shall be used to calculate the TRE index for a given vent stream:

$$\text{TRE} = \frac{1}{E} [a+b (\text{FL})^{0.88} + c(\text{FL}) + d(\text{FL})H_T + e(\text{FL})^{0.88} (H_T)^{0.88} + f(\text{FL})^{0.5}]$$

Where:

TRE = The total resource effectiveness index value.

E = The measured hourly emissions in units of kilograms/hour (kg/h).

FL = The vent stream flow rate in scm/min, at a standard temperature of 20°C. For a Category E stream (see Table 1), the factor $f(\text{FL})^{0.5}$ should be replaced with:

$$(f) \left| \frac{(\text{FL})(H_T)}{3.6} \right|^{0.5}$$

Where: H_T = Vent stream net heating value in units of MJ/scm, where the net enthalpy per mole of offgas is based on combustion at 25° C (68°F) and 760 millimeters of Mercury (mmHg), but the standard temperature for determining the volume corresponding to one mole is 20°C, as in the definition of FL.

a,b,c,d,e and f = Specific coefficients for six different general categories of process vent streams. The set of coefficients that apply to a given air oxidation process vent stream are specified in Table 1.

TABLE 1. COEFFICIENTS OF THE TOTAL RESOURCE EFFECTIVENESS (TRE) INDEX EQUATION

A1. For Chlorinated Process Vent Streams, if $0 \leq \text{Net Heating Value (MJ/scm)} \leq 3.5$:

FL - Vent Stream Flow Rate (scm/min)	a	b	c	d	e	f
$\text{FL} \leq 13.5$	48.73	0	0.404	-0.1632	0	0
$13.5 < \text{FL} \leq 700$	42.35	0.624	0.404	-0.1632	0	0.0245
$700 < \text{FL} \leq 1,400$	84.38	0.678	0.404	-0.1632	0	0.0346
$1,400 < \text{FL} \leq 2,100$	126.41	0.712	0.404	-0.1632	0	0.0424
$2,100 < \text{FL} \leq 2,800$	168.44	0.747	0.404	-0.1632	0	0.0490
$2,800 < \text{FL} \leq 3,500$	210.47	0.758	0.404	-0.1632	0	0.0548

A2. For Chlorinated Process Vent Streams, if $3.5 < \text{Net Heating Value (MJ/scm)}$:

FL - Vent Stream	a	b	c	d	e	f
Flow Rate (scm/min)						
$FL \leq 13.5$	47.76	0	0.292	0	0	0
$13.5 < FL \leq 700$	41.58	0.605	0.292	0	0	0.0245
$700 < FL \leq 1,400$	82.84	0.658	0.292	0	0	0.0346
$1,400 < FL \leq 2,100$	123.10	0.691	0.292	0	0	0.0424
$2,100 < FL \leq 2,800$	165.36	0.715	0.292	0	0	0.0490
$2,800 < FL \leq 3,500$	206.62	0.734	0.292	0	0	0.0548

B. For Nonchlorinated Process Vent Streams, if $0 \leq \text{Net Heating Value (MJ/scm)} \leq 0.48$:

FL - Vent Stream	a	b	c	d	e	f
Flow Rate (scm/min)						
$FL \leq 13.5$	19.05	0	0.113	-0.214	0	0
$13.5 < FL \leq 1,350$	16.61	0.239	0.113	-0.214	0	0.0245
$1,350 < FL \leq 2,700$	32.91	0.260	0.113	-0.214	0	0.0346
$2,700 < FL \leq 3,500$	49.21	0.273	0.113	-0.214	0	0.0424

C. For Nonchlorinated Process Vent Streams, if $0.48 < \text{Net Heating Value (MJ/scm)} \leq 1.9$:

FL - Vent Stream	a	b	c	d	e	f
Flow Rate (scm/min)						
$FL \leq 13.5$	19.74	0	0.400	-0.202	0	0
$13.5 < FL \leq 1,350$	18.30	0.138	0.400	-0.202	0	0.0245
$1,350 < FL \leq 2,700$	36.28	0.150	0.400	-0.202	0	0.0346
$2,700 < FL \leq 4,050$	54.26	0.158	0.400	-0.202	0	0.0424

D. For Nonchlorinated Process Vent Streams, if $1.9 < \text{Net Heating Value (MJ/scm)} \leq 3.6$:

FL - Vent Stream	a	b	c	d	e	f
Flow Rate (scm/min)						
$FL \leq 13.5$	15.24	0	0.033	0	0	0
$13.5 < FL \leq 1,190$	13.63	0.157	0.033	0	0	0.0245
$1,190 < FL \leq 2,380$	26.95	0.171	0.033	0	0	0.0346
$2,380 < FL \leq 3,570$	40.27	0.179	0.033	0	0	0.0424

E. For Nonchlorinated Process Vent Streams, if $3.6 < \text{Net Heating Value (MJ/scm)}$:

FL - Vent Stream	a	b	c	d	e	f
Flow Rate (scm/min)						
$FL \leq 13.5$	15.24	0	0	0.0090	0	0
$13.5 < FL \leq 1,190$	13.63	0	0	0.0090	0.0503	0.0245
$1,190 < FL \leq 2,380$	26.95	0	0	0.0090	0.0546	0.0346
$2,380 < FL \leq 3,570$	40.27	0	0	0.0090	0.0573	0.0424

- (2) Each owner or operator of an air oxidation facility seeking to comply with Paragraph (c) or Subparagraph (d)(3) of this Section shall recalculate the TRE index value for that air

oxidation facility whenever process changes are made. Some examples of process changes are changes in production capacity, feedstock type, or catalyst type, or whenever there is replacement, removal, or addition of recovery equipment. The TRE index value shall be recalculated based on test data, or on best engineering estimates of the effects of the change to the recovery system.

- (3) Reference Method 1 or 1A, as appropriate, for selection of the sampling sites. The control device inlet sampling site for determination of vent stream molar composition or VOC reduction efficiency shall be prior to the inlet of the control device and after the recovery system.
- (4) Reference Method 2, 2A, 2C or 2D, as appropriate, for determination of the volumetric flow rates.
- (5) The emission rate correction factor, integrated sampling and analysis procedure of Method 3 shall be used to determine the oxygen concentration (%O_{2d}) for the purposes of determining compliance with the 20 ppmv limit. The sampling site shall be the same as that of the VOC samples and the samples shall be taken during the same time that the VOC samples are taken. The VOC concentration corrected to 3 percent O₂ (C_C) shall be computed using the following equation:

$$C_C = C_{VOC} \frac{17.9}{20.9 - \%O_{2d}}$$

Where:

C_C = Concentration of VOC corrected to 3 percent O₂, dry basis, ppm by volume.

C_{VOC} = Concentration of VOC, dry basis, ppm by volume.

%O_{2d} = Concentration of O₂, dry basis, percent by volume.

- (6) Reference Method 18 to determine concentration of VOC in the control device outlet and the concentration of VOC in the inlet when the reduction efficiency of the control device is to be determined, according to the following:
 - (i) The sampling time for each run shall be 1 hour in which either an integrated sample or four grab samples shall be taken. If grab sampling is used, then the samples shall be taken at 15-minute intervals.
 - (ii) The emission reduction (R) of VOC shall be determined using the following equation:

$$R = \frac{E_i - E_o}{E_i} \times 100$$

Where:

R = Emission reduction, percent by weight.

E_i = Mass rate of VOC entering the control device, kg VOC/hr.

E_o = Mass rate of VOC discharged to the atmosphere, kg VOC/hr.

- (iii) The mass rates of VOC (E_i , E_o) shall be computed using the following equations:

$$E_i = K_2 \sum_{j=1}^n (C_{ij}M_{ij}) Q_i$$

$$E_o = K_2 \sum_{j=1}^n (C_{oj}M_{oj}) Q_o$$

Where:

C_{ij} , C_{oj} = Concentration of sample component “j” of the gas stream at the inlet and outlet of the control device, respectively.

M_{ij} , M_{oj} = Molecular weight of sample component “j” of the gas stream at the inlet and outlet of the control device, respectively, g/g-mole (lb/lb-mole).

Q_i , Q_o = Flow rate of gas stream at the inlet and outlet of the control device, respectively, dscm/min (dscf/hr).

K_2 = Constant, 2.494×10^{-6} (1/ppm) (g-mole/scm) (kg/g) (min/h), where standard temperature for (g-mole/scm) is 20°C.

- (iv) The VOC concentration (C_{VOC}) is the sum of the individual components and shall be computed for each run using the following equation:

$$C_{VOC} = \sum_{j=1}^n C_j$$

Where:

C_{VOC} = Concentration of VOC, dry basis, ppm by volume.

C_j = Concentration of sample components in the sample.

N = Number of components in the sample.

- (7) When a flare is used to seek to comply with Subparagraph (d)(2) of this Section, the flare shall comply with the requirements of 40 CFR 60.18, as of July 1, 1991.

(8) The following test methods shall be used for determining the net heating value of the gas combusted to determine the compliance under Subparagraph (d)(2) of this Section, and for determining the process vent stream TRE index value to determine compliance under Subparagraph (d)(3) of this Section:

(i) For selection of sampling site:

(A) Reference Method 1 or 1A, as appropriate, for selection of the sampling site. The sampling site for the vent stream flow rate and molar composition determination prescribed in Paragraphs (ii) and (iii) of this subparagraph shall be, except for the situations outlined in Subpart (B) of this part, prior to the inlet of any control device, prior to any post-reactor dilution of the stream with air, and prior to any post-reactor introduction of halogenated compounds into the vent stream. No transverse site selection method is needed for vents smaller than 4 inches in diameter.

(B) If any gas stream other than the air oxidation vent stream is normally conducted through the final recovery device:

(I) The sampling site for vent stream flow rate and molar composition shall be prior to the final recovery device and prior to the point at which the nonair oxidation stream is introduced.

(II) The efficiency of the final recovery device is determined by measuring the VOC concentration using Method 18 at the inlet to the final recovery device after the introduction of any nonair oxidation vent stream and at the outlet of the final recovery device.

(III) This efficiency is applied to the VOC concentration measured prior to the final recovery device and prior to the introduction of the nonair oxidation stream to determine the concentration of VOC in the air oxidation stream from the final recovery device. This concentration of VOC is then used to perform the calculations outlined in Paragraphs (iv) and (v) of this subparagraph.

(ii) For determining molar composition of the process vent stream:

(A) Reference Method 18 to measure the concentration of VOC including those containing halogens.

(B) ASTM D1946-77 to measure the concentration of carbon monoxide and hydrogen.

(C) Reference Method 4 to measure the content of water vapor.

(iii) For volumetric flow rate Reference Method 2, 2A, 2C or 2D as appropriate.

(iv) For net heating value of the vent stream, the following equation:

$$H_T = K_1 \sum_{j=1}^n C_j H_j$$

Where:

H_T = Net heating value of the sample, MJ/scm, where the net enthalpy per mole of offgas is based on combustion at 25°C and 760 mmHg, but the standard temperature for determining the volume corresponding to one mole is 20°C, as in the definition of Q_S (offgas flow rate).

$$K_1 = \text{Constant, } 1.740 \times 10^{-7} \frac{(1)}{\text{ppm}} \frac{(\text{g-mole})}{\text{scm}} \frac{(\text{MJ})}{\text{kcal}}$$

Where standard temperature for $\frac{(\text{g-mole})}{\text{scm}}$ is 20°C.

C_j = Concentration of compound j in ppm, as measured for organics by Reference Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946-77 as indicated in Paragraph (ii) of this subparagraph.

H_j = Net heat of combustion of compound j, kcal/g-mole, based on combustion at 25° C and 760 mmHg. The heats of combustion of vent stream components would be required to be determined using ASTM D2382-76 if published values are not available or cannot be calculated.

(v) For emission rate of VOC in the process vent stream, the following equation:

$$E_{\text{VOC}} = K_2 \sum_{j=1}^n (C_j M_j) Q_S$$

Where:

E_{VOC} = Emission rate of VOC in the sample, kg/hr.

K_2 = Constant, 2.494×10^{-6} (1/ppm) (g-mole/scm) (kg/g) (min/hr), where standard temperature for (g-mole/scm) is 20°C.

C_j = Concentration on a dry basis of compound j in ppm as measured in Paragraph (ii) of this subparagraph.

M_j = Molecular weight of sample j, g/g-mole.

Q_S = Vent stream flow rate (scm/min) at a standard temperature of 20°C.

- (g) The owner or operator of a facility subject to this Section shall keep the records specified in this paragraph for at least 3 years. These records, as follow, shall be made available to the Director immediately upon request:
- (1) Where an owner or operator subject to this Section seeks to demonstrate compliance with Subparagraph (d)(1) of this Section through the use of either a thermal or catalytic incinerator:
 - (i) The average firebox temperature of the incinerator (or the average temperature upstream and downstream of the catalyst bed for a catalytic incinerator), measured at least every 15 minutes and averaged over the same time period as the compliance test; and
 - (ii) The percent reduction of VOC determined as specified in Subparagraph (d)(1) of this Section that is achieved by the incinerator, or the concentration of VOC determined as specified in Subparagraph (d)(1) of this Section at the outlet of the control device on a dry basis corrected to 3 percent oxygen.
 - (2) Where an owner or operator subject to the provisions of this Section seeks to demonstrate compliance with Subparagraph (d)(1) of this Section through the use of a boiler or process heater:
 - (i) A description of the location at which the vent stream is introduced into the boiler or process heater; and
 - (ii) The average combustion temperature of the boiler or process heater with a design heat input capacity of less than 44 MW (150 million BTU/hr) measured at least every 15 minutes and averaged over the same time period of the compliance testing.
 - (3) Where an owner or operator subject to the provisions of this Section seeks to comply with Subparagraph (d)(2) of this Section through the use of a smokeless flare, flare design (i.e., steam-assisted, air-assisted, or non-assisted), all visible emission readings, heat content determinations, flow rate measurements, and exit velocity determinations made during the compliance test, continuous records of the flare pilot flame monitoring, and records of all periods of operation during which the pilot flame is absent.
 - (4) Where an owner or operator seeks to demonstrate compliance with Subparagraph (d)(3) of this Section:
 - (i) Where an absorber is the final recovery device in a recovery system, the exit specific gravity and average exit temperature of the absorbing liquid, measured at least every 15 minutes and averaged over the same time period of the compliance testing (both measured while the vent stream is normally routed and constituted); or
 - (ii) Where a condenser is the final recovery device in a recovery device in a recovery system, the average exit (product side) temperature, measured at least every 15 minutes and averaged over the same time period of the compliance testing while the vent stream is normally routed and constituted; or

- (iii) Where a carbon adsorber is the final recovery device in a recovery system, the total steam mass flow measured at least every 15 minutes and averaged over the same time period of the compliance test (full carbon bed cycle), temperature of the carbon bed after regeneration (and within 15 minutes of completion of any cooling cycle(s)), and duration of the carbon bed steaming cycle (all measured while the vent stream is normally routed and constituted); or
 - (iv) As an alternative to Paragraph (i), (ii) or (iii) of this subparagraph, the concentration level or reading indicated by the organic monitoring device at the outlet of the adsorber, condenser, or carbon adsorber measured at least every 15 minutes and averaged over the same time period of the compliance testing while the vent stream is normally routed and constituted.
 - (v) All measurements and calculations performed to determine the TRE index value of the vent stream.
- (5) Each owner or operator subject to the provisions of this Section shall keep up-to-date continuous records of the equipment operating parameters specified to be monitored under Subparagraphs (e)(1) and (e)(3) of this Section as well as up-to-date records of periods of the most recent compliance test are exceeded. The Director may at any time require a report of these data. Where a combustion device is used by an owner or operator seeking to demonstrate compliance with Subparagraph (d)(1) or (d)(3) of this Section, records of periods of operation during which the parameter boundaries established during the most recent performance tests are exceeded and therefore an instance of noncompliance has occurred are defined as follows:
- (i) For thermal incinerators, all 3-hour periods of operation during which the average combustion temperature was more than 28° C (50° F) below the average combustion temperature during the most recent test at which compliance with Subparagraph (d)(1) of this Section was determined.
 - (ii) For catalytic incinerators, all 3-hour periods of operation during which the average temperature of the vent stream immediately before the catalyst bed is more than 28° C (50° F) below the average temperature of the vent stream during the most recent test at which compliance with Subparagraph (d)(1) of this Section was determined. The owner or operator also shall record all 3-hour periods of operation during which the average temperature difference across the catalyst bed is less than 80 percent of the average temperature difference of the device during the most recent test at which compliance with Subparagraph (d)(1) of this Section was determined.
 - (iii) All 3-hour periods of operation during which the average combustion temperature was more than 28° C (50° F) below the average combustion temperature during the most recent test at which compliance with Subparagraph (d)(1) of this Section was determined for boilers or process heaters with a design heat input capacity of less than 44 MW (150 million BTU/hr).

- (iv) For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under Subparagraph (d)(1) of this Section.
- (6) Each owner or operator subject to the provisions of this Section shall keep up-to-date continuous records of the flow indication specified under Paragraph (e)(1)(ii), (e)(2)(ii), and (e)(3)(i) of this Section, as well as up-to-date records of all periods when the vent stream is diverted from the control device or has no flow rate.
- (7) Each owner or operator subject to the provisions of this Section who uses a boiler or process heater with a design heat input capacity of 44 MW or greater to comply with Subparagraph (d)(1) of this Section shall keep an up-to-date record of all periods of operation of the boiler or process heater. (Examples of such records should include records of steam use, fuel use, or monitoring data collected pursuant to other regulatory requirements.)
- (8) Each owner or operator subject to the provisions of this Section shall keep up-to-date continuous records of the flare pilot flame monitoring specified in Subparagraph (e)(2) of this Section as well as up-to-date records of all periods of operations in which the pilot flame is absent.
- (9) Each owner or operator subject to the provisions of this Section shall keep up-to-date continuous records of the equipment operating parameters specified to be monitored under Subparagraph (e)(3) of this Section as well as up-to-date records of periods of operation during which the parameter boundaries established during the most recent compliance test are exceeded. The Director may at any time require a report of these data. Where the owner or operator seeks to demonstrate compliance with Subparagraph (d)(3) of this Section, periods of operation during which the parameter boundaries established during the most recent compliance tests are exceeded and therefore an instance of noncompliance has occurred are defined as follows:
 - (i) Where an absorber is the final recovery device in a recovery system, and where an organic monitoring device is not used:
 - (A) All 3-hour periods of operation during which the average absorbing liquid temperature was more than 11° C (20° F) above the average absorbing liquid temperature during the most recent compliance test that demonstrated that the facility was in compliance; or
 - (B) All 3-hour periods of operation during which the average absorbing liquid specific gravity was more than 0.1 unit above, or more than 0.1 unit below, the average absorbing liquid specific gravity during the most recent compliance test that demonstrated that the facility was in compliance.
 - (ii) Where a condenser is the final recovery device in a recovery system, and where an organic monitoring device is not used, all 3-hour periods of operation during which the average exit (product site) condenser operation temperature was more than 6° C (11° C) above the average exit (product site) operating temperature during the most recent compliance test that demonstrated that the facility was in compliance.

- (iii) Where a carbon adsorber is the final recovery device in a recovery system and where an organic monitoring device is not used:
 - (A) All carbon bed regeneration cycles during which the total mass steam flow was more than 10 percent below the total mass stream flow during the most recent compliance test that demonstrated that the facility was in compliance; or
 - (B) All carbon bed regeneration cycles during which the temperature of the carbon bed after regeneration (and after completion of any cooling cycle(s)) was more than 10 percent greater than the carbon bed temperature (in degrees Celsius) during the most recent compliance test that demonstrated that the facility was in compliance.
 - (iv) Where an absorber, condenser, or carbon adsorber is the final recovery device in the recovery system and an organic monitoring device approved by the Director is used, all 3-hour periods of operation during which the average concentration level or reading of organic compounds in the exhaust gases is more than 20 percent greater than the exhaust gas organic compound concentration level or reading measured by the monitoring device during the most recent compliance test that demonstrated that the facility was in compliance.
- (10) Each owner or operator subject to the provisions of this Section and seeking to demonstrate compliance with Subparagraph (d)(3) of this Section shall keep up-to-date records of:
- (i) Any changes in production capacity, feedstock type, or catalyst type, or of any replacement, removal, or addition of recovery equipment or air oxidation reactors;
 - (ii) Any calculation of the TRE index value performed pursuant to Subparagraph (f)(2) of this Section; and
 - (iii) The results of any test performed pursuant to the methods and procedures required by Subparagraph (e)(4) of this Section.
- (h) The owner or operator of any facility containing sources subject to this Section shall submit to the Director an initial compliance certificate by November 9, 1994.

SECTION 7-24: Test Methods and Procedures

(a) General Provisions

- (1) The owner or operator of any volatile organic compound source required to comply with the provisions of this Regulation, shall, at his own expense, demonstrate complete compliance by the methods of this Section or an alternative method approved by the United States Environmental Protection Agency. All tests shall be made by, or under the direction of, a person qualified by training and/or experience in the field of air pollution testing.

- (2) No volatile organic compound emissions compliance testing will be allowed, nor the results accepted, unless prior notification has been supplied to the Director as required under Paragraph (3) and (4) of this Section and the director has granted approval.
- (3) Any person proposing to conduct a volatile organic compound emissions test for the purpose of demonstrating compliance shall notify the Director, in the manner set forth under Paragraph (4) of this Section, of the intent to test not less than 30 days before the proposed initiation of the tests so the Director may, at his option, observe the test.
- (4) Any person notifying the Director of a proposed volatile organic compound emissions test shall include, as part of notification, the following minimum information:
 - (i) A statement indicating the purpose of the proposed test and the applicable Section of the Regulation;
 - (ii) A detailed description of the facility to be tested;
 - (iii) A detailed description of the test procedures, equipment, and sampling sites; and
 - (iv) A timetable, setting forth the dates on which:
 - (A) The testing will be conducted; and
 - (B) The final test report will be submitted.
 - (v) An internal QA program that shall include, at a minimum, the activities planned by routine operators and analysts to provide an assessment of test data precision. An example of internal QA is the sampling and analysis of replicable samples.
 - (vi) An external QA program is as follows:
 - (A) The external QA program shall include, at a minimum, application of plans for a test method performance audit (PA) during the compliance test.
 - (B) The external QA program may also include systems audits, which include the opportunity for on-site evaluation by the Director of instrument calibration, data validation, sample logging, and documentation of quality control data and field maintenance activities.
 - (C) The PA's shall consist of blind audit samples provided by the Director and analyzed during the compliance test to provide a measure of test data bias as follows:
 - (I) The Director shall require the owner or operator to analyze PA samples during each compliance test when audit samples are available.
 - (II) Information concerning the availability of audit materials for a specific compliance test may be obtained from the Director.
 - (III) The evaluation criteria applied to the interpretation of the PA results and the subsequent remedial actions required of the owner or operator are the sole responsibility of the Director.
- (5) For compliance determination, the owner or operator of any volatile organic compound emissions source shall be responsible for providing:

- (i) Sampling ports, pipes, lines, or appurtenances for the collection of samples and data required by the test procedure;
 - (ii) Safe access to the sample and data collection locations; and
 - (iii) Light, electricity, and other utilities required for sample and data collection.
- (6) Unless otherwise specified in an applicable Section of this Regulation each performance test shall consist of three separate one hour runs using the applicable test method. For the purpose of determining compliance with applicable standards, the arithmetic means of results of three runs shall apply.
- (7) No later than 60 days after completion of the on-site sampling, the owner or operator shall submit a test report to the Director. The test report shall include the following minimum information:
- (i) Process description;
 - (ii) Air pollution capture system and control device description;
 - (iii) Process conditions during testing;
 - (iv) Test results and example calculations;
 - (v) Description of sampling locations and test methods;
 - (vi) Quality assurance measures; and
 - (vii) Field and analytical data.
- (b) Determination of the volatile organic compound (VOC) content of surface coatings.
- (1) This method applies to the determination of VOC content, water content, density, volume solids and weight solids of paint, varnish, lacquer, or related surface coatings.
 - (2) For the purpose of this method, a representative sample of the surface coating shall be obtained at the point of delivery to the coater or any other point in the process that the Director approves where the sample is representative of the coating delivered to the coater.
 - (3) The VOC content, water content, density, volume solids, and weight solids of the sample shall be determined in accordance with Reference Method 24 as outlined in 40 CFR, Part 60, Appendix A, "Reference Methods."
 - (4) To determine the total volatile organic content, water content, and density of multicomponent coatings, the following procedures shall be used in addition to Reference Method 24:
 - (i) The components shall be mixed in a storage container in proportions the same as those in the coating, as applied. The mixing shall be accomplished by weighing the components in the proper proportion into a container which is closed between additions and during mixing. About 100 ml of coating shall be prepared in a container just large enough to hold the mixture prior to withdrawing a sample.

- (ii) For determination of volatile content, a sample shall be withdrawn from the mixed coating, and then transferred to a dish where the sample shall stand for at least 1 hour, but no more than 24 hours prior to being oven dried.
 - (iii) For determination of the water content and density of multicomponent coatings, samples shall be taken from the same 100 ml mixture of coating and shall be analyzed by the appropriate ASTM methods referenced in Reference Method 24.
- (c) Determination of volatile organic compound (VOC) content of printing inks and related coatings.
 - (1) This method applies to the determination of the VOC content and density of solvent-borne printing inks and related coatings.
 - (2) For the purpose of this method, a representative sample of the ink or related coating shall be obtained at the point of delivery to the coater or any other point in the process that the Director approves where the sample is representative of the coating delivered to the coater.
 - (3) The VOC content and density of the sample shall be determined in accordance with Reference Method 24A as outlined in 40 CFR, Part 60, Appendix A, "Reference Methods."
- (d) Determination of volatile organic compound (VOC) emission control system efficiency.
 - (1) The provisions of this Section are generally applicable to any test method employed to determine the collection or control efficiency of any device or system designed, installed, and operated for the purpose of reducing volatile organic compound emissions.
 - (2) The following procedures shall be included in any efficiency determination:
 - (i) The VOC containing material shall be sampled and analyzed in accordance with Subsection (b) or (c) of this Section in order to quantify the VOC emissions that would result from use of the material;
 - (ii) Capture efficiency shall be determined in accordance with the EPA Technical Document "Guidelines for Determining Capture Efficiency" (January 9, 1995).
 - (iii) Three one hour tests shall be conducted simultaneously at the inlet and outlet of the control device in accordance with Reference Methods 25, 25A or 25B as approved by the Director and outlined in 40 CFR, Part 60, Appendix A, "Reference Methods";
 - (iv) The efficiency of the control device shall be expressed as the fraction of total combustible carbon content reduction achieved; and
 - (v) The VOC mass emission rate shall be expressed as the sum of the emissions from the control device, emissions not collected by the capture system and capture system losses.
- (e) Determination of volatile organic compound (VOC) emissions from bulk gasoline terminals.

- (1) For the purpose of demonstrating compliance with Section 7-12 of this Regulation, the following test methods outlined in 40 CFR, Part 60, Appendix A, "Reference Methods" shall be used:
 - (i) For the determination of volume at the exhaust vent use:
 - (A) Reference Method 2B for combustion type vapor processing systems; and
 - (B) Reference Method 2A for all other vapor processing systems.
 - (ii) For the determination of the total VOC concentration at the exhaust vent use Reference Method 25A or 25B and the appropriate range of calibration gases consisting of either propane or butane in nitrogen; and
 - (iii) Prior to conducting the compliance test, all potential sources of vapor leakage in the vapor collection system shall be monitored for leaks utilizing Reference Method 21 while a gasoline tank truck is being loaded. A reading of 10,000 ppmv shall be considered a leak. All leaks shall be repaired prior to conducting the compliance test.
- (2) Summary of the compliance test procedure.
 - (i) The time period for a compliance test shall be not less than 6 hours during which time at least 300,000 liters of gasoline are loaded. If the throughput criteria is not met during the initial 6 hours, the test shall be continued until the throughput criteria is met.
 - (ii) Prior to testing, calibrate and install a pressure measurement device (liquid manometer, magnehelic gauge or equivalent) in the terminal's vapor collection system as close as possible to the connection with the gasoline tank truck. During the compliance test, record the pressure every 5 minutes while a tank truck is being loaded.
 - (iii) For intermittent vapor processing systems:
 - (A) The vapor holder level shall be recorded at the start of the compliance test. The end of the compliance test shall coincide with a time when the vapor holder is at its original level; and
 - (B) At least two startups and shutdowns of the vapor processor shall occur during the compliance test. If this does not occur under normal operation, the system shall be manually controlled.
- (3) Measurements and data required for demonstrating compliance with Section 7-12 of this Regulation.
 - (i) The volume of gasoline dispensed during the compliance test period at all loading racks whose vapor emissions are controlled by the processing system shall be determined from terminal records or from dispensing meters at each loading rack.
 - (ii) An emission testing interval shall consist of each five minute period during the compliance test. For each interval:

- (A) A reading from each measurement instrument shall be recorded; and
 - (B) The volume of air-vapor mixture exhausted and the average total volatile organic compound concentration in the exhaust shall be determined as specified in the appropriate reference test method.
- (iii) The total volatile organic compound mass emission rate shall be determined as follows:
- (A) The mass of total volatile organic compounds emitted during each five minute interval shall be calculated as follows:

$$Mei = 10^{-6} K Ves Ce$$

Where:

Mei = Mass of total organic compounds emitted during testing interval i, (mg).

Ves = Volume of air-vapor mixture exhausted, m³, at standard conditions.

Ce = Total volatile organic compound concentration (as measured) at the exhaust vent, ppmv.

K = Density of calibration gas, mg/m³, at standard conditions.

= 1.83 x 10⁶ for propane.

= 2.41 x 10⁶ for butane.

s = Standard conditions, 20°C and 760 mmHg.

- (B) The total volatile organic compound mass emission per volume of gasoline loaded shall be calculated as follows:

$$E = \frac{Mei}{L}$$

Where:

E = Mass of total volatile organic compounds emitted per volume of gasoline loaded, mg/liter.

Mei = Mass of total volatile organic compounds emitted during testing interval i, mg.

L = Total volume of gasoline loaded, liters.

n = Number of testing intervals.

- (C) The owner or operator may adjust the emission results to exclude the methane and ethane content in the exhaust vent by any method approved by the Director.
- (f) Determination of alternative compliance methods for surface coating methods for surface coating operations.
- (1) The weighted average VOC content, in units of mass of VOC per volume of coating and/or ink, excluding water and/or exempt compounds, as applied, of the coatings and/or inks used on a day on a coating line or operation shall be calculated using the following equation:

$$\text{VOC}_w = \frac{\sum_{i=1}^n V_i C_i}{V_T}$$

Where:

VOC_w = the weighted average VOC content of the coatings and/or inks, as applied, used on a line or operation in units of kilograms of VOC per liter of coating and/or ink (kg VOC/L) (pounds of VOC per gallons of coating and/or ink (lb VOC/gal)), excluding water and/or exempt compounds;

n = The number of different coatings and/or inks, as applied, each day on a line or operation;

V_i = The volume of each coating or ink, as applied, each day on a line or operation in units of L (gal), excluding water and/or exempt compounds;

C_i = The VOC content of each coating or ink, as applied, each day on a line or operation in units of kg VOC/L of coating or ink (lb VOC/gal), excluding water and/or exempt compounds; and

V_T = The total volume of all coating and/or ink, as applied, each day on a line or operation in units of L (gal), excluding water and/or exempt compounds.

- (2) The overall emission reduction efficiency needed to demonstrate compliance is determined each day as follows:
- (i) Obtain the emission limitation from the applicable Section of this Regulation.
- (ii) Calculate the emission limitation on a solids basis according to the following equation:

$$S = \frac{C}{1 - C/d}$$

Where:

S = The VOC emission limitation in terms of kg VOC/L of coating or

ink solids (lb VOC/gal);

C = The VOC emissions limitation in terms of kg VOC/L of coating or ink (lb/gal), excluding water and/or exempt compounds; and

d = The density of VOC for converting emission limitation to a solids basis. The density equals (0.882 kg/L)(7.36 lb/gal).

- (iii) Calculate the required overall emission reduction efficiency of the control system for the day according to the following equation:

$$E = \frac{(VOC_a - S)}{VOC_a} \times 100$$

Where:

E = The required overall emission reduction efficiency of the control system;

VOC_a =

1. The maximum VOC content of the coatings and/or inks, as applied, used each day on the subject line or operation, in units of kg VOC/L of solids (lb/gal), as determined by the applicable test methods and procedures specified in this Regulation; or
2. The weighted average VOC content, as applied, of the coatings and/or inks used each day on the subject line or operation, in units of kg VOC/L of solids (lb/gal), as determined by the applicable test methods and procedures specified in this Regulation and in Subparagraph (iv) of this paragraph; and

S = VOC emission limitation in terms of kg VOC/L of solids (lb VOC/gal).

- (iv) The weighted average VOC content, as applied, of the coatings and/or inks used on a coating line or operation in units of mass of VOC per unit volume of coating and/or ink solids shall be calculated by the following equation:

$$VOC_{WS} = \frac{\sum_{i=1}^n W_{VOCi} D_i V_i}{\sum_{i=1}^n V_i VS_i}$$

Where:

VOC_{ws} = The weighted average VOC content, as applied, of the coatings and/or inks used on the line or operation in units of mass of VOC per unit volume of coating and/or ink solids;

n = The number of different coatings and/or inks, as applied, used in a day on the line or operation;

V_i = The volume of each coating or ink (i), as applied, used in a day on the line or operation in units of liters (L) (gallons (gal));

W_{VOC_i} = The weight fraction of VOC in each coating or ink (i), as applied, used in a day on the line or operation in units of kg VOC/kg coating or ink (lb/lb);

D_i = The density of each coating or ink (i) as applied, used in a day on the line or operation in units of kg/L of coating or ink (lb/gal);
and

VS_1 = The volume fraction solids content of each coating or ink (i), as applied, used in a day on the line or operation in units of L solids/L coating or ink (gal/gal).

(g) Leak detection methods for volatile organic compounds.

(1) Owners or operators required to carry out a leak detection monitoring program shall comply with the following requirements:

(i) Monitoring shall be performed in accordance with Reference Method 21.

(ii) The detection instrument shall meet the performance criteria of Reference Method 21.

(iii) The detection instrument shall be calibrated before and after use on each day of its use by the methods specified in Reference Method 21. Failure to achieve a post-use calibration precision of less than 10 percent shall constitute grounds for rejecting all tests performed since the last pre-use calibration. In such cases, required leak tests must be reperformed.

(iv) Calibration gases shall be:

(A) Zero air (less than 10 parts per million (ppm) of hydrocarbon in air); and

(B) A mixture of methane or n-hexane and air at a concentration of approximately, but less than, 10,000 ppm methane or n-hexane.

(v) The detection instrument probe shall be traversed around all potential leak interfaces as close to the interface as possible as described in Reference Method 21.

(h) Determination of volatile organic compound emissions from any source not specifically covered by other paragraphs of this Section shall be by:

- (1) The applicable Reference Method outlined in 40 CFR, Part 60, Appendix A, “Reference Methods”; or
- (2) An equivalent method approved by the United States Environmental Protection Agency.

SECTION 7-25: Reserved

SECTION 7-26: Special Provisions for New Volatile Organic Compound Sources and Modifications

- (a) Definitions
 - (1) “**Best available control technology (BACT)**” - is an emission rate based on the maximum degree of reduction, taking into account energy, environmental and economic impacts, and other costs. In no event shall application of BACT result in emissions of any pollutant which will exceed the emission allowed by the New Source Performance Standards.
 - (2) “**Lowest achievable emission rate (LAER)**” - the rate of emission which reflects the most stringent emission limitation which is achieved in practice by such class or category of sources. In no event shall the application of this term permit a proposed, new, or modified source to emit any pollutant in excess of the amount allowable under applicable new source standards of performance.
- (b) Regardless of the specific emission standards of this Regulation, all new or modified facilities which have the potential to emit greater than 100 tons per year of volatile organic compounds shall utilize LAER.
- (c) Any new or modified facilities which have a potential to emit less than 100 tons per year of volatile organic compounds (VOC) shall utilize BACT.

SECTION 7-27: Handling, Storage, Use, and Disposal of Volatile Organic Compounds (VOC)

- (a) This Section applies to any facility which contains any source which is subject to any other Section of this Regulation, other than those requirements for demonstration of exemption or for maintenance of records to document that exemption is achieved.

This Section does not apply to:

- (1) Any VOC or material containing VOC emitted in compliance with any other Section of this Regulation; and
 - (2) Waste paint (sludge) handling systems, water treatment systems, and other similar operations at coating and printing facilities using complying coatings and/or inks.
- (b) No owner or operator of a source subject to this Section may cause, allow, or permit the disposal of more than 5 kilograms (kg)(11 pounds [lb]) of any volatile organic compound (VOC), or of any materials containing more than 5 kg (11 lb) of any VOCs, in any 1 day in a manner that would permit the evaporation from the facility of that VOC into the ambient air in excess of the minimum reasonably attainable.
 - (c) No owner or operator of a source subject to this Section shall use open containers for the storage or disposal of materials impregnated with VOCs that are used for surface preparation, cleanup, coating removal, or facility or equipment cleaning or maintenance.
 - (d) No owner or operator of a source subject to this Section shall store in open containers spent or fresh VOC to be used for surface preparation, cleanup, coating removal, or facility or equipment cleaning or maintenance except as otherwise provided for in this Section.
 - (e) No owner or operator of a source subject to this Section shall use VOC for the cleanup of tools and process equipment, such as spray equipment, unless equipment is used to collect the cleaning compounds and to reasonably minimize their evaporation to the atmosphere.
 - (f) An owner or operator of a source subject to this Section and utilizing all reasonable techniques for controlling evaporation during handling, storage, use, and disposal of materials shall be considered to have achieved the minimum reasonably attainable VOC emissions required in Paragraph (b) of this Section and shall have reasonably minimized VOC emissions as required in Paragraph (e) of this Section. Prevention of any evaporation of VOCs from handling, storage, use, and disposal shall be considered achievement of minimum reasonably attainable and to reasonably minimize emissions. Such prevention of any evaporation shall be accepted as a method of achieving compliance with the requirements of Paragraph (b) and (e).
 - (g) By November 15, 1996, the owner or operator of a source subject to this Section shall submit to the Director a plan acceptable to the Director specifying the methods that will be implemented to achieve compliance with the requirements of this Section, along with details of the records to be maintained for the purpose of demonstrating compliance.
 - (h) With respect to compliance certification, initiation of recordkeeping and reporting, and completion of control system compliance testing of a source, the owner or operator shall comply with the requirements of Section 7-4 of this Regulation. Records demonstrating compliance with this Section shall be maintained for a minimum of five (5) years and shall be made available to the Director upon request.
 - (i) For any source subject to any other Section of this Regulation which handles, stores, uses, or disposes of volatile organic compounds, the standards and requirements of that Section with

respect to handling, storage, use, or disposal shall take precedence over the requirements this Section.”

SECTION 7-28: Surface Coating of Plastic Parts

- (a) For the purpose of this Section the following definitions apply:
- (1) “Basecoat/clear coat” - means a two step topcoat system in which a highly pigmented, often metallic, basecoat is followed by a clearcoat. It results in a finish with high-gloss characteristics often used on automotive parts.
 - (2) “Clearcoat” - means a transparent coating usually applied over a colored, opaque coat to improve gloss and protection to the basecoat below.
 - (3) “Colorcoat” - means a coating that contains pigment and provides color to a part; may constitute the topcoat or serve as the base coat portion of the basecoat/clearcoat system.
 - (4) “Electromagnetic interference/radio frequency interference (EMI/RFI) coatings” - means coating used in plastic business machine housing to attenuate electromagnetic and radio frequency interference signals that would otherwise pass through the plastic housings. The EMI/RFI shielding substance used in coating include copper or nickel. Zinc-arc spraying, electrolyses plating, conductive plastics, metal inserts, and vacuum-metallizing and sputtering are other means of EMI/RFI shielding.
 - (5) “Flexible coating” - means a coating with ability to withstand dimensional changes; flexible substrates utilizing flexible coatings include thermoplastic olefin (TPO), vinyl, acrylonitrile-butadiene (ABS) alloy, reaction injection molded (RIM) and thermoplastic urethane (TPU).
 - (6) “Non-flexible coating” - means a coating which lacks the ability to withstand dimensional changes; non-flexible substrates utilizing non-flexible coatings include sheet molding compound (SMC), nylon, polyester, ABS, Xenoy polycarbonate, and acrylic.
 - (7) “Plastic part” - means a piece made from a substance that has been formed from a resin through the application of pressure or heat or both.
 - (8) “Waterborne coating” - means a coating which contains more than five percent by weight water in its volatile fraction.
- (b) This Section applies to any plastic parts coating line whose potential volatile organic compound emissions from all plastic parts coating lines within the facility are greater than 25 tons of volatile organic compounds per year and coats plastic components for the following uses:
- (1) Automotive or other transportation equipment including interior and/or exterior parts for automobiles, trucks, tractors, lawn mowers, and other mobile equipment;

- (2) Business machines and office machines, including computers, copy machines, and typewriters;
 - (3) Medical equipment housing;
 - (4) Entertainment equipment housing; and
 - (5) Miscellaneous plastic parts, including toys, musical equipment housing, sporting goods, outdoor signs, and architectural structures such as doors, floors, and window frames.
- (c) Emission Standards.
- (1) No owner or operator of a plastic coating line subject to this Section shall apply coatings on that line containing more than the following VOC contents, excluding water and any exempt VOC compound:

(i) **FROM BUSINESS MACHINES/MISCELLANEOUS COATING**

<u>COATING</u>	<u>VOC (lb/gal)</u>
Primer	1.20
Color	2.30
Color/texture	2.30
EMI/RFI	2.50

(ii) **FROM AUTOMOTIVE COATING**

	<u>VOC (lb/gal)</u>
Auto Interiors	
High Bake Colorcoat	4.1
High Bake Primer	3.8
Low Bake Colorcoat	3.2
Low Bake Primer	3.5
Auto Exterior	
Flexible/Nonflexible (unless otherwise noted)	
High Bake Colorcoat	4.7
High Bake Clearcoat	4.3
High Bake Primer (flexible)	5.0
High Bake Primer (nonflexible)	4.5
Low Bake Colorcoat (red & black)	5.6
Low Bake Colorcoat	5.1

Low Bake Primer	5.5
Low Bake Clear	4.5

(iii) **FROM AUTOMOTIVE SPECIALTY**

	<u>VOC (lb/gal)</u>
Group A-1 Coatings	5.5
Vacuum Metallizing	
Basecoats	
Texture Basecoats	
Group A-2 Coatings	5.9
Black and Reflective	
Argent	
Air Bag Cover	
Coatings	
Soft Coatings	
Group B Coatings	6.4
Gloss Reducers	
Vacuum Metallizing	
Topcoats	
Texture Topcoats	
Group C Coatings	6.8
Stencil	
Adhesion Primer/Promoter	
Ink Pad	
Electrostatic Prep	
Resist	
Headlight Lens Coating	7.4

- (2) As an alternative to compliance with the emission limits in Paragraph (c)(1), an owner or operator of a plastic parts coating line may comply with the requirements of this Section by meeting the requirements of Paragraph (d) or (e) of this Section.
- (d) An owner or operator of a plastic coating line subject to this Section may comply with this Section by applying coatings on that line during any one day whose weighted average VOC contents do not exceed the emission limits outlined in Paragraph (c)(1) of this Section. The calculations shall be for the daily total of all coatings of the appropriate coating category used on all lines subject to this Section:
- (e) (1) Control device requirements as follow apply:

- (i) Installing and operating a capture system and a control device on that line;
 - (ii) Determine for each day the overall emission reduction efficiency needed to demonstrate compliance. The overall emission reduction needed is the lesser of the value calculated according to the procedure in this Section or 95 percent; and
 - (iii) Demonstrate each day that the overall emission reduction efficiency achieved is greater than or equal to the overall emission reduction efficiency required.
- (2) An owner or operator of a plastic coating line subject to this Section electing to comply with the requirements of Paragraph (e)(1) shall ensure that:
- (i) A capture system and control device are operated at all times that the line is in operation, and the owner or operator demonstrates compliance with this Section through the applicable coating analysis and capture system and control device efficiency test method outlined in Section 7-24 of this Regulation; and
 - (ii) The control device is equipped with temperature monitoring devices installed at the following locations:
 - (A) Condenser: At the inlet and outlet;
 - (B) Thermal Incinerator: At the exit of the combustion chamber;
 - (C) Catalytic Incinerator: Immediately before and after the catalytic bed; and
 - (D) Carbon Adsorber: At the approximate center of the carbon bed.
 - (iii) The temperature monitoring devices must have an accuracy of ± 0.5 percent and must be installed, calibrated and maintained in accordance with the manufacturer's specifications.
- (f) Compliance certification, recordkeeping, and reporting requirements.
- (g) The owner or operator of an affected source subject to this Section shall:
- (1) Demonstrate compliance with this Section by using the applicable test methods specified in Section 7-24 of this Regulation; and
 - (2) Except that for waterborne coatings the methods for determining VOC content may be batch formulation data certified as accurate by the coating supplier. If there is a discrepancy between the batch formulation data and the results of the test method specified in (g)(1) above, the test method in (g)(1) will be used to determine compliance.
- (h) With respect to compliance certification, initiation of recordkeeping and reporting, and completion of control system compliance testing of a source, the owner or operator of that source shall comply with the requirements of Sections 7-4 and 7-24 of this Regulation. The applicable date for initial compliance and certification and performance testing shall be November 15, 1996.

APPENDIX A: 40 CFR 60.489, “List of Chemicals Produced by Affected Facilities”

APPENDIX A
LIST OF CHEMICALS PRODUCED BY AFFECTED FACILITIES
40CFR60.489

CAS No. ^a	Chemical	CAS No. ^a	Chemical
105-57-7	Acetal	75-07-0	Acetaldehyde
107-89-1	Acetaldol	60-35-5	Acetamide
103-84-4	Acetanilide	64-19-7	Acetic acid
108-24-7	Acetic anhydride	67-64-1	Acetone
75-86-5	Acetone cyanohydrin	75-05-8	Acetonitrile
98-86-2	Acetophenone	75-36-5	Acetyl chloride
74-86-2	Acetylene	107-02-8	Acrolein
79-06-1	Acrylamide	79-10-7	Acrylic acid
107-13-1	Acrylonitrile	124-04-9	Adipic acid
111-69-3	Adiponitrile	^b	Alkyl naphthalenes
107-18-6	Allyl alcohol	107-05-1	Allyl chloride
1321-11-5	Aminobenzoic acid	111-41-1	Aminoethylethanolamine
123-30-8	p-Aminophenol	628-63-7, 123-92-2	Amyl acetates
71-41-0 ^c	Amyl alcohols	110-58-7	Amyl amine
543-59-9	Amyl chloride	110-66-7 ^c	Amyl mercaptans
1322-06-1	Amyl phenol	62-53-3	Aniline
142-04-1	Aniline hydrochloride	29191-52-4	Anisidine
100-66-3	Anisole	118-92-3	Anthranilic acid
84-65-1	Anthraquinone	100-52-7	Benzaldehyde
55-21-0	Benzamide	71-43-2	Benzene
98-48-6	Benzenedisulfonic acid	98-11-3	Benzenesulfonic acid
134-81-6	Benzil	76-93-7	Benzilic acid
65-85-0	Benzoic acid	119-53-9	Benzoin
100-47-0	Benzonitrile	119-61-9	Benzophenone
98-07-7	Benzotrichloride	98-88-4	Benzoyl chloride
100-51-6	Benzyl alcohol	100-46-9	Benzylamine
120-51-4	Benzyl benzoate	100-44-7	Benzyl chloride
98-87-3	Benzyl dichloride	92-52-4	Biphenyl
80-05-7	Bisphenol A	10-86-1	Bromobenzene
27497-51-4	Bromonaphthalene	106-99-0	Butadiene
106-98-9	1-butene	123-86-4	n-butyl acetate
141-32-2	n-butyl acrylate	71-36-3	n-butyl alcohol
78-92-2	s-butyl alcohol	75-65-0	t-butyl alcohol
109-73-9	n-butylamine	13952-84-6	s-butylamine
75-64-9	t-butylamine	98-73-7	p-tert-butyl benzoic acid
107-88-0	1,3-butylene glycol	123-72-8	n-butyraldehyde
107-92-6	Butyric acid	106-31-0	Butyric anhydride
109-74-0	Butyronitrile	105-60-2	Caprolactam
75-1-50	Carbon disulfide	558-13-4	Carbon tetrabromide
56-23-5	Carbon tetrachloride	9004-35-7	Cellulose acetate
79-11-8	Chloroacetic acid	108-42-9	m-chloroaniline
95-51-2	o-chloroaniline	106-47-8	p-chloroaniline
35913-09-8	Chlorobenzaldehyde	108-90-7	Chlorobenzene
118-91-2, 535-80-8, 74-11-3 ^c	Chlorobenzoic acid		
2136-81-4, 2136-89-2,	Chlorobenzotrichloride	1321-03-5	Chlorbenzoyl chloride
5216-25-1 ^c			
25497-29-4	Chlorodifluoromethane	75-45-6	Chlorodifluoroethane

CAS No. ^a	Chemical	CAS No. ^a	Chemical
67-66-3	Chloroform	25586-43-0	Chloronaphthalene
88-73-3	o-chloronitrobenzene	100-00-5	p-chloronitrobenzene
25167-80-0	Chlorophenols	126-99-8	Chloroprene
7790-94-5	Chlorosulfonic acid	108-41-8	m-chlorotoluene
95-49-8	o-chlorotoluene	106-43-4	p-chlorotoluene
75-72-9	Chlorotrifluoromethane	108-39-4	m-cresol
95-48-7	o-cresol	106-44-5	p-cresol
1319-77-3	Mixed cresols	1319-77-3	Cresylic acid
4170-30-0	Crotonaldehyde	3724-65-0	Crotonic acid
98-82-8	Cumene	80-15-9	Cumene hydroperoxide
372-09-8	Cyanoacetic acid	506-77-4	Cyanogen chloride
108-80-5	Cyanuric acid	108-77-0	Cyanuric chloride
110-82-7	Cyclohexane	108-93-0	Cyclohexanol
108-94-1	Cyclohexanone	110-83-8	Cyclohexene
108-91-8	Cyclohexylamine	111-78-4	Cyclooctadiene
112-30-1	Decanol	123-42-2	Diacetone alcohol
27576-04-1	Diaminobenzoic acid	95-76-1, 95-82-9, 554-00-7, 608-27-5, 608- 31-1, 626-43-7, 27134-27-6, 57311-92-9 ^c	Dichloroaniline
541-73-1	m-dichlorobenzene	95-50-1	o-dichlorobenzene
106-46-7	p-dichlorobenzene	75-71-8	Dichlorodifluoromethane
111-44-4	Dichloroethyl ether	107-06-2	1,2-dichloroethane (EDC)
96-23-1	Dichlorohydrin.	26952-23-8	Dichloropropene.
101-83-7	Dicyclohexylamine	109-89-7	Diethylamine
111-46-6	Diethylene glycol	112-36-7	Diethylene glycol diethyl ether
111-96-6	Diethylene glycol dimethyl ether	112-34-5	Diethylene glycol monobutyl ether
124-17-7	Diethylene glycol monobutyl ether acetate	111-90-0	Diethylene glycol monoethyl ether
112-15-2	Diethylene glycol monoethyl ether acetate	111-77-3	Diethylene glycol monomethyl ether
64-67-5	Diethyl sulfate	75-37-6	Difluoroethane
25167-70-8	Diisobutylene	26761-40-0	Diisodecyl phthalate
27554-26-3	Diisooctyl phthalate	674-82-8	Diketene
124-40-3	Dimethylamine	121-69-7	N,N-dimethylaniline
115-10-6	N,N-dimethyl ether	68-12-2	N,N-dimethylformamide
57-14-7	Dimethylhydrazine	77-78-1	Dimethyl sulfate
75-18-3	Dimethyl sulfide	67-68-5	Dimethyl sulfoxide
120-61-6	Dimethyl terephthalate	99-34-3	3,5-dinitrobenzoic acid
51-28-5	Dinitrophenol	25321-14-6	Dinitrotoluene
123-91-1	Dioxane	646-06-0	Dioxilane
122-39-4	Diphenylamine	101-84-8	Diphenyl oxide
102-08-9	Diphenyl thiourea	25265-71-8	Dipropylene glycol
25378-22-7	Dodecene	28675-17-4	Dodecylaniline
27193-86-8	Dodecylphenol	106-89-8	Epichlorohydrin
64-17-5	Ethanol	141-43-5 ^c	Ethanolamines
141-78-6	Ethyl acetate	141-97-9	Ethyl acetoacetate
140-88-5	Ethyl acrylate	75-04-7	Ethylamine
100-41-4	Ethylbenzene	74-96-4	Ethyl bromide
9004-57-3	Ethylcellulose	75-00-3	Ethyl chloride
105-39-5	Ethyl chloroacetate	105-56-6	Ethylcyanoacetate
74-85-1	Ethylene	96-49-1	Ethylne carbonate

CAS No. ^a	Chemical	CAS No. ^a	Chemical
107-07-3	Ethylene chlorohydrin	107-15-3	Ethylenediamine
106-93-4	Ethylene dibromide	107-21-1	Ethylene glycol
111-55-7	Ethylene glycol diacetate	110-71-4	Ethylene glycol dimethyl ether
111-76-2	Ethylene glycol monobutyl ether	112-07-2	Ethylene glycol monobutyl ether acetate
110-80-5	Ethylene glycol monoethyl ether	111-15-9	Ethylene glycol monethyl ether acetate
109-86-4	Ethylene glycol monomethyl ether	110-49-6	Ethylene glycol monomethyl ether acetate
122-99-6	Ethylene glycol monophenyl ether	2807-30-9	Ethylene glycol monopropyl ether
75-21-8	Ethylene oxide	60-29-7	Ethyl
104-76-7	2-ethylhexanol	122-51-0	Ethyl orthoformate
95-92-1	Ethyl oxalate	41892-71-1	Ethyl sodium oxalacetate
50-00-0	Formaldehyde	75-12-7	Formamide
64-18-6	Formic acid	110-17-8	Fumaric acid
98-01-1	Furfural	56-81-5	Glycerol
26545-73-7	Glycerol dichlorohydrin	25791-96-2	Glycerol triether
56-40-6	Glycine	107-22-2	Glyoxal
118-74-1	Hexachlorobenzene	67-72-1	Hexachloroethane
36653-82-4	Hexadecyl alcohol	124-09-4	Hexamethylenediamine
629-11-8	Hexamethylene glycol	100-97-0	Hexamethylenetetramine
74-90-8	Hydrogen cyanide	123-31-9	Hydroquinone
99-96-7	p-hydroxybenzoic acid	26760-64-5	Isoamylene
78-83-1	Isobutanol	110-19-0	Isobutyl acetate
115-11-7	Isobutylene	78-84-2	Isobutyraldehyde
79-31-2	Isobutyric acid	25339-17-7	Isodecanol
26952-21-6	Isooctyl alcohol	78-78-4	Isopentane
78-59-1	Isophorone	121-91-5	Isophthalic acid
78-79-5	Isoprene	67-63-0	Isopropanol
108-21-4	Isopropyl acetate	75-31-0	Isopropylamine
75-29-6	Isopropyl chloride	25168-06-3	Isopropylphenol
463-51-4	Ketene	^b	Linear alkyl sulfonate
123-01-3	Linear alkylbenzene (linear dodecylbenzene)	110-16-7	Maleic acid
108-31-6	Maleic anhydride	6915-15-7	Malic acid
141-79-7	Mesityl oxide	121-47-1	Metanilic acid
79-41-4	Methacrylic acid	563-47-3	Methallyl chloride
67-56-1	Methanol	79-20-9	Methyl acetate
105-45-3	Methyl acetoacetate	74-89-5	Methylamine
100-61-8	n-methylaniline	74-83-9	Methyl bromide
37365-71-2	Methyl butynol	74-87-3	Methyl chloride.
108-87-2	Methylcyclohexane	1331-22-2	Methylcyclohexanone
75-09-2	Methylene chloride	101-77-9	Methylene dianiline
101-68-8	Methylene diphenyl diisocyanate	78-93-3	Methyl ethyl ketone
107-31-3	Methyl formate	108-11-2	Methyl isobutyl carbinol
108-10-1	Methyl isobutyl ketone	80-62-6	Methyl methacrylate
77-75-8	Methylpentynol	98-83-9	a-methylstyrene
110-91-8	Morpholine	85-47-2	a-naphthalene sulfonic acid
120-18-3	b-naphthalene sulfonic acid	90-15-3	a-naphthol
135-19-3	b-naphthol	75-98-9	Neopentanoic acid
88-74-4	o-nitroaniline	100-01-6	p-nitroaniline
91-23-6	o-nitroanisole	100-17-4	p-nitroanisole
98-95-3	Nitrobenzene	27178-83-2 ^c	Nitrobenzoic acid (o,m, and p)
79-24-3	Nitroethane	75-52-5	Nitromethane

CAS No. ^a	Chemical	CAS No. ^a	Chemical
88-75-52-	Nitrophenol	25322-01-4	Nitropropane
1321-12-6	Nitrotoluene	27215-95-8	Nonene
25154-52-3	Nonylphenol	27193-28-8	Octylphenol
123-63-7	Paraldehyde	115-77-5	Pentaerythritol
109-66-0	n-pentane	109-67-1	1-pentene
127-18-4	Perchloroethylene	594-42-3	Perchloromethyl mercaptan
94-70-2	o-phenetidine	156-43-4	p-phenetidine
108-95-2	Phenol	98-67-9, 585-38-6, 609-46-1, 1333-39-7 ^c	Phenolsulfonic acids
91-40-7	Phenyl anthranilic acid	^b	Phenylenediamine
75-44-5	Phosgene	85-44-9	Phthalic anhydride
85-41-6	Phthalimide	108-99-6	b-picoline
110-85-0	Piperazine	9003-29-6, 25036-29-7 ^c	Polybutenes
25322-68-3	Polyethylene glycol	25322-69-4	Polypropylene glycol
123-38-6	Propional dehyde	79-09-4	Propionic acid
71-23-8	n-propyl alcohol	107-10-8	Propylamine
540-54-5	Propyl chloride	115-07-1	Propylene
127-00-4	Propylene chlorohydrin	78-87-5	Propylene dichloride
57-55-6	Propylene glycol	75-56-9	Propylene oxide
110-86-1	Pyridine	106-51-4	Quinone
108-46-3	Resorcinol	27138-57-4	Resorcylic acid
69-72-3	Sulfanilic acid	126-33-0	Sulfolane
1401-55-4	Tannic acid	100-21-0	Terephthalic acid
79-34-5 ^c	Tetrachloroethanes	117-08-8	Tetrachlorophthalic anhydride
78-00-2	Tetraethyl lead	119-64-2	Tetrahydronaphthalene
85-43-8	Tetrahydrophthalic anhydride	75-74-1	Tetramethyl lead
110-60-1	Tetramethylenediamine	110-18-9	Tetramethylethylenediamine
108-88-3	Toluene	95-80-7	Toluene-2,4-diamine
584-84-9	Toluene-2,4-diisocyanate	26471-62-5	Toluene diisocyanates (mixture)
1333-07-9	Toluenesulfonamide	104-15-4 ^c	Toluenesulfonic acids
98-59-9	Toluenesulfonyl chloride	26915-12-8	Toluidines
87-61-6, 108-70-3, 120-82-1 ^c	Trichlorobenzenes	71-55-6	1,1,1-trichloroethane
79-00-5	1,1,2-trichloroethane	79-01-6	Trichloroethylene
75-69-4	Trichlorofluoromethane	96-18-4	1,2,3-trichloropropane
76-13-1	1,1,2-trichloro-1,2,2-trifluoroethane	121-44-8	Triethylamine
112-27-6	Triethylene glycol	112-49-2	Triethylene glycol dimethyl ether
7756-94-7	Triisobutylene	75-50-3	Trimethylamine
57-13-6	Urea	108-05-4	Vinyl acetate
75-01-4	Vinyl chloride	75-35-4	Vinylidene chloride
25013-15-4	Vinyl toluene	1330-20-7	Xylenes (mixed)
95-47-6	o-xylene	106-42-3	p-xylene
1300-71-6	Xylenol	1300-73-8	Xylidine

^aCAS numbers refer to the Chemical Abstracts Registry numbers assigned to specific chemicals, isomers, or mixtures of chemicals. Some isomers or mixtures that are covered by the standards do not have CAS numbers assigned to them. The standards apply to all of the chemicals listed, whether CAS numbers have been assigned or not.

^bNo CAS number(s) have been assigned to this chemical, its isomers, or mixtures containing these chemicals.

^cCAS numbers for some of the isomers are listed; the standards apply to all of the isomers and mixtures, even if CAS numbers have not been assigned.

APPROVED THIS 7th DAY OF JULY, 2016

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