Enhanced Regulatory Outreach Program
Maricopa County Air Quality Department

Notice of Stakeholder Workshop

AQ-2015-005-Rule 336: Surface Coating Operations

Date: Thursday, December 17, 2015
Location: 1001 North Central Avenue, Floor 5 Classroom*

The Maricopa County Air Quality Department (department) will conduct a Stakeholder Workshop to discuss proposed revisions to AQ-2015-005-Rule 336: Surface Coating Operations. Since the last workshop, the department has restructured Rule 336 into three separate rules. The three draft rules to be discussed during this workshop are attached to this announcement and are listed below along with proposed presentation times:

Rule 336: Miscellaneous Surface Coating Operations	*1:00–2:00 p.m.*
Proposed Rule 357: Miscellaneous Industrial Adhesives	*2:15–3:15 p.m.*
Proposed Rule 356: Polyester Resin Operations	*3:30–4:30 p.m.*

The department will also discuss the items/questions that were raised at the previous workshop conducted on September 3, 2015:

- Do manufacturing of fiberglass "add on" boat parts and/or after-market devices belong in the rule?
- Is there a distinction between industrial adhesives used for manufacturing and adhesives used for maintenance purposes?
- Are industrial adhesives regulated in another county rule or are adhesives addressed only in New Rule 357?
- Are sources being asked to track adhesive use in their maintenance departments?
- Are caulking tubes exempt?
- Is it necessary to track use of aerosol can for the exemption?
- How are the NESHAPS and MACT standards compared to the limits in these operations?
- How are the surface coating limits changing?
- Will the department require the 0.21 lbs. per gallon limit for solvent cleaning operations?
- Do spray-gun cleaning requirements apply to polyester resin operations for touch-up and repair?
- Will there be a transition schedule for the new rule limits?
- Be more specific as to when exemptions apply to the whole rule or just to specific parts of the rule.
- Explain surface coating operations for maintenance purposes.
- Clarify low-usage facility if less than 55 gallons per year for surface coating are used.

Additional information is available on the Enhanced Regulatory Outreach Program (EROP) website (www.maricopa.gov/regulations).

The Stakeholder Workshop is an informal meeting for all interested parties, is free of charge and no advance registration or RSVP is required. If you would like to remotely attend this workshop, please log-on to join my meeting from your computer, tablet or smartphone by clicking the following link https://global.gotomeeting.com/join/894853765. To participate in the discussion, dial in using your phone. Call +1 (872) 240-3412 using access code: 894-853-765

*If you will be attending this workshop in-person, when you arrive at 1001 North Central Avenue, please check-in in Suite #125 then proceed to the Floor 5 Classroom. Thank you for participating in the rulemaking process.

Maricopa County Air Quality Dept.
Planning & Analysis Division
1001 N. Central Ave. Ste. 125
Phoenix, AZ 85004

~~Revised 07/13/88~~
~~Revised 09/21/92~~
~~Revised 06/19/96~~
~~Revised 04/07/99~~
~~Revised 09/25/13~~

Revised 07/13/1988; Revised 09/21/1992; Revised 06/19/1996; Revised 04/07/1999; Revised 09/25/13; **Revised MM/DD/YY**

MARICOPA COUNTY
AIR POLLUTION CONTROL REGULATIONS

REGULATION III – CONTROL OF AIR CONTAMINANTS

RULE 336
SURFACE COATING OPERATIONS

SECTION 100 – GENERAL

101 **PURPOSE:** To limit the emission of volatile organic compounds (VOCs) from surface coating operations.

102 **APPLICABILITY:** This rule applies to coating operations listed in Sections 102.1 through 102.4 of this rule, ~~Table 1 of this rule~~ that are not more specifically regulated by another rule within Maricopa County Rules 300 to 359 of Regulation III. ~~Examples of coating operations not regulated by this rule appear~~ as listed in ~~subsection 305.1.~~ Section 104 of this rule.

102.1 Surface-coating activities regulated under this rule include, but are not limited to, the application of coating, coating preparation/mixing at the facility applying the coating, and the cleanup of coating application equipment.

102.2 ~~Subsections 305.2~~ Sections 103 through ~~305.7~~ 105 of this rule, set forth partial or conditional exemptions for certain materials or uses employed by a surface coating operation subject to this rule.

102.3 **Pleasure Craft Surface Coating**: The application of surface coatings on fiberglass and metal recreational boats (pleasure craft: Section 259) or their parts and components, for the purpose of refinishing, repairing, modifying or manufacturing such craft.

~~102.3 This rule is not applicable to coatings having a VOC content, minus exempt compounds, of less than 0.15 lb VOC/gal (18g/L) nor to solvents having a VOC content of material less than 0.15 lb VOC/gal.~~

~~102.4~~ **102.4** ~~**NSPS & NESHAP:**~~ In addition to this rule, facilities may be subject to New Source Performance Standards (NSPS) in Rule 360 and/or to National Emission Standards for Hazardous Air Pollutants (NESHAP) in Rule 370 of these Rules and Regulations.

103 **EXEMPTIONS AND BURDEN OF PROOF:** The owner or operator claiming a total exemption under Sections 103.1 throught103.4 of this rule, shall document the type and quantity of VOC containing materials used and keep records according to Section 501 of this rule to justify the exemption status.

103.1 **Low VOC Content Usage:** This rule is not applicable to coatings having a VOC content, minus exempt compounds, of less than 0.15 lb VOC/gal (18g/L) nor to solvents having a VOC content of material less than 0.15 lb VOC/gal.

103.2 **Low VOC Usage Surface Coating Facility:** This rule is not applicable to facilities with VOC emissions from all miscellaneous metal product and plastic parts surface coating operations, including related cleaning activities that does not exceed 15 lb/day (6.8 kg/day) or an equivalent level of 2.7 tons per 12-month rolling period, before use of controls.

103.3 **Low VOC Usage Pleasure Craft Facility :** This rule is not applicable to Pleasure Craft facilities that use 3 gallons per day or less than sixty-six (66) gal. per calendar month of coating, as applied, for touch-up coatings, and repair coatings, including VOC containing materials added to the original coating as supplied by the manufacturer.

103.4 **Leak-Preventing Materials**:

a. Sealants, caulking, and similar materials used on the following substrates for the primary purpose of leak prevention are exempt for this Rule but may be subject to Rule 357: Miscellaneous Industrial Adhesives of these rules:

(1) Non-metallic substrates; and

(2) Used substrates, post manufacture, such as, but not limited to, old joints and seals on pipe and valve assemblies.

b. **Certain Joint Fillers:** Caulking and beaded sealants used to fill gaps or to fill joints between surfaces are exempt from this rule, except those used in manufacturing other metal parts and products as defined in Section 248 of this rule, or in the manufacturing of cans.

104 **TOTAL CATEGORICAL EXEMPTIONS:** This rule does not apply to the following operations:

104.1 Aerospace coating operations (Rule 348).

104.2 Architectural coatings including buildings and erected structures (Rule 335).

104.3 ~~Cleaning: VOC loss from cleaning or stripping a surface for coating or other purpose is regulated by Rule 331~~. Solvent Cleaning (Rule 331)

104.4 Marine vessel exterior refinishing.

104.5 Polyester Resin Operations (Rule 356)

104.6 Printing and graphic arts coating (Rule 337).

104.7 Semiconductor manufacturing (Rule 338).

104.8 Coating or refinishing a highway vehicle or mobile equipment (Rule 345).

104.9 ~~Wood:~~ Coating wood furniture and fixtures (Rule 342).

104.10 Coating wood millwork (Rule 346).

104.11 Miscellaneous Industrial Adhesives (Rule 357)

105 **PARTIAL EXEMPTIONS:**

105.1 **Extreme Performance Coatings:** Extreme performance coatings are exempt from the VOC limits in ~~1~~ Tables 336-1 through 336-7 of this rule but not from any other Sections of this Rule when used under the following conditions:

a. Used on internal combustion engine components that are normally above 250°F (121°C) during use; or

b. Used at temperatures above 250°F (121°C) on items that are both included under the ~~SIC (Standard Industrial Classificiation)~~ North American Industry Classifications System (NAICS) codes ~~3661,3663,3669,3677,3678,3679,or~~ ~~3769~~ 334210, 334220, 334290, 334416, 334417, 334418, 334419, 334310 or 336419 and are electronic products in space vehicles and/or are communications equipment. The US Government Printing Office" Standard Industrial Classification Manual, 1987"(and no future editions) is incorporated by reference and is on file at the Maricopa County Air Quality Department, Suite 125 1001 N. Central Avenue, Phoenix, Arizona 85004.

105.2 **Stencil coatings;** Stencil coatings (Section 275) are exempt used on the following substrates but still shall comply with the work practices listed in Sections 303, and 304 and the recordkeeping provisions listed in Section 500 of this rule:

a. When used to coat metal parts, are exempt from the VOC limits listed in Section 301, and the application methods listed in Section 302 of this rule;

b. When used to coat clear or transparent substances or plastic parts , are exempt from the VOC limits listed in Section 301 but are still required to comply with the applications methods listed in section 302 of this rule.

105.3 ~~**Spray Gun and VOC Limit**~~ **Miscellaneous Exemptions:** The following ~~application methods~~ coatings or operations are exempt from the:

a. VOC limits listed in Tables 336.-1 1through 336-7 of this rule;

b. the Emissions control System (ECS) requirements in Section 305 of this rule;and

c. the application methods listed in Section 302 of this rule, but shall comply with

d. the work practices listed in Sections 303 and 304; and

e. the recordkeeping provisions listed in Section 500.

f. Aerosol Can Spray-Coating; or

g. Touch up or repair coating operations as defined in Sections ~~250~~ 269 and ~~240~~ 283 of this rule; or

h. ~~Low usage~~ Coatings, listed in Tables 336-1through 336-7 ,which in aggregate of all formulations do not exceed 55 gallons (208 liters) per year facility-wide if the owner or operator updates usage-records of these coatings on each day of their use, according to Section ~~501.2~~ 501.4 (b);or

i. **Small surface-coating source (SSCS) Section 273 of this rule:**

(1) For such a facility that does not have either a 15 lbs.VOC/day or a 2 tons VOC/year emission limit in a Maricopa County Air ~~Pollution~~ Quality Permit for processes regulated by this rule, an owner or operator may retain the exemption if s/he agrees in writing to enforceable permit conditions that establish these or stricter limits.

(2) However, a facility that violates its permit limit of either 15 lbs. VOC/day or 2 tons VOC/year for coating process regulated by this Rule 336 is permanently subject to the limits of ~~subsections 301.1 and 301.2 and Section 302~~ Tables 336-1through 336-7of this rule, the ECS requirements in Section 305 of this rule and the work practices in Sections 303, and 304 of this rule.

e. A Quality Class Q protective coating that is used on equipment, structures, and/or components within a containment facility of a nuclear power plant and is approved in accordance with either ~~ANSI standards~~ American Society of Testing Materials Standards ~~N101.2 and N101.4 or with ASTM standards D3911 and D3843~~(ASTM) D5144-00, D3911-03, or D3843-00.

105.5 **Low Usage Allowance for Restricted Guns:** An owner or operator may employ spray guns otherwise prohibited by Section 302 of this rule for use with coatings over 2 lbs. VOC/gal under the following limited conditions:

a. If VOC emissions from the finishing application station are captured and directed to an ECS complying with the provisions of Section 305 of this rule; or

b. To coat the inside of pipes and tubes with a wand-style applicator;or

c. Using an airbrush or other small gun that has a reservoir capacity not exceeding 250 cc (8.8 fluid ounces) and is used solely for detailing, lettering, touchup, and/or repair.

SECTION 200 – DEFINITIONS: For the purpose of this rule, the following definitions shall apply, in addition to those definitions found in Rule 100 (General Provisions and Definitions) of these rules. In the event of any

inconsistency between any of the Maricopa County air pollution control rules, the definitions in this rule take precedence.

201 **ADHESIVE -** A material used for the primary purpose of bonding two or more surfaces together.

202 ~~**AEROSOL CAN** – A non-refillable hand-held container from which a product is dispensed by means of pressurized propellant packaged within the container.~~

203 **AEROSOL CAN-SPRAY COATING:** A coating which is sold in a hand-held, pressurized, non-refillable container, of less than 22 fluid ounces (0.66 liter) capacity, and which is expelled from the container in a finely divided form when a valve on the container is depressed.s

204 **AIR-DRIED COATING –** A coating which is dried by the use of air or forced warm air at temperatures up to and including 200°F (93.3°C).

205 **ANTIFOULANT COATING:** This is any coating applied to the underwater portion of a pleasure craft to prevent or reduce the attachment of biological organisms, and registered with the United States Environmental Protection Agency (EPA) as a pesticide under the Federal Insecticide, Fungicide, and Rodenticide Act (7 United States Code Section 136).

206 **BAKED COATING –** A coating that is dried or cured in an oven in which the oven temperature exceeds 200°F (93.3°C).

207 **BUSINESS MACHINE:** A device that uses electronic or mechanical methods to process information, perform calculations, print or copy information, or convert sound into electrical impulses for transmission, such as:

207.1 Products classified as typewriters under SIC Code 3572;

207.2 Products classified as electronic computing devices under SIC Code 3573;

207.3 Products classified as calculating and accounting machines under SIC Code 3574;

207.4 Products classified as telephone and telegraph equipment under SIC Code 3661;

207.5 Products classified as office machines, not elsewhere classified, under SIC Code 3579; and (6) Photocopy machines, a subcategory of products classified as photographic equipment under SIC code 3861.

208 **CAMOUFLAGE COATING –** A coating used, principally by the military, to conceal equipment from detection.

~~**205**~~ **209** **CAN COATING –** Any coating either used in the production of metal cans applied to the surface(s) of formed cans or applied at a can making facility to the surface(s) of flat metal sheets or strips that are formed there into cans.

~~**206**~~ **210** **CAN PRINTING INK –** A fluid or viscous formulation used in can printing that imparts design, pattern, and/or alphanumeric symbols to a can.

~~**207**~~ **211** **CLEAR COAT –** Any coating which lacks color or opacity or is transparent.

XXX **CLEAR WOOD FINISHES:** These are clear and semi-transparent coating layers applied to wood substrates to provide a transparent or translucent film.

212 **COATING APPLICATION EQUIPMENT –** Any spray gun, wand, rollers, brushes or any other means used to apply or cover a surface with a coating for either beauty, protection or other purposes

~~208~~ 213 **COIL COATING –** Any coating applied to the surface(s) of flat metal sheets or strips that are formed into rolls or coils not used to make cans.

214 Containers" include but are not limited to drums, buckets, cans, pails, and trays.

~~209~~ 215 **DAY –** A period of 24 consecutive hours beginning at midnight.

216 **DRUM –** A cylindrical metal shipping container larger than 12 gallons capacity but no larger than 110 gallons capacity.

217 **ELECTRIC DISSIPATING COATING –** A coating that rapidly dissipates a high-voltage electric charge.

~~210~~ 215 **ELECTROSTATIC ~~SPRAY~~/SYSTEM –** A method of applying atomized paint by electrically charging the coating and the object being coated with opposing charges. A higher proportion of the coating reaches and coats the object than would occur in the absence of a charge.

~~211~~ 216 **EMISSION CONTROL SYSTEM (ECS) –** A system, approved in writing by the Control Officer, designed and operated in accordance with good engineering practice to reduce emissions of volatile organic compounds. Such system consists of an emissions collection subsystem and an emissions processing subsystem.

~~212~~ 217 **END SEALING COMPOUND –** A compound which is coated onto can ends and functions as a gasket when the end is attached to the can.

218 **ETCHING FILLER** – A coating that contains less than 23 percent solids by weight and at least ½ percent acid by weight, and is used instead of applying a pretreatment coating followed by a primer.

~~213~~ 219 **EXEMPT EVAPORATING COMPONENTS (EXEMPT COMPOUNDS) –** The non-VOC, evaporating portion of a coating formulation; this necessarily includes all non-precursor organic compounds as defined in Rule 100 of these Rules and Regulations, as well as water and other inorganic liquids and gases.

~~214~~ 220 **EXTERIOR CAN BASECOAT –** Any coating applied to the exterior of a can to provide protection for the metal or to provide background for any lithographic or printing operation.

221 **EXTREME HIGH-GLOSS COATING –** A coating which when tested by the American Society for Testing Material Test Method D-523 adopted in 1980, shows reflectance of 75 or more on a 60° meter.

~~215~~ 222 **EXTREME-PERFORMANCE COATING –** A coating used on a surface where the coated surface in its intended use is at temperatures consistently in excess of 250°F (121°C). Extreme performance coatings include but are not limited to, coatings applied to locomotives, railroads cars, farm machinery, and heavy duty vehicles.

~~216~~ 223 **FABRIC –** A textile material. Non-manufactured items from nature are not fabric except for natural threads, fibers, filaments, and similar that have been manufactured into textile fabric.

~~217~~ 224 **FABRIC COATING –** Any decorative or protective coating or reinforcing material applied onto or impregnated into textile fabric.

225 **FILLER:** A relatively non-adhesive substance added to an adhesive to improve its working properties, permanence, strength, or other qualities.

~~218~~ 226 **FILM COATING –** Any coating applied in a web coating process on film substrate other than paper or fabric, including, but not limited to, typewriter ribbons, photographic film, magnetic tape, and metal foil gift wrap.

227 **FINISH PRIMER/ SURFACER –** A coating applied with a wet thickness film of 10 mils prior to the application of a topcoat for purposes of providing corrosion resistance, adhesion of subsequent coatings, a moisture barrier, or promotion of a uniform surface necessary for filling in surface imperfections.

228 **FLEXIBLE COATING –** Any coating that is required to comply with engineering specifications for impact resistance, mandrel bend, or elongation as defined by the original equipment manufacturer.

~~219~~ **229** **FLEXIBLE PLASTIC PART OR PRODUCT –** A plastic part or product designed to withstand significant deformation without damaging it for its intended use. Not included are flexible plastic parts that are found on a can, coil, metal furniture, or large appliance, or that are already a part of an aerospace component, highway vehicle, mobile equipment, architectural building or structure, or a previously coated marine-vessel.

230 **GEL COAT –** A thermosetting polyester resin surface coating, either pigmented or clear, that provides a cosmetic enhancement and improves resistance to degradation from exposure to the elements.

231 **GLOSS REDUCER –** A coating that is applied to a plastic part solely to reduce the shine of the part and is applied at a thickness of less than or equal to 0.5 mils of coating solids.

232 **HAND APPLICATION METHODS**: Application of coatings by non-mechanical, hand-held equipment including but not limited to paint brushes, hand rollers, caulking guns, trowels, spatulas, syringe daubers, rags, and sponges.

233 **HEAT-RESISTANT COATING –** A coating that must withstand a temperature of at least 400° during normal use.

234 HIGH BUILD PRIMER/SURFACER is a coating applied with a wet film thickness of 10 mils or more prior to the application of a topcoat for purposes of providing corrosion resistance, adhesion of subsequent coatings, or a moisture barrier, or promoting a uniform surface necessary for filling in surface imperfections.

235 HIGH GLOSS COATING is any coating which achieves at least 85 percent reflectance on a 60o meter when tested by ASTM D 523-89.

236 **HIGH-TEMPERATURE COATING –** A coating that is certified to withstand a temperature of 1000°F for 24 hours.

~~220~~ **277** ~~**HEAT SENSITIVE MATERIAL** Materials which cannot consistently be exposed to temperatures greater than 203°F (95°C) without materially affecting desired function, performance, or other characteristics~~ **HIGH VOLUME-LOW PRESSURE SPRAY EQUIPMENT –** Spray Equipment used to apply coatings which is designed to be operated and is operated between 0.1 and 10.0 pounds per square inch gauge (psig) air pressure measured dynamically at the center of the air cap and at the air horns.

~~221~~ **238** **HIGHWAY VEHICLE –** Any vehicle that is physically capable of being driven upon a highway including, but not limited to, cars, pickups, vans, trucks, truck-tractors, motor-homes, motorcycles, and utility vehicles.

~~222~~ **239** **INTERIOR BASECOAT –** Any coating applied to the interior of a can to provide a protective lining between the intended contents and the metal shell of the can.

~~223~~ **240** **INTERIOR BODY SPRAY –** Any coating sprayed onto the interior of a can to provide a protective film between the intended contents and the metal shell of the can.

241 in use" or "handled ": actively engaging the materials with activities such as mixing, depositing, brushing, rolling, padding, wiping or removing or transferring material into or out of the container. Immediately after the operation is completed, the container shall be closed.

~~224~~ **242** **LARGE APPLIANCE –** A door, case, lid, panel, or interior support part of residential and commercial washers, dryers, ranges, refrigerators, freezers, water heaters, dishwashers, trash compactors, air conditioners, evaporative coolers, and other similar products.

~~225~~ 243 **LOW PRESSURE SPRAY GUN –** An air-atomized spray gun that, by design, functions best at tip pressures below 10 psig (516 mm Hg), measured according to Section 503.1d of this rule, and for which the manufacturer makes no claims to the public that the gun can be used effectively above 12 psig (619 mm Hg).

244 **MARINE VESSEL –**Any tugboat, tanker, freighter, passenger ship, barge, or other boat, ship or watercraft except those used primarily for recreation. This includes both salt water and fresh water vessels.

~~226~~ 245 **METAL FURNITURE –** Any furniture made of metal or any metal part which will be assembled with other parts made of metal or other material(s) to form a furniture piece.

246 **METALLIC COATING –** A coating which contains more than 5 grams of metal particles per liter of coating as applied.

247 **MILITARY SPECIFICATION COATING –** A coating that has a formulation that has been approved by a United States Military Agency for use on military equipment.

~~227~~ 248 **MINUS EXEMPT COMPOUNDS or MINUS EXEMPT EVAPORATING COMPONENTS –** See VOC Content Minus Exempt Compounds.

249 **MIRROR BACKING COATING –** Any coating applied onto the silvered surface of a mirror.

~~228~~ 250 **MOBILE EQUIPMENT** – Any equipment that is physically capable of being driven or drawn upon a highway including, but not limited to, the following types of equipment: construction vehicles (such as mobile cranes, bulldozers, concrete mixers); farming equipment (wheel tractor, plow, pesticide sprayer); hauling equipment (truck trailers, utility bodies, camper shells); and miscellaneous equipment (street cleaners, mopeds, golf carts).

251 **MOLD-SEAL COATING –** The initial coating applied to a new mold or a repaired mold to provide a smooth surface which, when coated with a mold release coating, prevents products from sticking to the mold.

~~229~~ 252 ~~**NON-PRECURSOR ORGANIC COMPOUND –** Any of the organic compounds which have been designated by the EPA as having negligible photochemical reactivity. EPA designates such compounds as "exempt". A listing of these compounds is found in Rule 100.~~**MULTI-COMPONENT COATING –** A coating requiring the addition of one or more separate reactive resins, commonly known as catalysts or hardeners, prior to application to form an acceptable dry film.

~~230~~ 253 ~~**ORGANIC COMPOUND** – Any compound of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, carbonates, and metallic carbides.~~ **ONE-COMPONENT COATING –** Any coating that is ready for application as it comes out of its container to form an acceptable dry film. A thinner or reducer, necessary to reduce the viscosity, is not considered a component.

254 **OPTICAL COATING –** A coating applied to an optical lens.

~~231~~ 255 **OTHER METAL PARTS AND PRODUCTS –** Any metal part or product, excluding the following items that are made of metal: can, coil, furniture, large appliance, aerospace component, metal foil, metal textile fabric, semiconductor metal, highway vehicle, mobile equipment, an architectural building or structure, a previously coated marine-vessel.

~~232~~ 256 **OVERVARNISH –** Any coating applied to a can to reduce the coefficient of friction, to provide gloss, or to protect the finish against abrasion and/or corrosion.

257 **PAN BACKING COATING –** A coating applied to the surface of pots, pans, or other cooking implements that are exposed directly to a flame or other heating element.

~~233~~ 258 **PAPER COATING –** Any coating applied on or impregnated into paper, including, but not limited to, adhesive tapes ~~and labels~~, book covers, post cards, office copier paper, and drafting paper ~~and pressure sensitive tapes~~.

~~234~~ 259 **PLASTIC –** Substrates containing one or more resins and may be solid, porous, flexible, or rigid. Plastics include fiber reinforced plastic composites. Any solid, synthetic: resin, polymer, or elastomer, except rubber. For the purposes of this rule, plastic film is considered film; fabric and paper made of polymeric plastic fibers are considered fabric and paper, respectively.g

260 **PLEASURE CRAFT –** Vessels which are manufactured or operated primarily for recreational purposes, or leased, rented, or chartered to a person or business for recreational purposes. The owner or operator of such vessels is responsible for certifying that the intended use is for recreational purposes.

261 **PLEASURE CRAFT COATING –** Any marine coating, except unsaturated polyester resin (fiberglass) coatings, applied by brush, spray, roller, or other means to a pleasure craft.

~~235 **POLYESTER AND POLYESTER RESIN** – A complex, polymeric ester containing difunctional acids. Polyester resins can be isophthalic, orthophthalic,halogenated,bisphenol A, vinyl ester, furans, cross-linking agents, catalysts, gel coats, inhibitors, accelerators, promoters and any other material containing VOC used in polyester resin operations.~~

~~236 **POLYESTER COMPOSITE** – Cured material made of polyester resin with reinforcing material imbedded in it, such as glass fibers.~~

262 **PREFABRICATED ARCHITECTURAL COMPONENT COATING –** A coating applied to metal parts and products which are to be used as an architectural structure.

263 **PRESSURE SENSITIVE LABEL –** A flexible strip of paper or other material that is coated on one side with a permanently tacky adhesive which will adhere to a variety of surfaces with light pressure.

264 **PRESSURE SENSITIVE TAPE –** A flexible backing material with a pressure-sensitive adhesive coating on one or both sides of the backing such as duct tape, duct insulation tape and medical tape.

265 **PRETREATMENT COATING –** A coating which contains no more than 12 percent solids by weight, and at least 1/2 percent acid, by weight, is used to provide surface etching, and is applied directly to metal surfaces to provide corrosion resistance, adhesion and ease of stripping.

266 **PRETREATMENT WASH PRIMER –** A coating which contains no more than 12 percent solids, by weight, and at least 1/2 percent acids, by weight; is used to provide surface etching; and is applied directly to fiberglass and metal surfaces to provide corrosion resistance and adhesion of subsequent coatings.

~~237~~ 267 **PRIMER –** A coating applied directly to substrate for any one or combination of the following purposes: corrosion prevention, protection from the environment, functional fluid resistance, or adhesion of subsequent coatings.

~~238~~ 268 **QUALITY CLASS Q –** Any system, structure, coating or other component which, if defective or inoperable, could cause or increase the severity of a nuclear incident, thereby imposing undue risk to the health and safety of the public.

~~239~~ 269 **REFINISHING –** Recoating a used object's surface which arrives at the refinisher with a coating or with a previous coating worn away by use.

~~240~~ 270 **REPAIR COATING –** A coating or coating operation used to recoat the portion of a completed finish that suffered post-production damage at the facility where the finish was applied.

~~241~~ 271 **RESTRICTED SPRAY GUN –** Any air-atomizing spray gun that is not a low pressure spray gun, and any other coating gun that is not on the list in ~~Section 303.1~~Section 302 of this rule.

272 **SHOCK-FREE COATING –** A coating applied to electrical components to protect the user from electric shock. The coating has characteristics of being of low capacitance and high resistance, and having resistance to breaking down under high voltage.

~~242~~ 273 **SILICONE RELEASE COATING –** Any resin coating the major cured portion of which is silicone resin, having as its primary function the release of food products from metal surfaces such as baking pans.

~~243~~ 274 **SMALL SURFACE COATING SOURCE (SSCS) –** A facility from which the total VOC emissions for all surface coating operations that are subject to this rule without, or prior to, any emission control, is less than 15 pounds (6.8 kg) per day and less than 2 tons (1814 kg) per year; as demonstrated by both adequate records of coating and diluent use (~~pursuant~~ according to Section ~~501.2~~ 501.4 of this rule) and a separate tally of the number of days each month that such coating operations occur.

275 **SOLAR-ABSORBENT COATING –** A coating which has as its prime purpose the absorption of solar radiation.

276 **STENCIL COATING –** An ink or a coating which is rolled or brushed onto a template or stamp in order to add identifying letters, symbols and/or numbers.

~~244~~ 277 **STRIPPABLE BOOTH COATING –** A temporary coating that is applied to spray booth surfaces to receive the overspray and protect the surfaces, and which is designed to readily be pulled off the substrate in strips or sheets, and disposed of.

~~245~~ 278 **SURFACE COATING –** Any liquid, fluid, or mastic composition which is converted to a solid (or semi-solid) protective, decorative, or adherent film or deposit after application as a thin layer. Surface coating is generally distinct and different from impregnation and from applying adhesive for bonding purposes.

~~246~~ 279 **SURFACE COATING OPERATION –** Preparation, handling, mixing, and application of surface coating, and cleanup of application-equipment and enclosures at a facility where surface coating is applied.

280 **SURFACE PREPARATION:** The cleaning of metal parts and products prior to coating, further treatment, sale, or intended use. Solvent Cleaning Operations, are not subject to the surface preparation standards in this Rule.

~~247~~ 281 **THREE-PIECE CAN SIDE-SEAM ~~COAT~~ SPRAY COATING –** Any coating sprayed onto the interior and/or exterior of a can body seam on a three-piece can to protect the exposed metal.

~~248~~ 282 **TOPCOAT –** The final, permanent, coating-formulation that completed the finish on a surface.

~~249~~ 283 **TOTAL VOC VAPOR PRESSURE (VOC COMPOSITE PARTIAL PRESSURE) –** The sum of the partial pressures of the compounds defined as VOCs, calculated according to the formula in Section 504 of this rule.

~~250~~ 284 **TOUCH-UP COATING –** A coating used to cover minor coating imperfections after the main coating operation. This includes touch-up coating that accompanies the purchase of an object already coated with that coating.

285 **TRANSFER EFFICIENCY –** The ratio of the weight of coating solids adhering to the part being coated to the weight of coating solids used in the application process expressed as a percentage.

~~251~~ 286 **TWO-PIECE CAN EXTERIOR END ~~COAT~~ COATING –** Any coating applied to the exterior end of a can to provide protection to the metal.

287 **VACUUM-METALIZING COATING –** The undercoat applied to the substrate on which the metal is deposited or the overcoat is applied directly to the metal film. Vacuum metalizing/ physical vapor deposition (PVD) is the process whereby the metal is vaporized and deposited in a substrate in a vacuum chamber.

~~252~~ **288** **VINYL COATING (COATING ON VINYL) –** Any decorative or protective coating or reinforcing coating applied over vinyl-coated textile fabric or vinyl sheets

~~253~~ **289** ~~**VOC-BORNE COATING** – A coating that contains more VOC than water, by weight.~~ **VOC -CONTAINING MATERIAL –**Any chemical or item that contains an organic compound that participates in atmospheric photochemical reactions, except the non-precursor organic compounds. This includes but is not limited to rags, waste coatings, waste brushes, waste rollers, waste applicators, waste solvents, and their residues that are used for surface preparation, cleanup or removal of surface coatings.

~~254~~ ~~**VOC-BORNE DILUENT** – A solvent or other diluent that contains more VOC than water, by weight~~

~~255~~ **290** **VOC CONTENT –** In this rule, VOC content is determined by one of the following two formulas: To determine compliance with the VOC limits in Section 301, Tables 336.1-336.3 of this rule or the 2.0 lb VOC/gal threshold in Section 302 of this rule, use the following formula in Section ~~255.1~~ 284.1 of this rule. For other purposes, use the formula in Section ~~255.2~~ 284.2 of this rule:

~~255.1~~ **290.1** **VOC CONTENT MINUS EXEMPT COMPOUNDS** (is the same as **VOC CONTENT MINUS EXEMPT EVAPORATING COMPONENTS**) (also known as **"THE EPA METHOD 24 VOC CONTENT"** on manufacturer's data sheets.)

VOC Content Minus Exempt Compounds = $\frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$

Using consistently either English or metric measures in the calculations, where: W_s = weight of all volatile material in pounds (or grams), including VOC, water, non-precursor organic compounds and dissolved vapors

W_w =weight of water in pounds (or grams)

W_{es} =weight of all non-precursor compounds in pounds (or grams)

V_m =volume of total material in gallons (or liters)

V_w =volume of water in gallons (or liters)

V_{es} =volume of all non-precursor compounds in gallons (or liters)

~~255~~**290.2** **VOC CONTENT OF MATERIAL (MATERIAL VOC-CONTENT)**

VOC Content of Material = $\frac{W_s - W_w - W_{es}}{V_m}$

Using consistently either English or metric measures in the calculations,

where: W_s = weight of all volatile material in pounds (or grams) including VOC, water, non-precursor organic compounds and dissolved vapors

W_w =weight of water in pounds (or grams)

W_{es} =weight of all non-precursor compounds in pounds (or grams)

V_m =volume of total material in gallons (or liters)

~~**256** **VOLATILE ORGANIC COMPOUND (VOC)** – Any organic compound which participates in atmospheric photochemical reactions, except non-precursor organic compounds.~~

SECTION 300 – STANDARDS

301 **Miscellaneous Surface Coatings:** A person shall comply with one of the following for all applications of surface coatings:

301.1 Meet the limits in ~~Table 1~~ Tables 336-1 through 336-7 of this rule.

301.2 ~~Operate an ECS in accordance with subsection 306. when applying a coating that exceeds the VOC limits in Table 1.~~ **Emissions Control System (ECS) Use In Lieu Of Meeting VOC Limits; Equipment and Work Practice:** In lieu of meeting VOC limits, equipment or work practice standards within Sections 301.1, 302, 303, or 304, an owner or operator is allowed to instead use an ECS that has a capture and control efficiency not less than 90% and meets ECS requirements in Section 305.

301.3 Qualify for an exemption under ~~Section 305~~ Sections 103; 104; or 105 of this rule.

~~**TABLE 1**~~

~~**SURFACE COATING EMISSION LIMITS**~~		
~~TYPE OF SURFACE COATING~~	~~LIMITS AS APPLIED: VOC content minus exempt compounds (see subsection 255.1)~~	
~~**Column I**~~	~~**Column II**~~ ~~lbs/gal~~	~~g/liter~~
~~**Can Coating**~~		
~~Sheet Basecoat (Exterior and Interior) and Overvarnish~~	~~2.8~~	~~340~~
~~Two-Piece Can Exterior (Basecoat and Overvarnish)~~	~~2.8~~	~~340~~
~~Two and Three-Piece Can Interior Body Spray~~	~~4.2~~	~~510~~
~~Two-Piece Can Exterior End (Spray or Roll Coat)~~	~~4.2~~	~~510~~
~~Three-Piece Can Side-Seam Spray~~	~~5.5~~	~~660~~
~~End Sealing Compound~~	~~3.7~~	~~440~~
~~Can Printing Ink~~	~~2.5~~	~~300~~
~~**Coil Coating (any coat)**~~	~~2.6~~	~~310~~
~~**Metal Furniture Coating**~~	~~3.0~~	~~360~~
~~**Large Appliance Coating**~~	~~2.8~~	~~340~~
~~**OTHER METAL PARTS AND PRODUCTS COATING** (As defined in Section 231)~~		
~~The following includes Non-adhesive Coating, Adhesive, Adhesive Primer, Caulking, and Beaded Sealants:~~		
~~**Air-Dried Coating**~~	~~3.5~~	~~420~~
~~**Baked Coating** [above 200°F (93°C)]~~	~~3.0~~	~~360~~
~~**Silicone Release Coating:** Baked or Air-Dried~~	~~3.5~~	~~420~~
~~**Fabric Coating**~~	~~2.9~~	~~350~~
~~**Film Coating**~~	~~2.9~~	~~350~~
~~**COATING PLASTIC PARTS AND PRODUCTS THAT ARE NOT DEFINED AS FLEXIBLE**~~	~~3.5~~	~~420~~
~~**COATING FLEXIBLE PLASTIC PARTS AND PRODUCTS**~~		
~~Primer~~	~~4.1~~	~~490~~
~~Color Topcoat~~	~~3.8~~	~~450~~
~~Basecoat/Clear Coat (Combined System) – Limit for either coat~~	~~4.5~~	~~540~~
~~**Paper Coating, including Adhesives**~~	~~2.9~~	~~350~~
~~**Vinyl Coating (Coating on Vinyl)**~~	~~3.8~~	~~450~~
~~**STRIPPABLE BOOTH COATINGS**~~	~~2.0~~	~~240~~

Maricopa County Air Quality Dept.
Planning & Analysis Division
1001 N. Central Ave. Ste. 125
Phoenix, AZ 85004

Table 336-1: Metal Parts and Products VOC Content Limits (less water and exempt compounds)

Coating Category	Air Dried		Baked	
	g VOC/l	lb VOC/gal	g VOC/l	lb VOC/gal
General One Component	340	2.8	280	2.3
General Multi Component	340	2.8	280	2.3
Camouflage	420	3.5	420	3.5
Electric-Insulating Varnish	420	3.5	420	3.5
Etching Filler	420	3.5	420	3.5
Extreme High-Gloss	420	3.5	360	3.0
Extreme Performance	420	3.5	360	3.0
Heat-Resistant	420	3.5	360	3.0
High Performance Architectural	740	6.2	740	6.2
High Temperature	420	3.5	420	3.5
Metallic	420	3.5	420	3.5
Military Specification	340	2.8	280	2.3
Mold-Seal	420	3.5	420	3.5
Pan Backing	420	3.5	420	3.5
Prefabricated Architectural Multi-Component	420	3.5	280	2.3
Prefabricated Architectural One-Component	0.42	3.5	280	2.3
Pretreatment Coatings	420	3.5	420	3.5
Repair and Touch Up	420	3.5	360	3.0
Silicone Release	420	3.5	420	3.5
Solar-Absorbent	420	3.5	360	3.0
Vacuum-Metalizing	420	3.5	420	3.5
Drum Coating, New, Exterior	340	2.8	0.34	2.8
Drum Coating, New, Interior	420	3.5	420	3.5
Drum Coating, Reconditioned, Exterior	420	3.5	420	3.5
Drum Coating, Reconditioned, Interior	500	4.2	500	4.2

TABLE 336 – 2 : Can and Coil Coating Limits (VOC content minus water and exempt compounds)

COATING CATEGORY	LIMITS AS APPLIED:	
	lbs/gal	g/liter
Can Coating		
Sheet Basecoat (Exterior and Interior) and Overvarnish	2.8	340
Two-Piece Can Exterior (Basecoat and Overvarnish)	2.8	340
Two and Three-Piece Can Interior Body Spray	4.2	510
Two-Piece Can Exterior End (Spray or Roll Coat)	4.2	510
Three-Piece Can Side-Seam Spray	5.5	660
End Sealing Compound	3.7	440
Can Printing Ink	2.5	300

TABLE 336 – 2 : Can and Coil Coating Limits (VOC content minus water and exempt compounds)

COATING CATEGORY	**LIMITS AS APPLIED:**	
	lbs/gal	g/liter
Coil Coating (any coat)	2.6	310
Fabric Coating	2.9	350
Film Coating	2.9	350

Table 336-3: Plastic Parts And Products VOC Content Limits(less water and exempt compounds)

Coating Category	**g VOC/liter**	**lbs VOC/gal**
General One Component	280	2.3
General Multi Component	420	3.5
Electric Dissipating Coatings and Shock-Free Coatings	800	6.7
Extreme Performance	420 (2-pack coatings)	3.5 (2-pack coatings)
Metallic	420	3.5
Military Specification	340 (1 pack) 420 (2 pack)	2.8 (1 pack) 3.5 (2 pack)
Mold-Seal	760	6.3
Multi-colored Coatings	680	5.7
Optical Coatings	800	6.7
Vacuum-Metalizing	800	6.7

Table 336-4: Business Machine Coatings (VOC Content ess water and exempt compounds)

		g VOC/liter	**lbs. VOC/ gal.**
I.	Primers	350	2.9
II.	Topcoat	350	2.9
III.	Texture Coat	350	2.9
IV.	Fog Coat	260	2.2
V.	Touchup and repair	350	2.9

Table 336 – 5: VOC Content Limits for Metal Furniture and Large Appliance Coatings (VOC content less water and exempt compounds)

Coating Type	**Baked**		**Air Dried**	
	g/l	**lb/gal**	**g/l**	**lb/gal**
General, One Component/ Large Appliances	275	2.3	275	2.3
General, Multi-Component	275	2.3	340	2.8
Extreme High Gloss	360	3.0	340	2.8
Extreme Performance	360	3.0	420	3.5
Heat Resistant	360	3.0	420	3.5
Metallic	420	3.5	420	3.5
Pretreatment Coatings	420	3.5	420	3.5
Solar Absorbent	360	3.0	420	3.5

301.4 **Paper, Film and Foil Coatings**: Coatings used in paper, film and foil surface coating (Section 224 , 251 of this rule) shall attain a 90 percent VOC control efficiency for each coating line . The options to attain the 90% control efficiency are use of:

a. Use of low -VOC content materials (Table 336-6) ; or

b. **Use of Emissions Control System (ECS) In Lieu Of Meeting VOC Limits; Equipment and Work Practice:** In lieu of meeting VOC limits , application methods and work practices within Sections 301, 302 and 304, of this rule, an owner or operator can chose to use an ECS that has a capture and control efficiency not less than 90% and meets ECS requirements in Section 305.

Table 336-6: VOC limits for Paper, Film, and Foil Surface Coating

Units	RACT Limits	
	Pressure Sensitive Tape and Label Surface Coating	Paper, Film, and Foil Surface Coating (Not including Pressure Sensitive Tape and Label)
Emission Reduction (%)	90	90
kg VOC/kg solids (lb VOC/lb solids)	0.20	0.40
kg VOC/kg coating (lb VOC/lb solids)	0.067	0.08

301.5 **Pleasure Craft Surface Coating:**

a. **Manufacturers and Suppliers:** An owner or operator selling, offering for sale, supplying for use or manufacturing for sale in Maricopa County any VOC-containing material for use in pleasure craft coating operations shall limit VOC content to the limits in Table 359-1 of this rule, less water and exempt solvents.

b. **Metal Product or Plastic Part Coating Operations – VOC Content:** An owner or operator shall not apply any coatings, including any VOC-containing materials added to the original coating supplied by the manufacturer, which contain VOC in excess of the limits specified in Table 336-7 of this rule..

TABLE 336-7
VOC Content Limits for Pleasure Craft Surface Coating

Coating category	kg VOC/l.	lbs VOC/gal.
Extreme High Gloss Topcoat	0.49 (0.60)	4.1
High Gloss Topcoat	0.42	3.5
Pretreatment Wash Primers	0.78	6.5
Finish Primer/Surfacer	0.42 (0.60)	3.5
High Build Primer Surfacer	0.34	2.8
Aluminum Substrate Anti-foulant Coating	0.56	4.7
Other Substrate Anti-foulant Coating	0.33 (0.40)	2.8
All other Pleasure craft surface coatings for metal or plastic	0.42	
Antifouling Sealer/Tie Coat (new category)	0.42	3.5

301.6 **Surface Preparation**:

No owner or operator shall use a surface preparation solvent with a VOC content that exceeds 50 g/l (0.42 lbs/gal), as applied, for surface preparation of any metal part or product unless emissions to the atmosphere are controlled to an equivalent level by an approved emission control system with an overall abatement efficiency of at least 90 percent.

302 APPLICATION METHODS FOR SURFACE COATINGS:

302.1 **Miscellaneous Surface Coatings:** ~~A person~~ An owner or operator shall ~~employ~~ use one of the following methods for all applications of surface coating containing more than 2 pounds of VOC per gallon (240 g/L) minus exempt compounds (except for pleasure craft coating operations described in Section 302.2 of this rule):

~~302.1~~ **a**. A low pressure spray gun; or

~~302.2~~ **b.** An electrostatic system; or

~~302.3~~ **c.** A system that atomizes principally by hydraulic pressure, including "airless" and "air assisted airless"; or

~~302.4~~ **d.** Non-atomizing or non-spraying application methods, such as but not limited to dipping, rolling, brushing or any hand application methods; or

e. A high-volume low pressure (HVLP) spray-gun that meets the definition of HVLP in this rule (Section XXX) and that meets the spray-gun tip pressure measurement test described in Section 503.1(d) of this rule;

~~302.5~~ **f.** **An Alternative Application Method:** Any method approved by the Administrator of the Federal EPA or the Control Officer ~~as having a~~ which achieves either an HVLP equivalent or transfer efficiency ~~of 65% or greater~~ greater than or equal to 65%, as demonstrated with the following:

(1) In accordance with the provisions of Section 503.1(d) of this rule; or

(2) As stamped on the gun by the manufacturer; or

(3) From testing documentation of the HVLP spray-gun status provided by the manufacturer.

g. **Low Usage Allowance for Restricted Guns:** Spray guns otherwise prohibited by Section 302.1(f) of this rule may be used under the following conditions:

(1) If VOC emissions are captured and directed to an ECS complying with the provisions of Section 305 of this rule; or

(2) To coat the inside of pipes and tubes with a wand-style applicator; or

(3) Using an airbrush or other small gun that has a reservoir capacity not exceeding 250 cc (8.8 fluid ounces) and is used solely for detailing, lettering, touchup, and/or repair.

302.2 **Pleasure Craft:** An owner or operator shall apply VOC-containing coatings for pleasure craft to products with equipment operated according to the equipment manufacturer specifications, and by the use of one of the following methods:

a. Electrostatic application; or

b. High-Volume, Low-Pressure Spray (HVLP); or

c. Flow coat, or

d. Roll coat, or

e. Dip-Coat; or

f. Hand Application Methods; or

g. Such other coating application methods as are demonstrated to the Control Officer to be capable of achieving a transfer efficiency equivalent or better than that achieved by HVLP Spray and for which written approval of the Control Officer has been obtained.

h. **Extreme High Gloss Coatings:** Extreme High Gloss Coatings shall be applied with the use of the hand application methods although the remaining provisions of this rule apply.

303 **CLEANUP OF APPLICATION EQUIPMENT:** ~~A person~~ An owner or operator shall comply with the following when using VOC-containing material to clean application equipment:

~~303.1~~ ~~Disassemble any spray gun and other application equipment and clean it in:~~

~~**a.** A container which remains covered at all times, except when the application equipment is being handled in the container, or transferred into or out of the container; or~~

~~**b.** A commercially-sold gun cleaning machine which shall be operated and maintained as stipulated in the Air Pollution Permit's Operation and Maintenance (O&M) Plan, or in the absence of its mention in the O&M Plan, according to manufacturer's or distributor's instructions.~~

~~303.2 **Vapor Pressure Limits:** Any person subject to this rule using VOC solvent to clean coating application equipment shall use only solvent which, as used, has a VOC vapor pressure below 35 mm Hg at 20° C (68° F), except for sprayless equipment exempted pursuant to subsection~~

303.1 Spray-Gun Cleaning Requirements:

a. An owner or operator subject to this rule shall clean spray-guns without spraying or atomizing a solvent cleaner with the gun.

b. **Spray-Gun Cleaning Machine:** An owner or operator subject to this rule shall use a spray-gun cleaning machine that complies with the following requirements unless the owner or operator complies with the manual spray-gun cleaning requirements in Section 303.2 of this rule.

(1) **Spray-Gun Cleaning Machine-General Requirements:** The spray-gun cleaning machine shall meet all of the following requirements:

(a) Be designed to clean spray-guns.

(b) Have at least one pump which drives solvent cleaner through and over the spray-gun.

(c) Have a basin which permits containment of the solvent cleaner.

(d) Be kept in proper repair and free from liquid leaks.

(e) Shall be fitted with a cover.

(f) Be located on-site where the spray application occurs.

(2) **Automatic Spray-Gun Cleaning Machine:** An automatic spray-gun cleaning machine shall meet all of the following requirements:

(a) Be self-covering or enclosing when not loading or unloading.

(b) Have a self-closing cover or other self-enclosing feature which in the cover's closed position allows no gaps exceeding 1/8 inch (3 mm) between the cover and the cabinet.

(c) Be designed and maintained to prevent operation of its mechanical cleaning feature(s) unless it is completely covered or enclosed to the gap limits specified in Section 303.3(b)(2)(b) of this rule.

(3) **Non-Automatic Remote Reservoir Spray-Gun Cleaning Machine:** A non-automatic remote reservoir spray-gun cleaning machine shall meet all of the following requirements:

(a) Drain solvent cleaner from the sink/work-space quickly into a remote reservoir when work-space is not in use.

(b) Have the machine reservoir ability to contain VOC vapors and not have a cumulative total opening, including the drain opening(s), allowing VOC-escape to the atmosphere exceeding two square inches in area.

(c) Allow a machine design in which the base of the sink/work-space functions as the reservoir's top surface, as long as the fit/seal between sink base and reservoir container allows the reservoir to meet the opening limits specified in Section 303.3(b)(3)(b) of this rule.

303.2 **Manual Spray-Gun Cleaning Requirements**: Manual cleaning of spray-guns shall comply with the following requirements:

a. Disassembled spray-guns must be cleaned by hand which consists of application of coatings by non-mechanical, hand-held equipment including but not limited to paint brushes, hand rollers, caulking guns, trowels, spatulas, syringe daubers, rags, and sponges; or

b. Disassembled spray-guns must be soaked in a vat that is closed

c. Solvent cleaners shall be less than 10 percent VOC (excluding water and non-precursor organic compounds) and shall contain less than 8.0 percent VOC by weight (including water and non-precursor organic compounds) and calculated pursuant to Section 503.3 of this rule; or

d. Solvent cleaner has a VOC-vapor pressure below 35 mm Hg at 20°C (68°F).

304 Work Practices –Handling, Disposal and Storage of VOC-Containing Material: An owner or operator of any surface coating or pleasure craft facility shall store, handle, and dispose of VOC or VOC-containing material in a way to prevent the evaporation of VOC to the atmosphere. Work practices limiting VOC emissions include but are not limited to the following:

304.1 HANDLING AND DISPOSAL OF VOC:

a. Use And Storage: A person shall cover and keep covered each VOC containing material which is not currently in use. A person shall store finishing and cleaning materials in closed or covered leak-free containers.

b. Disposal Of VOC And VOC-Containing Material: A person shall store all VOC-containing materials intended for disposal including, but not limited to, rags, waste coatings, waste brushes, waste rollers, waste applicators, waste solvents, and their residues, in closed, leakfree containers which are legibly labeled with their contents and which remain covered when not in use.

304.2 Pleasure Craft Coatings Storage, Mixing, and Handling: An owner or operator shall comply with the following work practices for storage, mixing, and handling of coatings, thinners, and coating-related waste materials.

a Waste Materials: Store all VOC-containing coatings, thinners, and coating-related waste materials such as shop towels in closed, leak free containers; and

b Containers: Ensure that mixing and storage containers used for VOC-containing coatings, thinners, and coating-related waste materials are kept closed at all times except when depositing or removing these materials; and

c Minimize spills of VOC-containing coatings, thinners, and coating-related waste materials; and

d. Convey VOC-containing coatings, thinners, and coating-related waste materials from one location to another in closed containers or pipes.

~~**305 EXEMPTIONS:**~~

~~**305.1 Categorical Exemptions:** This rule does not apply to the following operations:~~

~~**a.** Aerospace coating operations (Rule 348).~~

~~**b.** Architectural coating, including buildings and erected structures (Rule 335).~~

~~**c.** Cleaning: VOC loss from cleaning or stripping a surface for coating or other purpose is regulated by Rule 331.~~

~~**d.** Marine vessel exterior refinishing.~~

~~**e.** Polyester coatings applied to polyester composites.~~

~~**f.** Printing and graphic arts coating (Rule 337).~~

~~**g.** Semiconductor manufacturing (Rule 338).~~

~~**h.** Coating a highway vehicle or mobile equipment (Rule 345).~~

i. Wood: Coating Wood Furniture (Rule 342); Coating Wood Millwork (Rule 346).

305.2 Exemptions for Qualified Materials: Rule 336 does not apply to the following materials that meet the specific qualification(s) and limitation(s) set forth herein:

a. Leak-Preventing Materials: Sealants, adhesives, caulking, and similar materials used on the following substrates for the primary purpose of leak prevention are exempt from this rule:

(1) Non-metallic substrates; and

(2) Used substrates, post manufacture, such as, but not limited to, old joints and seals on pipe and valve assemblies.

b. Adhesive Use:

(1) Adhesive and adhesive primer applications are exempt from this rule, except for the 2 categories that appear in Table 1, namely adhesive materials applied to other metal parts and products (as defined in Section 231), and adhesives used in paper coating (as defined in Section 233).

(2) Any adhesive exempted by this Rule 336 and to which no other rule in Regulation III specifically applies shall comply with the provisions of Rule 330 (Volatile Organic Compounds) of these Rules & Regulations.

c. Certain Joint Fillers: Caulking and beaded sealants used to fill gaps or to fill joints between surfaces are exempt from this rule, except those used in manufacturing other metal parts and products as defined in Section 231 of this rule, or in the manufacturing of cans.

d. Extreme Performance Coatings: Extreme performance coatings are exempt from the VOC limits of Table 1 when used under the following conditions:

(1) Used on internal combustion engine components that are normally above 250°F (121°C) during use; or

(2) Used at temperatures above 250°F (121°C) on items that are both included under SIC (Standard Industrial Classification, 1987) codes 3661, 3663, 3669, 3677, 3678, 3679, or 3769 and are electronic products in space vehicles and/or are communications equipment. The US Government Printing Office "Standard Industrial Classification Manual, 1987" (and no future editions) is incorporated by reference and is on file at the Maricopa County Air Quality Department, 1001 N. Central Ave., Phoenix, Arizona 85004.

305.3 ECS Use In Lieu Of Equipment/Practice: In lieu of meeting an equipment or work practice standard within Sections 302, 303, or 304, an owner or operator is allowed to instead use an ECS that has a capture efficiency not less than 90% and meets all ECS requirements in Section 306.

305.4 Spray Gun And VOC Limit Exemptions: The following are exempt from subsection 301.1, subsection 301.2, and Section 302 of this rule:

a. Coating with an aerosol can.

b. Touch up or repair coating operations as defined in Sections 250 and 240.

c. Low usage coatings which in aggregate of all formulations do not exceed 55 gallons (208 liters) per year facility-wide if the operator updates usage records of these coatings on each day of their use, pursuant to subsection 501.2.

d. A small surface coating source (SSCS) as defined in Section 243. However, once a small surface coating source exceeds either the 15 lb per day or the 2 tons per year limits that are required to maintain SSCS status that facility is permanently subject to the limits of subsection 301.1, subsection 301.2, and Section 302, with the following exception:

(1) For such a facility that does not have either a 15 lb/day or a 2 ton/year VOC emission limit in an Air Pollution Permit for processes regulated by this rule, an owner or operator may retain the exemption if s/he agrees in writing to enforceable permit conditions that establish these or stricter limits.

(2) However, a facility that violates its permit limit of either 15 lbs VOC/day or 2 tons VOC/yr. for coating process regulated by this Rule 336 is permanently subject to the limits of subsections 301.1 and 301.2, and Section 302.

e. A Quality Class Q protective coating that is used on equipment, structures, and/or components within a containment facility of a nuclear power plant and is approved in accordance with either ANSI standards N101.2 and N101.4 or with ASTM Standards D3911 and D3843.

f. A tactical military-equipment coating that is approved in a Maricopa County Air Pollution Permit subsequent to a sufficient demonstration by the user that no compliant substitute exists.

305.5 Special Facilities/Operations:

a. Silicone Release Coatings: Silicone release coating operations controlled by an ECS pursuant to subsection 301.2 are exempt from the 85 percent overall control efficiency requirement if the ECS demonstrates at least 70 percent overall control and the coating is applied with a liquid seal air spray system.

b. Bonding Impact Resistant Rubber Lining To Metal: An adhesive and an adhesive primer are exempt from Table 1 limits, but shall not have a VOC content of material exceeding 850 grams of VOC per liter (7.1 lb/gal), if such adhesive is used to bond sheets/strips of rubber to metal equipment so that such rubber sheathing directly contacts material received by the metal and so protects the metal. This exception does not apply to any other situations where adhesives are used to bond rubber to metal.

305.6 Exemption Of Coating Applicator Cleanup: A person is allowed to use solvent that has at 20° C (68° F) a total VOC vapor pressure above 35 mm Hg for cleaning coating application equipment, but only if such application equipment does not use spray devices and the same principal solvent is used for cleaning as is used in the coating.

305.7 Low-Usage Allowance for Restricted Guns: A person may employ spray guns otherwise prohibited by Section 302 for use with coatings over 2 lb VOC /gal under the following limited conditions:

a. If VOC emissions from the finishing application station, are captured and directed to an ECS complying with the provisions of Section 306.

b. To coat the inside of pipes and tubes with a wand-style applicator.

c. Using an airbrush or other small gun that has a reservoir capacity not exceeding 250 cc (8.8 fluid ounces) and is used solely for detailing, lettering, touchup, and/or repair.

306 REQUIREMENTS FOR AIR POLLUTION CONTROL EQUIPMENT AND ECS MONITORING EQUIPMENT:

306.1 ECS Control Efficiencies: To meet the requirements pursuant to subsection 301.2, subsection 305.3, or subsection 305.7, an ECS shall be operated as follows:

a. Overall ECS Efficiency: Overall, the ECS shall prevent at least 85% of the mass of the VOC emitted by each coating or process so controlled from entering the atmosphere except as successfully controlled pursuant to the alternative in subsection 306.1c(2).

b. Capture Efficiencies:

(1) For an ECS used pursuant to subsection 301.2 and/or subsection 305.7, capture shall be at least 87%.

(2) For an ECS used pursuant to subsection 305.3, capture shall be at least 90%.

c. Control Efficiency Of The Emissions Processing Subsystem:

(1) The emissions processing subsystem of the ECS shall reduce the mass of VOC entering it by at least 90 percent; or

~~**(2) Alternative for Very Dilute Input**: For VOC input-concentrations of less than 100 ppm (as carbon) at the inlet of the ECS emissions processing subsystem, an ECS' VOC processing subsystem also satisfies the processor efficiency requirements of this rule if:~~

~~**(a)** The VOC output is consistently less than 20 mg VOC/M3 (as carbon) adjusted to standard conditions; and~~

~~**(b)** The ECS consistently shows an overall control efficiency of at least 85% when tested pursuant to subsection 503.3 at VOC input-concentrations exceeding 100 ppm (as carbon).~~

~~**d.** Coating that exceeds the applicable VOC limits in Table 1 shall be clearly identified such that coating operators are informed an ECS must be used.~~

~~**306.2 Operation And Maintenance (O&M) Plan Required for ECS:**~~

~~**a.** An owner or operator shall provide and maintain (an) O&M Plan(s) for any ECS, any other emission processing equipment, and any ECS monitoring devices that are used pursuant to this Rule 336 or to an air pollution control permit.~~

~~**b.** The owner or operator shall submit to the Control Officer for approval the O&M Plans of each ECS and each ECS monitoring device that is used pursuant to this Rule 336.~~

~~**c.** The owner or operator shall comply with all the identified actions and schedules provided in each O&M Plan.~~

~~**306.3 Providing And Maintaining ECS Monitoring Devices:** Any person incinerating, adsorbing, or otherwise processing VOC emissions pursuant to this rule shall provide, properly install and maintain in calibration, in good working order and in operation, devices described in the facility's O&M Plan that indicate temperatures, pressures, rates of flow, or other operating conditions necessary to determine if air pollution control equipment is functioning properly and is properly maintained. Records shall be kept pursuant to Section 502 which demonstrate that the ECS meets the overall control standard required by subsection 306.1.~~

~~**306.4 O&M Plan Responsibility:** An owner or operator of a facility that is required to have an O&M Plan pursuant to subsection 306.2 must fully comply with all O&M Plans that the owner or operator has submitted for approval, but which have not yet been approved, unless notified otherwise by the Control Officer in writing.~~

305 REQUIREMENTS FOR AIR POLLUTION CONTROL EQUIPMENT AND EMISSION CONTROL SYSTEM (ECS) MONITORING EQUIPMENT:

305.1 Emission Control System Required: For affected operations which may exceed any of the applicable standards set forth in Section 300 of this rule, an owner or operator may comply by installing and operating an emission control system (ECS).

305.2 Providing and Maintaining ECS Monitoring Devices: No owner or operator required to use an approved ECS pursuant to this rule shall do so without first properly installing, operating, and maintaining in calibration and in good working order, devices for indicating temperatures, pressures, transfer rates, rates of flow, or other operating conditions necessary to determine if air pollution control equipment is functioning properly and is properly maintained as described in an approved Operation and Maintenance (O&M) Plan.

305.3 Operation and Maintenance (O&M) Plan Required For ECS:

a. General Requirements: An owner or operator shall provide and maintain an O&M Plan for any ECS, any other emission processing equipment, and any ECS monitoring devices that are used pursuant to this rule or to an air pollution permit.

b. Approval by Control Officer: An owner or operator shall submit to the Control Officer for approval the O&M Plans of each ECS and each ECS monitoring device that is used pursuant to this rule.

c. **Initial Plans:** An owner or operator that is required to have an O&M Plan pursuant to this rule shall comply with all O&M Plans that the owner or operator has submitted for approval, but which have not yet been approved, unless notified by the Control Officer in writing. Once the initial plan has been approved in writing by the Control Officer, an owner or operator shall then comply with the approved plan.

An O&M Plan for any ECS including any ECS monitoring devices shall include all of the following information:

(1) ECS equipment manufacturer;

(2) ECS equipment model;

(3) ECS equipment identification number or identifier that owner or operator subject to this rule assigns to such ECS equipment when manufacturer's equipment identification number is unknown,; and

(4) Information required by Section 501 of this rule.

d. **Revisions to Plan:** If revisions to the initial plan have been approved by the Control Officer in writing, an owner or operator shall comply with the revisions to the initial plan. If revisions to the plan have not yet been approved by the Control Officer, then an owner or operator shall comply with the newest recent O&M plan on file at Maricopa County Air Quality Department.

e. **Control Officer Modifications to Plan**: After discussion with the owner or operator, the Control Officer may modify the plan in writing prior to approval of the initial O & M plan. An owner or operator shall then comply with the plan that has been modified

f. **Deficient Plan**: The owner or operator subject to this rule, who receives a written notice from the Control Officer that the O&M Plan is deficient or inadequate, must make written revisions to the O&M Plan for any ECS including any ECS monitoring devices and must submit such revised O&M Plan to the Control Officer within five working days of receipt of the Control Officer's written notice, unless such time period is extended by the Control Officer, upon written request, for good cause. During the time that such owner or operator subject to this rule is preparing revisions to the O&M Plan, such owner or operator shall still comply with all requirement of this rule.

SECTION 400 – ADMINISTRATIVE REQUIREMENTS

401 COMPLIANCE SCHEDULE:

401.1 ~~By August 1, 1999:~~ **EMISSIONS CONTROL SYSTEM (ECS) SCHEDULE:** Any owner or operator intending to install an ECS in a facility to comply with requirements of this rule shall complete the requirements of Section 305 of this rule.

~~a. All new recordkeeping provisions shall be in effect, including subsections 501.1c and 501.2a.~~

~~b. The intention to use an Emission Control System (ECS) shall be announced to the Control Officer in writing if:~~

~~(1) The ECS is used as an alternative to meeting the spray gun provisions of Section 302; or~~

~~(2) The ECS is used as an alternative to meeting the gun cleaning machine provisions of Section 303.~~

~~401.2 By November 1, 1999, the following shall be in continuing use:~~

~~a. Spray guns required pursuant to Section 302;~~

~~b. Cleaning solvent(s) having the required vapor pressure pursuant to Section 303, and the data sheet(s) confirming the vapor pressure.~~

~~401.3 By May 1, 2000, the ECS announced pursuant to subsection 401.1b shall be in continuing use.~~

401.2 **COMPLIANCE SCHEDULE:** The VOC limits and terms in this rule shall be applied upon adoption of this Rule 336.

402 O&M Plan:

402.1 The owner or operator of an existing facility shall revise/update all O&M Plans by XX/XX/XXXX.

402.2 The Control Officer shall take final action on an O&M Plan revision/update to address the newly amended provisions of this rule within 30 calendar days of the filing of the complete O&M Plan revision/update. The Control Officer shall notify the applicant in writing of his approval or denial.

SECTION 500 – MONITORING AND RECORDS

501 RECORDKEEPING AND REPORTING: ~~Any person~~ Any owner or operator subject to this rule shall comply with the following requirements ~~of subsections 501.1 and 501.2~~ that apply to materials regulated by this Rule. Records shall be retained for 5 years and shall be made available to the Control Officer upon request.

501.1 Current Lists:

a. Maintain a current list of coatings, ~~adhesives~~, ~~reducers, thinners, gun cleaning materials, additives, and any~~ or any other VOC-containing materials regulated by this rule; ~~give the~~

Maintain the VOC content ~~of material~~ for each as received (before thinning). ~~A complete, neat assemblage of this data meets the requirements for a list~~.

Express VOC content in 1 of 3 forms:

(1) ~~pounds~~ Pounds VOC per gallon~~,~~;

(2) ~~grams~~ Grams VOC per liter~~,~~ ; or

(3) ~~the percent~~ VOC by weight along with the specific gravity or density, (2 numbers are required).

b. Less Stringent Recordkeeping for Consistently Low Users: An owner or operator of a facility that always uses less than 2 gallons per day total of thinner and coating ~~(listed in Table 1),~~ meets the listing and recording requirements of ~~subsections~~ Sections 501.1a, 501.1c, and 501.2 if:

(1) All purchase receipts/invoices of VOC-containing material that is regulated by this rule for the most recent 12 months are kept together; and

(2) Current data sheets show the VOC content of material for every VOC containing substance currently used that is regulated by this rule.

c. Facilities That Are Not Small Surface-Coating Sources: Facilities that are not small surface-coating sources shall do the following:

(1) Coatings: For all coatings (except those recorded under the ~~subsection 305.4c~~ Section 105.4(d) low usage allowance), make the following listings for coatings ~~and adhesives~~ that have VOC limits in ~~Table 1~~ Tables 336-1 through 336-7:

(a) VOC Before Reducing: The VOC content of each coating as received, minus exempt compounds. (This figure is sometimes called the "EPA Method 24" VOC content on manufacturer's data sheets). If the coating is a multi-part coating, list the VOC content which the manufacturer states the coating will have once you have mixed all the necessary parts together in the proportions specified by the manufacturer.

(b) List Maximum VOC Content Of Coating As Applied: For each coating that you thin/reduce or add any additive to, record in a permanent log either of the following:

(i) The maximum number of fluid ounces thinner/reducer that you ever add to a gallon of unreduced coating (or maximum g/liter), and the maximum fluid ounces of every other additive you mix into a gallon of the coating; or

(ii) The VOC content of the coating, after adding the maximum amount of thinner/reducer and other additives that you would ever add, as determined by the formula in subsection 255.1.

(2) Applicator Cleanup Solvent: Have a hardcopy of the VOC vapor pressure (VP) at 20°C (68°F) of solvent(s) used to clean spray guns, hoses, reservoirs, and any other coating application equipment. Any one of the following ways of providing the VP data is sufficient:

(a) A current manufacturer's technical data sheet;

(b) A current manufacturer's safety data sheet (MSDS);

(c) Actual test results; or

(d) A letter signed by an official or lab manager of the supplying facility.

501.2 Frequency Of Updating Usage Records: Update your records, showing the type and amount used of each VOC-containing coating ~~or adhesive~~ which is regulated by name or type in ~~Table 1~~ Tables 336-1 through 336-7, and update each VOC-containing material, related to surface coating, that is not addressed by ~~Table 1~~ these tables. This includes, but is not limited to, thinners, surfacers, and diluents. Maintain records according to the following schedule:

a. Small Surface-Coating Sources: Small surface-coating sources shall update each month's records of coating use by the end of the following month.

b. All Other Sources: For a source that does not meet the definition of small surface-coating source:

~~**(1)**~~ **Monthly:** Monthly update records of each coating used that complies with the VOC limits in ~~Table 1~~ Tables 336- 1 throught 336-7. Complete a month's update by the end of the following month.

~~**(2) Daily:** Daily update the usage of each coating that exceeds its limits in Table 1, including coating exempted by subsection 305.4c.~~

501.3 Grouping By VOC Content: For purposes of recording usage, ~~coatings and adhesives that are in the same category in Table 1, and have similar VOC content, may be recorded under a name that includes the category name~~. The highest VOC content among the members of that grouping shall be assigned to that grouping, rounded to the nearest 10th of a pound. To identify what products belong within each group, after each group name and the group's VOC content of material must appear the name of each product in the group and its VOC content of material. **For example:** For flexible plastic parts, you use 20 gallons of primer that has 3.04 lb VOC/gal., 30 gallons of primer having 3.14 lb VOC/gal., and 40 gallons of primer having 2.89 lb VOC/gal. You may record usage as 90 gallons of flexible plastic primer containing 3.1 lb VOC/gal. If grams VOC per liter is used to record VOC content, round off to the nearest whole number of grams.

502 ECS RECORDING REQUIREMENTS:

502.1 On each day an ECS is used at a facility pursuant to this rule, an owner or operator of the facility shall:

a. Record the amount and VOC content of coating, the amount of catalyst/hardener, and the amounts of solvent, reducer, and diluent used that were subject to ECS control pursuant to this Rule; and

b. Make a permanent record of the operating parameters of the key systems as required by the O&M Plan; and

c. Make a permanent record of the maintenance actions taken, within 24 hours of the action's completion, for each day or period in which the O&M Plan requires that maintenance be done.

502.2. An explanation shall be entered for scheduled maintenance that is not performed during the period designated for it in the O&M Plan.

503 **O&M Plan Records**: An owner or operator of a facility shall maintain all of the following records in accordance with an approved O&M Plan for any ECS, that is used pursuant to this Rule or to an Air Pollution Control Permit:

503.1 Periods of time that an approved ECS is operating to comply with this rule;

503.2 Periods of time that an approved ECS is not operating;

503.3 Flow rates;

503.4 Pressure drops;

503.5 Other conditions necessary to determine if the approved ECS is functioning properly;

503.6 Results of visual inspections; and

503.7 Correction action taken, if necessary.

503 **COMPLIANCE DETERMINATION AND TEST METHODS:** When more than one test method is permitted for a determination, an exceedance of the limits established in the rule determined by any of the applicable test methods constitutes a violation of this rule.

503.1 **Compliance Determination:** The following means shall be used to determine compliance with this rule:

a. Measurement of VOC content of materials subject to Section 301 or Section 302 of this rule shall be conducted and reported using one of the following means:

(1) VOC content of coatings, solvents, and other substances having less than 5% solids will be determined by the test method in subsection 503.2f (BAAQMD Method 31 [April 15, 1992]) or 503.2g (SCAQMD Method 313-91 [April 1997]).

(2) The VOC content of coatings or other materials having 5% or more solids will be determined by the test method in subsection 503.2c (EPA Method 24), 503.2f (BAAQMD Method 31 [April 15, 1992]) or 503.2g (SCAQMD Method 313-91 [April 1997]).

(a) Plastisols, powder coatings, and radiation-cured coatings shall be cured according to the procedures actually used in the coating process being tested before final VOC-emission determinations are made.

(b) In the case of multi-component, polymerizing coatings tested according to 503.1a, Method 24 shall be modified to eliminate the post-mixing dilution-step (that employs toluene or other solvent). Instead, the mixture shall be spread by appropriate technique to form a thin layer, occupying the entire bottom of the foil pan. Techniques included in the method referenced in 503.1b can be used as a guide for such spreading.

b. The VOC content of gaseous emissions entering and exiting an ECS shall be determined by either EPA Method 18 referred to in subsection 503.2b, or EPA Method 25 and its submethod, referred to in subsection 503.2d.

c. Capture efficiency of an ECS shall be determined either by the methods in 503.2e (EPA Method 204 and its submethods), or by using mass balance calculation methods in concert with the methods in 503.2a (EPA Methods 2, 2a, 2c, and 2d).

d. Measurement of air pressure at the center of the spray gun tip and air horns of an air-atomizing spray gun (reference subsection 302.1 and Section 225) shall be performed using an attachable

device in proper working order supplied by the gun's manufacturer for performing such a measurement.

e. Temperature measurements shall be done with an instrument with an accuracy and precision of less than one-half degree Fahrenheit (0.25°C) for temperatures up to 480°F (250°C).

503.2 **Test Methods Adopted By Reference:** The EPA test methods as they exist in the Code of Federal Regulations (CFR) (July 1, 1998), as listed below, are adopted by reference. The other test methods listed here are also adopted by reference, each having paired with it a specific date that identifies the particular version/revision of the method that is adopted by reference. These adoptions by reference include no future editions or amendments. Copies of test methods referenced in this Section 503 are available at the Maricopa County Air Quality Department, 1001 N. Central Ave., Phoenix, AZ, 85004.

a. EPA Methods 2 ("Determination of Stack Gas Velocity and Volumetric Flow Rate"), 2a ("Direct Measurement of Gas Volume Through Pipes and Small Ducts"), 2c ("Determination of Stack Gas Velocity and Volumetric Flow rate in Small Stacks or Ducts"), and 2d ("Measurement of Gas volumetric Flow Rates in Small Pipes and Ducts"). All 4 of the foregoing methods are in 40 CFR 60, Appendix A.

b. EPA Method 18 ("Measurement of Gaseous Organic Compound Emissions by Gas Chromatography") and its submethods (40 CFR 60, Appendix A).

c. EPA Test Method 24 ("Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings") (40 CFR 60, Appendix A).

d. EPA Method 25 ("Determination of Total Gaseous Non-methane Organic Emissions as Carbon") and its submethods (40 CFR 60, Appendix A).

e. EPA Test Methods 204 ("Criteria for and Verification Of a Permanent or Temporary Total Enclosure"), 204a, 204b, 204c, 204d, 204e, and 204f (Appendix M, 40 CFR 51).

f. California's Bay Area Air Quality Management District (BAAQMD) Method 31 (April 15, 1992), "Determination of Volatile Organic Compounds in Paint Strippers, Solvent Cleaners, and Low Solids Coatings."

g. California's South Coast Air Quality Management District (SCAQMD) Method 313-91 (April 1997).

503.3 **Test Methods for ECS:** For coatings/adhesives controlled pursuant to subsection 302.1 or subsection 305.3:

a. Measurements of VOC emissions from an ECS shall be conducted in accordance with EPA Methods 18 or its submethods, or by Method 25 or its submethods (40 CFR 60, Appendix A).

b. Capture efficiency of an ECS shall be determined by mass balance in combination with ventilation/draft rate determinations done in accordance with subsection 503.3c or with US EPA Test Methods 204, 204a, 204b, 204c, 204d, 204e, and 204f (Appendix M, 40 CFR 51).

c. Ventilation/draft rates shall be determined by EPA Methods 2, 2a, 2c, and 2d (40 CFR 60, Appendix A).

504 **FORMULA FOR TOTAL VOC VAPOR PRESSURE:** Equivalent to: **VOC COMPOSITE PARTIAL PRESSURE.** Reference subsection 303.2

$$PP_c = \frac{\sum_{i=1}^{n} (W_i)(VP_i) / MW_i}{\frac{W_w}{18} + \sum_{i=1}^{m} \frac{W_{ej}}{MW_{ej}} + \sum_{i=1}^{n} \frac{W_i}{MW_i}}$$

W_i	=	Weight of the "*i*"th VOC compound in grams
W_w	=	Weight of water in grams
W_{ej}	=	Weight of the "*j*"th non-precursor compound in grams
MW_i	=	Molecular weight of the "*i*"th VOC compound in grams per gram mole, e.g., one gram-mole of isopropyl alcohol weighs 60 grams
MW_{ej}	=	Molecular weight of the "*j*"th non-precursor compound, e.g., 1 gram-mole of acetone weighs 58 grams
PP_c	=	VOC composite partial pressure at 20°C in mm mercury (Hg)
VP_i	=	Vapor pressure of the "*i*"th VOC compound at 20°C in mm Hg
18	=	Weight of one gram-mole of water

Maricopa County Air Quality Dept.
Planning & Analysis Division
1001 N. Central Ave. Ste. 125
Phoenix, AZ 85004

Adopted XX/XX/XX

MARICOPA COUNTY
AIR POLLUTION CONTROL REGULATIONS
REGULATION III - CONTROL OF AIR CONTAMINANTS

RULE 356
POLYESTER RESIN OPERATIONS

SECTION 100 – GENERAL

101 **PURPOSE: T**o limit the emission of volatile organic compounds (VOCs) from the manufacturing, rework, repair, and touch-up of composite products made of polyester resin, fiberglass and gel coats.

102 **APPLICABILITY:**

102.1 This rule shall apply to all polyester resin and gel coat operations that fabricate, rework, repair,or touch-up products for commercial, military, or industrial use including, but not limited to, boats, tubs, pools, shower enclosures, spas, bathroom fixtures, jigs, tools, molds, building panels, fiberglass boat parts, air pollution control equipment, sewage treatment equipment, storage tanks, transportation parts, automotive, aircraft, other industrial and consumer products, as well as the cleanup, storage and disposal of solvents used in these operations.

102.2 In addition to this rule, facilities may be subject to New Source Performance Standards (NSPS) in Rule 360 and/or to National Emission Standards for Hazardous Air Pollutants (NESHAP) in Rule 370 of these Rules and Regulations.

103 **EXEMPTION AND BURDEN OF PROOF:**

103.1 **LOW USAGE POLYESTER RESIN FACILITY:** The owner or operator of a polyester resin operation can claim an exemption to the VOC limits and application methods (Sections 301 and 303 of this Rule 356) if use of polyester resin materials is less than 20 gallons per month, provided the owner or operator keeps records required to demonstrate this exemption status as defined in Section 500 of this rule.

103.2 **Fiberglass Boat Manufacturing:** The following operations and/or materials are exempt from the monomer and nonmonomer VOC requirements of this Rule.

a. **Life-Saving Craft:** Resin productions applied to military vessels, U.S. Coast Guard lifeboats, rescue boats, and other life-saving appliances approved under 46 CFR subchapter Q, or the construction of small passenger vessels regulated by 46 CFR subchapter T are exempt, if applied using non-atomizing application equipment serving as emission control.

b. **Part or Mold Repair and Touch Up:** Production and tooling resins, pigmented, clear, and tooling gel coats used for part, mold repair and touch-up are exempt if not exceeding 1 percent by weight of all resin and gel coats used at a facility on a 12-month rolling-period basis.

c. **Pure 100-Percent Vinyl Ester Resin Used for Skin Coats**: Pure, 100-percent vinyl ester resins (blends of vinyl ester and polyester) used for skin coats are exempt if applied with non-atomizing resin application equipment serving as the emission control and the amount of resin used shall not exceed 5 percent by weight of all resin used at a facility on a 12-month rolling period basis.

SECTION 200 – DEFINITIONS: For the purpose of this rule, the following definitions shall apply, in addition to those definitions found in Rule 100: (General Provisions and Definition) of these rules. In the event of any inconsistency between any of the Maricopa County air pollution control rules the definitions in this rule take precedence.

201 **AEROSOL CAN-SPRAY COATING:** A coating which is sold in a hand-held, pressurized, non-refillable container, of less than 22 fluid ounces (0.66 liter) capacity, and which is expelled from the container in a finely divided form when a valve on the container is depressed.

202 **AIR-ASSISTED AIRLESS SPRAY:** A coating application system in which the coating fluid is supplied to the gun under fluid pressure and air is combined at the spray cap.

203 **ATOMIZED RESIN APPLICATION**: Technology that utilizes application equipment that breaks resin into droplets 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.

204 **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.

XXX **CLOSED MOLDING PROCESS – FIBERGLASS BOAT PARTS:** Closed molding means a molding process in which pressure is used to distribute the resin through the reinforcing fabric placed between two mold surfaces to either saturate the fabric or fill the mold cavity. The pressure may be clamping pressure, fluid pressure, atmospheric pressure, or vacuum pressure used either alone or in combination. The 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. In closed molding operations, nearly all of the monomers are bound in the cross-link reactions and emissions are very low. (Closed molding is generally applicable to making a large number of small parts, such as hatches and locker doors, or small numbers of high performance boat hulls.)

205 **CLOSED MOLDING PROCESS – POLYESTER RESINS:** Closed molding means any molding process using polyester resin materials whereby the VOC-containing materials are not exposed to the atmosphere except during the material loading stage (e.g., compression molding, injection molding, and resin transfer molding). This includes processes where the mold is covered with plastic (or equivalent material) prior to resin application, and the resin is injected into the covered mold.

206 **COMPOSITE MATERIALS:** Individual components that, combined, make up the composite product. Composite materials include resins, gel coats, molding compounds, thinners, catalyzing agents, binders, fillers, reinforcement fibers, other reinforcement materials, and any other material added to enhance the properties of the composite product. For the purposes of this rule, composite products are products that are fabricated from polyester resins and composite materials.

207 **CONTAINERS:** This term include but is not limited to drums, buckets, cans, pails, and trays.

208 **CORROSION-RESISTANT RESIN:** A resin or composite material used to manufacture a product that is required to meet a corrosion resistant industry standard, as defined in 40 CFR 63.5935, or a food contact industry standard or used to manufacture a product with corrosion resistant end use applications involving continuous or temporary chemical exposure.

209 **CROSS-LINKING:** The process of chemically linking two or more polymer chains to create a three-dimensional or network polymer.

210 **ELECTROSTATIC SPRAY:** Equipment used to apply materials by charging atomized coating particles that are deposited to a grounded substrate by electrostatic attraction.

211 **EMISSION CONTROL SYSTEM (ECS):** A system, approved in writing by the Control Officer, designed and operated in accordance with good engineering practice to reduce emissions of volatile organic compounds. Such system consists of an emissions collection subsystem and an emissions processing subsystem.

212 **FILAMENT APPLICATION:** A method of applying resin to an open mold that involves feeding reinforcement fibers through a resin bath and winding the resin-impregnated fibers on a rotating mandrel.

213 **FILLER:** A non-reactive constituent of a composite product. Fillers include hollow glass spheres, fibers, particulates, clays, silicates, talcs, carbonates, carbon black, chalk, titanium dioxide, graphite, molybdenum disulfide, PTFE, barium sulfate, aluminum, and copper, and may impart properties such as color, magnetic, smoothness, lubrication, thermal or electric properties.

214 **FIRE RETARDANT RESIN:** Resin that is used to make composite products specifically designed to be a low flame spread/low smoke product, as defined in 40 CFR 63.5935.

215 **FLOW COATING: (FLOW COATERS):** Flowcoating is a nonatomizing application technique of applying resins and gel coats to an open mold with a fluid nozzle in a fan pattern with no air supplied to the nozzle and the excess coating drains back into the collection system.

216 **FLUID IMPINGEMENT TECHNOLOGY:** A spray gun that produces an expanding non-misting curtain of liquid by the impingement of low-pressure uninterrupted liquid streams.

217 **GEL COAT: el Coat:** A pigmented or clear resin material that functions as a surface coating to provide cosmetic enhancement or resistance to degradation, ultraviolet radiation, or water or chemical adsorption.

218 **HAND LAY-UP (HAND APPLICATION)** : A hand application technique of composite materials Uses a bucket and a paint brush or a paint roller, , caulking guns, trowels, spatulas, syringe daubers, rags, and sponges or other hand held method of application.

219 **HIGH STRENGTH RESIN:** Resin used to manufacture composite products requiring a tensile strength of 10,000 psi or more for a minimal casting thickness of one-eighth inch.

220 **HIGH-VOLUME LOW- PRESSURE (HVLP) SPRAY:** Equipment used to apply materials by means of a gun that operates at between 0.1 and 10 psig of air pressure. Spray Equipment: equipment used to apply materials by means of a spray gun which is designed and intended to be operated, and which is operated, between 0.1 and 10.0 psig of air atomizing pressure, measured dynamically at the center of the air cap and the air horns.

221 **IN USE:** This is the active application of contents to a substrate by pouring, siphoning, brushing, rolling, padding, wiping or other methods

222 **INJECTION MOLDING**: A high-volume method of forming an object by forcing composite materials from an external heated chamber through a sprue, runner, or gate into a cavity of a closed mold by means of a pressure gradient.

223 **LAMINATION RESIN:** A resin used to fabricate a composite product made up of layers of reinforcement fibers and resins. Boats hulls, surfboards, and automotive panels are typically made of lamination resins.

224 **MANUAL APPLICATION:** The application of resin to an open mold using a hand lay-up technique. Components of successive plies of resin-impregnated reinforcement fibers are applied using hand tools such as brushes and rollers.

225 **MARBLE OR CULTURED RESINS:** Resin filled with additives to create a polymer matrix that is cast (poured) over a mold. This cultured marble process is used to fabricate composite products resembling natural stone such as marble, onyx, or granite.

226 **MOLD:** The cavity or surface into or on which gel coat, resin, and fibers are placed and from which finished fiberglass parts take their form.

227 **MONOMER:** A small molecule used as a cross-linking agent. Monomers partially combine with themselves or with other compounds chemically, to become part of a cured resin (polymer). Monomers include, but are not limited to, styrene and methyl methacrylate.

228 **MONOMER PERCENT BY WEIGHT OF A RESIN:** This means the weight of the monomer, divided by the weight of the polymer.

229 **NON-ATOMIZING MECHANICAL APPLICATION:** An application technique, other than a manual application technique, to apply resins or gel coats to molds. Methods include flow coater, pressure fed rollers, impingement spray, or any other mechanical techniques described in 40 CFR 63.5935.

230 **NON-ATOMIZING SPRAY APPLICATION EQUIPMENT:** Any application technique in which resin flows from the applicator, in a steady and observable coherent flow, without droplets, for a minimum distance of three (3) inches from the applicator orifices. Non-Atomized mechanical application means the use of application tools other than buckets and brushes to apply resin and gel coat. Examples of non-atomized application include flow coaters, pressure-fed rollers, and fluid impingement spray guns which can be a low pressure chopper gun or any other mechanical techniques described in 40 CFR 63.5935.

231 **OPEN-MOLD PROCESS:** Open Molding means any molding process using polyester resin materials whereby the VOC-containing materials are exposed to the atmosphere. Open molding includes processes such as manual resin application, mechanical resin application, filament application, and gel coat application. Open molding also includes application of resins and gel coats to parts that have been removed from the open mold.

232 **OVERALL EFFICIENCY:** The efficiency of an approved emission control system, measured by the collection system's efficiency multiplied by the destruction efficiency of the control device, expressed as a percentage.

233 **PIGMENTED GEL COATS**: Used when a solid color surface is desired. Most gel coats are pigmented. Clear gel coats do not have any pigments and usually have a higher VOC content than pigmented gel coats. Pigmented gel coats do not include tooling gel coats used to build or repair molds.

234 **POLYESTER:** A synthetic, long-chain polymeric ester produced mainly by reaction of an acid and an alcohol and linked together by the ester.

235 **POLYESTER RESIN:** A resin used to fabricate composite products. Polyester resins include but are not limited to, unsaturated polyester resins, such as orthophthalic, isopthalic, halogenated, dicyclopentadiene, bisphenol A and furans. For the purposes of this rule, vinyl ester resins are polyester resins.

236 **POLYESTER RESIN OPERATIONS:** The fabrication, rework, repair, or touch-up of composite products for commercial, military, or industrial uses by mixing, pouring, manual application, molding, impregnating, injecting, forming, spraying, pultrusion, filament winding, centrifugally casting, or corn-forming with polyester resins.

237 **POLYMERIZE:** Transformation from a liquid to a solid or semi-solid state to achieve desired product physical properties, including hardness

238 **PRESSURE-FED ROLLER**: A fabric roller that is fed with continuous supply of catalyzed resins from a mechanical fluid pump.

239 **PRIMER –** A coating labeled as such, which is designed to be applied to a surface to provide a bond between that surface and subsequent coats.

240 **PRIMER GEL COAT:** A gel coat that functions as a primer for subsequent coating on the product after it is removed from the mold.

241 **PULTRUSION:** A continuous manufacturing process for composite products that have a uniform cross-sectional shape. Continuous strands of fiber-reinforcing material are pulled through a strand-tensioning device into a resin impregnation chamber or bath and then pulled through a shaping die.

242 **REINFORCEMENT FIBER:** A multifilament material of glass or other fibrous material, such as carbon, boron, metal, kevlar, and amid polymer, that is used to reinforce composite products.

243 **REINFORCED PLASTIC COMPOSITE:** A composite material consisting of plastic reinforced with fibers.

244 **REPAIR:** A process that requires the addition of polyester resin or other composite material to portions of a previously-fabricated product in order to mend minor structural damage.

245 **RESIN:** Any class of organic polymers of natural or synthetic origin used to encapsulate and bind together reinforcement fibers and/or fillers in the formulation of composite products. means any thermosetting resin with or without pigment containing styrene or methyl methacrylate and used to encapsulate and bind together reinforcement fibers in the construction of fiberglass parts.

246 **RESIN IMPREGNATOR**: A mechanical non-atomizing composite materials application technique in which fiber reinforcement is saturated with resins in a controlled ratio for each specific composite product.

247 **SKIN COAT***:* A layer of resin and fibers applied over the gel coat to protect the gel coat from being deformed by the next laminate layers.

248 **SPECIALTY GEL COAT:** A gel coat that is used in conjunction with a composite product that is required to have fire retardant properties, is corrosion-resistant, is a highstrength resin, or is used in a tooling application.

249 **TOOLING RESIN:** Resin used to produce a mold, or a gel coat to form a surface layer on a mold, for the fabrication of a composite product.

251 **TOOLING GEL COAT:** The gel coat used to build or repair molds (also known as tools) or prototypes (also known as plugs) from which molds will be made.

251 **TOUCH-UP:** The application of resin or gel coat to cover minor cosmetic imperfections that occur during fabrication or field installations.

252 **TUB/SHOWER RESIN:** Dicyclopentadiene (DCPD) resins, along with orthophthalate and isophthalate resins, which are used to fabricate bathware products.

253 **TRANSFER EFFICIENCY:** The ratio of the weight of coating solids adhering to the part being coated to the weight of coating solids used in the application process expressed as a percentage.

254 **VACUUM BAGGING:** A molding technique in which the reinforcing fabric is saturated with resin and then covered with a flexible sheet that is sealed to the edge of the mold and where a vacuum is applied under the sheet to compress the laminate, remove excess resin, or remove trapped air from the laminate during curing. Vacuum bagging does not include processes that meet the definition of closed molding.

255 **VAPOR PRESSURE:** Pressure exerted at a uniform temperature by the gas of a substance when the gas is in equilibrium with the liquid (or solid) phase of that substance.

256 **VOC VAPOR PRESSURE (VOC COMPOSITE PARTIAL PRESSURE):** Sum of the partial pressures of the compounds defined as VOCs, calculated according to the formula in Section 504 of this rule.

257 **VOC -CONTAINING MATERIAL:** Any chemical or item that contains an organic compound that participates in atmospheric photochemical reactions, except the non-precursor organic compounds. This includes but is not limited to rags, waste coatings, waste brushes, waste rollers, waste applicators, waste solvents, and their residues that are used for surface preparation, cleanup or removal of surface coatings.

258 **VOC CONTENT:** The portion of a chemical or substance in the organic compound that participates in atmospheric photochemical reactions, except for the non-precursor organic compounds. Section 504 of this rule instructs how to calculate the VOC content of a substance.

259 **VAPOR SUPPRESSANT:** A wax substance added to resin for the purpose of forming a layer on the surface of the resin while it is curing and minimize the outward diffusion of monomer vapor into the atmosphere.

SECTION 300 – STANDARDS

301 **MATERIAL REQUIREMENTS:** An owner or operator of a polyester resin/composite operation shall use one or more of the following VOC emission reduction methods:

301.1 **Open Molding Process:** Except as provided in Section 302.7 of this rule, an open molding process (Section 231 of this Rule), shall use materials that comply with the weighted average monomer VOC content limits listed in Table 356-1 of this Rule; or

301.2 **A Closed-Mold Process:** (Section 205 of this Rule); or

301.3 **Vapor Suppressed Resin**: All the applied resin material is vapor suppressed, such that the weight loss from the VOC emissions does not exceed 50 grams per square meter of exposed surface during resin polymerization;

301.4 **Use of Emission Control System (ECS) :** In lieu of complying with the requirements of Sections 301.1 through 301.3 of this rule, an owner or operator may install and operate a VOC emissions control system that complies with the following:

a. Achieves a 90% or more, overall capture and control efficiency (by weight) of the VOC emissions generated by the sources; and

b. Complies with Section 303 of this rule; and

c. Continuously averages emissions over a rolling 24 hour period.

TABLE 356-1: POLYESTER RESIN OPERATIONS: VOC CONTENT LIMITS FOR OPEN MOLDING RESIN AND GEL COAT

Gel Coats and Resins	Weight Percent Limit (by weight)
Gel Coats	-
Clear Gel Coats	-
Marble Resin Gel Coats	42
Other Tooling Gel Coats	40
All Other Clear Gel Coats	44
Pigmented Gel Coats	-
White and Off-White Gel Coats	30
Other Non-White Gel Coats	37
Primer Gel Coats	28

Specialty Gel Coats	48
-	-
Resins	-
Marble resins	10% with fillers or 32% without fillers*
Solid Surface Resins	17
Tub/Shower Resins	24% with fillers or 35% without fillers
Lamination Resins	31% with fillers or 35% without fillers
Fire Retardant Resins	38
Corrosion Resistant, High Strength and Tooling Resins	-
Non-atomizing Mechanical Application	46**
Filament Application	42**
Manual Application	40**
Other Resins	35

Monomer percent by weight includes the addition of any VOC-containing materials.

* An owner or operator of a polyester resin operation may meet the monomer content limits by adding filler to a resin to reduce the monomer content to the applicable limit or by using resin with a monomer content that complies with the applicable limit without the addition of fillers.

** If the owner or operator manufactures a composite product by using more than one technology to apply corrosion-resistant, high strength or tooling resins, the highest permissible resin monomer content is the applicable limit.

301.5 **FIBERGLASS BOAT MANUFACTURING:** Owners or operators of fiberglass boat manufacturing operations shall comply with the applicable VOC Limits in Table 356-2 of this Rule, with either of the following:

a. **Use of Low Monomer VOC content Resins and Gel Coats:** The monomer VOC content limits used for any open molding resin and gel coat operation and any molding operation that does not meet the definition of closed molding, such as vacuum bagging operations, shall not exceed the monomer VOC limits established in Table 356-2 of this rule:

TABLE 356-2: FIBERGLASS BOAT MANUFACTURING: COMPLIANT MATERIALS MONOMER* VOC CONTENT FOR OPEN MOLDING RESIN AND GEL COATS

For this Material	This application method	This weighted average monomer VOC content (weight %) limit is required:
Production Resin	Atomized (Spray)	28
Production Resin	Non-atomized	35
Pigmented gel coat	Any Method	33
Clear Gel Coat	Any Method	48
Tooling Resin	Atomized	30
Tooling Resin	Non-atomized	39
Tooling Gel Coat	Any Method	40

*Monomer VOC Calculation: Section 502.3 of this rule.

b. **Use of Emissions Control System (ECS) In Lieu Of Meeting VOC Limits, Equipment and Work Practice:** In lieu of meeting VOC limits, equipment or work practice standards within Sections 301.5 and 302 of this rule an owner or operator has a choice use an ECS that has a capture and control efficiency not less than 90% and meets the ECS requirements of Section 303 of this rule.

302 **APPLICATION TECHNIQUES:**

302.1 **Tub/Shower Polyester Resin Materials**: An owner or operator shall not apply to an open molding process any tub/shower polyester resin material unless all the applied resin material is

vapor suppressed, such that the weight loss from the VOC emissions does not exceed 50 grams per square meter of exposed surface during resin polymerization;

302.2 **Resin Material Application (Excluding Gel Coats):** An owner or operator shall not apply any resin materials to an open mold surface unless one of the following non-atomizing application techniques are used and operated according to the operating procedure specified by the equipment manufacturer:

a. Pressure-fed rollers (Section 238 of this rule); or

b. Resin Impregnators (Section 246 of this rule); or

c. Flow Coaters (Section 215 of this rule); or

d. Fluid impingement technology (Section 216 of this rule); or

e. Hand Lay-up applications (Section 218 of this rule); or

f. Other non-atomizing application techniques (Section 230 of this rule) which are approved in writing by the Control Officer as having similar emission reduction efficiencies.

302.3 **Gel Coat Application:** An owner or operator shall not apply gel coat materials in an open molding process unless one of the following application techniques is used and operated according to the operating procedure specified by the equipment

manufacturer:

a. Any non-atomizing application technique listed under Sections 229 & 230 of this rule;

b. Air-Assisted Airless Spray, Section 202 of this rule;

c. Electrostatic Attraction, Section 210 of this rule; or

d. High-Volume, Low-Pressure (HVLP), Section 220 of this rule.

302.4 **Equipment Requirements:** An owner or operator shall cover all resin baths and wet baths to reduce organic compound emissions.

302.5 **Pultrusion Operations:** Pultrusion operations (Section 241 of this Rule 356) shall be covered, except as allowed by 40 CFR 63.5830 (except for 18 inches from the exit of the bath to the die). The weight loss of polyester resin materials during polymerization shall be less than three (3) percent in a pultrusion operation.

302.6 **Alternative Compliance Option**: An owner or operator may use alternative application processes and materials other than those listed in Sections 303.2 and 303.3 of this rule provided they result in equivalent VOC emissions and are approved in writing by the Control Officer and U.S. EPA.

302.7 **Touch-Up and Repair**: Resins and gel coats used to touch-up, repair or install a composite product, may have a monomer content limit up to 10% more than the applicable limits set forth in Table 356-1 of this rule, provided the resins or gel coats are applied by hand-held atomized spray technologies that operate with a container that is part of the gun with a maximum capacity of 1 quart.

303 REQUIREMENTS FOR AIR POLLUTION CONTROL EQUIPMENT AND ECS MONITORING EQUIPMENT:

303.1 **Emission Control System Required:** For affected operations which may exceed any of the applicable standards set forth in Section 300 of this rule, an owner or operator may comply by installing and operating an emission control system (ECS).

303.2 **Providing and Maintaining ECS Monitoring Devices:** No owner or operator required to use an approved ECS pursuant to this rule shall do so without first properly installing, operating, and maintaining in calibration and in good working order, devices for indicating temperatures, pressures, transfer rates, rates of flow, or other operating conditions necessary to determine if air pollution

control equipment is functioning properly and is properly maintained as described in an approved Operation and Maintenance (O&M) Plan.

303.3 Operation and Maintenance (O&M) Plan Required For ECS:

a. General Requirements: An owner or operator shall provide and maintain an O&M Plan for any ECS, any other emission processing equipment, and any ECS monitoring devices that are used pursuant to this rule or to an air pollution permit.

b. Approval by Control Officer: An owner or operator shall submit to the Control Officer for approval the O&M Plans of each ECS and each ECS monitoring device that is used pursuant to this rule.

c. Initial Plans: An owner or operator that is required to have an O&M Plan pursuant to this rule shall comply with all O&M Plans that the owner or operator has submitted for approval, but which have not yet been approved, unless notified by the Control Officer in writing. Once the initial plan has been approved in writing by the Control Officer, an owner or operator shall then comply with the approved plan. An O&M Plan for any ECS including any ECS monitoring devices shall include all of the following information:

(1) ECS equipment manufacturer;

(2) ECS equipment model;

(3) ECS equipment identification number or identifier that owner or operator subject to this rule assigns to such ECS equipment when manufacturer's equipment identification number is unknown,; and

(4) Information required by Section 501 of this rule.

d. Revisions to Plan: If revisions to the initial plan have been approved by the Control Officer in writing, an owner or operator shall comply with the revisions to the initial plan. If revisions to the plan have not yet been approved by the Control Officer, then an owner or operator shall comply with the newest recent O&M plan on file at Maricopa County Air Quality Department.

e. Control Officer Modifications to Plan: After discussion with the owner or operator, the Control Officer may modify the plan in writing prior to approval of the initial O & M plan. An owner or operator shall then comply with the plan that has been modified

f. Deficient Plan: The owner or operator subject to this rule, who receives a written notice from the Control Officer that the O&M Plan is deficient or inadequate, must make written revisions to the O&M Plan for any ECS including any ECS monitoring devices and must submit such revised O&M Plan to the Control Officer within five working days of receipt of the Control Officer's written notice, unless such time period is extended by the Control Officer, upon written request, for good cause. During the time that such owner or operator subject to this rule is preparing revisions to the O&M Plan, such owner or operator shall still comply with all requirement of this rule.

304 CLEANUP ACTIVITIES AND WORK PRACTICES (STORAGE, HANDLING, AND DISPOSAL):

304.1 Solvent Cleaning: An owner or operator shall ensure any solvent used to clean polyester resin application equipment, parts, products, tools, machinery, equipment, and general working areas shall contain no more than 5 percent VOC, by weight, or have a composite vapor pressure of no more than 0.50 mm Hg at 68 ºF.

304.2 Storage, Mixing, and Use of VOC Containing Materials: An owner or operator shall store all VOC-containing material and VOC-containing cleaning materials in closed or covered leak-free containers. The containers shall be closed at all times except when the material is being handled such as when mixing, depositing, removing or transferring material into or out of the container.

304.3 **Waste Materials**: An owner or operator shall store all VOC-containing coatings, thinners, and coating-related waste materials intended for disposal in closed or covered, leak-free containers which are legibly labeled with their contents and which remain covered at all times when not in use.

304.4 **Spills:** An owner or operator shall implement procedures to minimize spills of any VOC-containing material immediately during handling and transfer to and from containers, enclosed systems, waste receptacles and other equipment including small containers.

304.5 **Conveyance of VOC-Containing Materials and VOC-Containing Cleaning Materials:** An owner or operator shall ensure that all VOC-containing materials and VOC-containing cleaning materials shall be conveyed from one location to another in labeled and closed containers and pipes.

304.6 **Labeling:** All containers that are 1 gallon or larger used for collection of VOC-containing material shall be clearly identified with their contents.

304.7 **Fiberglass Resin, Gel Coat and Putty Mixing Operations:** Mixing containers with a capacity equal to or greater than 55 gallons (208 liters), including those used for on-site mixing of putties and poly-putties, shall have a cover with no visible gaps in place at all times. This shall not apply when the material is being manually added to or removed from a container, or when mixing or pumping equipment is being placed in or removed from a container.

SECTION 400 - ADMINISTRATIVE REQUIREMENTS- COMPLIANCE SCHEDULE: An owner or operator who chooses to, or is required to comply with the emission limits by installing an ECS (Section 303 of this rule) shall meet the following milestones:

401 **SUBMIT PLAN:** Submit a compliance plan, by (3 months after DATE OF RULE ADOPTION) or within three (3) months of becoming subject to the rule, to the Control Officer for approval which describes the method(s) used to achieve full compliance with the rule. The compliance plan shall specify dates for completing increments of progress, such as the contractual arrival date of new control equipment. The Control Officer may require an owner or operator submitting the compliance plan to also submit subsequent reports on progress in achieving compliance; and

402 **COMPLIANCE DATE:** Attain full compliance with all of the standards in this rule by (12 months after DATE OF RULE ADOPTION) or within twelve (12) months of becoming subject to the rule.

SECTION 500 - MONITORING AND RECORDS:

501 **RECORDKEEPING AND REPORTING**: An owner or operator subject to this rule shall comply with the recordkeeping and reporting requirements section 500 of this rule. Records can consist of but are not limited to purchase orders, invoices, receipts, usage records, MSDS, and hazardous wastes manifests. Any records required by this rule shall be retained for five (5) years and be made available to the Control Officer upon request. Records may be kept in either electronic or paper format and listed with the following units:

a. VOC per gallon; or

b. grams per VOC per liter; or

c. VOC per liter, or the percent VOC by weight along with the specific gravity or density, (numbers are required).

501.1 **Required Records:**

a. **Applications:** The type of non-atomizing application, or in the case of gel coat, other application techniques(s) used, manufacturer's names, and the records of the fluid tip, pressure calibration as specified by the manufacturer; and

b. **Materials and VOC Content:** The manufacturer's name, the type and amount of each of the polyester resin basic raw materials used, delivered and the weight (in percent) of monomer for all polyester resin materials and filler(s). If VOC-containing materials are added to the polyester resin, the amount of VOC-containing materials, in grams, and the VOC content in grams per liter, of VOC-containing materials; and

c. **Pultrusion systems:** For pultrusion systems, the weight loss (in percent) of polyester resins materials for each application; and

d. **Vapor Suppressed materials and Tub/Shower resin materials**: Certification from the resin manufacturer(s) that the tub/shower resin materials are vapor suppressed and the weight loss (in percent) for all vapor suppressed applications.

501.2 **Equipment Cleanup/VOC Vapor Pressure:** An owner or operator of a polyester resin operation shall keep a hardcopy of the VOC vapor pressure (VP) at 20°C (68°F) of solvent(s) for coating and of solvents used for cleaning spray guns, hoses, reservoirs, and any other coating application equipment. Any one of the following ways of providing the VP data is sufficient:

a. A current manufacturer's technical data sheet; or

b. A current manufacturer's safety data sheet (MSDS); or

c. Actual test results; or

d. A letter signed by an official or lab manager of the supplying facility.

501.3 **ECS Recordkeeping Requirements:** The owner or operator of the facility shall document the installation, maintenance, and calibration of ECS monitoring devices described in an O&M Plan in the following manner:

a. **Initial Installation:** Make a permanent record of the date of installation of the ECS.

b. **Monthly:** Make a permanent record of the operating parameters of the key systems as required by the O&M Plan. If the ECS was not operational due to equipment malfunction or not being used at any time during the day, record this fact in the permanent record; and

c. Within 24 hours of a completed scheduled routine maintenance, make a permanent record of the maintenance actions taken for each day or period in which the O&M Plan requires that maintenance be done; or

d. Enter an explanation for scheduled maintenance that is not performed during the period designated for it in the O&M Plan.

501.4 **Facilities Claiming an Exemption:** The owner or operator claiming an exemption under Section 103 of this rule shall document the quantity of VOC materials used and keep sufficient records of the basis of such calculations to justify the exemption status.

502 **COMPLIANCE DETERMINATION – TEST METHODS:** An exceedance of the limits established in this rule determined by any of the applicable test methods constitutes a violation of this rule. The EPA and the American Society for Testing and Materials (ASTM) test methods and other documents as they exist in the Code of Federal Regulations (CFR) as listed below, are adopted and incorporated by reference in Appendix G of the Maricopa County Air Pollution Control Regulations. These documents are available Maricopa County Air Quality Department, 1001 N. Central Ave., Phoenix, AZ 85004; or by calling (602) 506-0169 for information. ASTM methods are also available from the American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, or from its website at www.astm.org.

502.1 **VOC Content of Materials:**

a. The VOC content of polyester resin operations regulated by Section 301 of this rule shall be determined using one of the following:

(1) EPA Reference Method 24 – Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings, 40 CFR 60, Appendix A; or

(2) A material safety data sheet **(MSDS)** or product data sheet showing the material name and VOC content as applied.

(3) Exempt solvent content shall be determined by: South Coast Air Quality Management District's (SCAQMD) "Laboratory Method of Analysis for Enforcement Samples" manual;

(i) Method 302; or

(ii) Methods 303.

b. Weight Loss of Polyester Resin Materials shall be determined and reported in accordance with SCAQMD Method 309-91 for determination of static volatile emissions.

c. Monomer content of polyester resin materials shall be determined by SCAQMD Method 312-91.

d. Volatile Organic Compounds shall be determined SCAQMD Method 313- 91 (February 1997) " Determination of Volatile Organic Compounds (VOC) by Gas Chromatography/ Mass Spectrometry (GC/MS):"

502.2 **VOC Vapor Pressure:** The total composite partial vapor pressure of all VOCs in a solution shall be determined by one of the following methods:

a. U.S. EPA Reference Method 24 (Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings), 40 CFR, Part 60,Appendix A-7; or

b. ASTM D2879-97(2007) Standard Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope; or

c. Calculations using certified data from a laboratory or manufacturer revealing the exact formulation; or

d. A Material Safety Data Sheet (MSDS) or product data sheet showing the material name and VOC vapor pressure; or

e. Calculating VOC composite partial vapor pressure as follows:

$$PP_c = \frac{\sum_{i=1}^{n} (W_i)(VP_i)/MW_i}{\frac{W_w}{MW_w} + \sum_{i=1}^{n} \frac{W_c}{MW_c} + \sum_{i=1}^{n} \frac{W_i}{MW_i}}$$

where:

W_i = Weight of the "*i*"th VOC compound, in grams
W_w = Weight of water, in grams
W_c = Weight of exempt compound, in grams
MW_i = Molecular weight of the "*i*"th VOC compound, in g/g-mol
MW_w = Molecular weight of water, in g/g-mol
MW_c = Molecular weight of exempt compound, in g/g-mol
PP_c = VOC composite partial vapor pressure at 20 °C (68°F), in mm Hg
VP_i = Vapor pressure of the "*i*"th VOC compound at 20 °C (68°F), in mm Hg

502.3 Monomer VOC Calculation: The weighted average monomer VOC content for a specific application method meets the monomer VOC content limit using Equation 1:

Equation 1

$$\text{Weighted Average Monomer VOC Content} = \frac{\sum_{i=1}^{n} (M_i \, VOC_i)}{\sum_{i=1}^{n} (M_i)}$$

Where M_i = mass of each open molding resin or gel coat used in the past 12 months in an operation, in megagrams.

VOC_i = monomer VOC content, by weight percent, of each open molding resin or gel coat used in the past 12 months in an operation.

n = number of different open molding resins or gel coats used in the past 12 months in an operation

502.4 **Emission Testing:** Capture and control efficiency of an emissions control device shall be determined according to:

a. "Guidelines for Determining Capture Efficiency", January 9, 1995, Candace Sorrell, Source Characterization Group A, Office of Air Quality Planning and Standards, US EPA; or

b. EPA Reference Method 204 – Criteria for and Verification of a Permanent or Temporary Total Enclosure, 40 CFR 51, Appendix M; or applicable Subparts 204A, 204B, 204C, 204D, 204E, or 204F; or

c. EPA Reference Method 18 – Measurement of Gaseous Organic Compound Emissions by Gas Chromatography, 40 CFR 60, Appendix A; or

d. EPA Reference Method 25 – Determination of Total Gaseous Nonmethane Organic Emissions as Carbon, 40 CFR 60, Appendix A; or applicable Subparts 25A or 25B.

Maricopa County Air Quality Dept.
Planning & Analysis Division
1001 N. Central Ave. Ste. 125
Phoenix, AZ 85004

MARICOPA COUNTY
AIR POLLUTION CONTROL REGULATIONS
REGULATION III – CONTROL OF AIR CONTAMINANTS

RULE 357
MISCELLANEOUS INDUSTRIAL ADHESIVES

INDEX

229 REINFORCED PLASTIC COMPOSITE
230 RUBBER
231 SEALANT
232 SHEET RUBBER LINING INSTALLATION
233 SINGLE-PLY ROOF MEMBRANE
234 SINGLE-PLY ROOF MEMBRANE ADHESIVE PRIMER
235 SINGLE-PLY ROOF MEMBRANE INSTALLATION AND REPAIR ADHESIVE
236 STRUCTURAL GLAZING
237 SUBFLOOR INSTALLATION
238 THIN METAL LAMINATING ADHESIVE
239 TIRE REPAIR
240 VOC CONTENT
241 WATERPROOF RESORCINOL GLUE

SECTION 300 – STANDARDS

301 APPLICATION OF ADHESIVES
302 APPLICATION METHODS FOR APPLYING ADHESIVES
303 WORK PRACTICE: SURFACE PREPARATION
304 WORK PRACTICE: CLEANUP OF ADHESIVE AND ADHESIVE PRIMER APPLICATION EQUIPMENT
305 WORK PRACTICE: HANDLING AND DISPOSAL OF VOC-CONTAINING ADHESIVES AND RELATED MATERIALS
306 EMISSION CONTROL SYSTEM (ECS) USED INSTEAD OF EQUIPMENT/PRACTICES
307 REQUIREMENTS FOR AIR POLLUTION CONTROL EQUIPMENT AND ECS MONITORING EQUIPMENT

SECTION 400 – ADMINISTRATIVE REQUIREMENTS

401 COMPLIANCE SCHEDULE

SECTION 500 – MONITORING AND RECORDS

501 RECORDKEEPING AND REPORTING
502 ECS RECORDING REQUIREMENTS
503 COMPLIANCE DETERMINATION AND TEST METHODS
504 FORMULA FOR TOTAL VOC VAPOR PRESSURE

Maricopa County Air Quality Dept.
Planning & Analysis Division
1001 N. Central Ave. Ste. 125
Phoenix, AZ 85004

Adopted XX/XX/XX

MARICOPA COUNTY
AIR POLLUTION CONTROL REGULATIONS
REGULATION III – CONTROL OF AIR CONTAMINANTS

RULE 357
MISCELLANEOUS INDUSTRIAL ADHESIVES

SECTION 100 – GENERAL

101 **PURPOSE:** To limit the emission of volatile organic compounds (VOCs) from the manufacture, supply, use of miscellaneous industrial adhesives and/or adhesive primers.

102 **APPLICABILITY:** This rule applies to adhesives and adhesive primers listed in Table 357-1.

102.1 Adhesive and/or adhesive primer usage regulated under this rule includes, but is not limited to, the application of adhesive, adhesive preparation/mixing at the facility, applying the adhesive, and the cleanup of the adhesive application equipment.

102.2 In addition to this rule, facilities may be subject to New Source Performance Standards (NSPS) in Rule 360 and/or to National Emission Standards for Hazardous Air Pollutants (NESHAP) in Rule 370 of these rules.

103 **TOTAL EXEMPTIONS:** This rule is not applicable to the following limits or materials and the exemption status shall be justified by documenting the VOC containing materials used according to Section 501.3 of this rule.

103.1 **VOC Emissions**: Facility VOC emission that are less than 15 lb/day (6.8 kg/day) or 2.7 tons per 12-month rolling period including industrial adhesives, related cleaning activities prior to controls; or

103.2 Tire Repair; or

103.3 Flat Wood Paneling; or

103.4 Field operations including construction; or

103.5 Maintenance activities not associated with those regulated by the rule.

104 **PARTIAL EXEMPTIONS:** The following activities are exempt from the VOC limits listed in Section 301, Table 357.1 and the 90% control efficiency listed in Section 307.1, but still shall comply with the application methods in Section 302 and the work practices listed in Sections 303, 304 and 305:

104.1 Adhesives or adhesive primers being tested or evaluated in any research and development, quality assurance, or analytical laboratory; or

104.2 Adhesives or adhesive primers used in the assembly, repair, or manufacture of aerospace or undersea-based weapon systems; or

104.3 Adhesives or adhesive primers used in medical equipment manufacturing operations; or

104.4 Cyanoacrylate adhesive application processes; or

104.5 Aerosol adhesive and aerosol adhesive primer application processes; or

104.6 Processes using adhesives and adhesive primers that are supplied to the manufacturer in containers with a net volume of 16 ounces or less, or a net weight of one pound or less; or

104.7 Processes using polyester bonding putties to assemble fiberglass parts at fiberglass boat manufacturing facilities and at other reinforced plastic composite manufacturing facilities.

Maricopa County Air Quality Dept.
Planning & Analysis Division
1001 N. Central Ave. Ste. 125
Phoenix, AZ 85004

105 **CATEGORICAL EXEMPTIONS:** This Rule 357 does not apply to adhesives or adhesive primers used in the following operations:

105.1 Aerospace Manufacturing and Rework Operations (Rule 348).

105.2 Surface Coating Operations (Rule 336)

105.3 Graphic Arts (Rule 337).

105.4 Semiconductor Manufacturing (Rule 338).

105.5 Polystyrene Foam Operations (Rule 358).

105.6 Coating Wood Furniture and Fixtures (Rule 342).

105.7 Vehicle and Mobile Equipment Coating (Rule 345).

105.8 Coating Wood Millwork (Rule 346).

105.9 Rubber Tire Manufacturing.

105.10 Adhesives applied to any auto or truck parts.

SECTION 200 – DEFINITIONS: For the purpose of this rule, the following definitions apply, in addition to those definitions found in Rule 100: General Provisions and Definitions of these rules. In the event of any inconsistency between any of the Maricopa County air pollution control rules, the definitions in this rule take precedence.

201 **ACRYLONITRILE-BUTADIENE-STYRENE OR ABS WELDING** – Any process to weld acrylonitrile-butadiene-styrene pipe.

202 **ADHESIVE** – A chemical substance that is applied for the purpose of bonding two surfaces together other than by mechanical means.

203 **ADHESIVE PRIMER** – Any product intended by the manufacturer for application to a substrate, prior to the application of an adhesive, to provide a bonding surface.

204 **AEROSOL ADHESIVE OR ADHESIVE PRIMER** – An adhesive or adhesive primer packaged as an aerosol product in which the spray mechanism is permanently housed in a non-refillable can designed for handheld application without the need for ancillary hoses or spray equipment.

205 **CERAMIC TILE INSTALLATION ADHESIVE** – Any adhesive intended by the manufacturer for use in the installation of ceramic tiles.

206 **CHLORINATED POLYVINYL CHLORIDE PLASTIC OR CPVC PLASTIC WELDING** – A polymer of the vinyl chloride monomer that contains 67% chlorine and is normally identified with a CPVC marking.

207 **CHLORINATED POLYVINYL CHLORIDE WELDING OR CPVC WELDING** – An adhesive labeled for welding of chlorinated polyvinyl chloride plastic.

208 **CONTACT BOND ADHESIVE** – An adhesive that: (i) is designed for application to both surfaces to be bonded together, and (ii) is allowed to dry before the two surfaces are placed in contact with each other, and (iii) forms an immediate bond that is difficult, to reposition after both adhesive-coated surfaces are placed in contact with each other, and (iv) does not need sustained pressure or clamping of surfaces after the adhesive-coated surfaces have been brought together using sufficient momentary pressure to establish full contact between both surfaces. *Contact bond* does not include rubber cements that are primarily intended for use on paper substrates. *Contact bond* also does not include vulcanizing fluids that are designed and labeled for tire repair only.

209 **COVE BASE** – A flooring trim unit, generally made of vinyl or rubber, having a concave radius on one edge and a convex radius on the opposite edge that is used in forming a junction between the bottom wall course and the floor or to form an inside corner.

210 **COVE BASE INSTALLATION ADHESIVE** – Any adhesive intended by the manufacturer to be used for the installation of cove base or wall base on a wall or vertical surface at floor level.

211 **CYANOACRYLATE ADHESIVE** – Any adhesive with a cyanoacrylate content of at least 95 percent by weight.

212 **ETHYLENE PROPYLENE DIENE TERPOLYMER (EPDM) ROOF MEMBRANE** – A prefabricated single sheet of elastomeric material composed of ethylene propylenediene monomer and that is field applied to a building roof using one layer or membrane material.

213 **FLEXIBLE VINYL** – A non-rigid polyvinyl chloride plastic with at 5 percent by weight plasticizer content.

214 **HIGH VOLUME-LOW PRESSURE SPRAY EQUIPMENT**–Equipment used to apply adhesives by means of a spray gun designed to be operated and is operated between 0.1 and 10.0 pounds per square inch gauge (psig) air atomizing pressure, measured dynamically at the center of the air cap and at the air horns.

215 **INDOOR FLOOR COVERING INSTALLATION ADHESIVE** – Any adhesive intended by the manufacturer for use in the installation of wood flooring, carpet, resilient tile, vinyl tile, vinyl backed carpet, resilient sheet and roll or artificial grass. Adhesives used to install ceramic tile and perimeter bonded sheet flooring with vinyl backing onto a non-porous substrate, such as flexible vinyl, are excluded from this category.

216 **LAMINATE** – A product made by bonding together two or more layers of material.

217 **METAL TO URETHANE/RUBBER MOLDING OR CASTING ADHESIVE** –Any adhesive intended by the manufacturer to bond metal to high density or elastomeric urethane or molded rubber materials, in heater molding or casting processes, to fabricate products such as rollers for computer printers or other paper handling equipment.

218 **MULTIPURPOSE CONSTRUCTION ADHESIVE** – Any adhesive intended by the manufacturer for use in the installation or repair of various construction materials, including but not limited to drywall, subfloor, panel, fiberglass reinforced plastic (FRP), ceiling tile and acoustical tile.

219 **OUTDOOR FLOOR COVERING INSTALLATION ADHESIVE** – Any adhesive intended by the manufacturer for use in the installation of floor covering that is not in an enclosure and that is exposed to ambient weather conditions during normal use.

220 **PANEL INSTALLATION** – The installation of plywood, pre-decorated hardboard (or tileboard), fiberglass reinforced plastic, and similar pre-decorated or non-decorated panels to studs or solid surfaces using an adhesive formulated for that purpose.

221 **PERIMETER BONDED SHEET FLOORING INSTALLATION** – The installation of sheet flooring with vinyl backing onto a nonporous substrate using an adhesive designed to be applied only to a strip of up to four inches wide around the perimeter of the sheet flooring.

222 **PLASTIC SOLVENT WELDING ADHESIVE** – Any adhesive intended by the manufacturer for use to dissolve the surface of plastic to form a bond between mating surfaces.

Maricopa County Air Quality Dept.
Planning & Analysis Division
1001 N. Central Ave. Ste. 125
Phoenix, AZ 85004

223 **PLASTIC SOLVENT WELDING ADHESIVE PRIMER** – Any primer intended by the manufacturer for use to prepare plastic substrates prior to bonding or welding.

224 **PLASTIC FOAM** – Foam constructed of plastics.

225 **PLASTICS** – Synthetic materials chemically formed by the polymerization of organic (carbon-based) substances. Plastics are usually compounded with modifiers, extenders, and/or reinforcers and are capable of being molded, extruded, cast into various shapes and films, or drawn into filaments.

226 **POLYVINYL CHLORIDE PLASTIC OR PVC PLASTIC** – A polymer of the chlorinated vinyl monomer that contains 57% chlorine.

227 **POLYVINYL CHLORIDE WELDING ADHESIVE OR PVC WELDING ADHESIVE** – Any adhesive intended by the manufacturer for use in the welding of PVC plastic pipe.

228 **POROUS MATERIAL** – A substance that has tiny openings, often microscopic, in which fluids may be absorbed or discharged, including, but not limited to, paper and corrugated paperboard. For the purposes of this rule, *porous material* does not include wood.

229 **REINFORCED PLASTIC COMPOSITE** – A composite material consisting of plastic reinforced with fibers.

230 **RUBBER** – Any natural or manmade rubber substrate, including but not limited to, styrene-butadiene rubber, polychloroprene (neoprene), butyl rubber, nitrile rubber,chlorosulfonated polyethylene and ethylene propylenediene terpolymer.

231 **SEALANT** – Any material with adhesive properties that is formulated primarily to fill, seal, or waterproof gaps or joints between two surfaces and includes primer and caulks.

232 **SHEET RUBBER LINING INSTALLATION** – The process of applying sheet rubber liners by hand to metal or plastic substrates to protect the underlying substrate from or abrasion. These operations also include laminating sheet rubber to fabric by hand.

233 **SINGLE-PLY ROOF MEMBRANE** – A prefabricated single sheet of rubber, normally ethylene-propylenediene terpolymer, that is field applied to a building roof using one layer of membrane material. For the purposes of this rule, *single-ply roof membrane* does not include membranes prefabricated from ethylene-propylenediene monomer (EPDM).

234 **SINGLE-PLY ROOF MEMBRANE ADHESIVE PRIMER** – Any primer labeled for use to clean and promote adhesion of the single-ply roof membrane seams or splices prior to bonding.

235 **SINGLE-PLY ROOF MEMBRANE INSTALLATION AND REPAIR ADHESIVE** – Any adhesive labeled for use in the installation or repair of single-ply roof membrane. Installation includes, as a minimum, attaching the edge of the membrane to the edge of the roof and applying flashings to vents, pipes and ducts that protrude through the membrane. Repair includes gluing the edges of torn membrane together, attaching a patch over a hole and reapplying flashings to vents, pipes or ducts installed through the membrane.

236 **STRUCTURAL GLAZING** – A process that includes the application of adhesive to bond glass, ceramic, metal, stone or composite panels to exterior building frames.

237 **SUBFLOOR INSTALLATION** – The installation of subflooring material over floor joists, including the construction of any load bearing joists. Subflooring is covered by a finish surface material.

238 **THIN METAL LAMINATING ADHESIVE** – Any adhesive intended by the manufacturer for use in bonding multiple layers of metal to metal or metal to plastic in the production of electronic or magnetic components in which the thickness of the bond line(s) is less than 0.25 millimeters.

239 **TIRE REPAIR** – A process that includes expanding a hole, tear, fissure or blemish in a tire casing by grinding or gouging, applying adhesive and filling the hole or crevice with rubber.

240 **VOC CONTENT** – In this rule, VOC content is determined by one of the following two formulas: To determine compliance with the VOC limits in Section 301 of this rule or the 2.0 lb VOC/gal threshold in Section 302 of this rule, use the following formula in Section 240.1 of this rule. For other purposes, use the formula in Section 240.2 of this rule:

240.1 **VOC CONTENT MINUS EXEMPT COMPOUNDS** (is the same as VOC CONTENT MINUS EXEMPT EVAPORATING COMPONENTS) (also known as "THE EPA METHOD 24 VOC CONTENT" on manufacturer's data sheets.)

VOC Content Minus Exempt Compounds $$\frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Using consistently either English or metric measures in the calculations, where:

W_s = weight of all volatile material in pounds (or grams), including VOC, water, non-precursor organic compounds and dissolved vapors

W_w = weight of water in pounds (or grams)

W_{es} = weight of all non-precursor compounds in pounds (or grams)

V_m = volume of total material in gallons (or liters)

V_w = volume of water in gallons (or liters)

V_{es} = volume of all non-precursor compounds in gallons (or liters)

240.2 VOC CONTENT OF MATERIAL (MATERIAL VOC-CONTENT)

$$\text{VOC Content of Material} = \frac{W_s - W_w - W_{es}}{V_m}$$

Using consistently either English or metric measures in the calculations, where: W_s = weight of all volatile material in pounds (or grams) including VOC, water, non-precursor organic compounds and dissolved vapors

W_w weight of water in pounds (or grams)

W_{es} weight of all non-precursor compounds in pounds (or grams)

V_m volume of total material in gallons (or liters)

241 **WATERPROOF RESORCINOL GLUE** – A two-part resorcinol-resin-based adhesive designed for applications where the bond line must be resistant to conditions of continuous immersion in fresh or salt water.

SECTION 300 – STANDARDS

301 **APPLICATION OF ADHESIVES**: An owner or operator shall comply with one of the following for all applications of adhesives:

301.1 Meet the limits in Section 301, Table 357-1; or

301.2 Operate an Emission Control System (ECS) in accordance with Section 307 when applying a coating that exceeds the VOC limits in Table 357-1; or

301.3 Qualify for an exemption under Sections 104 and 105.

TABLE 357-1

INDUSTRIAL ADHESIVE EMISSION LIMITS		
	VOC LIMITS AS APPLIED: VOC content minus exempt compounds (section 240.1 of this rule)	
GENERAL ADHESIVE APPLICATION PROCESSES	Column II lbs/gal	g/liter
Reinforced Plastic Composite	1.7	200
Flexible Vinyl	2.1	250
Metal	0.3	30
Porous Metal (except wood)	1.0	120
Rubber	2.1	250
Wood	0.3	30
Other Substrates	2.1	250
SPECIALTY ADHESIVE APPLICATION PROCESSES		
Ceramic Tile Installation	1.1	130
Contact Adhesive	2.1	250
Cove Base Installation	1.3	150
Floor Covering Installation (Indoor)	1.3	150
Floor Covering Installation (Outdoor)	2.1	250
Floor Covering Installation (Perimeter Bonded Sheet Vinyl)	5.5	660
Metal to Urethane/Rubber Molding or Casting	7.1	850
Multipurpose Construction	1.7	200
Plastic Solvent Welding (ABS)	3.3	400
Plastic Solvent Welding (Except ABS)	4.2	500
Sheet Rubber Lining Installation	7.1	850
Single-Ply Roof Membrane Installation/Repair (Except EPDM)	2.1	250
Structural Glazing	0.8	100
Thin Metal Laminating	6.5	780
Waterproof Resorcinol Glue	1.4	170
ADHESIVE PRIMER APPLICATION PROCESSES		
Plastic Solvent Welding Adhesive Primer	5.4	650
Single-Ply Roof Membrane Adhesive Primer	2.1	250

Other Adhesive Primer	2.1	250

* If an adhesive is used to bond dissimilar substances together, then the applicable substrate category with the highest VOC emission limit is recommended as the limit for such application.

** Emission limits are mass of VOC per volume of adhesive or adhesive primer excluding water and exempt compounds, as applied.

302 APPLICATION METHODS FOR APPLYING ADHESIVES: An owner or operator shall employ one of the following for all applications of adhesives or adhesive primers containing more than 2 pounds of VOC per gallon (240 g/L) minus exempt compounds:

302.1 A High-Volume, Low Pressure (HVLP) spray gun; or any method which is approved by the Administrator of the Federal EPA and the Control Officer as having a transfer efficiency of 65% or greater; or

302.3 An electrostatic spray system; or

302.4 A system that atomizes principally by hydraulic pressure, including "airless" and "air assisted airless"; or

302.5 Non-atomizing or non-spraying application methods, such as but not limited to dipping, rolling, brushing, flow coating, hand application or using a mechanical caulking gun; or

302.6 Dip coat (including electro-deposition); or

302.7 Flow coat or

302.8 Other adhesive application method capable of achieving a transfer efficiency equivalent to or better than that achieved by HVLP spraying.

303 WORK PRACTICE: CLEANUP OF ADHESIVE AND ADHESIVE PRIMER APPLICATION EQUIPMENT: An owner or operator must comply with the following procedures when using VOC-containing material to clean adhesive or adhesive primer application equipment:

303.1 Spray-Gun Cleaning Requirements:

a. An owner or operator subject to this rule shall clean spray-guns without spraying or atomizing a solvent cleaner with the gun.

b. Spray-Gun Cleaning Machine: An owner or operator subject to this rule shall use a spray-gun cleaning machine that complies with the following requirements unless the owner or operator complies with the manual spray-gun cleaning requirements in Section 303.3(c) of this rule.

(1) Spray-Gun Cleaning Machine-General Requirements: The spray-gun cleaning machine shall meet all of the following requirements:

(a) Be designed to clean spray-guns.

(b) Have at least one pump which drives solvent cleaner through and over the spray-gun.

(c) Have a basin which permits containment of the solvent cleaner.

(d) Be kept in proper repair and free from liquid leaks.

(e) Shall be fitted with a cover.

(f) Be located on-site where the spray application occurs.

(2) Automatic Spray-Gun Cleaning Machine: An automatic spray-gun cleaning machine shall meet all of the following requirements:

(a) Be self-covering or enclosing when not loading or unloading.

(b) Have a self-closing cover or other self-enclosing feature which in the cover's closed position allows no gaps exceeding 1/8 inch (3 mm) between the cover and the cabinet.

(c) Be designed and maintained to prevent operation of its mechanical cleaning feature(s) unless it is completely covered or enclosed to the gap limits specified in Section 303.3(b)(2)(b) of this rule.

(3) Non-Automatic Remote Reservoir Spray-Gun Cleaning Machine: A non-automatic remote reservoir spray-gun cleaning machine shall meet all of the following requirements:

(a) Drain solvent cleaner from the sink/work-space quickly into a remote reservoir when work-space is not in use.

(b) Have the machine reservoir ability to contain VOC vapors and not have a cumulative total opening, including the drain opening(s), allowing VOC-escape to the atmosphere exceeding two square inches in area.

(c) Allow a machine design in which the base of the sink/work-space functions as the reservoir's top surface, as long as the fit/seal between sink base and reservoir container allows the reservoir to meet the opening limits specified in Section 303.3(b)(3)(b) of this rule.

c. Manual Spray-Gun Cleaning Requirements: Manual cleaning of spray-guns shall comply with the following requirements:

(1) Disassembled spray-guns must be cleaned by hand which consists of application of coatings by non-mechanical, hand-held equipment including but not limited to paint brushes, hand rollers, caulking guns, trowels, spatulas, syringe daubers, rags, and sponges; or

(2) Disassembled spray-guns must be soaked in a vat that is closed

(3) Solvent cleaners shall be less than 10 percent VOC (excluding water and non-precursor organic compounds) and shall contain less than 8.0 percent VOC by weight (including water and non-precursor organic compounds) and calculated pursuant to Section 503.3 of this rule; or

d. Vapor Pressure Limits: Solvent cleaners for both manual cleaning of spray guns or any use of cleaning solvent to clean adhesive application equipment shall have a VOC-vapor pressure below 35 mm Hg at 20°C (68°F).

303.2 Vapor Pressure Limits of Cleaning Solvent: Any person subject to this rule using VOC-solvent to clean adhesive application equipment must use only solvents which, as used, have a VOC-vapor pressure below 35 mm Hg at 20 ˚C (68° F)

305 WORK PRACTICE: HANDLING AND DISPOSAL OF VOC-CONTAINING ADHESIVES AND RELATED MATERIALS: The following measures must be taken to prevent at all times the evaporation of VOC containing materials to the atmosphere. All adhesives, adhesive primers, cleaning solvents and surface preparation solvents are subject to these following work practices:

305.1 Labeling of Containers: All containers holding VOC-containing adhesives, adhesive primers, VOC-containing cleaning materials and VOC-containing surface preparation materials that are 1 gallon or larger must be legibly labeled with their contents. The label shall be constructed such that the label is readable at all times. The label should not be soluble in the contents of the container so that the label can still be read if the contents of the can spill onto the label.

305.2 Use and Storage: For the purposes of this rule, the following definitions apply:

a. "in use" or "handled": actively engaging the materials with activities such as mixing, depositing, removing or transferring material into or out of the container. Immediately after the operation is completed, the container shall be closed.

b. **"**Containers": include but are not limited to drums, buckets, cans, pails, and trays.

c. An owner or operator shall not leave containers of VOC-containing material open/uncovered when not in use.

d. An owner or operator shall store all VOC-containing material and VOC-containing cleaning materials in closed or covered leak-free containers. An owner or operator shall not use open containers for the storage of VOC –containing materials. The containers shall be closed at all times except when the material is being handled in the containers.

305.3 **Spills**: An owner or operator must implement procedures to minimize spills of any VOC-containing material immediately during handling and transfer to and from containers, enclosed systems, waste receptacles and other equipment.

305.4 **Conveyance of VOC-Containing Materials and VOC-Containing Cleaning Materials**: All VOC-containing materials must be conveyed from one location to another in labeled, closed containers or pipes.

305.5 **Disposal of VOC-Containing Material and VOC-Containing Cleaning Material:** An owner or operator shall store all VOC-containing materials intended for disposal including, but not limited to, in closed, leak-free containers which are legibly labeled with their contents and which remain covered at all times when not in use.

306 **EMISSION CONTROL SYSTEM (ECS) USED INSTEAD OF EQUIPMENT/PRACTICES:** Instead of meeting an equipment or work practice standard within Sections 302, 303,304 or 305 of this rule, an owner or operator is allowed to instead use an ECS that has an overall combined capture and control efficiency not less than 90% and meets all ECS requirements in Section 307 of this rule.

307 **REQUIREMENTS FOR AIR POLLUTION CONTROL EQUIPMENT AND ECS MONITORING EQUIPMENT:**

307.1 ECS Control Efficiencies: To meet the requirements according to Sections 301.2, or 306 of this rule, an ECS must be operated as follows:

a. Overall ECS Efficiency: Overall, the ECS must prevent at least 90% of the mass of the VOC emitted by each adhesive or process controlled from entering the atmosphere except as controlled according to the alternative in Section 307.1(b)(2).

b. Control Efficiency of the Emissions Processing Subsystem:

(1) The emissions-processing subsystem of the ECS must reduce the mass of VOC entering it by at least 90%; or

(2) Alternative For Very Dilute Input: For VOC input-concentrations of less than 100 ppm (as carbon) at the inlet of the ECS emissions-processing subsystem, the VOC processing subsystem of an ECS also satisfies the processor efficiency requirements of this rule if:

(a) The VOC output is consistently less than 20 mg VOC/m^3 (as carbon) adjusted to standard conditions; and

(b) The ECS consistently shows an overall control efficiency of at least 90% when tested according to EPA Methods listed in Section 503.2(c) of this rule at VOC input-concentrations exceeding 100 ppm (as carbon).

(c) Providing and Maintaining ECS Monitoring Devices: Any owner or operator incinerating, adsorbing, or otherwise processing VOC emissions pursuant to this rule must provide, properly install and maintain in calibration, in good working order and in

operation, devices described in the facility's O&M Plan that indicate temperatures, pressures, rates of flow, or other operating conditions necessary to determine if air pollution control equipment is functioning properly and is properly maintained. Records must be kept according to Section 502 of this rule which demonstrate that the ECS meets the overall control standards required by Section 307.1(a) of this rule.

307.2 Operation and Maintenance (O&M) Plan Required for ECS: An owner or operator of a facility that is required to have an O&M Plan according to Section 307 shall comply with the following:

a. General Requirements: Provide and maintain an O&M Plan(s) for any ECS, any other emission processing equipment, and any ECS monitoring devices that are used according to this Rule 357 or according to an Air Quality Permit. The O& M plan must be readily available on-site at all times to the Control Officer.

b. Approval by Control Officer: Submit to the Control Officer for approval the O&M Plans of each ECS and each ECS monitoring device that is used according to this Rule 357.

c. Initial Plans: Fully comply with all O&M Plans that the owner or operator has submitted for approval, but which have not yet been approved, unless notified otherwise by the Control Officer in writing. Once the initial plan has been approved in writing by the Control Officer, an owner or operator must comply with this approved plan.

d. Revisions to Plan by Owner or Operator: Comply with the revisions to the initial plan if revisions to the initial plan have been approved by the Control Officer in writing. If revisions to the plan have not yet been approved by the Control Officer in writing, then an owner or operator must comply with the most recent O&M plan on file at Maricopa County Air Quality Department.

e. Modifications to Plan by Control Officer: Comply with the modified plan after notification by the Control Officer if the Control Officer modifies the plan in writing before the Control Officer's approval of the O & M plans.

307.3 **Providing and Maintaining ECS Monitoring Devices:** Any person incinerating, adsorbing, or otherwise processing VOC emissions pursuant to this rule shall provide, properly install and maintain in calibration, in good working order and in operation, devices described in the facility's O&M Plan that indicate temperatures, pressures, rates of flow, or other operating conditions necessary to determine if air pollution control equipment is functioning properly and is properly maintained. Records shall be kept pursuant to Section 502 of this rule which demonstrate that the ECS meets the overall control standards required by Section 305.1of this rule.

SECTION 400 – ADMINISTRATIVE REQUIREMENTS

401 **COMPLIANCE SCHEDULE**: An owner or operator of any operation or that uses an adhesive that is subject to Section 307.1 of this rule must comply with the following increments of progress:

401.1 By(insert 1 yr. after adoption of the rule), an owner or operator of any operation or that uses an adhesive that is regulated by this Rule 357 must comply with the new VOC limits listed in Section 301,Tables 357.1 of this rule.

401.2 By (insert 1 yr. after adoption of the rule), an owner or operator of any operation or that uses an adhesive that is regulated by this Rule 357 and that uses a spray gun must comply with the spray gun efficiency limits listed in Section 302.1 of this rule.

401.3 By (insert 6 months after the adoption of the rule), an owner or operator of any operation or adhesive that is regulated by Section 307.1(a) of this Rule 357 must either:

a. Submit an application or have been issued a modified permit that addresses the installation of a new ECS; or

b. Submit an application or have been issued a modified permit that addresses the modification of an existing ECS.

401.4 By (insert 1 yr. after adoption of the rule), an owner or operator of any operation or adhesive that is regulated by Section 307.1(a) of this Rule 357 must have completed the installation of the ECS and also comply with all O&M plan requirements as listed in Section 307.2 of this rule.

SECTION 500 – MONITORING AND RECORDS

501 **RECORDKEEPING AND REPORTING:** Any owner or operator subject to this rule must keep the following records in accordance with Section 501 of this rule. Records must be retained for 5 years and must be made available to the Control Officer or designee immediately upon request. Electronic or paper records are both acceptable.

501.1 Current Lists of Materials: An owner or operator must maintain a current list of all VOC-containing process materials. The usage and adhesives that are in the same category in Tables 357.1 and have similar VOC content may be recorded under a name that includes the category name. The highest VOC content among the members of that grouping must be assigned to that grouping, rounded to the nearest 10^{th} of a pound. To identify what products belong within each group, after each group name and the group's VOC content of material must appear the name of each product in the group and its VOC content of material.

a. Facilities using less than 2 gallons per day of VOC-containing material listed in Tables must keep the following records:

(1) Current Name and List: A current list including the name and listing of all VOC-containing materials, including adhesives, adhesive primers and solvents ,used in the coating; and

(2) Purchase Receipts: All purchase receipts/ invoices of VOC-containing material that is regulated by this rule for the most recent months are kept together; and

(3) Data Sheets Listing VOC Content: All current data sheets that list the VOC content of material for every VOC-containing substance currently used that is regulated by this rule. VOC content may be expressed in one of three forms: lbs. VOC/ gallon; grams of VOC per liter, or % VOC by weight. This data can be supplied to the Control Officer through certified product data sheets (CPDS) Material Safety Data Sheets (MSDS) or any other technical data sheets that identify the appropriate data on material properties and composition.

b. Facilities using more than 2 gallons per day of VOC-containing material listed in Tables 357.1 must keep the following records:

(1) Current Name and List: A current list including the name and listing of all VOC-containing materials (including adhesive, adhesive primer and solvent,) used in the coating; and

(2) VOC Content as Received: The VOC content of each of the materials listed in Section 501.1 as expressed as either pounds of VOC per gallon, grams of VOC per liter or the % weight of the VOC. The VOC content of each coating as received, minus exempt compounds. (This figure is sometimes called the "EPA Method 24" VOC content on manufacturer's data sheets). If the coating is a multi-part coating, list the VOC content which the manufacturer states the coating will have once all the necessary parts are mixed together in the proportions specified by the manufacturer.

(3) VOC Content as Applied: List Maximum VOC Content of Adhesive as Applied: For each adhesive that you thin/reduce or add any additive to, record in a permanent log either of the following:

(i) The maximum number of fluid ounces thinner/reducer that you ever add to a gallon of unreduced adhesive (or maximum g/liter), and the maximum fluid ounces of every other additive you mix into a gallon of the adhesive; or

(ii) The VOC content of the coating, after adding the maximum amount of thinner/reducer and other additives that you would ever add, as determined by the formula in Section 283.1.

(4) Mixing Ratio: The mix ratio of the VOC-containing materials.

501.2 Surface Prep Solvent and Cleanup Solvent: An owner or operator of both types of facilities listed in Section 501.1 of this rule must keep a hardcopy of the VOC vapor pressure (VP) at 20°C (68°F) of solvent(s) used to perform surface preparation and the ones used to perform cleaning of spray guns, hoses, reservoirs, and any other coating application equipment. Any one of the following ways of providing the VP data is sufficient:

a. A current manufacturer's technical data sheet; or

b. A current manufacturer's safety data sheet (MSDS); or

c. Actual test results; or

d. A letter signed by an official or lab manager of the supplying facility.

501.3 Burden of Proof for Facilities Claiming an Exemption: The owner or operator claiming an exemption under Section 103 of this rule must document the quantity of VOC materials used and keep sufficient records of the basis of such calculations to justify the exemption status.

501.4 Frequency of Records:

a. Monthly Records: The amount of each adhesive listed in Tables 357.1 and the amount of each VOC-containing material including solvents used for surface preparation, cleanup and for removal of VOC-containing residues must be kept on a monthly basis.

b. Records Update: Update records of each adhesive and VOC-containing material used that do not comply with the VOC limits in Tables 357.1 daily.

502 EMISSION CONTROL SYSTEM (ECS) RECORDING REQUIREMENTS:

502.1 On each day an ECS is used at a facility according to this rule, an owner or operator of the facility must:

a. Record the amount and VOC content of coating, the amount of catalyst/hardener, and the amounts of solvent, reducer, and diluent used that were subject to ECS control according to this Rule 336; and

b. Keep a permanent record of the of the key system operating parameters as required by the O&M Plan; and

c. Keep a permanent record of the maintenance actions taken within 24 hours of the action's completion, for each day or period in which the O&M Plan requires that maintenance be done.

502.2 An explanation must be entered for scheduled maintenance that is not performed during the period designated for it in the O&M Plan.

503 COMPLIANCE DETERMINATION AND TEST METHODS:

When more than one test method is permitted for a determination, an exceedance of the limits established in the rule determined by any of the applicable test methods constitutes a violation of this rule.

503.1 Compliance Determination: The following means must be used to determine compliance with this rule:

a. Measurement of VOC content of nonaerosol adhesives, adhesive primers and solvents subject to VOC limits listed in Sections 303, 304.2, and 357.1, of this rule must be determined by EPA Method 24.

b. The VOC content of gaseous emissions entering and exiting an ECS must be determined by either EPA Method 18 or EPA Method 25 and its submethods.

c. Capture efficiency of an ECS must be determined either by the methods in EPA Method 204 and its submethods or by using mass balance calculation methods in concert with the methods in EPA Methods 2, 2a, 2c, and 2d.

d. Temperature measurements must be performed with an instrument with an accuracy and precision of less than one-half degree Fahrenheit (0.25°C) for temperatures up to 480°F (250°C).

e. Spray equipment transfer efficiency must be determined by the SCAQMD test method entitled "Spray Equipment Transfer Efficiency Test Procedure for Equipment User, "May 24, 1989.

503.2 Test Methods Incorporated by Reference: The EPA test methods as they exist in the Code of Federal Regulations (CFR) are incorporated by reference in Appendix G of the Maricopa County Air Pollution Control Rules and Regulations. The other test method listed here from the South Coast Air Quality Management District (SCAQMD) is also adopted by reference, having paired with it a specific date that identifies the particular version/revision of the method that is adopted by reference. Copies of test methods referenced in this Section 503 are available at the Maricopa County Air Quality Department, Planning and Analysis Division, 1001 North Central Avenue, Phoenix, AZ, 85004 or by calling (602)506-0169.

a. California South Coast Air Quality Management District (SCAQMD) Test Method, May 24, 1989, "Spray Equipment Transfer Efficiency Test Procedure for Equipment User."

504 **FORMULA FOR TOTAL VOC VAPOR PRESSURE:** Equivalent to: VOC COMPOSITE PARTIAL PRESSURE. Reference Section 303.2.

$$PP_c = \frac{\sum_{i=1}^{n} (W_i)(VP_i) / MW_i}{\frac{W_w}{18} + \sum_{i=1}^{m} \frac{W_{ej}}{MW_{ej}} + \sum_{i=1}^{n} \frac{W_i}{MW_i}}$$

W_i = Weight of the "i"th VOC compound in grams

W_w = Weight of water in grams

W_{ej} = Weight of the "j"th non-precursor compound in grams

MW_i = Molecular weight of the "i"th VOC compound in grams per gram mole, e.g., one gram-mole of isopropyl alcohol weighs 60 grams

MW_{ej} = Molecular weight of the "j"th non-precursor compound, e.g., 1 gram-mole of acetone weighs 58 grams

PP_c = VOC composite partial pressure at 20°C in mm mercury (Hg)

VP_i = Vapor pressure of the "i"th VOC compound at 20°C in mm Hg

18 = Weight of one gram-mole of water