

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report for

**PROPOSED AMENDED RULE 1168 – ADHESIVE AND SEALANT APPLICATIONS**

**Dated: July 2017**

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### **EXECUTIVE SUMMARY**

Rule 1168 was adopted in April 1989 to control volatile organic compounds (VOC) emissions from adhesives applications. While the rule has been amended 13 times, the last amendment was in January 2005. The rule currently limits VOC content in 41 categories of adhesives, adhesive primers, caulks, sealants and sealant primers. The rule applies to products used during manufacturing and to products used by consumers that are not regulated by the California Air Resources Board (CARB) in the Consumer Products Regulation (CPR) (1).

According to the 2016 Air Quality Management Plan (AQMP) (2), the 2017 annual average VOC emission inventory for adhesives and sealants is 4.1 tons per day (tpd) of VOC. However, a voluntary survey followed by mandatory sales information requests indicates that the inventory is actually closer to 10 tons per day. The estimate includes foam sealants that are not currently part of the 2016 AQMP inventory. The majority of emissions, more than 98 percent, come from area sources and consumer uses (e.g., architectural uses), which normally do not require permits to operate from the SCAQMD.

Over the past 17 years since the last major reduction in VOC limits from adhesive and sealant applications, the technology of low-VOC products has improved significantly. In particular, adhesives and sealants used for architectural and construction applications have significantly reduced VOC contents. Much of this progress can be attributed to efforts by adhesive and sealant manufacturers to provide environmentally preferable products such as LEED and Green Seal certified products to their customers. Building owners and architects request “green” product use by professional contractors during construction, repair, and maintenance of buildings. Institutional and household consumers also have provided incentives by preferentially purchasing lower-VOC products.

This rule amendment effort began in 2013 and continued into 2014 in attempt to clarify the current rule language and assess the feasibility of VOC reductions that would capitalize on the improvement of available technology for several currently regulated categories. During that timeframe, District staff conducted eight working group meetings, drafted six versions of proposed rule language, released a preliminary draft staff report, and surveyed regulated products sales in the SCAQMD. The 2013/2014 proposed rule amendment included technology forcing VOC reductions in several roofing adhesive and sealant categories. Those reductions were expected to be achieved by exempting dimethyl carbonate (DMC) and tertiary Butyl acetate (tBAC) from the definition of a VOC. Due to the toxicity concerns of DMC and tBAC and the uncertainty of the on-site exposure modeling methodologies, the rule amendment process was put on hold. While it was on hold, District staff conducted a toxics symposium in October 2014 and drafted an assessment on tBAC, the “tBAC Assessment White Paper” (3), which was released in October 2016. The assessment resulted in the Governing Board taking a precautionary approach when considering expanding or including an exemption for any compound with a toxic endpoint.

With the Governing Board’s decision not to allow further VOC exemptions for DMC or tBAC, staff initiated the amendment to Rule 1168 with a more modest proposal on VOC reductions for roofing adhesives and sealants. As part of the 2013/2014 rule development process, District staff developed a voluntary survey of regulated products sales in the SCAQMD to improve the emission inventory and to assess product market share. The survey was designed and conducted with

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feedback from interested stakeholders and trade associations. Initially, the response was insufficient from most of the industry, resulting in Notices to Comply to collect additional information on products and to establish a current inventory. Based on stakeholder feedback, staff believes there remains significant underreporting in the survey conducted in 2013.

The 2016 AQMP, specifically Control Measure CTS-01 - Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants, includes Rule 1168 as a VOC rule that may be targeted for further VOC emission reductions. Proposed Amended Rule (PAR) 1168 will partially implement CTS-01 and MCS-01 Application of All Feasible Measures Assessment [All Pollutants].

The purpose of PAR 1168 is to further reduce VOC and toxic air contaminant emissions from adhesives and sealants by relying on improvements in technology during the last 17 years. Staff proposes the following requirements for PAR 1168:

- Clarify that the rule applies to consumer product adhesives, adhesive primers, caulks, sealants and sealant primers not regulated by CARB.
- Revise, delete, and add certain definitions.
- Amend VOC limits for certain adhesives, adhesive primers, caulks, sealants and sealant primers and allow for a three-year sell through/use through.
- Establish new categories and VOC content limits to reflect technological advances.
- Include a most restrictive clause requiring that products marketed for use under varying categories be subject to the lower VOC limit of the varying categories.
- Prohibit storage of non-compliant regulated products on site unless those regulated products are being stored on site for the purpose of shipment outside of the District.
- Add test methods for VOC content analyses.
- Add requirements for labeling regulated product containers.
- Include reporting requirements for:
  - Manufacturers, private labelers, and Big Box retailers who sell regulated products, aerosol adhesives, and adhesive primers into or within the District; and
  - Facilities that use the 55 gallon per year exemption.
- Prohibit the use of Group II Exempt Solvents, except volatile methyl siloxanes, for regulated products.
- Include a technology assessment for the following categories:
  - Foam Sealants
  - Plastic Cement Welding, including ABS to PVC Transition Cement Welding, CPVC Cement Welding, and PVC Cement Welding
  - Top and Trim Adhesives
- Remove, limit, or add exemptions.

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- Expand the applicability of the rule to include consumer products used during manufacturing.
- Include streamlined recordkeeping options for regulated products with VOC content of 20 grams per liter (g/L) or less.
- Exempt regulated products with a viscosity of 200 centipoise or greater from transfer efficiency requirements.

The estimated rule inventory is 10.5 tpd. The projected emission reductions from the proposed amendments are 1.4 tpd of VOC emissions by 2023.

### **BACKGROUND**

Rule 1168 was adopted in April 1989 to control VOC emissions from adhesive applications. The rule has been amended 13 times, the last amendment was in January 2005. In 1997, several categories were added to the rule, including sealants and sealant primers. In terms of VOC reductions, the last six amendments, dating back to 1998, have been associated with attempts to minimize VOC emissions from Acrylonitrile-Butadiene-Styrene (ABS), Chlorinated Polyvinyl Chloride (CPVC), Polyvinyl Chloride (PVC), and Top and Trim adhesives. The amendments either extended effective dates or rescinded the proposed limits. During that period, several key amendments were made to prohibit sales of non-compliant products and to restrict the usage of some toxic chemicals including methylene chloride, perchloroethylene and trichloroethylene.

The current rule limits VOC content in 41 categories of adhesives, adhesive primers, caulks, sealants and sealant primers. The rule applies to products used during manufacturing at stationary sources and to products used by consumers that are not regulated by the CARB CPR.

Adhesive and sealant use subject to the rule spans a wide range of industries that have miscellaneous uses during manufacturing. The industry sectors that make extensive use of products subject to this rule include (4):

- Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing (NAICS 333415)
- All Other Rubber Product Manufacturing (NAICS 326299)
- Commercial and Institutional Building Construction (NAICS 236220)
- Custom Architectural Woodwork and Millwork Manufacturing (NAICS 337212)
- Drywall and Insulation Contractors (NAICS 238310)
- Flooring Contractors (NAICS 238330)
- Footwear Manufacturing (NAICS 316210)
- Glass and Glazing Contractors (NAICS 238150)
- Hardwood Veneer and Plywood Manufacturing (NAICS 321211)
- Household Furniture (except Wood and Metal) Manufacturing (NAICS 337125)
- Industrial Building Construction (NAICS 236210)
- Manufactured Home (Mobile Home) Manufacturing (NAICS 321991)
- Motor Vehicle Seating and Interior Trim Manufacturing (NAICS 336360)
- New Multifamily Housing Construction (except For-Sale Builders) (NAICS 236116)
- New Single-Family Housing Construction (except For-Sale Builders) (NAICS 236115)
- Office Furniture (except Wood) Manufacturing (NAICS 337214)

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- Oil and Gas Pipeline and Related Structures Construction (NAICS 237120)
- Other Millwork (including Flooring) (NAICS 321918)
- Plumbing, Heating, and Air-Conditioning Contractors (NAICS 238220)
- Polystyrene Foam Product Manufacturing (NAICS 326140)
- Residential Remodelers (NAICS 236118)
- Roofing Contractors (NAICS 238160)
- Rubber Product Manufacturing for Mechanical Use (NAICS 326291)
- Showcase, Partition, Shelving, and Locker Manufacturing (NAICS 337215)
- Siding Contractors (NAICS 238170)
- Surgical Appliance and Supplies Manufacturing (NAICS 339113)
- Tile and Terrazzo Contractors (NAICS 238340)
- Tire Retreading (NAICS 326212)
- Urethane and Other Foam Product (except Polystyrene) Manufacturing (NAICS 326150)
- Water and Sewer Line and Related Structures Construction (NAICS 237110)
- Wood Container and Pallet Manufacturing (NAICS 321920)
- Wood Kitchen Cabinet and Countertop Manufacturing (NAICS 337110)
- Wood Window and Door Manufacturing (NAICS 321911)

The industries that supply regulated products to facilities are covered by Asphalt Shingle and Coating Materials Manufacturing (NAICS 324122 and 325520) and Adhesive Manufacturing (NAICS 325520).

According to the 2016 AQMP, the total emissions inventory for adhesives and sealants is estimated to be 4.1 tons per day (tpd). The inventory does not include consumer products subject to the CARB CPR. The AQMP inventory does include emissions from small sources with permits, facilities that report as part of the Annual Emissions Reporting (AER) Program, and an estimate of emissions from small sources that do not have permits. Inclusion in the AER Program is limited to larger facilities that emit at least four tons per year of a criteria pollutant. In 2015, the AER facilities emitted 0.1 tons per day of VOC, which represents approximately one percent of the overall inventory of Rule 1168. The majority of emissions come from the large number of smaller facilities not subject to the AER program with limited data. The adhesive and sealants usage is primarily for architectural applications, which are not normally subject to SCAQMD permitting requirements. Additionally, the adhesive and sealants emissions also result from those smaller sources that may be more apt to take advantage of the 55 gallon per year exemption from VOC content limits provided for in the rule.

The current rule amendment process began in 2013, at which time District staff conducted eight working group meetings and drafted six versions of proposed rule language. As part of the 2013/2014 rule amendment process, the SCAQMD also developed a voluntary survey of product sales in the SCAQMD to improve the emission inventory and to assess product market share. The initial results from the survey were somewhat inconclusive because of limited participation. Further steps were taken to require manufacturers to provide sales information, which significantly improved the dataset.

During the 2013/2014 amendment, staff considered exempting both tBAc and DMC from the definition of a VOC. This proposal would have achieved substantial VOC emission reductions.

However, the rule amendment was put on hold in 2014 due to toxicity concerns of tBAC and DMC, and uncertainty of the on-site exposure modeling methodologies. Staff held a Toxic Symposium in October 2014 and developed the “tBAC Assessment White Paper”, which was initially released in October 2015. As a result of that work, the Governing Board adopted a precautionary approach such that compounds with a known or suspected toxic endpoint will not be exempted from the definition of the VOC. In May 2017, District staff resumed the proposed amendment to Rule 1168, without the proposed exemptions for tBAC and DMC.

Relying on the survey from 2013/2014, with a growth factor applied to estimate increased usage (population growth was used as a surrogate for increased usage) staff estimates that the current inventory for adhesives and sealants is 10.5 tpd.

Staff is proposing mandatory sales reporting of regulated product sales be submitted every three years until 2025, then every 5 years, with a sunset date in 2040. This reporting will provide an accurate emission inventory and more detailed data that can be utilized as a tool for future rule development.

### **CARB CONSUMER PRODUCTS REGULATION AND SCAQMD RULE 1168**

The proposed rule language includes clarifications on the applicability of the rule compared to those products in the CARB CPR. The current rule language exempts products subject to the CARB CPR from Rule 1168 requirements. Staff is proposing to clarify that this exemption, (i)(11), applies to products subject to the CARB CPR provided those products are “used by household and institutional consumers or by manufacturing facilities for repair or maintenance.” Staff is also proposing to amend the applicability section to explicitly state what is regulated by the CARB CPR:

“This rule also applies to all use of adhesives, adhesive primers, sealants or sealant primers excluding consumer and institutional use where the units of product, less packaging, weigh less than one pound and consist of less than 16 fluid ounces, and where there is an applicable VOC limit in the California Air Resources Board (CARB) Consumer Products Regulation (Title 17 of the California Code of Regulations, Section 94507, et. Seq.).”

The proposed clarification serves to explicitly state the District’s regulatory authority regarding Rule 1168. However, codifying this interpretation has caused concern and uncertainty concerning which products would be regulated by the CARB CPR versus the SCAQMD Rule 1168. The CARB CPR regulates adhesives and sealants explicitly defined within the regulation that weigh less than one pound and consist of less than 16 fluid ounces. The CARB CPR has the following seven general categories:

- Adhesives
  - Aerosol Adhesives;
  - Construction, Panel, or Floor Covering Adhesives;
  - Contact Adhesives, both for General Purpose and Special Purpose; and
  - General Purpose Adhesives
- Sealant or Caulking Compounds

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- Chemically Curing, nonaerosol; and
- Nonchemically Curing, nonaerosol.

The definitions of each of these broad categories list subcategories that are explicitly included and excluded from the definition. Those definitions are vital in determining the applicability of the CARB CPR compared to SCAQMD Rule 1168 since those subcategories that are excluded from the definitions of the CARB CPR would be subject to Rule 1168 regardless of the container size, such as clear/paintable/water resistant caulking compounds, roof cements, and roof sealants.

During the 2013/2014 rule amendment process, District staff received correspondence (5) from CARB regarding the SCAQMD's regulatory authority over consumer products. As stated on page 4 of Enclosure 2 of the letter:

*“To put the issue very simply, consumer products include the many chemically formulated products commonly available in such outlets as supermarkets, hardware stores, catalog sale companies, etc., that consumers purchase for use in and around their homes (i.e., household products). It is also fairly clear that certain products are not consumer products (i.e., products used by industrial facilities, where the products are “. . . incorporated into or used exclusively in the manufacture or construction of the goods or commodities at the site of the establishment . . .”). For example, “consumer products” do not include such products as fabric protectants and adhesives that are applied to furniture at a factory, as part of the manufacturing process. The definitions set forth above are intended to make this basic distinction.”*

ARB made it clear in that letter that SCAQMD has regulatory authority to regulate VOC emissions from stationary sources, even if those products are consumer products used at that site, provided they are used exclusively for the manufacturing process. The correspondence also helped clarify what is meant by products that are part of the manufacturing operation, as can be found on page 10 of the CARB correspondence letter:

*“Products “used as part of manufacturing operation” fall into two general categories, both of which the SCAQMD has the authority to regulate. The first category consists of products that are commonly referred to as industrial products, which are products that are incorporated into or used exclusively in the manufacture or construction of the goods or commodities at the site of the establishment. These products may be regulated by the SCAQMD because they are not “consumer products” as that term is defined in ARB regulations, and ARB Consumer Products Regulations thus do not apply to these products.”*

*“The second category consists of products that are “consumer products” (as that term is defined in ARB Consumer Products Regulations), and have VOC limits specified in ARB regulations, when such products are used at stationary sources such as manufacturing facilities. ARB's position is that the SCAQMD can regulate the use of consumer products at stationary sources, as part of the long-standing authority of local air districts to regulate pollution generating activities at stationary sources.”*

SCAQMD recognizes that there are household products that some commercial facilities use that will fall under the regulatory authority of the CARB CPR. Other products may primarily be used in an industrial setting but can be purchased at a local hardware store. In these cases, the primary purpose and use of the product will determine if it falls under the CARB CPR or SCAQMD Rule 1168. Further, the use of the phrase “used *exclusively* in the manufacture or construction of the goods or commodities” from the definition of “Institutional Product” in the CARB CPR is not intended as a mechanism for rule circumvention. If an adhesive is used primarily for the manufacturing process at a stationary source or facility, but there is some incidental institutional use, such as the maintenance or repair of the facility, the SCAQMD would interpret that product as being subject to Rule 1168.

CARB’s *Advisory 307 Industrial & Institutional Products Definition Clarification* (6) also addresses questions about the definition of Industrial and Institutional products and applicability in the CARB CPR. Question number three within that advisory addresses the concern of the use of a CPR noncompliant glass cleaner on a finished product from the assembly line of a manufacturing facility. The question in this scenario asks if the use of the glass cleaner for that purpose would exempt the product from the CARB CPR. CARB’s response within the advisory states that if the noncompliant product is designed to be used exclusively to clean finished products manufactured at the site of an establishment, such products are exempt from the CPR, even though they are not “actually incorporated into” the manufactured goods or commodities. Such a product may instead be subject to local air district regulations with jurisdiction over the manufacturing site. Although CARB’s example in the advisory was a cleaning product, the explanation of use for this purpose in a manufacturing assembly line could also explain the use of an adhesive or sealant in a similar setting.

Rule 1168 is written and implemented consistently with other SCAQMD VOC rules, such as Rule 1171 – Solvent Operations. The subjectivity to SCAQMD VOC rules versus CARB CPR is consistent with the SCAQMD’s long standing implementation and interpretation of applicability between the two regulations as stated in the CARB correspondence letter (page 3 of Enclosure 3) quoted below:

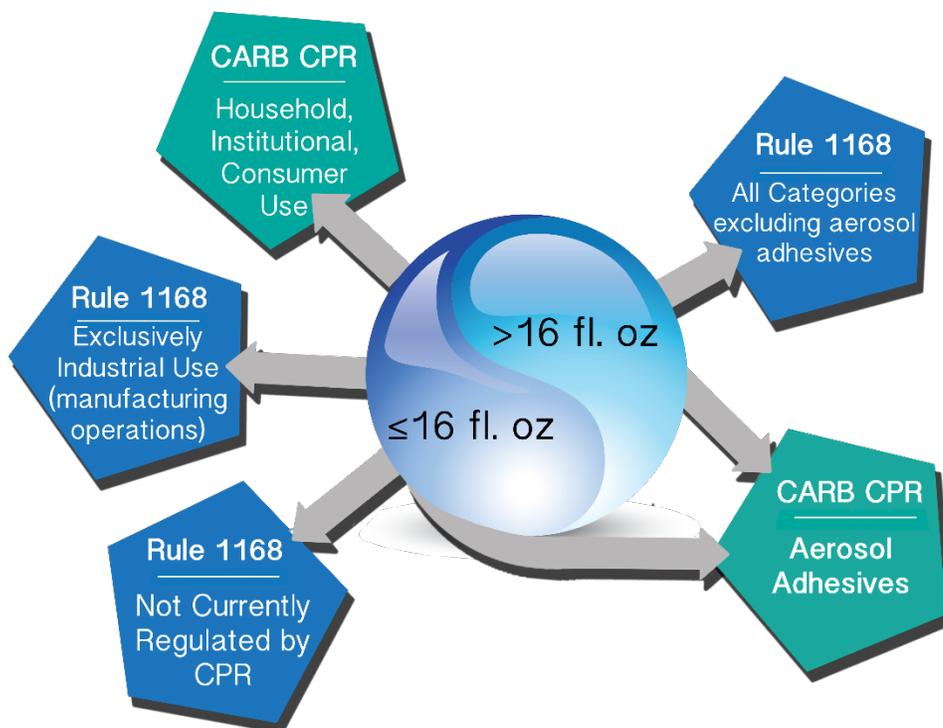
*“Turning to SCAQMD Rule 1171, at first glance Rule 1171 appears to apply very broadly. However, it is my understanding from your letter that Rule 1171 is not interpreted or applied by the SCAQMD in this manner. Your letter states the rule is not applied to individuals who perform solvent cleaning (e.g., a consumer using automotive brake cleaners on their own car), but is instead applied only to “solvent cleaning operations” (I.e., stationary and area sources that the SCAQMD has traditionally regulated). In other words, Rule 1171 is designed to regulate activities that occur at permitted stationary sources, and such unpermitted stationary sources (including area sources) that have been traditionally regulated by the districts. As such, it falls squarely within the long-established authority of the districts to regulate activities of stationary sources, and was adopted for a different purpose than the ARB consumer products regulation. It is therefore our opinion that SCAQMD Rule 1171, as interpreted and applied by the SCAQMD, is not preempted by Health and Safety Code section 41712(f).”*

Based on the information above, the proposed rule language also clarifies that any adhesive or sealant used to manufacture or construct goods or commodities, regardless of size, are regulated

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under Rule 1168 if those activities do not make use of products regulated by the CARB CPR. The figure shown attempts to demonstrate the applicability of the two regulations.

Figure 1: SCAQMD Rule 1168 Applicability versus the CARB CPR



The figure above differentiates those products equal to or less than 16 fluid ounces in size that are regulated by the CARB CPR versus SCAQMD Rule 1168. For all applicable products greater than 16 fluid ounces, SCAQMD Rule 1168 applies. Aerosol adhesives are currently regulated by CARB.

The table below is provided to show which of the categories in Rule 1168 are also regulated by the CARB CPR.

Table 1: SCAQMD Rule 1168 Applicability versus the CARB CPR

Category	RULE 1168	CPR
<b>Adhesives</b>		
Architectural Applications	✓	✓
Building Envelope Membrane Adhesive	✓	
Carpet Pad Adhesive	✓	✓
Ceramic Glass, Porcelain, & Stone Tile Adhesive	✓	✓
Cove Base Adhesive	✓	✓
Dry Wall and Panel Adhesive	✓	✓
Multi-Purpose Construction Adhesives	✓	✓
Other Indoor Floor Covering Adhesives	✓	✓
Other Outdoor Floor Covering Adhesives	✓	✓
<b>Roofing</b>		
Other Roof Adhesive	✓	✓

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<b>Category</b>	<b>RULE 1168</b>	<b>CPR</b>
Single Ply Roof Membrane Adhesive	✓	✓
Structural Glazing Adhesive	✓	✓
Structural Wood Member Adhesive	✓	✓
Subfloor Adhesive	✓	✓
VCT and Asphalt Tile Adhesive	✓	✓
<b>Welding</b>		
ABS Welding	✓	
ABS to PVC Transition Cement	✓	
CPVC Welding	✓	
PVC Welding	✓	
All Other Plastic Cement Welding	✓	
Wood Flooring Adhesive	✓	✓
Computer Diskette Manufacturing	✓	
Contact Adhesive	✓	✓
Edge Glue	✓	
Rubber Vulcanization Adhesive	✓	
Special Purpose Contact Adhesive	✓	✓
Thin Metal Laminating	✓	✓
Tire Tread	✓	
Top and Trim Adhesive	✓	✓
Waterproof Resorcinol Glue	✓	
All Other Adhesives	✓	N/A
<b>Substrate Specific Adhesive Applications</b>		
Metal	✓	
Plastic Foams	✓	
Porous Material (except wood)	✓	
Wood	✓	
Fiberglass	✓	
Reinforced Plastic Composite	✓	
<b>Sealants and Caulks</b>		
<b>Architectural Applications</b>		
Clear, Paintable, Immediately Water-Resistant	✓	
Foam Sealant	✓	
Grout	✓	
Marine Deck	✓	✓
Potable Water	✓	
<b>Roofing</b>		
All Other Roof	✓	
Single-Ply Roof Membrane	✓	
All Other Architectural Applications	✓	✓
Roadway	✓	
All Other Sealants	✓	N/A
<b>Adhesive Primers</b>		
Plastic	✓	
Pressure Sensitive	✓	
Traffic Marking Tape	✓	

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Category	RULE 1168	CPR
Vehicle Glass	✓	
All Other Adhesive Primers	✓	
<b>Sealant Primers</b>		
Architectural Applications	✓	
Non Porous	✓	
Porous	✓	
Marine Deck	✓	
Modified Bituminous	✓	
All Other Sealant Primers	✓	

For the table above, if a product category does not have a check mark under the CPR column, the product is excluded from the CARB CPR; therefore, **all** uses of the product are subject to Rule 1168 regardless of size. If a product category has a check mark under both the CARB CPR and the SCAQMD Rule 1168, then the product is regulated by the CARB CPR only when the product is sold for consumer use (household, personal, or institutional) in containers 16 fluid ounces or smaller. When the unit of product is greater than 16 fluid ounces or when the product is used exclusively in manufacturing operations, regardless of size, SCAQMD Rule 1168 applies.

For example, a Dry Wall Adhesive would be categorized as the CARB CPR's Construction, Panel, or Floor Adhesive category and subject to the CARB CPR provided it was sold in a container under 16 fluid ounces. If that same product were sold in a container size greater than 16 fluid ounces, the product would be subject to Rule 1168, regardless if it were for consumer or manufacturing use. A manufacturer marketing a Dry Wall Adhesive in 16 fluid ounce or smaller containers could be reasonably certain the product is being used as a consumer product and regulated under the CARB CPR; therefore, they would not be required to comply with the requirements of Rule 1168. However, for products not included in the CARB CPR, such as pipe cements (Plastic Welding Cements), **all** uses of those products are subject to the provisions of Rule 1168, including consumer use.

In addition to the examples above, a broader scenario was questioned by stakeholders during this rule amendment process, where stakeholders requested clarification for those cases of regulated products used during home construction. Contractors at a residential or commercial building sites using adhesives and sealants that are included in the CARB CPR and 16 fluid ounces or less in size would be regulated by the CARB CPR, as explained in CARB Advisory 307 (*question number five*). The use of products not regulated by the CARB CPR or greater than 16 fluid ounces are regulated by Rule 1168.

The clear line being established is that the use of any adhesive or sealant as part of a pollution generating activity taking place at stationary sources, or for the manufacture of a good or commodity for sale within the District, falls under regulatory authority of Rule 1168.

One other area of distinction between these two regulations is the Low Vapor Pressure VOC (LVP-VOC) exemption. The CARB CPR exempts the following compounds:

“LVP-VOC” means a chemical “compound” or “mixture” that contains at least one carbon atom and meets one of the following:

- (A) has a vapor pressure less than 0.1 mm Hg at 20°C, as determined by ARB Method 310; or
- (B) is a chemical “compound” with more than 12 carbon atoms, or a chemical “mixture” comprised solely of “compounds” with more than 12 carbon atoms, as verified by formulation data, and the vapor pressure and boiling point are unknown; or Legal Disclaimer: Unofficial version of the Regulation for Consumer Products. The official legal edition is available at the OAL website: <http://www.oal.ca.gov/CCR.htm>
- (C) is a chemical “compound” with a boiling point greater than 216°C, as determined by ARB Method 310; or
- (D) is the weight percent of a chemical “mixture” that boils above 216°C, as determined by ARB Method 310.

For the purposes of the definition of LVP-VOC, chemical “compound” means a molecule of definite chemical formula and isomeric structure, and chemical “mixture” means a substance comprised of two or more chemical “compounds.”

SCAQMD Rule 1168 does not exempt LVP-VOC compounds as testing shows they readily evaporate and are photochemically reactive (e.g. they form ground level ozone and secondary organic particles), as demonstrated in the *Air Quality Impacts of Low Vapor Pressure-Volatile Organic Compounds* study by Dr. David Cocker (7) and the SCAQMD study *Non-Volatile, Semi-Volatile, or Volatile: Redefining Volatile for Volatile Organic Compounds* by Uyen-Uyen T. Vo and Michael P. Morris (8). The VOC calculation is also different in the two regulations because the CARB CPR VOC limits are in weight percent and Rule 1168 VOC limits are in g/L. This difference in the calculation and VOC metric will affect manufacturers and private labelers for reporting and labeling purposes for those products that may be regulated under both regulations (e.g. business activities or manufacturing operations).

### **AVAILABLE TECHNOLOGY ASSESSMENT**

Adhesive, as defined in the rule, is a substance that is used to bond one surface to another by attachment. Very simply, it is a substance that is sticky in nature and can span a broad range of chemistries from products produced from plants and animals; to contact and pressure sensitive adhesives; and reactive chemistries. Attachment may occur mechanically, by infusing into the substrate or chemically, through chemical or electrostatic bonding. Using this definition, paints and coatings could be characterized as having adhesive properties; however, an adhesive must bond one surface to another surface, excluding the application of subsequent coatings. Sealants are very similar to adhesives except that they must also fill, seal or waterproof gaps or joints between two surfaces. As defined in this proposed rule, sealants are limited to products that are not continuous coatings. Products that are continuous coatings and are used to seal or waterproof gaps are sealers or mastic products and subject to Rule 1113 – Architectural Coatings. Similarly, staff has reviewed liquid membrane products used as air barriers and considers these products to be subject to Rule 1113 as they are continuous films used as a barrier in architectural applications.

Over the past 17 years since the last major reduction in VOC limits from adhesive and sealant applications, the technology of low-VOC products has improved significantly. In particular, adhesives and sealants used for architectural and construction applications. Staff conducted a voluntary survey, designed in cooperation with interested stakeholders including trade

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associations, to capture this trend. Response was limited and many categories did not have sufficient information. This effort was followed by a mandatory request from adhesive and sealant manufacturers to provide information. Table 1 below lists the information gathered as a result of the voluntary survey, and summarizes the sales weighted average (SWA) regulatory VOC (less water and exempt compound) content reported for various survey categories. The tables do not include products subject to the CARB CPR.

Categories listed as “Limited Data” means that limited volumes (<5,000 gallons sold), or limited responses (fewer than five products reported) were received from the surveys. Inclusion of this information may provide sufficient data for calculating market share of some manufacturers.

Table 2: SWA Regulatory VOC Content for Reported Regulated Products

Category	Current VOC Content Limit (g/L)	Regulatory SWA VOC Content (g/L)
<b>Adhesives</b>		
Architectural Applications		
Building Envelope Membrane Adhesive	250*	Limited Data
Carpet Pad Adhesive	50	Limited Data
Ceramic Glass, Porcelain, & Stone Tile Adhesive	65	59
Cove Base Adhesive	50	13
Dry Wall and Panel Adhesive	50	46
Multi-Purpose Construction Adhesives	70	30
Other Indoor Floor Covering Adhesives	50	18
Other Outdoor Floor Covering Adhesives	150	15
Roofing		
Other Roof Adhesive	250	127
Single Ply Roof Membrane Adhesive	250	152
Rubber Floor Adhesives	60	54
Structural Glazing Adhesive	100	Limited Data
Structural Wood Member Adhesive	140	Limited Data
Subfloor Adhesive	50	43
VCT and Asphalt Tile Adhesive	50	11
Welding		
ABS Welding	325	325
ABS to PVC Transition Cement	510	Limited Data
CPVC Welding	490	490
PVC Welding	510	510
All Other Plastic Cement Welding	250	504
Wood Flooring Adhesive	100	51
Computer Diskette Manufacturing	350	Limited Data
Contact Adhesive	80	70
Edge Glue	250	Limited Data

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<b>Category</b>	<b>Current VOC Content Limit (g/L)</b>	<b>Regulatory SWA VOC Content (g/L)</b>
Rubber Vulcanization Adhesive	850	Limited Data
Special Purpose Contact Adhesive	250	163
Thin Metal Laminating	780	Limited Data
Tire Tread	100	Limited Data
Top and Trim Adhesive	250	619
Waterproof Resorcinol Glue	250	Limited Data
All Other Adhesives	250	150
<b>Substrate Specific Adhesive Applications</b>		
Metal	30	5
Plastic Foams	50	13
Porous Material (except wood)	50	12
Wood	30	5
Fiberglass	80	75
Reinforced Plastic Composite	250	27
<b>Sealants and Caulks</b>		
<b>Architectural Applications</b>		
Clear, Paintable, Immediately Water-Resistant	380	Limited Data
Foam Sealant	250	153
Grout	250	60
Marine Deck	760	Limited Data
<b>Roofing</b>		
All Other Roof	300	219
Single-Ply Roof Membrane	450	153
All Other Architectural Applications	250	65
Roadway	250	70
All Other Sealants	420	326
<b>Adhesive Primers</b>		
Plastic	550	546
Pressure Sensitive	785	22
Traffic Marking Tape	150	Limited Data
Vehicle Glass	700	Limited Data
All Other Adhesive Primers	250	42
<b>Sealant Primers</b>		
<b>Architectural Applications</b>		
Marine Deck	760	Limited Data
Non Porous	250	Limited Data
Porous	775	Limited Data
Modified Bituminous	500	Limited Data
All Other Sealant Primers	750	Limited Data

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Detailed information, including sales volume and product count histograms for categories targeted for VOC limit reductions, are included later in the Proposed Amended Rule – Requirements (c) – VOC Limits section of this document.

### **PROPOSED AMENDED RULE**

Staff proposes the following modifications to PAR 1168:

#### **Purpose and Applicability (a)**

The purpose and applicability clarifies that the purpose of the rule is to reduce VOC and toxic air contaminants from adhesives, adhesive primers, caulks, sealants and sealant primers. Furthermore, the rule applies to persons who sell or use these products, including consumer products that are unregulated by the CARB CPR and products used for manufacturing purposes. Products that are one pound (16 fluid ounces) or less and have an applicable limit in the CARB CPR are not regulated by this rule unless they are used during manufacturing operations. Manufacturing is limited to the use of tools and labor to make things for sale. Where regulated by the CARB CPR, consumer and institutional uses as well as repair and maintenance activities at manufacturing facilities of consumer products remain outside of the scope of Rule 1168. Examples of such activities include repair of machinery, building maintenance, and office supplies.

#### **Definitions (b)**

Changes are proposed to the definitions to clarify the meaning of terms used within the regulation and to remove definitions that are obsolete. Additionally, many definitions are revised to provide more consistency between this regulation and the Ozone Transport Commission's (OTC) Model Rule for Adhesives and Sealants (9). The model rule is utilized as the framework for a number of states' adhesive regulations.

Some definitions refer to categories that have been incorporated into the catch-all "Other" category, which led to confusion. An effort has been made to make it clear that regulated products without a specific category limit are subject to the appropriate "Other" limit. Definitions that restated a dictionary definition and provided no additional insight have also been deleted. The proposed rule will remove the following definitions as obsolete:

- Adhesive Bonding Primer
- Adhesive Primer for Plastic
- Adhesive Promoter
- Adhesive Solid
- Aerosol Spray Can
- Aerospace Component
- Aircraft
- Aircraft Tire Repair
- Architectural Sealant or Sealant Primer
- Ceramic Tiles
- Coating Solid
- Foam
- Glue

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- Low-Solids Adhesive Primer
- Nonmembrane Roof Adhesive
- Nonmembrane Roof Sealant
- Orthotics and Prosthetics
- Primer
- Propellant
- Rubber Foam
- Sheet Applied Rubber Lining Operation
- Space Vehicle
- Viscosity
- Wood Parquet Flooring
- Wood Plank Flooring

Definitions that are revised or added to be more consistent with the CARB CPR and OTC Model Rule include the following:

- Adhesive
- Adhesive Primer
- Adhesive Tape
- Aerosol Adhesive
- Contact Adhesive
- Cove Base
- Indoor Floor Covering Adhesive
- Outdoor Floor Covering Adhesive
- Plastics
- Rubber
- Vehicle Glass Adhesive Primer

The following is a summary of the rule definition changes:

- ABS to PVC Transition Cement – The definition recognizes a category of products that are used to join ABS and PVC building drains and sewers. The product category is limited to products that comply with ASTM D3138.
- Adhesive Primer and Sealant Primer – Primers must be film forming to clarify that solvents used to clean and prepare the surface prior to application of an adhesive or sealant is subject to Rule 1171 – Solvent Cleaning Operations. Additionally, language was added to clarify that other terminology used in lieu of “primer” including, but not limited to “promoter” or “bonding primer” are to be classified as “primer” in this rule.
- Ambient Reactive Cure Adhesive – A test method has been included for products subject to the newly added definition.
- Architectural Appurtenance – The definition was made consistent with the terminology used in Rule 1113 – Architectural Coatings.

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- Big Box Retailer – Added to define the retailers responsible for the proposed reporting requirements within this rule.
- Building Envelope and Building Envelope Membrane Adhesives – Added to define a new category of adhesives that are subsets of the existing default category of from the ‘Other Adhesives’.
- Ceramic, Glass, Porcelain, and Stone Tile Adhesive – The definition of Ceramic Tile was modified to apply to all tile products, which include but are not limited to ceramic, glass, porcelain, and stone tile.
- CPVC Welding Cement – Products subject to this category must comply with ASTM F493.
- Clear, Paintable and Immediately Water-Resistant Sealant – A product category and VOC content limits have been included for the products excluded from the CPR.
- Consumer Products Regulation (CPR) – The definition was added to reference the California Air Resources Board’s regulation whenever this term is utilized within the rule.
- Cyanoacrylate Adhesive – The proposed rule removes the exemption for these products. The minimum cyanoacrylate content has been removed allowing products to take maximum advantage of the reactive portion of these types of products.
- Dip Coat – The definition was added to specify method of application.
- Distribution Center – The definition was added to specify applicability for reporting requirements.
- Edge Glue – Added to define a new category of adhesives, this is a subset of the existing default category of the ‘Other Adhesives’.
- Energy Curable Adhesives and Sealants – A definition has been added to provide manufacturers with a test method (ASTM D 7767) for thin film products when determining VOC content during manufacturing of the adhesives and sealants themselves.
- Establishment and Institutional Use – These definitions are included to clarify the applicability of the rule.
- Flow Coat – The definition was added to specify method of application.
- Foam Sealant and Insulating Foam– These definitions were included with specific VOC limits.
- Grout – Added to define a new category of sealant and caulks.
- Manufacturing and Repair – These definitions are included to clarify the applicability of the rule.
- Other Plastic Welding Cements – The VOC limit for this category was added to address reasonably available control measures (RACM) and best available control measures (BACM) requirements for cellulosic plastic welding and styrene acrylonitrile (SAN) welding adhesives.
- Ozone-Depleting Compound and Toxic Air Contaminant – These definitions are included to clarify the applicability of the rule.

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- Plastic Adhesive Primer – Products subject to this definition must meet the specifications of ASTM F656.
- Potable Water Architectural Sealant – Added to the rule to define new category of sealants used for drinking water and water treatment.
- Pressure Sensitive Adhesive – Included in the rule to define new category of primers used for the application of pressure sensitive adhesives.
- Private Labeler – This definition was included to clarify the applicability of the rule.
- PVC Welding Cement – Products subject to this definition must comply with ASTM 2564.
- Reactive Product – The definition of Reactive Diluent was modified to Reactive Product to reflect how these products are tested.
- Regulated Product – The definition was added to clarify that the rule applies to adhesive, adhesive primers, caulks, sealants and sealant primers whenever this term is utilized.
- Reinforced Plastic Composite Adhesives and Waterproof Resorcinol Glue – Added to address RACM/BACM requirements.
- Rubber Vulcanization Adhesive – This definition will replace Sheet-Applied Rubber Lining Operation to clarify which operations are subject to the VOC content limits in this category. The previous definition allowed some rubber bonding operations unnecessarily high VOC content limits while not addressing technology limitation for vulcanization operations.
- Vehicle Glass Adhesive Primer – Added to define new category of primers.
- Vinyl Compositions Tile (VCT) – The definition was modified for consistency with rule language.

### **Requirements (c)**

#### **VOC Limits**

Two approaches are taken to determine new proposed VOC limits for regulated products. The first approach is to investigate available products on market shelves and distributor, supplier and manufacturer websites. The second, where available, is to review product sales information provided in the survey. The data is analyzed to examine market trends and market share of low-VOC products. Where available, products sales information is provided below under each category designation (Table 2 through 10 and Figures 1 through 20). Available future compliant products are also provided below by product category. This represents only a sampling of products and not every product is listed.

#### **Adhesive – Architectural Applications – ABS to PVC Transition Cement**

This category was added based on stakeholder input. The proposed most restrictive clause stipulates that if a regulated product may be designated as various categories listed in the Table of Standards, the lowest VOC limit of those varying categories applies. For the case of ABS to PVC, the stakeholders indicated they needed the higher VOC limit to adhere the PVC to the ABS. Staff

is proposing an initial limit of 510 g/L with a VOC reduction in 2023 to 325 g/L when the PVC limit is proposed to be lowered.

**Adhesive – Architectural Applications – CPVC and PVC Welding Cement**

The 2013/2014 survey indicated that CPVC and PVC Welding Cement products have a VOC content close to the 490 g/L and 510 g/L existing rule limits. Staff is proposing a 325 g/L limit based on products released after the survey. There is currently a product being marketed as a multi-purpose welding cement for a combination of ABS, PVC, and CPVC at 325 g/L and a product marketed to the irrigation market for PVC and CPVC at 400 g/L. The adoption of the lower limits is contingent on altering the ASTM methods that are required for plumbing code (ASTM F493 and D2564). These products meet the performance standards; however, they do not meet the requirements to dissolve a certain percent of the polymer (3% and 10%). Stakeholders indicated they would work on modifying the ASTM standards. District staff can help guide this process through participation on the ASTM committee. The proposed rule includes a technology assessment to ensure the changes to the ASTM methods are successful prior to the proposed limits going into effect.

**Adhesive - Architectural Applications – Outdoor Floor Covering Adhesives**

Most of the reviewed Outdoor Floor Covering Adhesives are very low in VOC content. More than half are freeze/thaw stable. The proposed VOC content limit for this category is 50 g/L. This proposed limit is to align the VOC limit for this category with the current limit for Indoor Floor Covering Adhesives so that all Floor Covering Adhesives categories can be combined in the future. This will simplify compliance with the rule. Nearly all of the products reviewed had a VOC content of 50 g/L or below; therefore, staff does not anticipate emission reductions from this change. The table and two figures below show a list of future compliant products and sales volume and product count distributions.

Table 3: Other Outdoor Floor Covering Adhesives Less Than Proposed Limit

<b>Product Name</b>	<b>VOC Content (g/L)</b>
Bostik D808 Ext Carpet Adhesive	<1
Flexco Flex-Tuft Adhesive	17
HB Fuller TEC 975	0
Parabond 2850	0
Roberts 6700	0
Roberts Capitol CA024	0
Shaw 6300	0
XL Brand Stix 1100	0
<b>Proposed:</b>	<b>50</b>

**Adhesive - Architectural Applications – Other Roof Adhesives**

Other Roof Adhesives consist of roofing products excluding Single Ply Roof Membrane Adhesives. However, some products categorized as Other Roof Adhesives are the same products used for Single Ply Roof Membrane Adhesives as built up roofing system may consist of a single ply or multiple plys. The reviewed products are either high-solids asphalt or reactive products. The asphalt products require high heat to apply. Further sub-categorization of the Other Roof

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Adhesive category may be necessary. The proposed VOC limit for this category is 200 g/L. The table and two figures below show a list of future compliant products and sales volume and product count distributions.

Table 4: Other Roof Adhesives Less Than Proposed VOC Limit

<b>Product Name</b>	<b>VOC Content (g/L)</b>
Tremco Incorporated 372004 - PREMIUM IV ASPHALT	0
Johns Manville MBR COLD APPLICATION ADHESIVE 4.7 GAL (70000015)	178
Matrix Matrix™ 203 Plastic Roof Cement	200
Johns Manville MBR COLD APPLICATION ADHESIVE 53GAL (70000016)	178
Tremco Incorporated 372000 xxx - PREMIUM III ASPHALT	0
Tremco Incorporated 365305 xxx - POWERPLY WHITE ON WHITE ADHESIVE	184
Tremco Incorporated 360610Lxxx - ELS	169
Tremco Incorporated 361592 xxx - POLYROOF SF	21
Tremco Incorporated 182500 xxx - 100% SOLIDS INSUL ADHESIVE	10
Johns Manville MBR BONDING ADHESIVE BASE 4.4 GAL (70000028)	0
Tremco Incorporated 365600 XXX - BURMASTIC ADHESIVE SF	21
Tremco Incorporated 370110 xxx - ECOLASTIC	20
Johns Manville MBR BONDING ADHESIVE ACTIVATOR .6 GAL (70000027)	0
Tremco Incorporated 362300 xxx - LOW RISE FOAM INSULATION ADHESIVE	0
Tremco Incorporated 372004 - PREMIUM IV ASPHALT	0
Johns Manville MBR COLD APPLICATION ADHESIVE 4.7 GAL (70000015)	178
Tremco Incorporated 362300 xxx - LOW RISE FOAM INSULATION ADHESIVE	200
<b>Proposed:</b>	<b>200</b>

Figure 2: Other Roof Adhesives Sales Volume

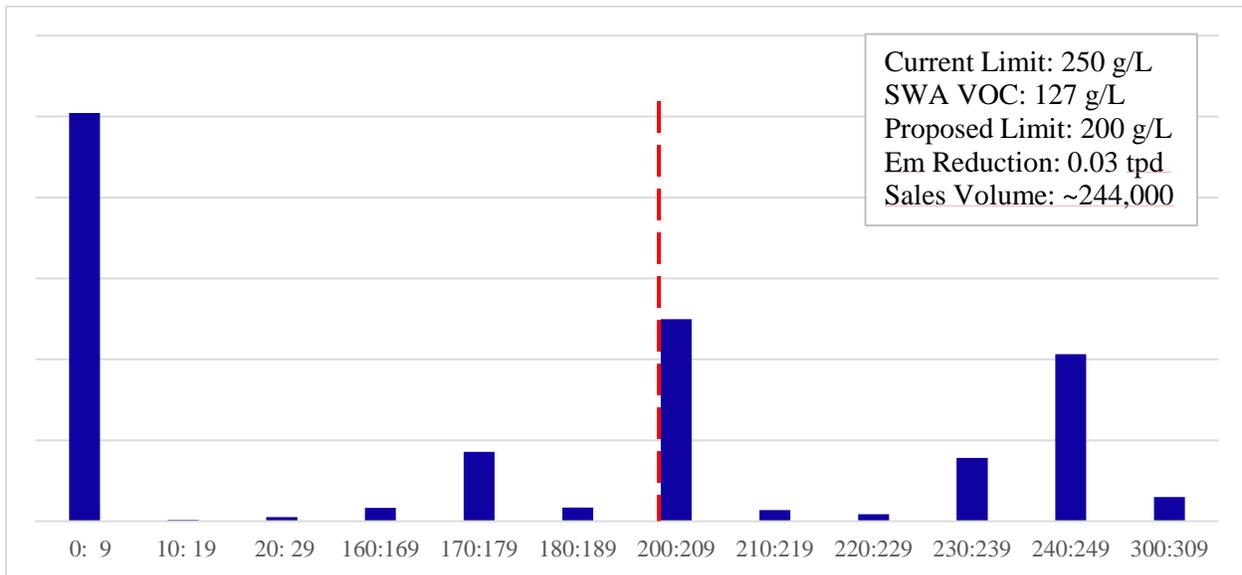
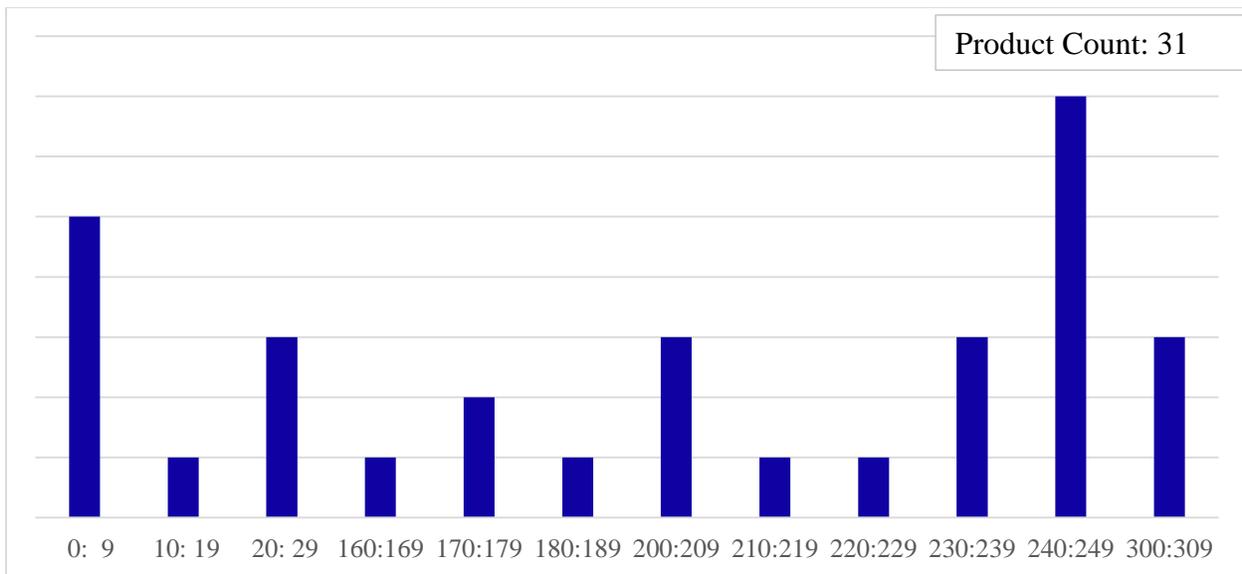


Figure 3: Other Roof Adhesives Product Count



**Adhesive - Architectural Applications – Single Ply Roof Membrane Adhesives**

Most of the products in the Single Ply Roof Membrane Adhesive category have VOC contents below 125 g/L. These products are primarily water-based or reactive. Solvent-based products may contain exempt solvents including PCBTF. Concerns have been raised regarding the use of water-based adhesives in cool weather (<50°F) or when the temperature is near the dew point. In Southern California, the weather normally is warm enough not to interfere with roofing operations. From the survey data, it appears that the water-based products represent approximately 50 percent

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of the market share. Further sub-categorization may be necessary. The table and two figures below show a list of future compliant products and sales volume and product count distributions.

**Table 5: Single Ply Roof Membrane Adhesives Less Than Proposed VOC Limit**

ADHESIVE	TYPE	VOC g/L	EPDM	PVC	TPO
Alfa WB 611FR	Water	0			
Carlisle FAST Adhesive**	Reactive	<100	X	X	X
CarlisleAquabase 120	Water	<10	X		X
Chemlink Single Ply EPDM Adhesive	Reactive	32	X		
DAP Roof Sealant		<200			
Durolast Duro-Fleece CR20	Reactive	68		X	
Durolast Duro-Fleece Membrane Adhesive	Reactive	<100		X	
Firestone ISO Spray S	Reactive	54			X
Firestone ISO Stick	Reactive	<100			X
Firestone Water Based Bonding Adhesive	Water	<100	X		X
Firestone XR Stick**	Reactive	13			X
Flex FB Low Rise Foam Adhesive**	Reactive	<100	X	X	X
Flex FleecebackSubstrate Adhesive	Water	<100		X	X
Flex WB 7008 Lamination Adhesive	Water	<100		X	X
GAF Everguard WB bonding Adhesive	Water	<20		X	X
GAF Olybond 500 Adhesive Fastener**	Reactive	<100		X	X
JM EPDM Membrane Adhesive Water Based	Water	<100	X		
JM Roofing System Urethane Adhesive**	Reactive	0	X	X	X
JM TPO Membrane Adhesive Water Based	Water	<100			X
Tremco Tremply HP 4510 Adhesive WB	Water	17			
<b>Proposed:</b>		<b>200</b>			

**Figure 4: Single Ply Roof Adhesive Sales Volume**

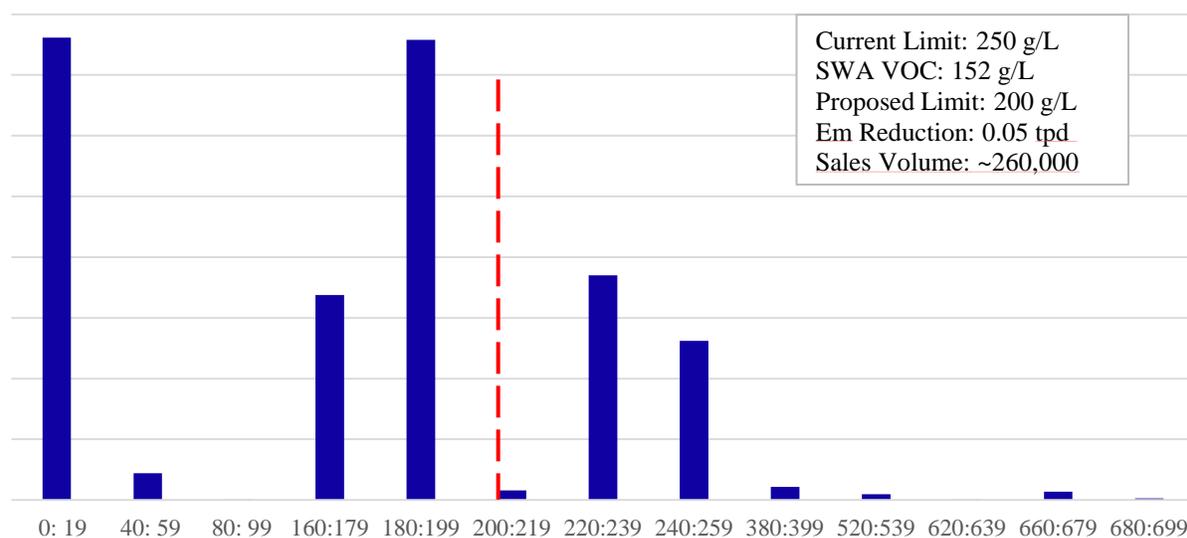
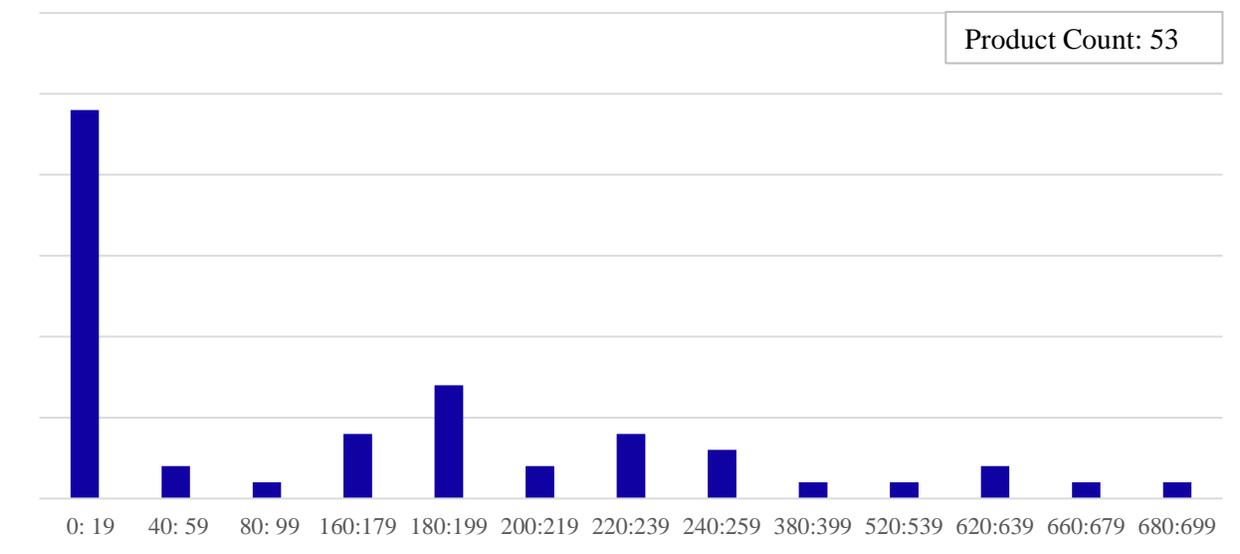


Figure 5: Single Ply Roof Adhesive Product Count



**Adhesive - Architectural Applications – Wood Flooring Adhesives**

Nearly half of the products reviewed and surveyed had a VOC content of 20 g/L or below, which is the proposed limit for this category. The table and two figures below show a list of future compliant products and sales volume and product count distributions.

Table 6: Wood Flooring Adhesives Less Than Proposed VOC Limit

Product Name	VOC Content (g/L)
AAT Problemsolver EW	11
APAC 979	15
APAC 999	20
DriTac 1001 All in One	0
HB Fuller 244	16
Shaw 4051	0
TEC Woodlock	0
USG Durock Wood Flooring Adhesive	2
Vermeister Monosil	0
WF Taylor 2020 Wood Master Engineered Floor Adhesive	19
WF Taylor Meta-Tec MS-Plus	0
<b>Proposed:</b>	<b>20</b>

Figure 6: Wood Flooring Adhesive Sales Volume

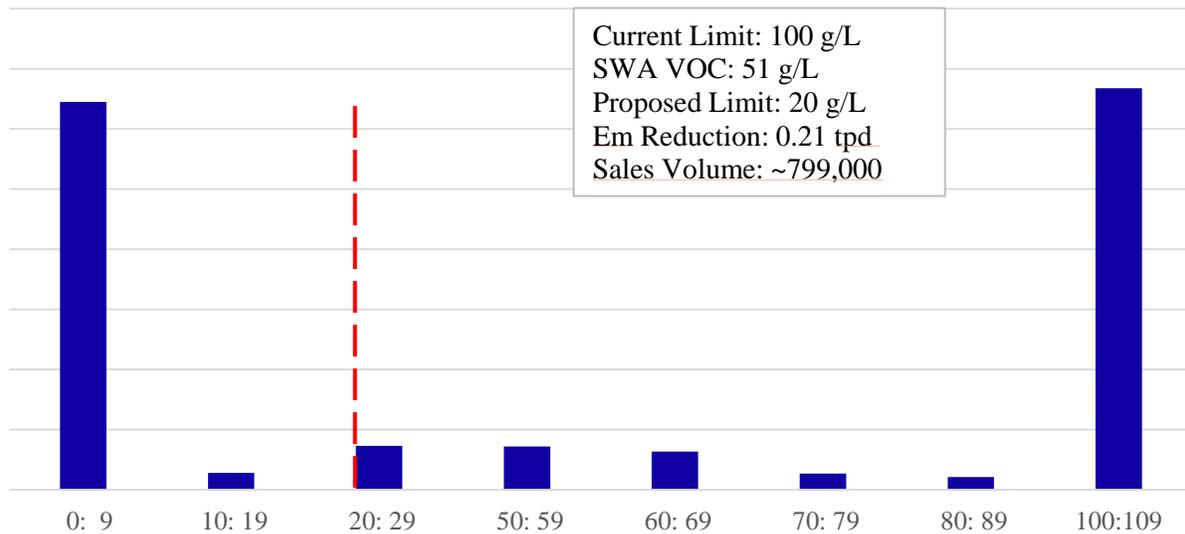
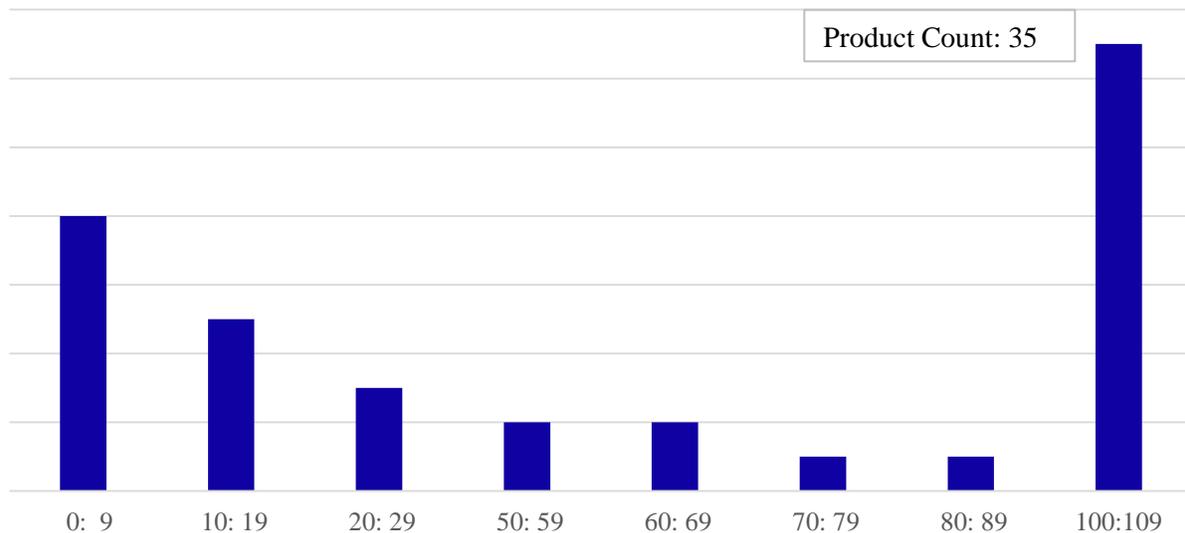


Figure 7: Wood Flooring Adhesive Product Count



**Adhesive – Rubber Vulcanization Adhesive**

This definition and VOC limit will replace the current version of the rule’s definition for Sheet-Applied Rubber Lining Operation to clarify which operations are subject to the VOC content limits in this category. The proposed higher VOC limit of 850 g/L that goes into effect upon rule adoption is offset by excluding Rubber Vulcanization Adhesive from the 55 gallon per year exemption in the proposed rule language. The future proposed limit will reduce the VOC limit to 250 g/L in 2021 to grant manufacturers time to reformulate to the default VOC limit.

### **Adhesive - Top and Trim Adhesives**

The June 2002 amendment of Rule 1168 included a category for Top and Trim adhesives. Top and Trim adhesives are used to adhere automobile and marine trim, including headliners, vinyl tops, vinyl trim, sunroofs, dash covering, door covering, floor covering, panel covering and upholstery. The VOC limit was set at 540 g/L, less water and exempt compounds, until January 1, 2004, when the VOC limit was projected to be reduced to 250 g/L. In October 2003, the rule was amended and the proposed VOC limit reduction was delayed for one year to allow manufacturers additional time to reformulate. The rule was amended again December 2004 (10), the Staff Report included the following assessment for Top and Trim Adhesives:

“Although initial results were promising on the availability and use of top and trim adhesives meeting the 250 grams VOC per liter standard by January 1, 2005, more recent information reveals that additional time will be required to develop acceptable products meeting that limit. Therefore, staff is recommending that the compliance date for the 250 grams of VOC per liter standard be moved to January 1, 2007 and the current limit of 540 grams of VOC per liter remain in effect until then.”

While the initial results were promising, the technical challenge of high heat resistance was never overcome and Top and Trim Adhesive users switched to higher VOC products (620 g/L), using the 55 gallon per year exemption. All reported sales for the Top and Trim category in 2012 was for the high VOC products. Rather than decrease emissions from this category by 0.2 tpd, the 250 g/L limit in conjunction with the volume usage exemption increased emissions by 0.04 tpd. To address this migration to exempted products, staff is proposing to reinstate the 540 g/L limit until 2023 and exclude Top and Trim Adhesives from the 55 gallon per year exemption. This would allow manufacturers time to reformulate and allow District staff to maintain the emissions reductions already claimed in previous versions of the rule.

### **Adhesive - Waterproof Resorcinol Glue**

The definition and VOC limit are identical to the provisions included in the OTC Model Rule for Adhesives and Sealants. The proposed limit for this category is 170 g/L. This proposed change is to address BACM requirements and is not projected to result in any significant emission reductions due to the limited use of these products.

### **Sealant – Architectural Applications – Clear, Paintable, Immediately Water-Resistant**

Architectural sealants already exist at 250 g/L that serve a similar purpose as this carved out category. This product category and VOC content limit have been included for the products, which are excluded from the CARB CPR. Although District staff does not recognize the necessity to have a product that is clear and paintable and immediately waterproof, District staff does understand that enforcement of these types of products would drive business out of the Basin. Currently, District staff interprets the regulated products that fall within this category as All Other Architectural Sealants, which has a VOC limit of 250 g/L. Staff proposed a VOC limit of 380 g/L upon rule adoption with a VOC limit reduction to 250 g/L in 2021 to align with the District’s current categorization of this product. The two figures below show a list of future compliant products and sales volume and product count distributions.

**Sealant - Architectural - Foam Sealant**

Foam Sealants are products used to fill and form durable, airtight seals to common building substrates. They are typically sprayed into building cavities to provide water resistance, thermal resistance, or acoustic dampening. Their use has been increasing as building owners and property managers seek to reduce building energy consumption. The foam itself is typically polyurethane or two-component isocyanate-based and contains little or no VOC. However, the propellants used in some of the aerosol products do contribute to the VOC content. The majority of the products offered for sale and the majority of the volume reported used are aerosol products. As they are substantially different from typical semi-solid paste or gel caulks and sealants, some may have concluded that these products would not be considered Architectural Sealants. To alleviate the confusion, staff is proposing to specifically define the category and assign a VOC content of 200 g/L, effective upon rule adoption. Staff is proposing to reduce the VOC limit to 50 g/L, effective January 1, 2023, provided the technology assessment demonstrates the VOC limits are feasible. As the VOC in these products is predominantly from the propellants, it is expected that to comply with the proposed limits, manufacturers will use alternative non-VOC propellants or utilize application techniques that do not depend on propellants to disburse the product. The table and two figures below show a list of future compliant products and sales volume and product count distributions.

Table 7: Foam Sealants Less Than Proposed VOC Limit

<b>Product Name</b>	<b>VOC Content (g/L)</b>	<b>Aerosol</b>
DAP Kwik Foam Polyurethane Foam	19	Yes
Canadian Industrial Distributors One-Component Polyurethane Cylinder Foam	< 20	Yes
Clayton Touch n Foam	155	Yes
DOW Froth Pak	< 20	No
Fomo Handifoam 40	0	Yes
Fomo Straw Foam Sealant	165	Yes
Henkel OSI WINTeQ Foam	177	Yes
Hilti CF812	2	Yes
Icynene LD50	0	No
ITW TACC Miracle FoamSeal 2100A	< 1	No
ITW TACC Miracle FoamSeal F6400 LVR	< 1	No
Red Devil Foam & Fill Minimal Expanding	150	Yes
Red Devil Foam & Fill Triple Expanding	150	Yes
Tiger Foam	0	No
<b>Proposed:</b>	<b>200/50</b>	

Figure 8: Foam Sealants Sales Volume

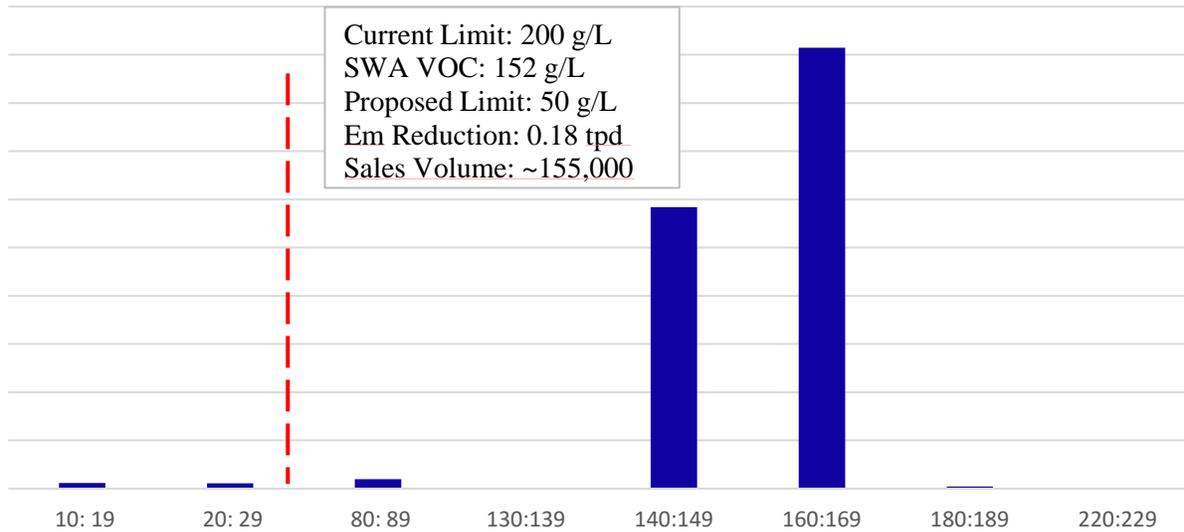
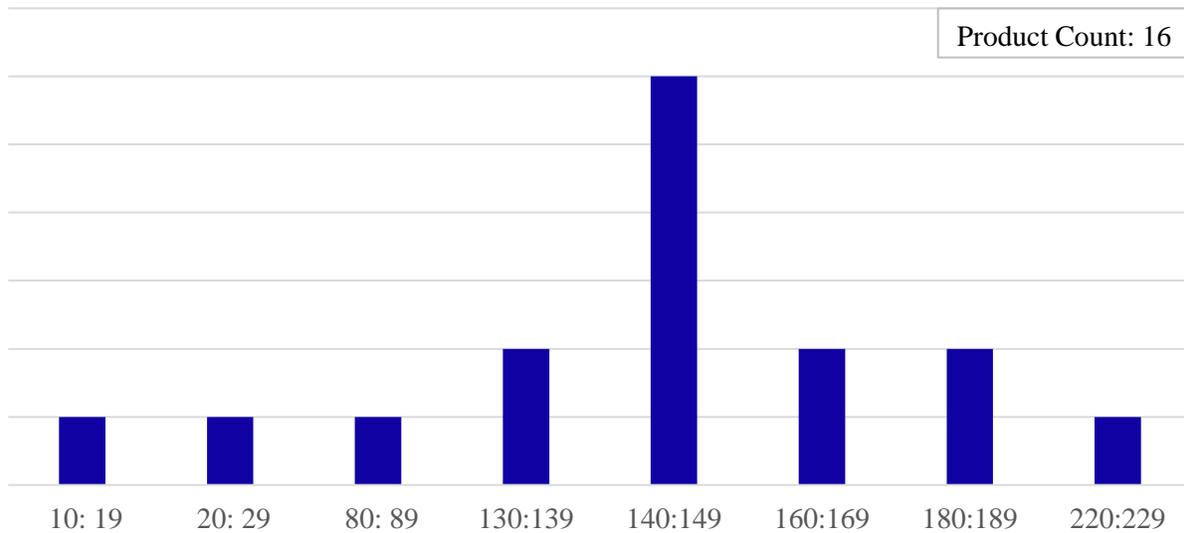


Figure 9: Foam Sealants Product Count



**Sealant – Architectural – Grout**

This definition and VOC limit was added to clarify that grout is regulated as an Architectural Sealant. The proposed VOC limit upon rule adoption is 65 g/L to reflect currently available products. Staff is not projecting emission reductions from this category.

**Sealant – Architectural – All Other Roof Sealants**

This category includes all roof sealants except Single Ply Roof Membrane Sealants. Most of the products in this category have a VOC content of 300 g/L or less. These products are asphalt or polyurethane-based. The low-VOC roof sealants in this category are reactive or elastomeric products that require the surface to moisture free. The higher-VOC solvent based products applicable during rainfall. While roofing construction normally does not occur during rain, this category includes roofing repair products that are often used to seal leaks while it is raining. The proposed limit for this category is 250 g/L. The table and two figures below show a list of future compliant products and sales volume and product count distributions.

Table 8: All Other Roof Sealants Less Than Proposed VOC Limits

<b>Product Name</b>	<b>VOC Content (g/L)</b>	<b>Immediately Water Resistant</b>
DAP Premium Polyurethane Roof & Flashing Sealant	36	No
Chem Link M-1	< 20	No
DeWitt’s 617 Clear Roof and Construction Sealant	14	No
Epmar Flexible Seal 60	>300	Yes
Franklin International Titebond WeatherMaster Metal Roof Sealant	28	No
Geocel 2300 CPW	> 300	Yes
Henry 900	5	No
Henry 925B	5	No
Loctite PL Polyurethane Roof & Flashing Sealant	35	No
Red Devil RD 3000 Blacktop & Roof Repair Sealant	35	No
Sashco Through the Roof	300	Yes
Seaman FTR 101	82	No
Tremco Reglet Joint Sealant 30	53	No
Tremco TremSEAL Pitch Pocket Sealer	0	No
<b>Proposed:</b>	<b>250</b>	

Figure 10: All Other Roof Sealant Sales Volume

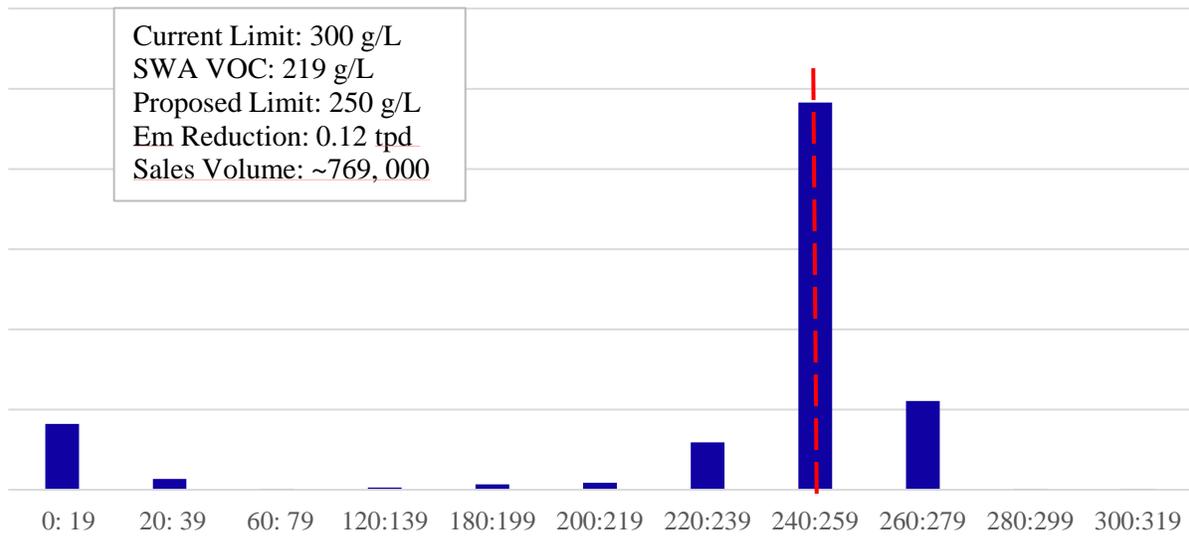
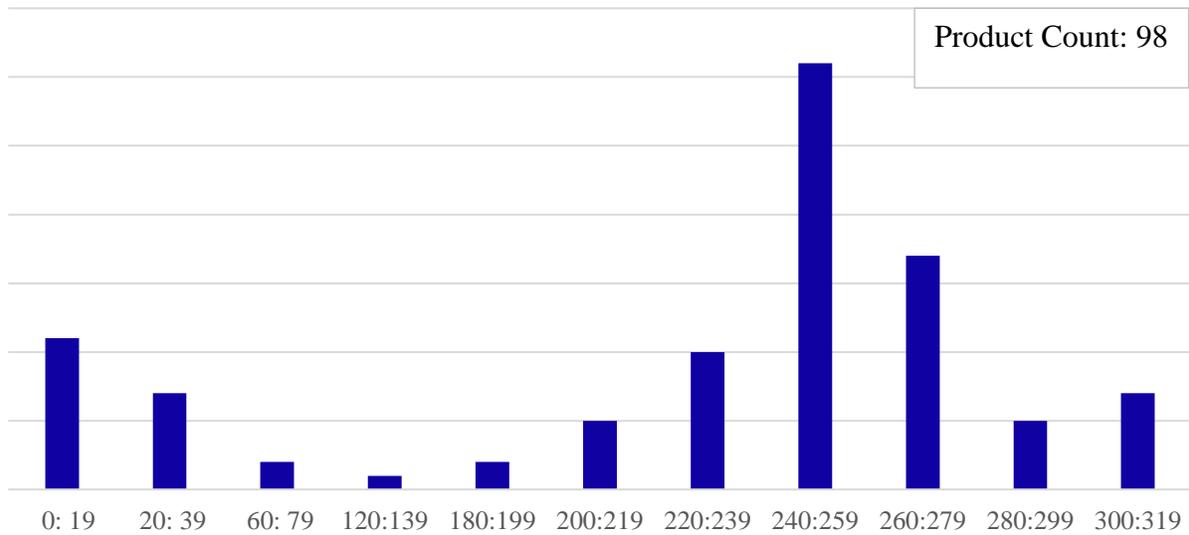


Figure 11: All Other Roof Sealant Product Count



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### Sealant – Architectural – Single Ply Roof Membrane Sealants

Single Ply Roof Membrane Sealants are divided between very low VOC content water-based, 100 percent solids technology, and solvent-based technologies, including exempt solvent-based products with VOC contents between 170 and 250 g/L. This category includes specialized sealants, such as waterproofing mastics. The overall volume is much lower than Other Roofing Sealant products. The proposed VOC limit is 250 g/L. The table and two figures below show a list of future compliant products and sales volume and product count distributions.

Table 9: Single Ply Roof Membrane Sealants Less Than Proposed VOC Limit

Product Name	VOC Content (g/L)	Notes
Carlisle Sure-Seal 2 Part Pourable Sealer	<100	Substrates must be primed
Carlisle Universal Single Ply Sealant	<100	
Carlisle Sure-Seal One Part Pourable Sealer	<100	Substrates must be primed
Carlisle White One Part Pourable Sealer	<100	EPDM/TPO Substrates must be primed
Firestone Pourable Sealant S-10	<100	
Firestone FillGard Pourable Sealer	<100	
Firestone FillGard M Pourable Sealer	<100	
JM EPDM/PVC Pourable Sealer	<100	
JM TPO Pourable Sealer	<100	
Sika Sarnafiller (Chemlink Pro Pack)	<100	
Sika Sikaflex - 11FC	<100	Substrates must be primed
Sika Sikaflex - 1a	<100	
GAF EverGuard Grey Pourable Sealant (A and B)	<100	
Seaman FTR 101	<100	
Durolast DURO-CAULK PLUS	<100	
Durolast Pitch-Pan Filler	<100	
Tremco TremSeal S	<100	May require use of primer or toluene wipe
Tremco TremSeal Pitch Pocket Sealer	<100	May require use of primer
Tremco SOLARGARD Seam Sealer	<100	
Mule-Hide Universal Single-Ply Sealant	<100	
Mule-Hide Pourable Sealer	<100	Substrates must be primed
Mule-Hide One-Part Pourable Sealer	<100	Substrates must be primed
<b>Proposed:</b>	<b>250</b>	

Figure 12: Single Ply Roof Sealant Sales Volume

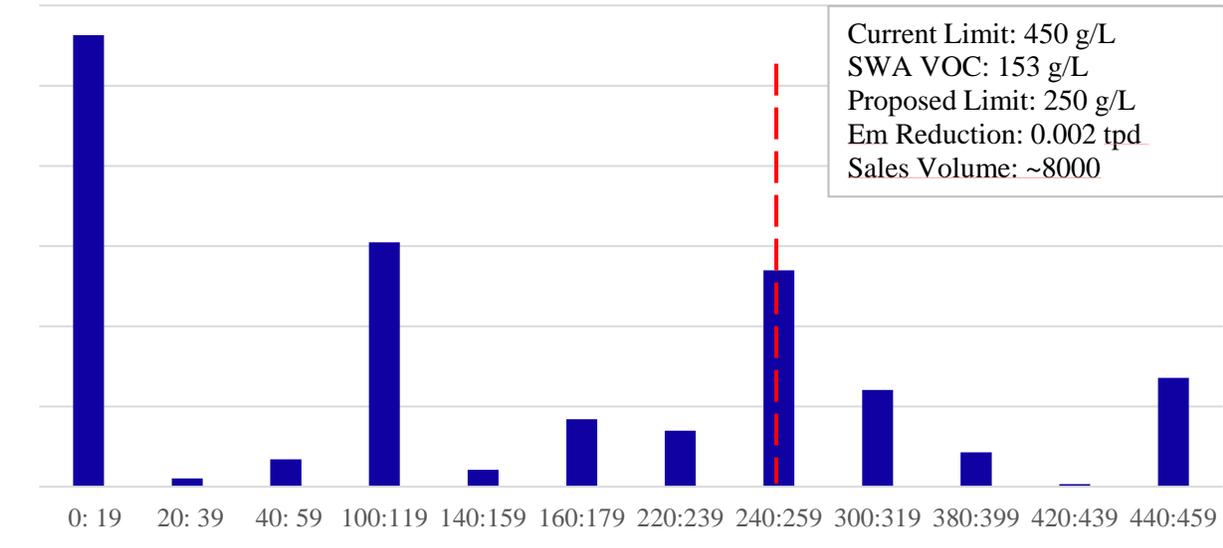
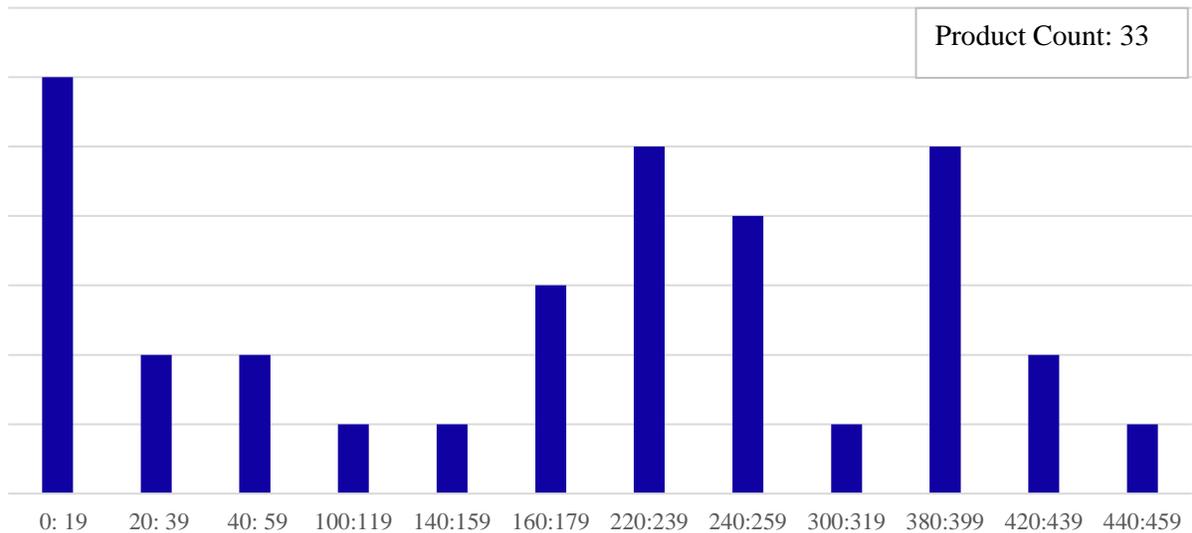


Figure 13: Single Ply Roof Sealant Product Count



**Sealant – Architectural – All Other Architectural Sealants**

All Other Architectural Sealants includes all sealants, except roofing sealants, used during the construction, maintenance, or repair of building structures and their appurtenances. Most products offered for sale have very low-VOC content. The most popular products have somewhat higher VOC content. Combined with the very large volume of Architectural Sealants sold, the VOC emissions from this category remains substantial. Most of the reviewed products are water-based, silicone-based, or high solids products with very low VOC content. The proposed limit for this category is 50 g/L. The table and two figures below show a list of future compliant products and sales volume and product count distributions.

Table 10: All Other Architectural Sealants Less Than Product VOC Limit

<b>Product Name</b>	<b>VOC Content (g/L)</b>
BOSS 370 HVAC/R Silicone Sealant	29
C.R. Laurence M66	9
Color Rite ASC	22
DAP Alex Plus Clear	44
Franklin International Titebond All Purpose	14
Franklin International Title Multi-Purpose 100% Silicone	29
Henry HE925B	10
Kel Kem Red Hi Temp Silicone	32
Mapeflex P1	25
Mapei Planibond JF	36
OSI Greenseries Flameseal	33
OSI Greenseries SC-175	45
Project 1 6000-6500	28
Surebond SB-188	30
White Lightning MaXimum Paintable Polymer Sealant	30
White Lightning WL30060	45
<b>Proposed:</b>	<b>50</b>

Figure 14: All Other Architectural Sales Volume

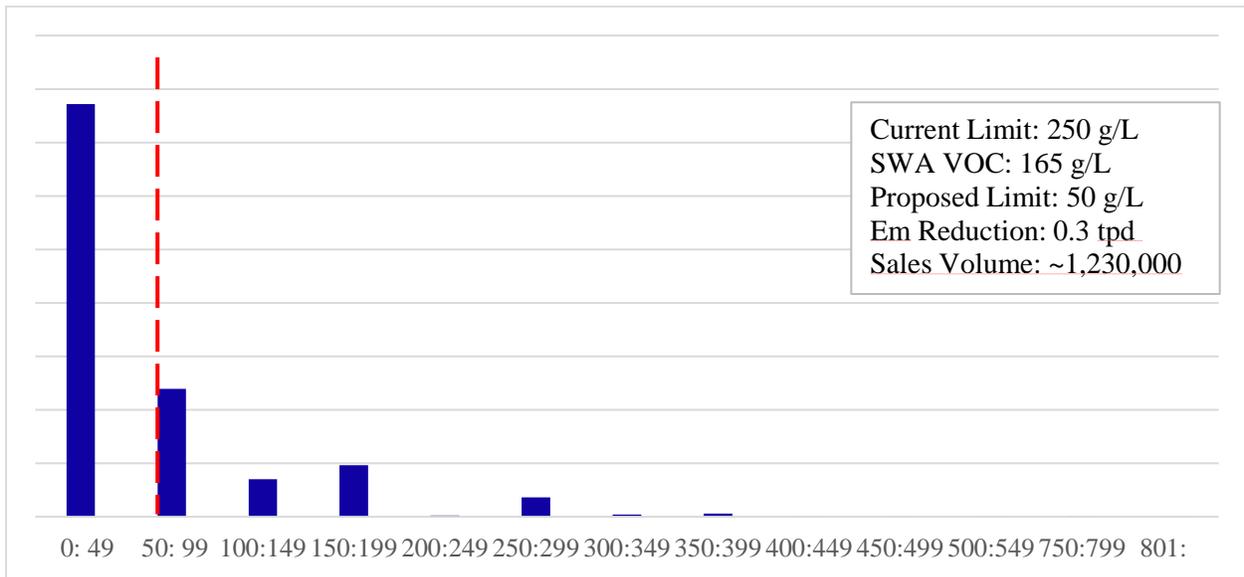
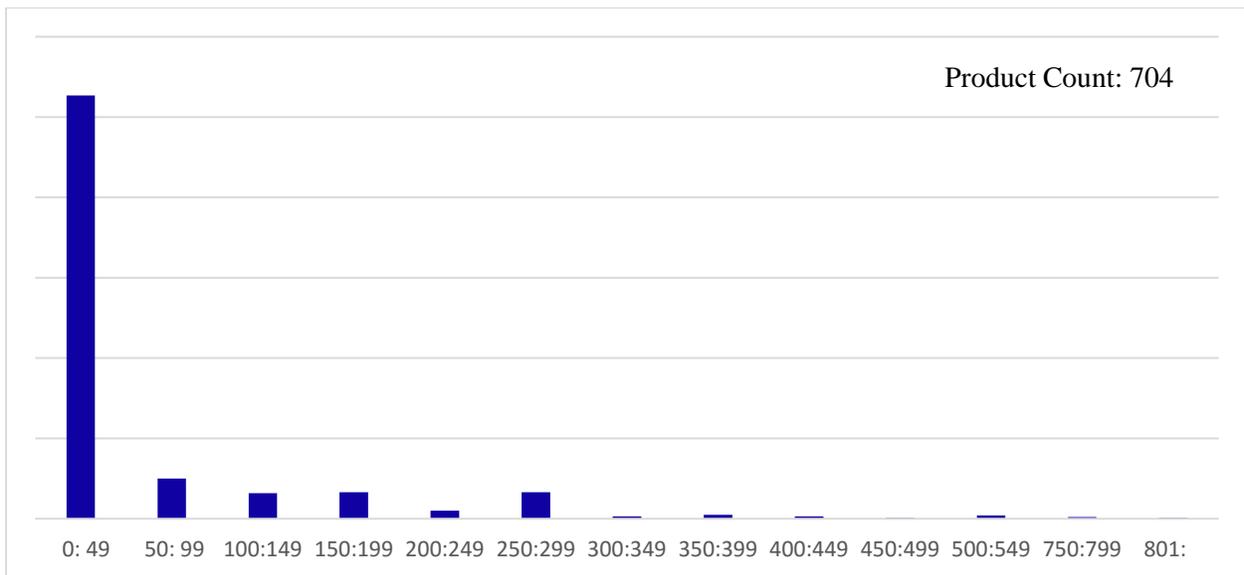


Figure 15: All Other Architectural Sealants Product Count



**Sealant – All Other Sealants**

All Other Sealants includes sealants that are not for architectural applications or roadway applications. The current limit is higher than the default category of 250 g/L, which can lead to rule circumvention. In addition, there is a large number of products formulated below the proposed limit. The table and two figures below show a list of future compliant products and sales volume and product count distributions.

Table 11: All Other Sealants Less Than Proposed VOC Limit

<b>Product Name</b>	<b>VOC Content (g/L)</b>
3M PN08609 3M SUPER FAST URETHANE BLACK	19
Stabond Corporation STASEAL 5000B	49
Color Rite, Inc Color Rite Acrylic Caulk/Sealant	20
3M PN08361 URETHANE SEAM	93
BASF Corporation MasterSeal 900 Stan	0
3M PN08308 3M HEAVY BODIED SEAM SEAL 200ML SYR	12
3M PN08310 3M(TM) BARE-METAL SEAM SEALER BEIGE 200 ML	14
3M PN08500 ALL AROUND AUTOBODY	22
3M PN08360 URETHANE SEAM SEALER	129
Gaco Western LLC F183M (B-Side)	66
3M PN08369 3M MSP Seam Sealer White 310mL	141
3M PN08370 3M MSP Seam Sealer Gray 310mL	41
Gaco Western LLC F5500PLT (B-Side)	24
3M PN08509 BDG & GLZG CPD BLK	129
<b>Proposed:</b>	<b>250</b>

Figure 16: All Other Sealants Sales Volume

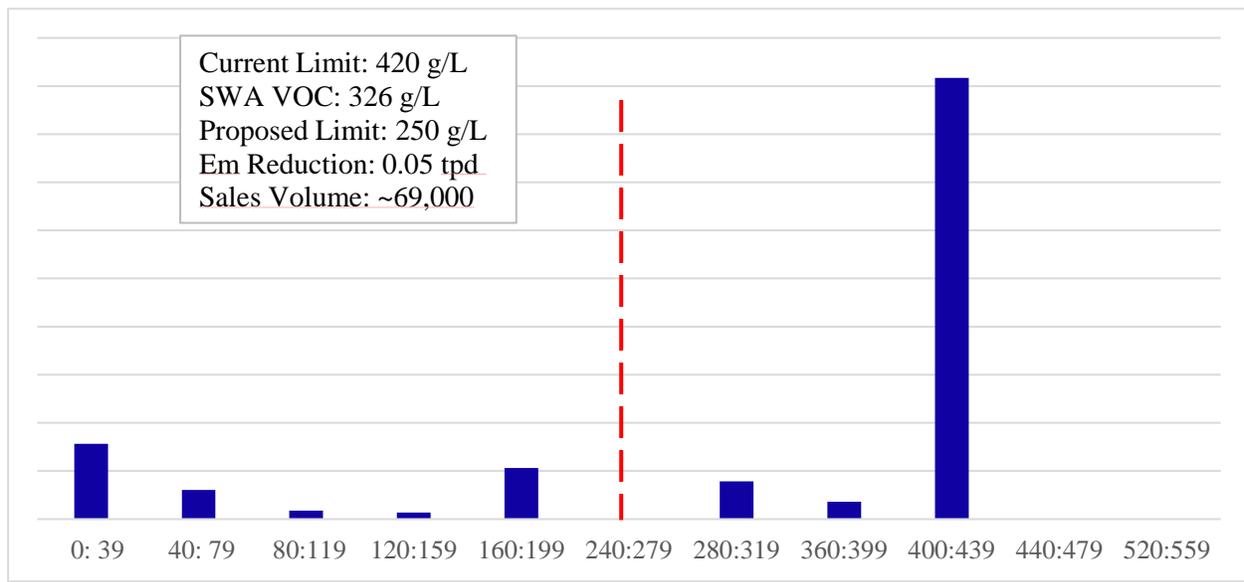
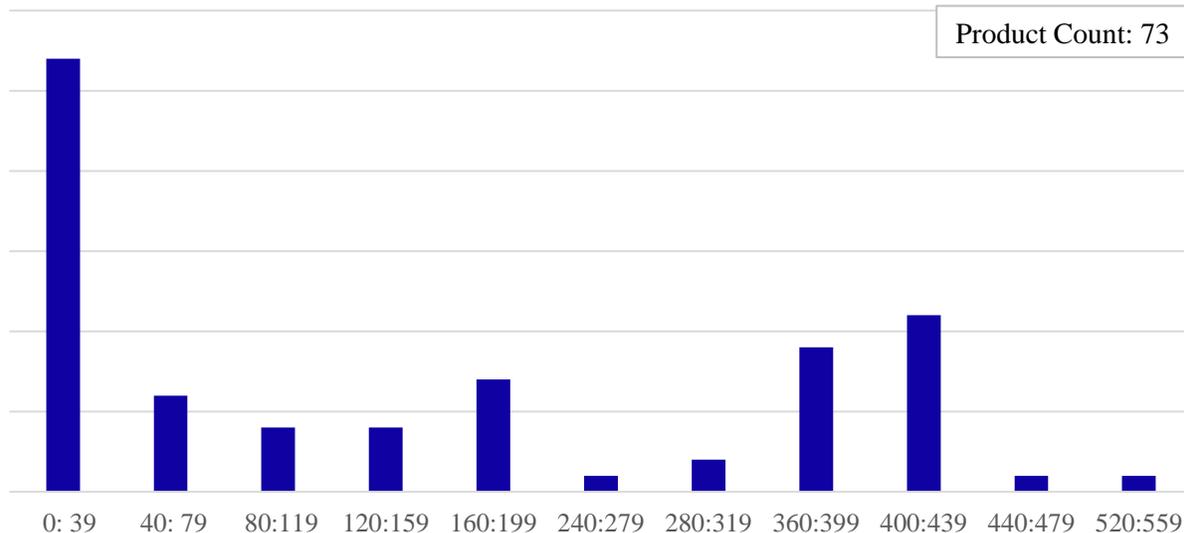


Figure 17: All Other Sealants Product Count



### **Proposed VOC Content Limits**

The proposed changes to VOC limits for regulated products are provided in the table below. Most of the proposed limits will have gone into effect on or before January 1, 2021. There are several categories where the effective date is proposed for January 1, 2023 to allow additional time for product reformulation. Technology assessments are proposed for plastic welding categories, Foam Sealants, and Top and Trim Adhesives. The proposed changes in plastic welding categories, which include ABS to PVC Transition Cement, CPVC, and PVC, require additional time for reformulation that not only includes a reduction in VOC content but reevaluation of performance according to ASTM standards. Because the VOC reductions are contingent on changes to the ASTM standards, staff is proposing to conduct a technology assessment near the proposed effective date. Some stakeholders support the proposed VOC limits for Foam Sealants, but due to the limited number of products at the proposed limit, staff will conduct a technology assessment to determine feasibility near the proposed effective date. Due to the complicated regulatory history with the Top and Trim category, staff is proposing a technology assessment for this category.

Since the SCAQMD is an extreme nonattainment area, the EPA reviews our regulations to confirm that we meet RACM/BACM requirements. The EPA identified four categories that do not meet the RACM/BACM requirements: cellulosic plastic welding, SAN welding adhesive, reinforced plastic composite adhesives, and waterproof resorcinol glue. The San Joaquin Valley APCD (SJVAPCD) regulates cellulosic plastic welding and SAN at 100 g/L, those products are regulated under the Other Plastic Cements Welding category with a 250 g/L VOC limit in the current rule language. The SJVAPCD also regulates reinforced plastic composite adhesives at 200 g/L, which is regulated under the default 250 g/L VOC limit in the current rule language. The Bay Area AQMD (BAAQMD) regulates waterproof resorcinol glue at 170 g/L, which is also regulated under the default 250 g/L VOC limit in the current rule language. Staff is proposing to carve out categories for reinforced plastic composite adhesives and waterproof resorcinol glue with the lower-VOC limit. In addition, staff is proposing to lower the lower VOC limit for Other Plastic Cement Welding to 100 g/L to address the cellulosic plastic welding and SAN categories. Staff is

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not projecting any emission reductions from these changes, as the sales volume for these products are minimal.

Table 12: Regulated Product Proposed VOC Content Limit

Category	VOC Content Limit (g/L)				
	Current	Upon Rule Adoption	1/1/2019	1/1/2021	1/1/2023
<b>Adhesives</b>					
<b>Architectural Applications</b>					
Building Envelope Membrane Adhesive	250				
Other Outdoor Floor Covering Adhesive	150		50		
<b>Roofing</b>					
Other Roof Adhesive	250			200	
Single Ply Roof Membrane Adhesive	250			200	
<b>Welding</b>					
ABS to PVC Transition Cement	510				325*
CPVC	490				325*
PVC	510				325*
Other Plastic Cement Welding	250		100		
Wood Flooring Adhesive	100			20	
Edge Glue	250				
Rubber Vulcanization Adhesive	250	850			250
Top and Trim Adhesive	250	540			250
Waterproof Resorcinol Glue	250		170		
<b>Substrate Specific Adhesive Applications</b>					
Reinforced Plastic Composite	250		200		
<b>Sealants and Caulks</b>					
<b>Architectural</b>					
Clear, Paintable, Immediately Water Resistant	250	380		250	
Foam Sealant	250	200		50*	
Potable Water	250	100			
<b>Roofing</b>					
All Other Roof	300			250	
Single-Ply Roof Membrane	450			250	
All Other Architectural	250		50		
All Other Sealants	420			250	

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<b>Adhesive Primers</b>					
Pressure Sensitive	200	785			
Vehicle Glass	250	700			

\* Subject to Technology Assessment

### **Regulated Product Categorization**

Previously, the most restrictive clause for regulated products only applied to other source specific rules. The requirements are expanded to include any more restrictive limit included in Table 1 of Rule 1168, excluding the substrate specific adhesives.

### **Sell-Through Provision**

Sell-through and use-through provisions are included in the proposed rule to allow manufacturers and suppliers to deplete regulated products in the warehouse or on the shelf. The provision also allows users to use up remaining product rather than having to dispose of them. The sell-through and use-through effective dates should accommodate the typical one-year shelf life of these regulated products.

### **Disposal of Regulated Products and VOC-Laden Cloth**

The requirements are clarified to specify that disposal provisions apply to all regulated products and VOC-laden cloth or paper, not just products used for stripping cured adhesives or sealants.

### **Solvent Cleaning Operations**

The requirements are clarified that all cleaning operations are subject to Rule 1171 – Solvent Cleaning Operations.

### **Transfer Efficiency**

The requirements are clarified. The exclusion for high viscosity regulated products is moved to paragraph (i)(14).

### **Control Devices**

The requirement for the use of air pollution control equipment to comply with the rule is made consistent with other VOC rules. Specifically, the control device must collect at least 90 percent by weight of VOC emissions and reduce collected emissions by at least 95 percent by weight for an overall minimum efficiency of 85 percent by weight.

### **Storage and Mixing**

The proposed rule requires that containers for storage or mixing shall remain closed except while in use. Containers of products with VOC content in excess of the limits may not be stored on premises except for use in approved air pollution control equipment or to be sold and used outside the SCAQMD.

### **Test Methods (e)**

Three additional VOC content methods are included in the proposal, and SCAQMD Method 302, is removed. SCAQMD Method 313 - Determination of Volatile Organic Compounds (VOC) by Gas Chromatography-Mass Spectrometry (11) is included for high water content or high exempt solvent content regulated products. ASTM Test Method 6886 (Standard Test Method for Determination of the Weight Percent Individual Volatile Organic Compounds in Waterborne Air-

Dry Coatings by Gas Chromatography) is included as a comparable method to SCAQMD Method 313. For compliance purposes, the SCAQMD laboratory will rely on the more rigorous M313, and provide a guidance document to explain the differences between the two methods such that a manufacturer utilizing M6886 will be aware of how their results could differ from results obtained by the SCAQMD laboratory. Both methods provide improved accuracy for verifying low-VOC regulated products, and is intended to improve compliance determinations and facilitate the use of regulated products with VOC contents of 50 g/L or less. For reactive adhesives, Appendix A to Subpart PPPP of 40 CFR Part 63 – Determination of Weight Volatile Matter Content and Weight Solids Content of Reactive Adhesives (12) is included. This method is a sandwich method where the adhesive cures between two substrates to prevent moisture in the atmosphere from competing with the reaction taking place in the adhesive. The method uses a relatively thick layer of adhesive so it is only appropriate for products applied at a similar film thickness. This method is not appropriate for sealants as they are exposed to ambient air during cure. Reactive sealants are tested using SCAQMD Method 304 using a 24-hour induction time prior to placing the sample in the oven.

Staff also added a clause for equivalent test methods which allows for other methods to be used once they have been reviewed to be equivalent by the Executive Officer, CARB, and the U.S. EPA. This allows for some flexibility for new innovative test methodologies for emerging technologies. An example is the test method development underway for foam sealants.

In regard to ASTM 7767 *Standard Test Method to Measure Volatiles from Radiation Curable Acrylate Monomers, Oligomers, and Blends and Thin Coatings Made from Them*, the test method for estimating the VOC content of thin-film energy curable products, it was included in the definition of energy curable adhesives and sealants instead of the test method (enforcement) section. This is because a third party laboratory, such as the SCAQMD laboratory, cannot independently perform this analysis and have confidence that the results accurately reflect the composition of the sample. The method is not performed on the fully formulated product, but estimates the VOC by measuring the VOC content of the reactive components of the product with a specified photoinitiator. If enforcement staff collected a sample of thin-film energy curable product, they would have to ask the manufacturer to supply the raw materials and a photoinitiator in order to perform the method. This would not be adequate to confirm compliance. At this time, staff is not aware of any thin-film energy curable adhesives or sealants but when these products became prevalent, staff will work with the manufacturers to develop or enhance a method for the analysis that can be used to independently verify the compliance of these products.

### **Administrative Requirements (f)**

#### **Labeling**

VOC content and date of manufacturing are proposed for inclusion on the container labels of regulated products. It is acceptable to list the VOC content as the maximum VOC allowed for the regulated product category or the maximum VOC anticipated for a product instead of the specific VOC to account for batch-to-batch variations. The proposed effective date for the labeling requirement is January 1, 2019. Products in containers one fluid ounces or less and products solely subject to the CARB CPR are exempt from this provision. The labeling requirements are consistent with the OTC Model Rule. Products that are subject to the CARB CPR are regulated by the weight percent VOC in a product and not by the grams of VOC per liter of regulated product.

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Those products that may be subject to both the CARB CPR and this rule would not be required to include the grams per liter VOC on the label but would be required to maintain supplemental documentation (e.g. product datasheet, via the manufacturer's webpage), readily accessible by SCAQMD staff, that included the grams per liter VOC. The grams per liter VOC has to include all LVP-VOC compounds that are exempted in the CARB CPR.

Several other labeling provisions were added in this section for specific categories that have higher VOC limits to account for the increases in the VOC limits justified by stakeholders. These categories are as follows:

- ABS to PVC Transition Cement
- Pressure Sensitive Adhesive Primer
- Rubber Vulcanization Adhesives
- Top and Trim Adhesive

### **Reporting Requirements**

The 2013/2014 survey data indicated that the emission inventory for adhesives and sealants is higher than previously estimated (4.1 tpd versus 10.5 tpd). Having strong inventory data is critical for planning purposes, emission reduction calculations, and understanding the products that are being used within our jurisdiction. To achieve this, the proposed rule will require manufacturers and private labelers of regulated products to submit a Quantity and Emission Report (QER) every three years, from the years 2019 to 2025; and every five years, thereafter, until, and including 2040 as demonstrated in the table below.

Table 13: Reporting Timeline

<b>Reporting Deadlines</b>		<b>Reported Years</b>
<b>Manufacturers or Private Labelers</b>	<b>Big Box Retailers &amp; Distribution Centers</b>	
September 1, 2019	May 1, 2019	2016, 2017, 2018
September 1, 2022	May 1, 2022	2019, 2020, 2021
September 1, 2025	May 1, 2025	2022, 2023, 2024
September 1, 2030	May 1, 2030	2027, 2028, 2029
September 1, 2035	May 1, 2035	2032, 2033, 2034
September 1, 2040	May 1, 2040	2037, 2038, 2039

The QER for regulated products will include the following information:

- Product manufacturer (as labeled)
- Product name and code
- Applicable Rule 1168 category
- Regulatory VOC content
- Material VOC content
- Utilization of Sell-Through Provision
- Designation as to whether or not the product is Low Solids
- Product type (water borne/solvent borne)

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- Volume sold into or within the District, including products sold through distribution centers located within or outside the District, reported in gallons of container size

As of January 1, 2000, the Health and Safety Code 41712(h) allows districts to regulate aerosol adhesives. Staff is not exercising the District's authority and is maintaining the exemption for aerosol adhesives and aerosol adhesive primers due to the fact these aerosols are already regulated by CARB who is currently surveying the industry and may consider lower VOC content limits in the near future. In addition, there is currently insufficient data on quantity and emissions from these types of products used in the District. To address the lack of inventory data, staff is proposing to require manufacturers and private labelers of these exempted aerosol adhesives to submit reporting for products shipped into the District so the SCAQMD can quantify the number and types of aerosol adhesive products that are being used within our jurisdiction. Those manufacturers and private labelers of these products would also be required to submit a QER according to the reporting timeline in the table above.

The QER for aerosol adhesives and aerosol adhesive primers will include the following:

- Product manufacturer (as listed on the label)
- Product name and code
- VOC content, in weight percent
- Total weight sold, including products sold through distribution centers located within or outside the District
- Container size of product

The proposal would also require that Big Box Retailers and distribution centers report to the manufacturer/private labeler, according to the Reporting Timeline in the table above, to assist the manufacturers or private labelers in providing accurate data to the District.

The QER for Big Box Retailers and distribution centers will include the following:

- The manufacturer or private labeler's product name and code
- The quantity of each regulated product, aerosol adhesive, and aerosol adhesive primer distributed into the District.

In addition to the reporting described above, facilities that use regulated products under the 55 gallon per year exemption in paragraph (i)(7) shall provide the volume purchased and the name and address of the company where the products were purchased from. This will allow the District to better assess the continued need for the exemption by product category and improve the enforceability of the annual limitation. The annual report submitted by the facilities utilizing the 55 gallon per year exemption will include the following:

- Product manufacturer (as listed on the label)
- Product name and code
- VOC content less water and exempt solvents
- VOC content of material
- Unit size of product
- Total volume purchased, in gallons
- The name and address of the company or retailer where the products were purchased

Lastly, manufacturers or suppliers of regulated products shall maintain records of VOC content determination. VOC content determination may be calculated based on product formulation or by laboratory analysis. The data used in determining VOC content must be retained for three years and be made available upon request. VOC content values of 20 g/L or lower may be reported as “20 g/L or less”. Otherwise, the calculated or analyzed VOC content shall be reported.

### **Prohibition of Sales and Use**

Currently the regulation prohibits the sale and use of regulated products that contain chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene. The proposal will also expand this prohibition to include all Group II exempt solvents except volatile methyl siloxanes (VMS). Small, but non-negligible, quantities of VMS are widely used in silicone-based sealants.

The prohibition of sales does not apply to products reasonably assumed to be subject to the CARB CPR or to manufacturers or suppliers who inform their distributors in writing that the regulated product is not to be used in the District, and who maintain such notification letters for three years, available to the Executive Officer upon request. District staff will not include specifications within the rule language to stipulate explicit requirements for a manufacturer, supplier, or distributor to demonstrate written proof that the regulated products exceeding the VOC limits set forth within the rule will not be sold or used within the SCAQMD’s jurisdiction. Instead, staff will provide a guidance document on the District’s webpage, which will provide options to demonstrate compliance with this section of the rule.

### **Exemptions**

The proposed rule includes an exemption from recordkeeping for products that contain 20 g/L or less VOC content, retaining the requirements under subdivisions (f) and (g), which relates to reporting and use of air toxic air contaminants in product formulation. The streamlined requirement is intended to be an incentive for users to switch to lower VOC regulated products.

An exemption is proposed for adhesive tapes and papers, which do not have an appreciable VOC content. This exemption does not include primers for such products.

Effective January 1, 2018, the 55 gallon per year exemption will no longer be available to users of Rubber Vulcanization Adhesives or Top and Trim Adhesives. These two categories of uses were nearly completely dependent on the exemption because no effective lower VOC content products were available. As noted in the VOC content limits discussion above, the proposed amendments include higher VOC content limits for these two categories temporarily to allow time for reformulation. As effective compliant products become available, the exemption is no longer necessary for these operations.

Staff initially proposed to replace the rule exemption of all aerosol adhesives with a limited exemption of 16 ounces per day determined on a monthly average. However, due to considerable stakeholder feedback, limited sales and emissions data for aerosol adhesives, and future limits on aerosols will be considered by CARB, staff decided to retain the current exemption but will require manufacturers or private labelers to report all aerosol adhesives and aerosol adhesive primers sold into the District.

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Regarding the authority of the District to regulate aerosol adhesives, the Health and Safety Code § 41712 (h) prohibited air districts from adopting any regulations for aerosol adhesives, irrespective of use, only until January 1, 2000. For the past two decades, Rule 1168 has completely exempted aerosol adhesives and products subject to the CARB CPR. The SCAQMD has the legal authority to regulate all uses of aerosol adhesives and could in the future develop a regulation specifically for these products with lower VOC limits than the CARB CPR. Staff will base this decision on future reported sales and emissions data.

Finally, staff proposed exemptions in sections (i)(15) and (i)(16), to address a high-VOC adhesive used in small volumes for critical infrastructure repair and exempting products that would not contain VOC, respectively. Staff also proposed an exemption in section (i)(17) to clarify that those distribution centers that do not ship regulated product, aerosol adhesives, or aerosol adhesive primers into the District are not subject to the provisions of this rule.

### **EMISSION INVENTORY**

The emission inventory for the proposed rule was determined by reviewing the 2016 AQMP inventory emissions for adhesive and sealants, reviewing reported emissions for 2016 as part of the AER program, and by examining survey data provided by adhesive and sealant manufacturers and suppliers in 2013.

According to the 2016 AQMP, emissions from adhesives and sealants subject to the rule are estimated to be 4.1 tpd. The VOC emissions reported through the AER program in 2015 totals 0.1 tons per day, or approximately one percent of overall emissions subject to the rule. The majority of the emissions come from small volume users including manufacturing, commercial, and consumer applications. Architectural uses appear to be the most prevalent use with 84 percent of reported products falling into one of the architectural categories.

Since the survey only provided a fraction of the products sold in the SCAQMD, staff scaled the survey data to estimate the contribution by category. In addition, the emissions were grown based on population growth to reflect the current inventory.

Daily VOC emissions estimated from all sources are 10.5 tons per day as detailed in the table below.

Table 14: Estimated VOC Emission Inventory

<b>Emission Source</b>	<b>Emissions (tons per day)</b>	<b>Total Sales</b>
Adhesives	6.6	8,000,000
Sealants	3.9	2,900,000
<b>Total</b>	<b>10.5</b>	<b>10,900,000</b>

### **EMISSION REDUCTIONS**

The proposed rule will reduce the VOC content limits for most of the architectural adhesive and sealant categories, including foam sealants. The proposal includes new VOC content limits for Waterproof Resorcinol Glue and Foam Sealants. Also proposed is to increase the VOC content limit for Top and Trim Adhesives.

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In the case of Top and Trim Adhesives, District staff found that emissions increased from the use of these products compared to the estimated reductions proposed in previous versions of the rule. Since 2003, the VOC limit reduction to 250 g/L was delayed twice to allow manufacturers to reformulate. Rather than decrease emissions from this category by 0.2 tpd, the 250 g/L limit in conjunction with the volume usage exemption increased emissions by 0.04 tpd. To address this migration to exempted products, staff is proposing to reinstate the 540 g/L limit and exclude Top and Trim Adhesives from the 55 gallon per year exemption. This will allow manufacturers time to reformulate to 250 g/L by 2023, and allow the District to maintain the emissions reductions already claimed in previous versions of the rule.

The emission reductions are estimated using the scaled emission inventory data along with SWA information collected from the survey. SWA material VOC content is determined by reviewing available products. The emissions reductions are calculated by assuming that the material VOC content of those above the proposed limit will be reduced to the same SWA material VOC content of the products that already meet the proposed limit. The estimated emission reductions are presented in the table below.

Table 15: Estimated Emission Reductions from PAR 1168

Category	Emission Reductions (tpd)				Total Reduction (tpd)
	Upon Adoption	2019	2021	2023	
Architectural Sealant		0.38			0.38
Clear, Paintable, Immediately Water Resistant Sealant			0.02		0.02
CPVC Welding				0.01	0.01
Foam Sealant				0.22	0.22
Other Roof Adhesive			0.04		0.04
Other Roof Sealant			0.15		0.15
Other Sealants			0.06		0.06
PVC Welding				0.22	0.22
Single Ply Roof Adhesive			0.06		0.06
Single-Ply Roof Membrane Sealant			0.005		0.005
Top and Trim	-0.21			0.21	
Wood Flooring Adhesive			0.26		0.26
<b>Totals:</b>	<b>-0.21</b>	<b>0.38</b>	<b>0.59</b>	<b>0.66</b>	<b>1.43</b>

The emission reductions from the proposed amendments will be 1.4 tons per day by 2023.

PAR 1168 will partially implement CTS-01 and MCS-01.

**COST-EFFECTIVENESS AND INCREMENTAL COST-EFFECTIVENESS**

The cost effectiveness and incremental cost effectiveness data will be included in subsequent versions of the staff report.

**COMPARATIVE ANALYSIS**

Health and Safety Code Section 40727.2 requires a written analysis comparing the proposed rule with existing federal and SCAQMD regulations. There are no other existing or proposed SCAQMD rules that directly apply to the same source type (adhesive and sealant applications). The federal government has suggested standards in the form of a Control Techniques Guideline for Miscellaneous Industrial Adhesives, but has no regulatory requirements. The Draft staff report will include such a comparative analysis.

**SOCIOECONOMIC ASSESSMENT**

A socioeconomic analysis of Proposed Amended Rule 1168 will be performed. A draft report will be released no later than 30 days prior to the SCAQMD Governing Board hearing.

**CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)**

PAR 1168 is considered a “project” as defined by the California Environmental Quality Act (CEQA), and the SCAQMD is the designated lead agency. Pursuant to CEQA and SCAQMD Rule 110, the SCAQMD, as lead agency for the proposed project, has determined that an Environmental Assessment (EA) will be required for PAR 1168. The Draft EA to be prepared will analyze the potential effects that the project may cause on the environment. In the event that the proposed project may have statewide, regional, or area-wide significance, a CEQA scoping meeting is required pursuant to Public Resources Code section 21083.9(a)(2) and will be held concurrently with the Public Workshop for PAR 1168. As part of the CEQA Scoping Meeting, SCAQMD staff will solicit input from the public on the CEQA evaluation. The Draft EA, upon its release, will be available for a public review and comment period and will contain responses to the comments made at the CEQA Scoping Meeting and comment letters received relative to the EA.

**DRAFT FINDINGS UNDER THE CALIFORNIA HEALTH AND SAFETY CODE**

Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the SCAQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the hearing. The draft findings are as follows:

**Necessity** – State and federal health-based ambient air quality standards for ozone are regularly and significantly exceeded in the SCAQMD. The reduction of VOC from Proposed Amended Rule 1168 is part of a comprehensive strategy to meet federal and state air quality standards.

**Authority** - The SCAQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from Health and Safety Code Sections 39002, 40000, 40001, 40440, 40441, 40702 and 41508.

**Clarity** - The SCAQMD Governing Board has determined that Proposed Amended Rule 1168 – Adhesive and Sealant Applications, is written and displayed so that the meaning can be easily understood by persons directly affected by them.

**Consistency** - The SCAQMD Governing Board has determined that Proposed Amended Rule 1168 – Adhesive and Sealant Applications, is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, federal or state regulations.

**Non-Duplication** - The SCAQMD Governing Board has determined that Proposed Amended Rule 1168 – Adhesive and Sealant Applications, does not impose the same requirement as any existing state or federal regulation, and the proposed amendments are necessary and proper to execute the powers and duties granted to, and imposed upon, the SCAQMD.

**Reference** - In adopting this regulation, the SCAQMD Governing Board references the following statutes which the SCAQMD hereby implements, interprets or makes specific: California Health and Safety Code sections 40001, 40440, and 40702.

### **REFERENCES**

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3. SCAQMD. *tBAC Assessment White Paper* (2016, October). Retrieved from <http://www.aqmd.gov/home/regulations/compliance/vocs/tbac-assessment>
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10. SCAQMD. *Staff Report Proposed Amended Rule 1168 – Adhesive and Sealant Applications* (2004, December).
11. SCAQMD. *Method 313 Determination of Volatile Organic Compounds (VOC) by Gas Chromatography/Mass Spectrometry (GC/MS)* from [http://www.aqmd.gov/home/regulations/compliance/vocs/working-group#&ImageGallery\\_C003\\_Col00=1](http://www.aqmd.gov/home/regulations/compliance/vocs/working-group#&ImageGallery_C003_Col00=1)
12. U.S. Environmental Protection Agency. *Appendix A to Subpart PPPP of Part 63 – Determination of Weight Volatile Matter Content and Weight Solids Content of Reactive Adhesives* (2004, July).