Eastern Kern Air Pollution Control District

Rule 432
POLYESTER RESIN OPERATIONS

STAFF REPORT

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I. EXECUTIVE SUMMARY

Reasons for Rule Development and Implementation

The Eastern Kern Air Pollution Control District (District) is proposing to amend Rule 432, Polyester Resin Operations. Rule 432 was initially adopted in March of 2014. The rule was designed to reduce volatile organic compound (VOC) emissions from polyester resin used in the manufacture of a variety of fiberglass composite products. Implementation of this Rule is one method the District used to attain the 2008 8-hour National Ambient Air Quality Standard (NAAQS) for ozone (VOC is an ozone precursor). Unfortunately, the District did not attain the required 75-parts per billion (ppb) 2008 NAAQS 8-hour ozone standard by 2020.

The Clean Air Act (CAA) Sections 172(c)(9) and 182(c)(9) require contingency measures if an ozone non-attainment area fails to meet Reasonable Further Progress (RFP) milestones or to attain the national primary ambient air quality standard by the 2020 attainment date. Therefore, the District is revising several rules including Rule 432, Polyester Resin Operations.

Rule 432 currently requires the monomer VOC content of the polyester resin material to be no more than 5 percent by weight or comply with specific materials with monomer percentage between 10% and 48% monomer weight percentage. Additionally, there is an exemption for facilities that do not utilize 20-gallons per month.

Fiberglass composite products produced in the District include aerospace manufacturing, storage tank insulation, and electrical vault manufacturing. The control technologies currently being applied in the District are the use of vapor-suppressed resins, the use of emulsion type cleaning solvents and limiting the VOC content of polyester resins. However, this rule was developed almost 10-years ago; therefore, low VOC content polyester resins are readily available. Using the same technology to generate additional emission reductions will not be effective. Therefore, the District if proposing to eliminate the 20-gallons per month exemption from polyester resin operations rule.

Appendix A: Proposed Revision of proposed Rule 432, Polyester Resin Operations.

Appendix B: Proposed Revision of Rule 432, Polyester Resin Operations, Strikeout Underline.

Appendix C: 40 CFR 51.100 VOC Definition

II. BACKGROUND

The CAA as amended in 1990 requires that State implementation plans (SIP's) for certain ozone nonattainment areas be revised to require implementation of Reasonably Available Control Technology (RACT) to limit VOC emissions.

The U.S. Environmental Protection Agency (EPA) defines RACT as *the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility*. Section 183(c) of the CAA requires the EPA Administrator to identify controls for all categories of stationary sources of VOC emissions that has the potential to emit 25-tons per year. Polyester Resin Operations is a class of stationary source that can emit 25-tons/year of VOC emissions.

In 2008 EPA published document number EPA-453/R-08-004 (Control Techniques Guidelines for Fiberglass Boat Manufacturing Materials). The Control Techniques Guidelines (CTG) for Fiberglass Boat Manufacturing Materials provides available controls, recommended control options, and cost effectiveness for recommended control options for the fiberglass boat manufacturing industry. This CTG is intended to provide State and local air pollution control authorities with an information base for proceeding with analyses of RACT for their own regulations. No Federal law or regulation precludes a district from requiring more stringent controls than those recommended as RACT. Currently, the District does not have any boat manufacturing operations within its jurisdiction; however, polyester resin operations is a growing class of source in the aerospace industry. Several aerospace companies and other industries within the District's jurisdiction utilize or will utilize polyester resin operations. Therefore, the District will proceed with developing a Polyester Resin Operations rule.

A. Other District Rules and Regulations

There are 35 air pollution control/management districts in California. The following 17 districts have Polyester Resin rules:

TABLE 1

Air District	Rule/Regulation No.	Adoption/ Amendment	20-gal/mo. Exemption
Antelope Valley AQMD	Rule 1162	05/13/1994	No
Bay Area AQMD	Regulation 8, Rule 50	12/02/2009	No
Butte County AQMD	Rule 232	09/22/2005	No
Colusa County APCD	Regulation 2, Rule 37	12/17/2019	No

Air District	Rule/Regulation No.	Adoption/ Amendment	20-gal/mo. Exemption
El Dorado County AQMD	Rule 240	12/15/2000	Yes
Glenn County APCD	Section 101	05/01/1999	No
Mojave Desert AQMD	Rule 1162	04/23/2018	Yes
Placer County APCD	Rule 243	04/10/2003	Yes
Sacramento Metro AQMD	Rule 465	09/25/2008	Yes
San Diego County APCD	Rule 67.12	05/11/2016	Yes
San Joaquin Valley APCD	Rule 4684	08/18/2011	Yes
Santa Barbara County APCD	Rule 349	06/21/2012	Yes
Shasta County APCD	Regulation 3, Rule 13	06/06/1995	No
South Coast AQMD	Rule 1162	05/13/1994	No
Tehama County APCD	Regulation 4, Rule29	12/02/2009	No
Ventura County APCD	Rule 74.14	09/22/2005	Yes
Yolo-Solano AQMD	Regulation 2, Rule 30	12/17/2019	No

Of the air pollution control/management districts with polyester resin rules, the District shares borders with the following: Antelope Valley, Mojave Desert, San Joaquin Valley, and South Coast districts; only Antelope Valley has no 20-gal/month exemption.

B. Technology Growth

The aerospace industry is a growing industry within the District. A few facilities within the District utilize polyester resins for aerospace vehicles (SpaceShipTwo, missiles, and etc.). Obviously, for aerospace vehicles, the bulk of polyester resins utilized will be of an extreme class. Able to endure high heat and pressure. The District does not currently have any boat manufacturing operations.

III. RULE DEVELOPMENT

The purpose of the rule amendment is a contingency measure, designed to be enacted (with other rules) if current rules are insufficient to reduce VOC emission to bring District ozone levels to attainment status. The current rule limits VOC emissions from polyester resin operations and related cleaning with, storage of,

and disposal of solvents and waste solvent materials. The rule applies to commercial and industrial polyester resin operations. Polyester resin operations is defined in this rule as the production or rework of products by mixing, pouring, hand layup, impregnating, injecting, forming, winding, spraying, and/or curing with fiberglass, fillers, or any other reinforcement materials and associated cleanup.

Rule 432, currently, exempts low-emitting operations such as facilities that use less than 20 gallons per month of polyester resin, provided the operator keeps the records required by the rule to demonstrate exemption status. The amended version will remove the low-use exemption. This amendment will control more facilities of Polyester Resin VOC emissions. The resultant inclusion will generate additional emission reductions.

Section II of Rule 432 (Definitions) include will be mostly unchanged except for the definition of VOC. Based on suggestion from EPA, the District will be changing the definition of VOC to the following: **VOC:** The definitions contained in 40 CFR 51.100 shall apply, and are hereby incorporated by reference. In the event of any discrepancy between a definition contained in 40 CFR 51.100 and any definition specified above, the definition in 40 CFR 51.100 (s) above shall be utilized.

IV. REQUIREMENTS

There are no changes to the requirements. Section IV of Draft Rule 432 contains the compliance requirements associated polyester resin operations, which include:

- Table of Standards for Open Mold Operations - VOC Content Limits
- Alternative VOC Control Measures
- Organic Solvent Cleaning Requirements, and
- Solvent Storage and Disposal

A. Table of Standards

There are no changes to the standards. For open molding process, owner/operators shall Use materials in an that comply with the weighted average monomer VOC content limits in Table of Standards, below.

TABLE 2
Table of Standards

Compliant Materials Weighted Average Monomer		
Material		**Weight Percent Limit**
a.	General Purpose Resin	
	• Marble Resin	10% or 32%, as supplied, with no fillers
	• Solid Surface	17%
	• Tub/Shower Resin	24% or 35%, as supplied, with no fillers
	• Lamination Resin	31% or 35%, as supplied, with no fillers
b.	Tooling Resin	
	• Atomized (spray)	30%
	• Non-atomized	29%
c.	Specialty Resin	
	• Fire Retardant Resin	38%
	• High Strength Materials	40%
	• Corrosion Resistant Resin	48%
d.	All Other Resins	35%
e.	Tooling Gel Coat	40%
f.	Pigmented Gel Coat	
	• White and Off White	30%
	• Non-White	37%
	• Primer	28%
g.	Clear Gel Coat	
	• Marble Resin	40%
	• Other Resin	44%
h.	Specialty Gel Coat	48%

B. Additional Polyester Resin Operation Requirements

1. In addition to complying with Table of Standards, the non-monomer VOC content of each resin and gel coat shall not contain more than 5 percent by weight of the resin or gel coat; or

2. Use resin containing a vapor suppressant, such that the weight loss from the VOC emissions does not exceed 50 grams per square meter of exposed surface during resin polymerization; or

3. Use a closed-mold system; or

4. Install and operate a VOC emissions control system that has 90% control efficiency or control emissions to a limit equivalent to the level achieved by the Table of Standards.

C. Equipment Requirements

Spray application of polyester resin shall only be performed using airless, air assisted airless, high-volume, low-pressure (HVLP) spray equipment, or electrostatic spray equipment

D. Organic Solvent Use and Storage Requirements

1. An operator shall not use organic solvents for cleaning operations that exceed the VOC content limits specified in Cleaning Solvents Table, below.

TABLE 3
VOC CONTENT LIMITS FOR ORGANIC SOLVENTS

Type of Solvent Cleaning Operation		VOC Content Limit Grams of VOC/liter of material (lb/gal)
a.	Product Cleaning During Manufacturing Process or Surface Preparation for Coating Application	25 (0.21)
b.	Repair and Maintenance Cleaning	25 (0.21)
c.	Cleaning of Polyester Resin Application Equipment	25 (0.21)

2. An operator shall store or dispose of all uncured polyester resin materials, fresh or spent solvents, waste solvent cleaning materials such as cloth, paper, etc., coatings, adhesives, catalysts, and thinners in self-closing, non-absorbent and non-leaking containers. The containers shall remain closed at all times except when depositing or removing the contents of the containers or when the container is empty.

V. EXEMPTIONS

Draft Rule 432 has the following exemptions:

The solvent cleaning provisions do not apply to the following applications to cleaning of solar cells, laser hardware, scientific instruments, high precision optics, laboratory tests and analyses, or bench scale or research and development projects.

VI. ADMINISTRATIVE REQUIREMENTS

A. Daily records of the type, quantity, and VOC content of all resins, gel coats, fillers, catalysts, and cleaning materials (including cleaning solvents) used in each operation at the facility.

B. Records showing the weight loss per square meter during resin polymerization for each vapor-suppressed resin.

C. VOC Emission Control System Records An operator using a VOC emission control system pursuant to Section IV.A.4 of Draft Rule 432 to comply with this rule shall maintain daily records of key system operating parameters to demonstrate continuous operation and compliance of the VOC emission control system during periods of emission-producing activities. Key system operating parameters are those parameters necessary to ensure compliance, including, but not limited to, temperature, pressure drop, and air flow rate.

D. An operator claiming exemption under Section 4.1 shall maintain records of polyester materials usage to support the claim of exemption.

E. Draft Rule 432 contains a number of specific test methods that must be followed in order to ensure compliance with the rule. See Section VI.B. of Appendix A.

Records required by the proposed Rule shall be retained for a minimum of five (5) years and made available on site during normal business hours to the APCO, ARB, or EPA upon request.

VII. RULE CONSISTENCY ANALYSIS

Pursuant to Section 40727.2 of the California Health and Safety Code, prior to adopting, amending, or repealing a rule or regulation, the District is required to perform a written analysis that identifies and compares the air pollution control elements of Draft Rule 432 with the corresponding elements of existing or proposed District and EPA rules, regulations, and guidelines that apply to the same source category. Rule elements that were analyzed are emission limits or control efficiency, operating parameters and work practices, monitoring and testing, and recordkeeping and reporting requirements.

Results of Consistency Analysis

District Rules

Facilities subject to Rule 432 could also be subject to the following rules:

Rule 410, Organic Solvents

Rule 410.2, Disposal and Evaporation of Solvents

Rule 410.3, Organic Solvent Degreasing Operations

Rule 410.4, Metal and Plastic Parts and Products and Pleasure Crafts

Rule 410.4A, Motor Vehicle and Mobile Equipment Coating Operations

Rule 410.7, Graphic Arts

Rule 410.8, Aerospace Coating and Coatings Operations

Rule 411, Storage of Organic Liquids

Rule 422, New and Modified Stationary Source Review Rule

Rule 423, National Emissions Standards for Hazardous Air Pollutants

Rules 410, 410.2, 40.3, 410.4, 410.4A, 410.7, 411, 422, and 423 are not in conflict with, nor are they inconsistent with the requirements of Rule 432.

State and Federal Regulations

There are no currently State regulations for general polyester resin operations. However, there are Federal regulations that include controls for polyester resin operations, including:

- EPA CTG for Fiberglass Boat Manufacturing Materials EPA-453/R-08-004 September 2008. CTG is designed to assist air districts in determining RACT for VOC from fiberglass boat manufacturing operations.

- National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart HHHH (Wet-Formed Fiberglass Mat Production Plants).

- NESHAP Subpart VVVV (Boat Manufacturing).

- NESHAP Subparts U, W, OOO, and JJJ (Polymers & Resins I, II, III, and IV, respectively) set forth requirements for polymer and resin manufacturing operations and not for their use.

Noted: The District currently has no fiberglass boat manufacturing operations within its jurisdiction. Also, Wet-Formed Fiberglass Mat Production Plants are a specific industry used, primarily, in the production of asphalt roofing products. Wet-formed fiberglass mat are used as a substrate for several asphalt roofing products. The District has no wet-formed fiberglass production plants.

Therefore, NESHAP Subpart HHHH and Subpart VVVV currently do not apply to any operations within the District; however, the District will update Rule 432 if a wet-formed fiberglass mat production plant or a fiberglass boat manufacturing operation is constructed within the District to reflect possible increased control measures for the new source(s).

B. EPA - Alternative Control Technology (ACT)

Currently no EPA ACT guidance document for general polyester resin operations.

C. Standards of Performance for New Stationary Sources (NSPS)

Currently no NSPS guidance document for general polyester resin operations.

D. National Emission Standards for Hazardous Air Pollutants (NESHAP) and Maximum Achievable Control Technologies (MACTs)

Currently no NESHAP guidance document for general polyester resin operations.

VIII. VOC REDUCTIONS

ARB emissions inventory shows the District VOC emissions of 0.05 tons of VOC per day for this category. Amendment to Rule 432 will include additional facilities to the requirements of this Rule. It is expected the generate a 6% VOC reduction to this category of source. The resultant VOC reduction is the following:

0.05-tons/day X 0.06 = 0.003-tons/day of emission reductions.

IX. ECONOMIC IMPACTS

Pursuant to California Health & Safety Code (CH&SC) §40920.6(a), the District is required to analyze the cost effectiveness of new rules or rule amendments that implement Best Available Retrofit Control Technology (BARCT) or all feasible measures. Proposed amendment to Rule 432 employs federal RACT requirements but not BARCT or all feasible measures, and is therefore not subject to the cost effectiveness analysis mandate.

X. ENVIRONMENTAL IMPACTS

Both the California Environmental Quality Act (CEQA) and ARB policy require an evaluation of the potential adverse environmental impacts of proposed projects. The intent of amendment to Rule 432 is to protect public health by reducing the public's exposure to potentially harmful VOC emissions. An additional

consideration is the impact that the proposed rule may have on the environment. District has determined that no significant adverse environmental impacts should occur as a result of adopting Draft Rule 432.

Pursuant to the Section 15061, Subsections (2) & (3) of the CEQA Guidelines, staff will prepared and file a Notice of Exemption for this project upon adoption.

XI. SOCIOECONOMIC IMPACTS

CH&SC Section 40728.5 exempts districts with a population of less than 500,000 persons from the requirement to assess the socioeconomic impacts of proposed rules. Eastern Kern County population is below 500,000 persons.

XII. RULE APPROVAL PROCESS

The District will be accepting written comments and concerns from persons interested in proposed Amended Rule 432 for a period of 30 days following the workshop. The District anticipates that Amended Rule 432 will be considered for adoption by the Governing Board at the September 1, 2022, Board Hearing.

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APPENDIX A:

PROPOSED REVISION RULE 432

POLYESTER RESIN OPERATIONS

RULE 432 Polyester Resin Operations - Adopted 3/13/2014, Amended X/XX/XXXX

I. Applicability

The purpose of this rule is to reduce volatile organic compounds (VOC) emissions from polyester resin operations. The provisions of this rule apply to commercial polyester resin operations, industrial polyester resin operations, and organic solvents (use, storage, and waste) associated with polyester resin operations.

II. Definitions

A. Air Pollution Control Officer (APCO): Eastern Kern Air Pollution Control District Air Pollution Control Officer, or his designee.

B. Application Equipment: Device, including, but not limited to, a spray gun, brush, and roller, used to apply adhesives, coatings, or inks.

C. CARB: California Air Resources Board.

D. Assembly Adhesive: Chemical material used to join two or more fiberglass, metal, foam, plastic, or wood parts. Assembly adhesives include, but are not limited to, methacrylate adhesives and putties made from polyester or vinylester resin mixed with inert filler or fibers.

E. ASTM: American Society of Testing and Materials International.

F. Atomized Resin Application: Technology that utilizes application equipment that breaks resin into droplets (or aerosol) as it exits application equipment to the surface of the part. Atomized resin application includes, but is not limited to, resin spray guns and resin chopper spray guns.

G. Bench Scale Project: Project (not located at Research and Development facility) operated on a small scale, such as one capable of being located on a laboratory bench top.

H. Catalyst: Substance is added to a resin to initiate or promote polymerization.

I. CFR: Code of Federal Regulations.

J. Cleaning Materials: Materials including, but not limited to, materials used for cleaning hands, tools, molds, application equipment, and work areas.

K. Clear Gel Coat: Clear (translucent) gel coating used to allow underlying colors or patterns to be visible. Tooling gel coat used to build or repair molds is NOT a clear gel coat.

L. Closed Molding Process: Molding process that utilizes pressure to distribute resin through the reinforcing fabric placed between two mold surfaces to either saturate the fabric or fill the mold cavity. Pressure utilized can be one or combination of the following forms: clamping, fluid (hydraulic), vacuum, or atmospheric. Mold surfaces may be rigid or flexible. Closed molding includes, but is not limited to, compression molding with sheet molding compound, infusion molding, resin injection molding (RIM),vacuum-assisted resin transfer molding (VARTM), resin transfer molding (RTM), and vacuum-assisted compression molding. The following are not close molding processes:

1. Processes utilizing a closed mold to compact saturated fabric or remove air or excess resin from the fabric (such as in vacuum bagging).

2. Open molding steps, such as application of gel coat or skin coat layer by conventional open molding prior to a closed molding process.

M. Coating: A material applied onto or impregnated into a substrate for protective, decorative, or functional purposes.

N. Corrosion-Resistant Material: Polyester resin material used to make products for corrosion resistant applications such as tooling, fuel or chemical tanks, boat hulls, pools and outdoor spas.

O. Cure: Polymerization process where small molecules, called monomers, combine chemically to produce a very large chainlike or network molecule. Chemicals are transformed from a liquid to a solid state or semisolid state to achieve desired physical properties for the product, including hardness.

P. Cured Coating: Coating that is dry to the touch.

Q. Degreaser: Solvent containing tank, tray, drum, etc. utilized to clean objects. Objects are cleaned by immersion into solvent or exposure to solvent vapor. Objects include, but not limited to, parts, products, tools, machinery, and equipment. An enclosed spray application equipment cleaning system is not a degreaser.

R. Dissolver: Organic solvent that is added to an adhesive, coating, or ink to melt or to liquefy solid particles.

S. EPA: United States Environmental Protection Agency.

T. Filament Application: Resin application method to an open mold where reinforcement fibers are fed through a resin bath and winding the resin impregnated fibers on a rotating mandrel.

U. Filled Polyester Resin Material: Material formulated by adding compatible filler(s) to polyester resin material(s).

V. Filler: Inert (non-VOC) substance added to the resin to enhance its mechanical properties or extend its volume. Resin fillers include, but are not limited to, silica, carbon black, talc, mica and calcium carbonate.

W. Fire Retardant Material: Polyester resin material used to make products that are resistant to flame or fire.

X. Fluid Impingement Technology: Spray gun that produces an expanding non-misting curtain of liquid by the impingement of low-pressure uninterrupted liquid streams.

Y. Gel Coat: Polyester resin topcoat that provides a cosmetic enhancement and improves resistance to degradation from environmental exposure.

Z. Grams of VOC per Liter of Material: The weight of VOC per volume of material and can be calculated by the following equation:

$$\text{Grams of VOC per liter of material} = \frac{Ws - Ww - Wec}{Vm}$$

Where:

Ws = weight of volatile compounds (grams)
Ww = weight of water (grams)
Wec = weight of exempt compounds (grams)
Vm = volume of material (liters)

AA. High-Strength Material: Polyester resins which have a casting tensile strength of 10,000-psi or more.

BB. High-Volume, Low-Pressure (HVLP): Spray equipment permanently labeled as such and which is designed and operated between 0.1 and 10 pounds per square inch, gauge, (psig) air atomizing pressure measured dynamically at the center of the air cap and at the air horns and with liquid supply pressure less than 50 psig.

CC. Lamination Resin: Orthophthalate, isophthalate and dicyclopentadiene (DCPD) resin which is used in composite system made of layers of reinforcement fibers and resins.

DD. Liquid Leak: Visible solvent leak from a container at a rate of more than three drops per minute, or a visible liquid mist.

EE. Maintenance Cleaning: Cleaning of tools, forms, molds, jigs, machinery, and equipment (excluding coating, ink and adhesive application equipment), and the cleaning of work areas where maintenance or manufacturing occurs.

FF. Manual Application: Application of resin to an open mold using a hand layup technique. Components of successive plies of resin-impregnated reinforcement fibers are applied using hand tools such as brushes and rollers.

GG. Manufacturing Process: Process of making goods or products by hand or by machine.

HH. Marble Resin: Orthophthalate and modified acrylic isophthalate resin, which is designed for the fabrication of cast products, such as vanities.

II. Mold: Cavity or surface where gel coat, resin, and fibers are placed and from which finished fiberglass parts take their form.

JJ. Monomer: Organic compound, such as styrene, that reacts with unsaturated polyester resins to form a cured polyester resin.

KK. Month: Calendar month.

LL. Neat Resin: Resin that has no added filler.

MM. Non-Absorbent Container: Container made of non-porous material that does not allow the migration of solvents through it.

NN. Non-Atomized Resin Application: Technology that utilizes application equipment that does not break resin into droplets (or aerosol) as it exits application equipment to the surface of the part. Non-atomized resin application technology includes, but are not limited to, non-atomizing spray guns, flowcoaters, chopper flowcoaters, pressure fed resin rollers, resin impregnators, or fluid impingement technology.

OO. Non-Atomized Solvent Flow: Solvents in the form of a liquid stream without the introduction of any propellant.

PP. Non-Atomizing Spray Gun: Spray gun where resin flows in a steady and observable coherent flow, with no droplets formed in the area that is within the first three (3) inches of the applicator orifice. Droplets may form in the area greater than three (3) inches from the applicator orifice.

QQ. Non-Leaking Container: Container without a liquid leak.

RR. Normal Business Hours: Monday through Friday, 8:00 am to 5:00 pm.

SS. Open Molding Resin and Gel Coat Process: Process where reinforcing fibers and resin are placed in an open-air mold while the reinforcing fibers are saturated with resin. Open molding operations include vacuum bags (or similar) used to compress uncured laminate to remove bubbles, excess resin, and to achieve a bond between core material and laminate.

TT. Organic Solvent: The same as “Solvent.”

UU. Organic Solvent Cleaning: Activity, operation, or process, (including surface preparation, cleanup, or wipe cleaning), performed outside of a degreaser, that uses organic solvents to remove uncured adhesives, uncured coatings, uncured inks or other contaminants. These operations including, but not limited to, dirt, soil, oil, lubricants, coolants, moisture, fingerprints, and grease, from parts, products, tools, machinery, general work areas and application equipment (including coatings, adhesives, and ink spray equipment).

VV. Pigmented Gel Coat: Opaque gel coat that provides a colored, glossy surface which improves the aesthetic appearance of the products. Pigmented gel coat does not include tooling gel coat used to build or repair molds.

WW. Polyester Resin Materials: Materials including, but not limited to: unsaturated polyester resins such as isophthalic, orthophthalic, halogenated, Bisphenol-A, vinyl-ester, or furan resins; cross-linking agents; catalysts, gel coats, inhibitors, accelerators, promoters, and any other materials used in polyester resin operations.

XX. Polyester Resin Operations: Production or rework of products by mixing, pouring, hand layup, impregnating, injecting, forming, winding, spraying, and/or curing with fiberglass, fillers, or any other reinforcement materials and associated cleanup.

YY. Polymer: Chemical compound comprised of a large number of chemical units, formed by chemical linking of monomers.

ZZ. Production Resin: General purpose resin material that is not especially corrosion resistant, fire retardant, high strength, or gel coats.

AAA. Propellant: Gas, including air, in a pressure container utilized to expel the contents when the pressure is released.

BBB. Repair Cleaning: Solvent cleaning operation or activity carried out during a repair process.

CCC. Repair Process: Process of returning a damaged or not operating properly object to good condition.

DDD. Research and Development: Facility or part of a facility used to development useful materials, devices, systems, or methods, including, but not limited to, design, development, and improvement of prototypes and processes. Research and development does not include the production manufacturing operations.

EEE. Resin: Class of natural or synthetic organic polymers used to encapsulate and bind together reinforcement fibers in the construction of fiberglass parts.

FFF. Resin and Gel Coat Operation: Operation in which resins or gel coats (including putties or polyputties) is combined with additives (including, but are not limited to, fillers, promoters, or catalysts).

GGG. SCAQMD: South Coast Air Quality Management District.

HHH. Skin Coat: Layer of resin and fibers applied over gel coat to protect the gel coat from deformation by the subsequent laminate layers.

III. Small Job: Minor resin or gel coat application project which requires only a very limited amount of materials. Total material use for all small jobs at a facility shall not exceed two (2) gallons a day.

JJJ. Solid Surface Resin: Resin, used without gel coats, to fabricate homogenous solid surface products.

KKK. Solvent: As defined in Rule 410.3, Organic Solvent Degreasing Operations.

LLL. Specialty Gel Coat: Gel coat used in conjunction with fire retardant, corrosion resistant or high-strength materials.

MMM. Specialty Resin: Halogenated, furan, bisphenol A, vinyl-ester, or isophthalic resin used to make products for exposure to one or more of the following extreme environmental conditions: corrosive agents, caustic agents, acidic agents, or flame (heat).

NNN. Stationary Source: As defined in Rule 210.1 (New and Modified Stationary Source Review Rule).

OOO. Tooling Resin: Resins used to build or repair molds (tools) or prototypes (plugs) that comprise the molds.

PPP. Tooling Gel Coat: Gel coat used to build or repair molds (tools) or prototypes (plugs) that comprise the molds.

QQQ. Touch-up: Application of resin or gel coat to correct minor cosmetic imperfections that occur during fabrication or field installations.

RRR. Tub/Shower Resin: Dicyclopentadiene (DCPD), orthophthalate and isophthalate resins, used to fabricate bath ware products.

SSS. Vapor Suppressant: Substance added to resin to minimize the transfer of monomer vapor into the atmosphere.

TTT. Vinylester Resin: Thermosetting resin containing esters of acrylic or methacrylic acids having a double-bond and ester linkage sites at the end of the resin molecules.

UUU. Volatile Organic Compound (VOC): The definitions contained in 40 CFR 51.100 shall apply, and are hereby incorporated by reference. In the event of any discrepancy between a definition contained in 40 CFR 51.100 and any definition in this rule, the definition in 40 CFR 51.100 (s) above shall be utilized.

VVV. Waste Materials: Materials including but not limited to paper or cloth used for cleaning operations, waste resins, or spent cleaning materials.

III. Exemptions

The solvent cleaning provisions of Section IV.D, Table 2 shall not apply to the following applications:

1. Cleaning of solar cells, laser hardware, scientific instruments, or high precision optics.

2. Cleaning in laboratory tests and analyses, or bench scale or research and development projects.

IV. Requirements

A. Polyester Resin Operation

1. An operator of a polyester resin operation shall comply with the following process or control requirements:

   Use materials in an open molding process that comply with the weighted average monomer VOC content limits in Table 1. In addition to complying with Table 1 limits, the non-monomer VOC content of each resin and gel coat shall not contain more than 5 percent by weight of the resin or gel coat; or comply with Sections IV.A.2, IV.A.3, or IV.A.4.

TABLE 1
VOC CONTENT LIMITS FOR OPEN MOLDING RESIN AND GEL COAT

Compliant Materials Weighted Average Monomer		
Material		**Weight Percent Limit**
a.	General Purpose Resin	
	• Marble Resin	10% or 32%, as supplied, with no fillers
	• Solid Surface	17%
	• Tub/Shower Resin	24% or 35%, as supplied, with no fillers
	• Lamination Resin	31% or 35%, as supplied, with no fillers
b.	Tooling Resin	
	• Atomized (spray)	30%
	• Non-atomized	29%
c.	Specialty Resin	
	• Fire Retardant Resin	38%
	• High Strength Materials	40%
	• Corrosion Resistant Resin	48%
d.	All Other Resins	35%
e.	Tooling Gel Coat	40%
f.	Pigmented Gel Coat	
	• White and Off White	30%
	• Non-White	37%
	• Primer	28%
g.	Clear Gel Coat	
	• Marble Resin	40%
	• Other Resin	44%
h.	Specialty Gel Coat	48%

2. Use resin containing a vapor suppressant, such that the weight loss from the VOC emissions does not exceed 50 grams per square meter of exposed surface during resin polymerization;
3. Use a closed-mold system; or

4. Install and operate a VOC emissions control system which meets all of the requirements of Sections IV.A.4.a. through IV.A.4.c during periods of emission producing activities:

   a. The VOC emission control system shall be approved, in writing, by the APCO.

   b. The VOC emission control system shall have an overall capture and control efficiency of at least 90 percent by weight, demonstrated using the applicable test method(s) in Section V.B.

   c. The VOC emission control system shall reduce VOC emissions, at all times, to a level that is not greater than the emission which would have been achieved through the use of compliant materials, compliant equipment, or compliant work practices, as applicable. The following equation shall be used to determine if the minimum required overall capture and control efficiency of an emission control system is at an equivalent or greater level of VOC reduction as would be achieved using compliant materials, equipment, or work practices:

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

   Where:

CE	=	Minimum Required Overall Capture and Control Efficiency, percent.
VOC_{LWc}	=	VOC Limit, less water and exempt compounds.
$VOC_{LWn,Max}$	=	Maximum VOC content of noncompliant 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 noncompliant coating, containing the maximum VOC content of the multi-component coating.
D_c	=	Density of corresponding solvent, reducer, or thinner used in the compliant coating system.

5. Resins and gel coats used for touch up, repair, or small jobs, may have a monomer content limit up to 10% more than the applicable limit set forth in Table 1. Such resins or gel coats shall only be applied by a hand-held atomized spray gun which has a container for the resin or gel coat as part of the gun. Resins or gels applied by another method shall comply with the applicable limit in Table 1. Total material use for all small jobs at a facility shall not exceed two (2) gallons a day.

B. Spray application of polyester resin shall only be performed using airless, air assisted airless, high-volume, low-pressure (HVLP) spray equipment, or electrostatic spray equipment.

1. High-Volume, Low-Pressure (HVLP) spray equipment shall be operated in accordance with the manufacturer's recommendations.

2. For HVLP spray guns manufactured prior to January 1, 1996, the end user shall demonstrate that the gun meets HVLP spray equipment standards. Satisfactory proof will be either in the form of manufacturer's published technical material or by a demonstration using a certified air pressure tip gauge, measuring the air atomizing pressure dynamically at the center of the air cap and at the air horns.

3. A person shall not sell or offer for sale for use within the District any HVLP spray gun without a permanent marking denoting the maximum inlet air pressure in psig at which the gun will operate within the parameters specified in Section II.

C. In lieu of complying with the applicable requirements of IV.B, an operator may install and maintain a VOC emission control system that meets the requirements of Section IV.A.4 around the coating application operation.

D. Organic Solvent Cleaning Requirements

1. An operator shall not use organic solvents for cleaning operations that exceed the VOC content limits specified in Table 2.

TABLE 2
VOC CONTENT LIMITS FOR ORGANIC SOLVENTS

Type of Solvent Cleaning Operation		VOC Content Limit Grams of VOC/liter of material (lb/gal)
a.	Product Cleaning During Manufacturing Process or Surface Preparation for Coating Application	25 (0.21)
b.	Repair and Maintenance Cleaning	25 (0.21)
c.	Cleaning of Polyester Resin Application Equipment	25 (0.21)

2. In lieu of complying with the VOC content limits in Table 2, an operator may control VOC emissions from cleaning operations with an APCO-approved VOC emission control system that meets the requirements of Section IV.A.4 for the solvent cleaning operations.

E. Solvent Storage and Disposal

An owner or operator shall store or dispose of all uncured polyester resin materials, fresh or spent solvents, waste solvent cleaning materials such as cloth, paper, etc., coatings, adhesives, catalysts, and thinners in self-closing, non-absorbent and non-leaking containers. The containers shall remain closed at all times except when depositing or removing the contents of the containers or when the container is empty.

V. Administrative Requirements

A. Recordkeeping

An operator subject to this rule shall maintain the following records:

1. Daily records of the type and quantity of all resins, gel coats, fillers, catalysts, and cleaning materials (including cleaning solvents) used in each operation. Records shall also indicate the amount used and VOC content, in weight percent, of all polyester resin and gel coat materials used for touch up, repair, and small jobs.

2. Records of the VOC content, in weight percent, of all polyester resin and gel coat, filler materials, including the weight percent of non-monomer VOC content of the resin and gel coat, used or stored at the stationary source.

3. Records of the VOC content of all cleaning materials used and stored at the stationary source as specified in Section IV.D.

4. Records showing the weight loss per square meter during resin polymerization for each vapor-suppressed resin.

5. VOC Emission Control System records an operator using a VOC emission control system pursuant to Section IV.A.4 to comply with this rule shall maintain daily records of key system operating parameters to demonstrate continuous operation and compliance of the VOC emission control system during periods of emission-producing activities. Key system operating parameters are those parameters necessary to ensure compliance, including, but not limited to, temperature, pressure drop, and air flow rate.

6. An operator claiming exemption under Section III shall maintain records of polyester materials usage to support the claim of exemption.

7. The operator shall retain the records specified in Sections V.A.1 through V.A.6, as applicable, on site for a period of five years, make the records available on site during normal business hours to the APCO, ARB, or EPA, and submit the records to the APCO, ARB, or EPA upon request.

B. Test Methods

The analysis of cleaning materials, polyester resin materials and control efficiency shall be determined by the following methods:

1. The emission rate per square meter of exposed surface during polymerization of Polyester Resins is to be determined using: SCAQMD Method 309-91 (Static Method for Determination of Volatile Emissions from Polyester and Vinyl Resins Operations), February, 1993.

2. Determination of Overall Capture and Control Efficiency of VOC Emission Control Systems:

   a. The capture efficiency of a VOC emission control system's collection device(s) shall be determined according to EPA's "Guidelines for Determining Capture Efficiency," January 9, 1995 and 40 CFR 51, Appendix M, Test Methods 204-204F, as applicable, or any other method approved by EPA, ARB, and the APCO.

   b. The control efficiency of a VOC emission control system's VOC control device(s) shall be determined using EPA Test Methods 2, 2A, or 2D for measuring flow rates and EPA Test Methods 25, 25A, or 25B for measuring total gaseous organic concentrations at the inlet and outlet of the control device(s). EPA Method 18 or ARB Method 422 shall be used to determine the emissions of exempt compounds.

   c. For VOC emission control systems that consist of a single VOC emission collection device connected to a single VOC emission control device, the overall capture and control efficiency shall be calculated by using the following equation:

$$CE_{\text{Capture and Control}} = \frac{[CE_{Capture} \text{ X } CE_{Control}]}{100}$$

   Where:

$CE_{\text{Capture and Control}}$	=	Overall Capture and Control Efficiency, in percent.
CE_{Capture}	=	Capture Efficiency of the collection device, in percent.
CE_{Control}	=	Control Efficiency of the control device, in percent.

3. The monomer content of uncatalyzed resin materials is to be determined using ASTM D2369-87 (Standard Test Method for Volatile Content of Coatings) or SCAQMD Test Method 312-91 (Determination of Percent Monomer in Polyester Resins) April, 1996.

4. The VOC content of cleaning materials shall be determined using EPA Method 24 (40 CFR Part 60, Appendix A).

5. Determination of emissions of VOC from spray gun cleaning systems shall be made using SCAQMD "General Test Method for Determining Solvent Losses from Spray Gun Cleaning Systems," October 3, 1989.

6. The transfer efficiency of alternative coating application methods shall be determined in accordance with the SCAQMD method "Spray Equipment Transfer Efficiency Test Procedure for Equipment User," May 24, 1989.

C. Multiple Test Methods

When more than one test method or set of test methods is 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 this rule.

VI. Compliance Schedule

A. New Sources

Owners or Operators of any facility proposing to install polyester resin operations and required to comply with Section IV of this rule shall obtain an Authority to Construct (ATC) in accordance with Rule 210.1 prior to installation or operation of any polyester resin operation.

B. Existing Sources

1. Owners or Operators of any facility with polyester resin operations required to comply with Section IV of this rule shall obtain a valid Permit to Operate (PTO) or an Authority to Construct (ATC), and shall apply for an ATC within 180-days from the adoption of this Rule.

2. Owners or operators with valid PTO(s), required to comply with Section IV of this rule shall obtain shall be in full compliance within 12 months after rule adoption.

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APPENDIX B:

PROPOSED REVISION RULE 432

POLYESTER RESIN OPERATIONS

STRIKEOUT UNDERLINE

RULE 432 Polyester Resin Operations - Adopted 3/13/2014, Amended X/XX/XXXX

I. Applicability

The purpose of this rule is to reduce volatile organic compounds (VOC) emissions from polyester resin operations. The provisions of this rule apply to commercial polyester resin operations, industrial polyester resin operations, and organic solvents (use ~~{including cleaning}~~, storage, and waste~~, and disposal {off-site transfer}~~) associated with polyester resin operations.

II. Definitions

A. Air Pollution Control Officer (APCO)~~APCO~~: Eastern Kern Air Pollution Control District Air Pollution Control Officer, or his designee. ~~of the Eastern Kern Air Pollution Control District.~~

B. Application Equipment: Device, including, but not limited to, a spray gun, brush, and roller, used to apply adhesives, coatings, or inks.

C. CARB: California Air Resources Board.

D. Assembly Adhesive: Chemical material used to join two or more fiberglass, metal, foam, plastic, or wood parts. Assembly adhesives include, but are not limited to, methacrylate adhesives and putties made from polyester or vinylester resin mixed with inert filler or fibers.

E. ASTM: American Society of Testing and Materials International.

F. Atomized Resin Application: Technology that utilizes application equipment that breaks resin into droplets (or aerosol) as it exits application equipment to the surface of the part. Atomized resin application includes, but is not limited to, resin spray guns and resin chopper spray guns.

G. Bench Scale Project: Project (not located at Research and Development facility) operated on a small scale, such as one capable of being located on a laboratory bench top.

H. Catalyst: Substance is added to a resin to initiate or promote polymerization.

I. CFR: Code of Federal Regulations.

J. Cleaning Materials: Materials including, but not limited to, materials used for cleaning hands, tools, molds, application equipment, and work areas.

K. Clear Gel Coat: Clear (translucent) gel coating used to allow underlying colors or patterns to be visible. Tooling gel coat used to build or repair molds is NOT a clear gel coat.

L. Closed Molding Process: Molding process that utilizes pressure to distribute resin through the reinforcing fabric placed between two mold surfaces to either saturate the fabric or fill the mold cavity. Pressure utilized can be one or combination of the following forms: clamping, fluid (hydraulic), vacuum, or atmospheric. Mold surfaces may be rigid or flexible. Closed molding includes, but is not limited to, compression molding with sheet molding compound, infusion molding, resin injection molding (RIM),vacuum-assisted resin transfer molding (VARTM), resin transfer molding (RTM), and vacuum-assisted compression molding. The following are not close molding processes:

1. Processes utilizing a closed mold to compact saturated fabric or remove air or excess resin from the fabric (such as in vacuum bagging).

2. Open molding steps, such as application of gel coat or skin coat layer by conventional open molding prior to a closed molding process.

M. Coating: A material applied onto or impregnated into a substrate for protective, decorative, or functional purposes.

N. Corrosion-Resistant Material: Polyester resin material used to make products for corrosion resistant applications such as tooling, fuel or chemical tanks, boat hulls, pools and outdoor spas.

O. Cure: Polymerization process where small molecules, called monomers, combine chemically to produce a very large chainlike or network molecule. Chemicals are transformed from a liquid to a solid state or semisolid state to achieve desired physical properties for the product, including hardness.

P. Cured Coating: Coating that is dry to the touch.

Q. Degreaser: Solvent containing tank, tray, drum, etc. utilized to clean objects. Objects are cleaned by immersion into solvent or exposure to solvent vapor. Objects include, but not limited to, parts, products, tools, machinery, and equipment. An enclosed spray application equipment cleaning system is not a degreaser.

R. Dissolver: Organic solvent that is added to an adhesive, coating, or ink to melt or to liquefy solid particles.

S. EPA: United States Environmental Protection Agency.

T. Filament Application: Resin application method to an open mold where reinforcement fibers are fed through a resin bath and winding the resin impregnated fibers on a rotating mandrel.

U. Filled Polyester Resin Material: Material formulated by adding compatible filler(s) to polyester resin material(s).

V. Filler: Inert (non-VOC) substance added to the resin to enhance its mechanical properties or extend its volume. Resin fillers include, but are not limited to, silica, carbon black, talc, mica and calcium carbonate.

W. Fire Retardant Material: Polyester resin material used to make products that are resistant to flame or fire.

X. Fluid Impingement Technology: Spray gun that produces an expanding non-misting curtain of liquid by the impingement of low-pressure uninterrupted liquid streams.

Y. Gel Coat: Polyester resin topcoat that provides a cosmetic enhancement and improves resistance to degradation from environmental exposure.

Z. Grams of VOC per Liter of Material: The weight of VOC per volume of material and can be calculated by the following equation:

$$\text{Grams of VOC per liter of material} = \frac{Ws - Ww - Wec}{Vm}$$

Where:

Ws = weight of volatile compounds (grams)
Ww = weight of water (grams)
Wec = weight of exempt compounds (grams)
Vm = volume of material (liters)

AA. High-Strength Material: Polyester resins which have a casting tensile strength of 10,000-psi or more.

BB. High-Volume, Low-Pressure (HVLP): Spray equipment permanently labeled as such and which is designed and operated between 0.1 and 10 pounds per square inch, gauge, (psig) air atomizing pressure measured dynamically at the center of the air cap and at the air horns and with liquid supply pressure less than 50 psig.

CC. Lamination Resin: Orthophthalate, isophthalate and dicyclopentadiene (DCPD) resin which is used in composite system made of layers of reinforcement fibers and resins.

DD. Liquid Leak: Visible solvent leak from a container at a rate of more than three drops per minute, or a visible liquid mist.

EE. Maintenance Cleaning: Cleaning of tools, forms, molds, jigs, machinery, and equipment (excluding coating, ink and adhesive application equipment), and the cleaning of work areas where maintenance or manufacturing occurs.

FF. Manual Application: Application of resin to an open mold using a hand layup technique. Components of successive plies of resin-impregnated reinforcement fibers are applied using hand tools such as brushes and rollers.

GG. Manufacturing Process: Process of making goods or products by hand or by machine.

HH. Marble Resin: Orthophthalate and modified acrylic isophthalate resin, which is designed for the fabrication of cast products, such as vanities.

II. Mold: Cavity or surface where gel coat, resin, and fibers are placed and from which finished fiberglass parts take their form.

JJ. Monomer: Organic compound, such as styrene, that reacts with unsaturated polyester resins to form a cured polyester resin.

KK. Month: Calendar month.

LL. Neat Resin: Resin that has no added filler.

MM. Non-Absorbent Container: Container made of non-porous material that does not allow the migration of solvents through it.

NN. Non-Atomized Resin Application: Technology that utilizes application equipment that does not break resin into droplets (or aerosol) as it exits application equipment to the surface of the part. Non-atomized resin application technology includes, but are not limited to, non-atomizing spray guns, flowcoaters, chopper flowcoaters, pressure fed resin rollers, resin impregnators, or fluid impingement technology.

OO. Non-Atomized Solvent Flow: Solvents in the form of a liquid stream without the introduction of any propellant.

PP. Non-Atomizing Spray Gun: Spray gun where resin flows in a steady and observable coherent flow, with no droplets formed in the area that is within the first three (3) inches of the applicator orifice. Droplets may form in the area greater than three (3) inches from the applicator orifice.

QQ. Non-Leaking Container: Container without a liquid leak.

RR. Normal Business Hours: Monday through Friday, 8:00 am to 5:00 pm.

SS. Open Molding Resin and Gel Coat Process: Process where reinforcing fibers and resin are placed in an open-air mold while the reinforcing fibers are saturated with resin. Open molding operations include vacuum bags (or similar) used to compress uncured laminate to remove bubbles, excess resin, and to achieve a bond between core material and laminate.

TT. Organic Solvent: The same as “Solvent.”

UU. Organic Solvent Cleaning: Activity, operation, or process, (including surface preparation, cleanup, or wipe cleaning), performed outside of a degreaser, that uses organic solvents to remove uncured adhesives, uncured coatings, uncured inks or other contaminants. These operations including, but not limited to, dirt, soil, oil, lubricants, coolants, moisture, fingerprints, and grease, from parts, products, tools, machinery, general work areas and application equipment (including coatings, adhesives, and ink spray equipment).

VV. Pigmented Gel Coat: Opaque gel coat that provides a colored, glossy surface which improves the aesthetic appearance of the products. Pigmented gel coat does not include tooling gel coat used to build or repair molds.

WW. Polyester Resin Materials: Materials including, but not limited to: unsaturated polyester resins such as isophthalic, orthophthalic, halogenated, Bisphenol-A, vinyl-ester, or furan resins; cross-linking agents; catalysts, gel coats, inhibitors, accelerators, promoters, and any other materials used in polyester resin operations.

XX. Polyester Resin Operations: Production or rework of products by mixing, pouring, hand layup, impregnating, injecting, forming, winding, spraying, and/or curing with fiberglass, fillers, or any other reinforcement materials and associated cleanup.

YY. Polymer: Chemical compound comprised of a large number of chemical units, formed by chemical linking of monomers.

ZZ. Production Resin: General purpose resin material that is not especially corrosion resistant, fire retardant, high strength, or gel coats.

AAA. Propellant: Gas, including air, in a pressure container utilized to expel the contents when the pressure is released.

BBB. Repair Cleaning: Solvent cleaning operation or activity carried out during a repair process.

CCC. Repair Process: Process of returning a damaged or not operating properly object to good condition.

DDD. Research and Development: Facility or part of a facility used to development useful materials, devices, systems, or methods, including, but not limited to, design, development, and improvement of prototypes and processes. Research and development does not include the production manufacturing operations.

EEE. Resin: Class of natural or synthetic organic polymers used to encapsulate and bind together reinforcement fibers in the construction of fiberglass parts.

FFF. Resin and Gel Coat Operation: Operation in which resins or gel coats (including putties or polyputties) is combined with additives (including, but are not limited to, fillers, promoters, or catalysts).

GGG. SCAQMD: South Coast Air Quality Management District.

HHH. Skin Coat: Layer of resin and fibers applied over gel coat to protect the gel coat from deformation by the subsequent laminate layers.

III. Small Job: Minor resin or gel coat application project which requires only a very limited amount of materials. Total material use for all small jobs at a facility shall not exceed two (2) gallons a day.

JJJ. Solid Surface Resin: Resin, used without gel coats, to fabricate homogenous solid surface products.

KKK. Solvent: As defined in Rule 410.3, Organic Solvent Degreasing Operations.

LLL. Specialty Gel Coat: Gel coat used in conjunction with fire retardant, corrosion resistant or high-strength materials.

MMM. Specialty Resin: Halogenated, furan, bisphenol A, vinyl-ester, or isophthalic resin used to make products for exposure to one or more of the following extreme environmental conditions: corrosive agents, caustic agents, acidic agents, or flame (heat).

NNN. Stationary Source: As defined in Rule 210.1 (New and Modified Stationary Source Review Rule).

OOO. Tooling Resin: Resins used to build or repair molds (tools) or prototypes (plugs) that comprise the molds.

PPP. Tooling Gel Coat: Gel coat used to build or repair molds (tools) or prototypes (plugs) that comprise the molds.

QQQ. Touch-up: Application of resin or gel coat to correct minor cosmetic imperfections that occur during fabrication or field installations.

RRR. Tub/Shower Resin: Dicyclopentadiene (DCPD), orthophthalate and isophthalate resins, used to fabricate bath ware products.

SSS. Vapor Suppressant: Substance added to resin to minimize the transfer of monomer vapor into the atmosphere.

TTT. Vinylester Resin: Thermosetting resin containing esters of acrylic or methacrylic acids having a double-bond and ester linkage sites at the end of the resin molecules.

UUU. Volatile Organic Compound (VOC): ~~As defined in Rule 102, Definitions~~ The definitions contained in 40 CFR 51.100 shall apply, and are hereby incorporated by reference. In the event of any discrepancy between a definition contained in 40 CFR 51.100 and any definition in this rule, the definition in 40 CFR 51.100 (s) above shall be utilized.

VVV. Waste Materials: Materials including but not limited to paper or cloth used for cleaning operations, waste resins, or spent cleaning materials.

III. Exemptions

~~A. The provisions of this rule, excluding recordkeeping requirements of Section V.A, shall not apply to any polyester resin operation provided the volume of polyester resin materials used is less than 20 gallons per month.~~

- The solvent cleaning provisions of Section IV.D, Table 2 shall not apply to the following applications:

1. Cleaning of solar cells, laser hardware, scientific instruments, or high precision optics.

2. Cleaning in laboratory tests and analyses, or bench scale or research and development projects.

IV. Requirements

A. Polyester Resin Operation

1. An operator of a polyester resin operation shall comply with the following process or control requirements:

   Use materials in an open molding process that comply with the weighted average monomer VOC content limits in Table 1. In addition to complying with Table 1 limits, the non-monomer VOC content of each resin and gel coat shall not contain more than 5 percent by weight of the resin or gel coat; or comply with Sections IV.A.2, IV.A.3, or IV.A.4.

TABLE 1
VOC CONTENT LIMITS FOR OPEN MOLDING RESIN AND GEL COAT

Compliant Materials Weighted Average Monomer		
Material		**Weight Percent Limit**
a.	General Purpose Resin	
	• Marble Resin	10% or 32%, as supplied, with no fillers
	• Solid Surface	17%
	• Tub/Shower Resin	24% or 35%, as supplied, with no fillers
	• Lamination Resin	31% or 35%, as supplied, with no fillers
b.	Tooling Resin	
	• Atomized (spray)	30%
	• Non-atomized	29%
c.	Specialty Resin	
	• Fire Retardant Resin	38%
	• High Strength Materials	40%
	• Corrosion Resistant Resin	48%
d.	All Other Resins	35%
e.	Tooling Gel Coat	40%
f.	Pigmented Gel Coat	
	• White and Off White	30%
	• Non-White	37%
	• Primer	28%
g.	Clear Gel Coat	
	• Marble Resin	40%

	• Other Resin	44%
h.	Specialty Gel Coat	48%

2. Use resin containing a vapor suppressant, such that the weight loss from the VOC emissions does not exceed 50 grams per square meter of exposed surface during resin polymerization;

3. Use a closed-mold system; or

4. Install and operate a VOC emissions control system which meets all of the requirements of Sections IV.A.4.a. through IV.A.4.c during periods of emission producing activities:

   a. The VOC emission control system shall be approved, in writing, by the APCO.

   b. The VOC emission control system shall have an overall capture and control efficiency of at least 90 percent by weight, demonstrated using the applicable test method(s) in Section V.B.

   c. The VOC emission control system shall reduce VOC emissions, at all times, to a level that is not greater than the emission which would have been achieved through the use of compliant materials, compliant equipment, or compliant work practices, as applicable. The following equation shall be used to determine if the minimum required overall capture and control efficiency of an emission control system is at an equivalent or greater level of VOC reduction as would be achieved using compliant materials, equipment, or work practices:

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

Where:

CE	=	Minimum Required Overall Capture and Control Efficiency, percent.
VOC_{LWc}	=	VOC Limit, less water and exempt compounds.
$VOC_{LWn,Max}$	=	Maximum VOC content of noncompliant 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 noncompliant coating, containing the maximum VOC content of the multi-component coating.
D_c	=	Density of corresponding solvent, reducer, or thinner used in the compliant coating system.

5. Resins and gel coats used for touch up, repair, or small jobs, may have a monomer content limit up to 10% more than the applicable limit set forth in Table 1. Such resins or gel coats shall only be applied by a hand-held atomized spray gun which has a container for the resin or gel coat as part of the gun. Resins or gels applied by another method shall comply with the applicable limit in Table 1. Total material use for all small jobs at a facility shall not exceed two (2) gallons a day.

B. Spray application of polyester resin shall only be performed using airless, air assisted airless, high-volume, low-pressure (HVLP) spray equipment, or electrostatic spray equipment.

1. High-Volume, Low-Pressure (HVLP) spray equipment shall be operated in accordance with the manufacturer's recommendations.

2. For HVLP spray guns manufactured prior to January 1, 1996, the end user shall demonstrate that the gun meets HVLP spray equipment standards. Satisfactory proof will be either in the form of manufacturer's published technical material or by a demonstration using a certified air pressure tip gauge, measuring the air atomizing pressure dynamically at the center of the air cap and at the air horns.

3. A person shall not sell or offer for sale for use within the District any HVLP spray gun without a permanent marking denoting the maximum inlet air pressure in psig at which the gun will operate within the parameters specified in Section II.

C. In lieu of complying with the applicable requirements of IV.B, an operator may install and maintain a VOC emission control system that meets the requirements of Section IV.A.4 around the coating application operation.

D. Organic Solvent Cleaning Requirements

1. An operator shall not use organic solvents for cleaning operations that exceed the VOC content limits specified in Table 2.

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b.	Repair and Maintenance Cleaning	25 (0.21)
c.	Cleaning of Polyester Resin Application Equipment	25 (0.21)

2. In lieu of complying with the VOC content limits in Table 2, an operator may control VOC emissions from cleaning operations with an APCO-approved VOC

emission control system that meets the requirements of Section IV.A.4 for the solvent cleaning operations.

E. Solvent Storage and Disposal

An owner or operator shall store or dispose of all uncured polyester resin materials, fresh or spent solvents, waste solvent cleaning materials such as cloth, paper, etc., coatings, adhesives, catalysts, and thinners in self-closing, non-absorbent and non-leaking containers. The containers shall remain closed at all times except when depositing or removing the contents of the containers or when the container is empty.

V. Administrative Requirements

A. Recordkeeping

An operator subject to this rule shall maintain the following records:

1. Daily records of the type and quantity of all resins, gel coats, fillers, catalysts, and cleaning materials (including cleaning solvents) used in each operation. Records shall also indicate the amount used and VOC content, in weight percent, of all polyester resin and gel coat materials used for touch up, repair, and small jobs.

2. Records of the VOC content, in weight percent, of all polyester resin and gel coat, filler materials, including the weight percent of non-monomer VOC content of the resin and gel coat, used or stored at the stationary source.

3. Records of the VOC content of all cleaning materials used and stored at the stationary source as specified in Section IV.D.

4. Records showing the weight loss per square meter during resin polymerization for each vapor-suppressed resin.

5. VOC Emission Control System records an operator using a VOC emission control system pursuant to Section IV.A.4 to comply with this rule shall maintain daily records of key system operating parameters to demonstrate continuous operation and compliance of the VOC emission control system during periods of emission-producing activities. Key system operating parameters are those parameters necessary to ensure compliance, including, but not limited to, temperature, pressure drop, and air flow rate.

6. An operator claiming exemption under Section III shall maintain records of polyester materials usage to support the claim of exemption.

7. The operator shall retain the records specified in Sections V.A.1 through V.A.6, as applicable, on site for a period of five years, make the records available on site during normal business hours to the APCO, ARB, or EPA, and submit the records to the APCO, ARB, or EPA upon request.

B. Test Methods

The analysis of cleaning materials, polyester resin materials and control efficiency shall be determined by the following methods:

1. The emission rate per square meter of exposed surface during polymerization of Polyester Resins is to be determined using: SCAQMD Method 309-91 (Static Method for Determination of Volatile Emissions from Polyester and Vinyl Resins Operations), February, 1993.

2. Determination of Overall Capture and Control Efficiency of VOC Emission Control Systems:

   a. The capture efficiency of a VOC emission control system's collection device(s) shall be determined according to EPA's "Guidelines for Determining Capture Efficiency," January 9, 1995 and 40 CFR 51, Appendix M, Test Methods 204-204F, as applicable, or any other method approved by EPA, ARB, and the APCO.

   b. The control efficiency of a VOC emission control system's VOC control device(s) shall be determined using EPA Test Methods 2, 2A, or 2D for measuring flow rates and EPA Test Methods 25, 25A, or 25B for measuring total gaseous organic concentrations at the inlet and outlet of the control device(s). EPA Method 18 or ARB Method 422 shall be used to determine the emissions of exempt compounds.

   c. For VOC emission control systems that consist of a single VOC emission collection device connected to a single VOC emission control device, the overall capture and control efficiency shall be calculated by using the following equation:

$$CE_{Capture\ and\ Control} = \frac{[CE_{Capture} \times CE_{Control}]}{100}$$

Where:

$CE_{Capture\ and\ Control}$ = Overall Capture and Control Efficiency, in percent.

$CE_{Capture}$ = Capture Efficiency of the collection device, in percent.

$CE_{Control}$ = Control Efficiency of the control device, in percent.

3. The monomer content of uncatalyzed resin materials is to be determined using ASTM D2369-87 (Standard Test Method for Volatile Content of Coatings) or SCAQMD Test Method 312-91 (Determination of Percent Monomer in Polyester Resins) April, 1996.

4. The VOC content of cleaning materials shall be determined using EPA Method 24 (40 CFR Part 60, Appendix A).

5. Determination of emissions of VOC from spray gun cleaning systems shall be made using SCAQMD "General Test Method for Determining Solvent Losses from Spray Gun Cleaning Systems," October 3, 1989.

6. The transfer efficiency of alternative coating application methods shall be determined in accordance with the SCAQMD method "Spray Equipment Transfer Efficiency Test Procedure for Equipment User," May 24, 1989.

C. Multiple Test Methods

When more than one test method or set of test methods is 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 this rule.

VI. Compliance Schedule

A. New Sources

~~1.~~ Owners or Operators of any facility proposing to install polyester resin operations and required to comply with Section IV of this rule shall obtain an Authority to Construct (ATC) in accordance with Rule 210.1 prior to installation or operation of any polyester resin operation.

~~2. Owners or Operators of any facility with polyester resin operations exempt by Section III.A of this rule shall maintain records of polyester resin use upon initial operations.~~

B. Existing Sources

1. Owners or Operators of any facility with polyester resin operations required to comply with Section IV of this rule shall obtain a valid Permit to Operate (PTO) or an Authority to Construct (ATC), and shall apply for an ATC within 180-days from the adoption of this Rule.

~~2. Owners or Operators of any facility with polyester resin operations exempt by Section III.A of this rule shall commence maintaining records of polyester resin use within 180 days of this rule adoption.~~

~~3~~2. Owners or operators with valid PTO(s), required to comply with Section IV of this rule shall obtain shall be in full compliance within 12 months after rule adoption.

APPENDIX C:

PROPOSED REVISION RULE 432

POLYESTER RESIN OPERATIONS

s) *Volatile organic compounds (VOC)* means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions.

(1) This includes any such organic compound other than the following, which have been determined to have negligible photochemical reactivity: Methane; ethane; methylene chloride (dichloromethane); 1,1,1-trichloroethane (methyl chloroform); 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113); trichlorofluoromethane (CFC-11); dichlorodifluoromethane (CFC-12); chlorodifluoromethane (HCFC-22); trifluoromethane (HFC-23); 1,2-dichloro 1,1,2,2-tetrafluoroethane (CFC-114); chloropentafluoroethane (CFC-115); 1,1,1-trifluoro 2,2-dichloroethane (HCFC-123); 1,1,1,2-tetrafluoroethane (HFC-134a); 1,1-dichloro 1-fluoroethane (HCFC-141b); 1-chloro 1,1-difluoroethane (HCFC-142b); 2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124); pentafluoroethane (HFC-125); 1,1,2,2-tetrafluoroethane (HFC-134); 1,1,1-trifluoroethane (HFC-143a); 1,1-difluoroethane (HFC-152a); parachlorobenzotrifluoride (PCBTF); cyclic, branched, or linear completely methylated siloxanes; acetone; perchloroethylene (tetrachloroethylene); 3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca); 1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb); 1,1,1,2,3,4,4,5,5,5-decafluoropentane (HFC 43-10mee); difluoromethane (HFC-32); ethylfluoride (HFC-161); 1,1,1,3,3,3-hexafluoropropane (HFC-236fa); 1,1,2,2,3-pentafluoropropane (HFC-245ca); 1,1,2,3,3-pentafluoropropane (HFC-245ea); 1,1,1,2,3-pentafluoropropane (HFC-245eb); 1,1,1,3,3-pentafluoropropane (HFC-245fa); 1,1,1,2,3,3-hexafluoropropane (HFC-236ea); 1,1,1,3,3-pentafluorobutane (HFC-365mfc); chlorofluoromethane (HCFC-31); 1 chloro-1-fluoroethane (HCFC-151a); 1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a); 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-butane (C4F9OCH3 or HFE-7100); 2-(difluoromethoxymethyl)-1,1,1,2,3,3,3-heptafluoropropane ((CF3)2CFCF2OCH3); 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane (C4F9OC2H5 or HFE-7200); 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane ((CF3)2CFCF2OC2H5); methyl acetate; 1,1,1,2,2,3,3-heptafluoro-3-methoxy-propane (n-C3F7OCH3, HFE-7000); 3-ethoxy- 1,1,1,2,3,4,4,5,5,6,6,6-dodecafluoro-2-(trifluoromethyl) hexane (HFE-7500); 1,1,1,2,3,3,3-heptafluoropropane (HFC 227ea); methyl formate (HCOOCH3); 1,1,1,2,2,3,4,5,5,5-decafluoro-3-methoxy-4-trifluoromethyl-pentane (HFE-7300); propylene carbonate; dimethyl carbonate; *trans*-1,3,3,3-tetrafluoropropene; HCF2OCF2H (HFE-134); HCF2OCF2OCF2H (HFE-236cal2); HCF2OCF2CF2OCF2H (HFE-338pcc13); HCF2OCF2OCF2CF2OCF2H (H-Galden 1040x or H-Galden ZT 130 (or 150 or 180)); *trans* 1-chloro-3,3,3-trifluoroprop-1-ene; 2,3,3,3-tetrafluoropropene; 2-amino-2-methyl-1-propanol; t-butyl acetate; 1,1,2,2- Tetrafluoro -1-(2,2,2-trifluoroethoxy) ethane; *cis*-1,1,1,4,4,4-hexafluorobut-2-ene (HFO-1336mzz-Z); and perfluorocarbon compounds which fall into these classes:

(i) Cyclic, branched, or linear, completely fluorinated alkanes;

(ii) Cyclic, branched, or linear, completely fluorinated ethers with no unsaturations;

(iii) Cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and

(iv) Sulfur containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine.

(2) For purposes of determining compliance with emissions limits, VOC will be measured by the test methods in the approved State implementation plan (SIP) or 40 CFR part 60, appendix A, as applicable. Where such a method also measures compounds with negligible photochemical reactivity, these negligibility-reactive compounds may be excluded as VOC if the amount of such compounds is accurately quantified, and such exclusion is approved by the enforcement authority.

(3) As a precondition to excluding these compounds as VOC or at any time thereafter, the enforcement authority may require an owner or operator to provide monitoring or testing methods and results demonstrating, to the satisfaction of the enforcement authority, the amount of negligibly-reactive compounds in the source's emissions.

(4) For purposes of Federal enforcement for a specific source, the EPA shall use the test methods specified in the applicable EPA-approved SIP, in a permit issued pursuant to a program approved or promulgated under title V of the Act, or under 40 CFR part 51, subpart I or appendix S, or under 40 CFR parts 52 or 60. The EPA shall not be bound by any State determination as to appropriate methods for testing or monitoring negligibly-reactive compounds if such determination is not reflected in any of the above provisions.

(5) [Reserved]

(6) For the purposes of determining compliance with California's aerosol coatings reactivity-based regulation, (as described in the California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 8.5, Article 3), any organic compound in the volatile portion of an aerosol coating is counted towards that product's reactivity-based limit. Therefore, the compounds identified in paragraph (s) of this section as negligibly reactive and excluded from EPA's definition of VOCs are to be counted towards a product's reactivity limit for the purposes of determining compliance with California's aerosol coatings reactivity-based regulation.

(7) For the purposes of determining compliance with EPA's aerosol coatings reactivity based regulation (as described in 40 CFR part 59 - National Volatile Organic Compound Emission Standards for Consumer and Commercial Products) any organic compound in the volatile portion of an aerosol coating is counted towards the product's reactivity-based limit, as provided in 40 CFR part 59, subpart E. Therefore, the compounds that are used in aerosol coating products and that are identified in paragraphs (s)(1) or (s)(5) of this section as excluded from EPA's definition of VOC are to be counted towards a product's reactivity limit for the purposes of determining compliance with EPA's aerosol coatings reactivity-based national regulation, as provided in 40 CFR part 59, subpart E.