(Adopted March 2, 1979)(Amended December 5, 1980)(Amended March 16, 1984)
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RULE 1115 MOTOR VEHICLE ASSEMBLY LINE COATING OPERATIONS

(a) Purpose

The purpose of Rule 1115 is to reduce volatile organic compound (VOC) emissions that result from coating operations conducted on motor vehicle assembly lines.

(b) Applicability

The provisions of this rule shall apply to an owner or operator engaged in assembly line coating operations conducted during the manufacturing of new motor vehicles and other automotive parts that are coated during the vehicle assembly process as well as during associated solvent cleaning operations. This rule does not apply to activities subject to Rule 1151 – *Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations*.

(c) Definitions

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

(1) ADHESIVE means any chemical substance that is applied for the purpose of bonding two surfaces together other than by mechanical means.

(2) ANTIRUST COATING means a coating that is specifically labeled and formulated to be applied to a metal substrate to prevent the oxidation of the metal and not applied during the assembly line process.

(3) APPLICATION LINE means that portion of a motor vehicle assembly production line which applies surface coatings and other coatings to motor vehicle bodies, hoods, fenders, cargo boxes, doors, and grill opening panels.

(4) ASSEMBLY LINE means an arrangement of industrial equipment and workers in which the product passes from one specialized operation to another until complete, by either automatic or manual means.

(5) BASECOAT means a pigmented topcoat which is the first topcoat applied as part of a multistage topcoat system.

(6) BASECOAT/CLEARCOAT (BC/CC) means a topcoat consisting of a basecoat portion and a clearcoat portion.

(c) (7) BEDLINER means a multi-component coating applied to a cargo bed after the application of topcoat and outside of the topcoat operation to provide additional durability.

(8) CAPTURE EFFICIENCY means the percentage of volatile organic compounds used, emitted, evolved, or generated by the operation, that are collected and directed to an air pollution control device.

(9) CAVITY WAX means a coating applied into the cavities of the vehicle primarily for the purpose of enhancing corrosion protection.

(10) CLEARCOAT means a topcoat which contains no pigments or only transparent pigments and which is the final topcoat applied as part of a multistage topcoat system.

(11) COATING means a material which is applied to a surface in order to beautify and/or protect such surface.

(12) DEADENER means a coating applied to selected vehicle surfaces primarily for the purpose of reducing the sound of road noise in the passenger compartment.

(13) ELECTRODEPOSITION means a process of applying a protective, corrosion-resistant waterborne primer on exterior and interior surfaces that provides thorough coverage of recessed areas. It is a dip coating method that uses an electrical field to apply or deposit the conductive coating onto the part.

(14) EXEMPT COMPOUNDS means those compounds defined as Exempt Compounds in Rule 102 – *Definition of Terms*.

(15) FINAL REPAIR means the operations performed and coating(s) applied to completely assembled motor vehicles, or to parts that are not yet on a completely assembled motor vehicle, to correct damage or imperfections in the coating.

(16) FLEXIBLE COATING means a coating applied to polyurethane or vinyl substrate to protect the substrate from damage or to repair the substrate.

(17) GASKET/GASKET SEALING MATERIAL means a fluid applied to coat a gasket or replace and perform the same function as a gasket. Automobile and light-duty truck gasket/gasket sealing material includes room temperature vulcanization (RTV) seal material.

(18) GLASS BONDING PRIMER means a primer applied to the windshield or other glass, or to body openings, to prepare the glass or body opening for the application of glass bonding adhesives or the installation of adhesive bonded glass. Automotive and light-duty truck glass bonding primer includes glass bonding/cleaning primers that perform both functions (cleaning and priming of

(c) the windshield or other glass, or body openings) prior to the application of adhesive or the installation of adhesive bonded glass.

(19) HIGH-VOLUME, LOW-PRESSURE (HVLP) SPRAY EQUIPMENT means equipment used to apply materials by means of a spray gun which is designed to atomize 100 percent by air pressure only and intended to be operated, and which is operated, between 0.1 and 10.0 pounds per square inch gauge (psig) of air atomizing pressure measured dynamically at the center of the air cap and at the air horns and is capable of achieving a transfer efficiency of a minimum of 65%.

(20) LUBRICATING WAX/COMPOUND means a protective lubricating material applied to vehicle hubs and hinges.

(21) METALLIC/IRIDESCENT TOPCOAT means a topcoat which contains iridescent particles, composed of either metal as metallic particles or silicon as mica particles, in excess of 5 g/L (0.042 lb/gal) as applied, where such particles are visible in the dry film.

(22) MIDCOAT means a semi-transparent topcoat which is the middle topcoat applied as part of a three-stage topcoat system.

(23) MOTOR VEHICLES means any self-propelled vehicles, including, but not limited to, motorcycles, passenger cars, light-duty trucks and vans, medium-duty and heavy-duty vehicles as defined in Section 1900, Title 13, of the California Code of Regulations. Additional examples include, but are not limited to, automobiles, buses, golf carts, tanks, and armored personnel carriers.

(24) MULTISTAGE TOPCOAT SYSTEM means any basecoat/clearcoat topcoat system or any three-stage topcoat system, manufactured as a system, and used as specified by the manufacturer.

(25) OVERALL CONTROL EFFICIENCY means the efficiency of an emission control system at which an equivalent or greater level of VOC reduction will be achieved so that the VOC emissions resulting from the use of coatings subject to this rule comply with the VOC emission limits established by the rule and includes consideration of both the capture efficiency and the efficiency of the control technology.

(26) PLASTIC PART means a polymer-based component added or installed onto a motor vehicle during the manufacturing process. It does not include any adhesives used to attach a plastic part to a vehicle.

(27) PRIMER means any coating applied prior to the applications of a topcoat for the purpose of corrosion resistance and/or adhesion of the topcoat.

(c) (28) PRIMER SURFACER means an intermediate protective coating applied over the electrodeposition primer and under the topcoat. Primer-surfacer provides adhesion, protection, and appearance properties to the total finish. Primer-surfacer may also be called guide coat or surfacer.

(29) PRIMER SURFACER OPERATIONS may include other coating(s) (e.g., anti-chip, lower-body anti-chip, chip-resistant edge primer, spot primer, blackout, deadener, interior color, basecoat replacement coating, etc.) that is (are) applied in the same spray booth(s).

(30) SEALER means a high viscosity material generally, but not always, applied in the paint shop after the body has received an electrodeposition primer coating and before the application of subsequent coatings (e.g., primer-surfacer). The primary purpose of an automotive sealer is to fill body joints completely so that there is no intrusion of water, gases or corrosive materials into the passenger area of the body compartment. Such materials are also referred to as sealant, sealant primer, or caulk.

(31) SOLIDS TURNOVER RATIO (R_T) means the ratio of total volume of coating solids that is added during electrodeposition in a calendar month divided by the total volume design capacity of the system.

(32) SOLVENT CLEANING OPERATION means the removal of loosely held uncured adhesives, uncured inks, uncured coatings, and contaminants which include, but are not limited to, dirt, soil, and grease from parts, products, tools, machinery, equipment, and general work areas. Each distinct method of cleaning in a cleaning process which consists of a series of cleaning methods shall constitute a separate solvent cleaning operation.

(33) THREE-STAGE TOPCOAT SYSTEM means a topcoat system composed of a basecoat portion, a midcoat portion, and a transparent clearcoat portion.

(34) TOPCOAT means the final coating applied to provide the final color and/or a protective finish. The topcoat may be a monocoat color or basecoat/clearcoat system. In-line repair and two-tone are part of topcoat.

(35) TRANSFER EFFICIENCY means the ratio of the volume of coating solids adhering to an object to the total or volume of coating solids used in the application process expressed as a percentage.

(36) TRUNK INTERIOR COATING means a coating outside of the primer-surfacer and topcoat operations, applied to the trunk interior to provide chip protection.

(37) UNDERBODY COATING means a coating applied to the undercarriage or firewall to prevent corrosion and/or provide chip protection.

(c) (38) VOC OF COATING LESS WATER AND LESS EXEMPT COMPOUNDS, OR REGULATORY VOC, means the weight of VOC per combined volume of VOC and coating solids and shall be calculated by the following equation:

$$\text{VOC OF COATING LESS WATER AND LESS EXEMPT COMPOUNDS (expressed in grams per liter or pounds per gallon)} = \frac{Wv - Ww - Wec}{Vm - Vw - Vec}$$

Where: Wv = Weight of volatile compounds
Ww = Weight of water
Wec = Weight of exempt compounds
Vm = Volume of material
Vw = Volume of water
Vec = Volume of exempt compounds

Weight is expressed in either grams or pounds.

Volume is expressed in either liters or gallons.

(39) VOC OF MATERIAL, OR ACTUAL VOC, means the weight of VOC per volume of material and shall be calculated by the following equation:

$$\text{VOC OF MATERIAL (expressed in grams per liter or pounds per gallon)} = \frac{Wv - Ww - Wec}{Vm}$$

Where: Wv = Weight of volatile compounds
Ww = Weight of water
Wec = Weight of exempt compounds
Vm = Volume of material

Weight is expressed in either grams or pounds.

Volume is expressed in either liters or gallons.

(40) VOC WEIGHT PER VOLUME OF SOLIDS DEPOSITED means the ratio of the VOC of material expressed in pounds per gallon (or grams per liter) to the amount of solids deposited during the application of a coating and shall be calculated by the following equation:

(c)

$$\text{VOCdep} = \frac{\text{VOCmat}}{\text{TE x V\%solid}}$$

Where: VOCdep = VOC weight per volume of solids deposited
VOCmat = VOC of material
TE = Transfer efficiency (%)
V%solid = Volume percent of solids in the coating

(41) VOLATILE ORGANIC COMPOUND (VOC) means the same as defined in Rule 102 – *Definition of Terms*.

(42) WEATHERSTRIP ADHESIVE means an adhesive applied to weatherstripping materials for the purpose of bonding the weatherstrip material to the surface of the vehicle.

(43) WHEEL TOPCOAT APPLICATION means a process where a coating is applied to the rims of tires installed on a motor vehicle.

(d) Requirements

(1) VOC Content of Coatings and VOC Emission Limits

An owner or operator of a motor vehicle assembly line shall not apply a coating or miscellaneous material used at motor vehicle coating operations that has a VOC content in excess of the limits specified in Table 1 or Table 2 of this subdivision, except as provided in paragraph (d)(2).

(d)

Table 1: VOC Emission Limits for Motor Vehicle Assembly Coating Operations

Assembly Coating Process	**VOC Emission Limit**		
Electrodeposition Primer operations (including application area, spray/rinse stations, and curing oven)	Solids Turnover Ratio (R_T)≥0.16	$0.040 \leq R_T < 0.160$	$R_T < 0.040$
	0.084 kg VOC per liter (0.7 lb/gal) of solids deposited	$0.084 \times 350^{0.160 - R_T}$ kg VOC per liter ($0.084 \times 350^{0.160 - R_T} \times 8.34$ lb/gal) of solids deposited	No VOC emission limit
Assembly Coating Process	**VOC Emission Limit**		
Primer-Surfacer operations (including application area, flash off area, and oven)	1.44 kg VOC per liter (12.0 lb VOC/gal) of solids deposited		
Topcoat operations (including application area, flash-off area, and oven)			
Combined Primer-Surfacer and Topcoat operations			
Final Repair operations	0.580 kg VOC per liter (4.8 lb VOC/gal) of Coating less water and less exempt solvents		

(d)

Table 2: VOC Content Limits for Miscellaneous Materials Used in Motor Vehicle Assembly Coating Operations (Grams of VOC per Liter of Coating Less Water and Less Exempt Compounds, as Applied)

Material	VOC Emission Limit, as Applied grams per liter (lbs/gal)
Glass Bonding Primer	900 (7.5)
Adhesive	250 (2.1)
Cavity Wax	650 (5.4)
Sealer	650 (5.4)
Deadener	650 (5.4)
Gasket/Gasket Sealing Material	200 (1.7)
Material	**VOC Emission Limit, as Applied grams per liter (lbs/gal)**
Underbody Coating	650 (5.4)
Trunk Interior Coating	650 (5.4)
Bedliner	200 (1.7)
Weatherstrip Adhesive	750 (6.3)
Lubricating Wax/Compound	700 (5.8)

(2) An owner or operator may comply with the requirements of paragraph (d)(1) by means of an Alternative Emission Control Plan pursuant to Rule 108 – *Alternative Emission Control Plans*.

(d) (3) Approved Emission Control System

An owner or operator may comply with the provisions of paragraph (d)(1) by using an approved emission control system for reducing VOC emissions, consisting of collection and control devices, provided such emission control system is approved pursuant to Rule 203 – Permit to Operate, in writing by the Executive Officer, for reducing emissions of VOC. The approved emission control system shall reduce the VOC emissions resulting from the use of coatings by an equivalent or greater level to that which would have been achieved by the provisions of paragraph (d)(1).

The required efficiency of an emission control system at which an equivalent or greater level of VOC reduction will be achieved shall be calculated by the following equation:

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

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

VOC_{LWc} = VOC Limit of Rule 1115, less water and less exempt compounds, pursuant to subdivision (d).

$VOC_{LWn,MAX}$ = Maximum VOC content of non-compliant coating used in conjunction with a control device, less water and exempt compounds.

$D_{n,MAX}$ = Density of solvent, reducer, or thinner contained in the non-compliant coating.

D_c = Density of corresponding solvent, reducer, or thinner used in the compliant coating system = 880 g/L.

(4) Carcinogenic Materials

A person shall not manufacture motor vehicle assembly coatings for use in the South Coast AQMD in which nickel, cadmium or hexavalent chromium is introduced, used, or included as a pigment or as an agent to impart any property or characteristic to the motor vehicle assembly coatings during manufacturing, distribution, or use of the applicable motor vehicle assembly coatings.

(5) Transfer Efficiency

(A) An owner or operator of an assembly line coating operation shall not apply coatings to any motor vehicle or any associated parts or components

to a motor vehicle on an assembly line except by the use of one of the following methods:

(d)

(i) electrostatic application, or

(ii) high-volume, low-pressure (HVLP) spray, or

(iii) brush, dip, or roller, or

(iv) spray gun application, provided the owner or operator demonstrates that the spray gun meets the HVLP definition in paragraph (c)(19) in design and use. A satisfactory demonstration must be based on the manufacturer's published technical material on the design of the spray gun and by a demonstration of the operation of the spray gun using an air pressure tip gauge from the manufacturer of the spray gun, or

(v) any such other automotive coating application methods as demonstrated, in accordance with the provisions of subparagraph (f)(2) capable of achieving equivalent or better transfer efficiency than the automotive coating application method listed in clause (d)(5)(A)(ii), provided written approval is obtained from the Executive Officer prior to use.

(B) An owner or operator shall not apply any automotive coating by any of the methods listed in subparagraph (d)(5)(A) unless the automotive coating is applied with properly operating equipment, operated according to procedures recommended by the manufacturer and in compliance with applicable permit conditions, if any.

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

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

(e) Recordkeeping

(1) Recordkeeping for VOC Emissions

An owner or operator shall maintain records of automotive coating usage pursuant to South Coast AQMD Rule 109 – *Recordkeeping for Volatile Organic Compound Emissions* to demonstrate compliance with the emission limits in subdivision (d), and shall at a minimum include the following information:

(e) (A) Material name and manufacturer; and

(B) Current manufacturer specification sheets, safety data sheets, technical data sheets, or air quality data sheets, which list the actual VOC, regulatory VOC, and solids content, for each ready-to-spray automotive coating (based on the manufacturer's stated mix ratio), and automotive coating components.

(C) Current manufacturer specification sheets, safety data sheets, technical data sheets, or air quality data sheets, which list the actual VOC and regulatory VOC for Miscellaneous Materials Used at Motor Vehicle Assembly Coating Operations

(2) Recordkeeping for Emission Control Systems

An owner or operator using an emission control system shall maintain records, available upon request by the Executive Officer, of key system operating parameters which will demonstrate continuous operation and compliance of the emission control system during periods of VOC emission producing activities. "Key system operating parameters" are those parameters necessary to ensure or document compliance with paragraph (d)(3), including, but not limited to, temperatures, pressure drop, and air flow rates.

(f) Methods of Analysis

(1) Determination of VOC and solids content

The VOC and solids content of materials subject to the provisions of the rule shall be determined by the following methods:

(A) United States Environmental Protection Agency Reference Method 24, [Code of Federal Regulations (CFR) Title 40, Part 60, Appendix A]. The exempt compound content shall be determined by South Coast AQMD Test Method 303 (Determination of Exempt Compounds) contained in the South Coast AQMD *Laboratory Methods of Analysis for Enforcement Samples* manual; or

(B) South Coast AQMD Test Method 304 [Determination of Volatile Organic Compounds (VOCs) in Various Materials] contained in the South Coast AQMD *Laboratory Methods of Analysis for Enforcement Samples* manual; or

(C) American Society of Testing and Materials (ASTM) Test D2369 – Standard Test Method for Volatile Content of Coatings.

(f) (D) Exempt Perfluorocarbon Compounds

The following classes of compounds:

cyclic, branched, or linear, completely fluorinated alkanes;

cyclic, branched, or linear, completely fluorinated ethers with no unsaturations;

cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and

sulfur-containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine,

will be analyzed as exempt compounds for compliance with paragraph (c), only when manufacturers specify which individual compounds are used in the coating formulation. In addition, the manufacturers must identify the United States Environmental Protection Agency, California Air Resources Board, and the District approved test methods used to quantify the amount of each exempt compound.

(2) Determination of Transfer Efficiency

The transfer efficiency of alternative automotive coating application methods, as defined by clause (d)(5)(A)(v), shall be determined in accordance with the South Coast AQMD method "Spray Equipment Transfer Efficiency Test Procedure for Equipment User, May 24, 1989," and South Coast AQMD “Guidelines for Demonstrating Equivalency With District Approved Transfer Efficiency Spray Gun September 26, 2002.”

(3) Determination of Efficiency of Emission Control System

(A) The capture efficiency of the emissions control system as specified in paragraph (d)(3) shall be determined by the procedures presented in the U.S. EPA technical guidance document, "Guidelines for Determining Capture Efficiency, January 9, 1995." Notwithstanding the test methods specified by the Guidelines, any other method approved by the U.S. EPA, the California Air Resources Board, and the South Coast AQMD Executive Officer may be substituted.

(B) The efficiency of the control device of the emission control system as specified in paragraph (d)(3) and the VO5C content in the control device exhaust gases, measured and calculated as carbon, shall be determined by the U.S. EPA Test Methods 25, 25A, or South Coast AQMD Method 25.1 (Determination of Total Gaseous Non-Methane Organic Emissions as

Carbon) as applicable. U.S. EPA Test Method 18, or ARB Method 422 shall be used to determine emissions of exempt compounds.

(f) (4) Multiple Test Methods

When more than one test method or set of methods are specified for any testing, a violation of any requirement of this rule established by any one of the specified test methods or set of test methods shall constitute a violation of the rule.

(g) Rule 442 Applicability

Any motor vehicle application line exempt from all or a portion of this rule shall comply with the provisions of Rule 442 – *Usage of Solvents*.

(h) Exemptions

The provisions of paragraph (d)(1) of this rule shall not apply to the following manufacturing uses:

(1) Wheel Topcoat Application

(2) Antirust Coatings

(3) Flexible Coatings

(4) Plastic Parts