South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 · www.aqmd.gov

March 2, 2018

Ms. Carol Sutkus, Manager
South Coast Air Quality Planning
Air Resources Board
1001 I Street
P.O. Box 2815
Sacramento, CA 95812

Re: SIP Submittal: ***Rule 1168 – Adhesive and Sealant Applications***

Dear Ms. Sutkus:

Attached you will find information pertaining to Rule 1168 – *Adhesive and Sealant Applications* which was amended by the South Coast Air Quality Management District Governing Board on October 6, 2017. Rule 1168 was amended to achieve additional Volatile Organic Compound (VOC) reductions pursuant to Control Measure CTS – 01 in the 2016 Air Quality Management Plan, which committed to a VOC reduction of 1.0 tons per day by 2023.

We are requesting upon your review and concurrence, the attached information be provided to U.S. EPA for its review and inclusion in the SIP.

If you have any questions on this submittal, please contact Michael Krause at (909) 396-2706.

Sincerely,

Philip M. Fine, Ph.D.
Deputy Executive Officer
Planning, Rule Development & Area Sources

PF:SN:MK:HF:NS

Attachments:

SIP Completeness Checklists
APCD/AQMD Rule Evaluation Forms
Clean and Strikeout Copy of Amended Rule
Referenced AQMD Rules
Proof of Publication
Signed Board Resolutions/Minutes
Staff Report (*Includes Public Comments & Responses*)
Environmental Assessment
Referenced Non-EPA Test Methods
Emissions Information

cc:

Doris Lo/U.S. EPA Region IX (w/o attachments)
Mary Leonard/SCAQMD (w/o attachments)
Philip Fine/SCAQMD (w/o attachments)
Michael Krause/SCAQMD (w/o attachments)
Heather Farr/SCAQMD (w/o attachments)
Nicole Silva/SCAQMD (w/o attachments)
Rule 1168 (w/o attachments)
SIP File (w/attachments)

CALIFORNIA AIR RESOURCES BOARD

SIP COMPLETENESS CHECKLIST
(Electronic Format)

***** TO BE COMPLETED BY DISTRICT AND RETURNED TO ARB *****

All rules submitted to the EPA as State Implementation Plan (SIP) revisions must be supported by certain information and documentation for the rule packages to be deemed complete for review by the EPA. Rules will not be evaluated for approvability by the EPA unless the submittal packages are complete. To assist you in determining that all necessary materials are included in rules packages sent to the ARB for submittal to the EPA, please fill out the following form and include it with the rule package you send ARB. See the ARB's Guidelines on the Implementation of the 40 CFR 51, Appendix V, for a more detailed explanation than is provided here. Adopted rules and rule amendments should be checked against U.S. EPA's Guidance Document for Correcting Common VOC & Other Rule Deficiencies (Little Blue Book, August 21, 2001) to ensure that they contain no elements which will result in disapproval by EPA.

District: South Coast Air Quality Mangement District

Rule No: 1168

Rule Title: Adhesive and Sealant Applications

Date Adopted or Amended: October 6, 2017

ADMINISTRATIVE MATERIALS

Note: All documents should be in electronic format. Items that have signatures, initials, or stamps may be scanned.

Attached	Not Attached	N/A	
☒	☐	☐	**COMPLETE COPY OF THE RULE:** Provide an unmarked copy of the entire rule as adopted or amended by your District Board.
☒	☐	☐	**UNDERLINE AND STRIKEOUT COPY OF THE RULE**: If an amended rule, provide a complete copy of the rule indicating in underline and strikeout format all language which has been added, deleted, or changed since the rule was last adopted or amended.
☒	☐	☐	**COMPLETE COPY OF THE REFERENCED RULE(S):** For any rule which includes language specifically referencing another rule, a copy of that other rule must also be submitted, unless it has already been submitted to EPA as part of a previous SIP submittal.
☒	☐	☐	**PUBLIC NOTICE EVIDENCE:** Include a copy of the local newspaper clipping certification(s), stating the date of publication, which must be at least 30 days before the hearing. As an alternative, include a copy of the actual published notice of the public hearing as it appeared in the local newspaper(s). In this case, however, enough of the newspaper page must be included to show the date of publication. The notice must specifically identify by title and number each rule adopted or amended.
☒	☐	☐	**RESOLUTION/MINUTE ORDER:** Provide the Board Clerk certified resolution or minute order. This document must include certification that the hearing was held in accordance with the information in the public notice. It must also list the rules that were adopted or amended, the date of the public hearing, and a statement of compliance with California Health and Safety Code Sections 40725-40728 (Administrative Procedures Act).
☒	☐	☐	**PUBLIC COMMENTS AND RESPONSES:** Submit copies of written public comments made during the notice period and at the public hearing. Also submit any written responses prepared by the District staff or presented to the District Board at the public hearing. A summary of the public comments and responses is adequate. If there were no comments made during the notice period or at the hearing, please indicate N/A to the left.

CALIFORNIA AIR RESOURCES BOARD

SIP COMPLETENESS CHECKLIST
(Electronic Format)

TECHNICAL MATERIALS

Attached	Not Attached	N/A	
☒	☐	☐	**RULE EVALUATION FORM:** See instructions for completing the Rule Evaluation Form and the accompanying sample form.
☒	☐	☐	**NON-EPA TEST METHODS:** Attach all test methods that are referenced in your rule that do not appear in 40 CFR 51, 60, 61, 63, or have not been previously submitted to EPA. EPA methods used in other media such as SW846 for solid waste are not automatically approved for air pollution applications. Submittal of test methods that are not EPA-approved should include the information and follow the procedure described in Region 9's "Test Method Review & Evaluation Process."
☐	☐	☒	**MODELING SUPPORT:** Provide if appropriate. In general, modeling support is not required for VOC and NOx rules to determine their impacts on ozone levels. Modeling is required where a rule is a relaxation that affects large sources (≥ 100 TPY) in an attainment area for SO2, directly emitted PM10, CO, or NOx (for NO2 purposes). In cases where EPA is concerned with the impact on air quality of rule revisions which relax limits or cause a shift in emission patterns in a nonattainment area, a reference back to the approved SIP will be sufficient provided the approved SIP accounts for the relaxation and provided the approved SIP used the current EPA modeling guidelines. If current EPA modeling guidelines were not used, then new modeling may be required.
☐	☐	☒	**ECONOMIC AND TECHNICAL JUSTIFICATION FOR DEVIATIONS FROM EPA POLICIES**: The District staff report or other information included with the submittal should discuss all potential relaxations or deviations from RACT, RACM, BACT, BACM, enforceability, attainment, RFP, or other relevant EPA requirements. This includes, for example, demonstrating that exemptions or emission limits less stringent than the presumptive RACT (e.g., a CTG) meet EPA's 5 percent policy, and demonstrating that all source categories exempted from a RACM/BACM rule are de minimus according to EPA's RACM/BACM policy.
☒	☐	☐	**ADDITIONAL MATERIALS**: Provide District staff reports and any other supporting information concerning development of the rule or rule changes. This information should explain the basis for all limits and thresholds contained in the rule.

CALIFORNIA AIR RESOURCES BOARD

APCD/AQMD RULE EVALUATION FORM – Page 1
(Electronic Format)

I. GENERAL INFORMATION

District: South Coast Air Quality Management District

Rule No(s): 1168 Date adopted/Amended/Rescinded: October 6, 2017

Rule Title(s): Adhesive and Sealant Applications

Date Submitted to ARB: March 2, 2018

If an Amended Rule, Date Last Amended (or Adopted): January 7, 2005

Is the Rule Intended to be Sent to the U.S. EPA as a SIP Revision? ☒ Yes ☐ No *(If No, do not complete remainder of form)*

District Contact: Nicole Silva Phone Number: 909-396-3384 E-mail Address: nsilva@aqmd.gov

Narrative Summary of New Rule or Rule Changes: ☐ New Rule ☒ Amended Rule

The proposed amendments will implement, in part, the 2016 Air Quality Management Plan Control Measure CTS-01: Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants, which targets a 1 ton per day VOC emission reduction by 2023. The amendments include: revision of VOC content limits for various categories; reporting and labeling requirements; clarification of rule language and applicability; language that distinguishes when products are regulated by the California Air Resources Board Consumer Products Regulation or Rule 1168; harmonization of language and requirements with regulations (state and national) affecting the same type of products; addition of test methods; removal of, or addition to, certain exemptions; and prohibition of Group II exempt compounds as defined in Rule 102. The net reductions from the amendment is approximately 1.4 tons per day VOC by 2023.

Pollutant(s) Regulated by the Rule (Check): ☒ ROG ☐ (NOx) ☐ SO2 ☐ (CO) ☐ PM ☐ TAC (name):_____

II. EFFECT ON EMISSIONS

Complete this section ONLY for rules that, when implemented, will result in quantifiable changes in emissions. Attach reference(s) for emission factor(s) and other information. Attach calculation sheet showing how the emission information provided below was determined.

Net Effect on Emissions: ☐ Increase ☒ Decrease ☐ N/A

Emission Reduction Commitment in SIP for this Source Category: The amendment of Rule 1168 partially implements Control Measure CTS-01 with 1.4 ton per day VOC reductions by compliance year 2023.

Inventory Year Used to Calculate Changes in Emissions: 2017 Area Affected: South Coast Air Basin

Future Year Control Profile Estimate *(Provide information on as many years as possible)*:
Reductions achieved by compliance year 2023, which ends December 31, 2023.

Baseline Inventory in the SIP for the Control Measure: 4.1 tons per day VOC (2017)

Emissions Reduction Commitment in the SIP for the Control Measure: 1 ton per day VOC by 2023

Revised Baseline Inventory (if any): 10.5 tons per day VOC (2017)

Revised Emission Reduction Estimate (if developed): 1.4 tons per day VOC by compliance year 2023, which ends December 31, 2023.

Note that the district's input to the Rule Evaluation Form will not be used as input to the ARB's emission forecasting and planning.

III. SOURCES/ATTAINMENT STATUS

District is: ☐ Attainment ☒ Nonattainment ☐ Split

Approximate Total Number of Small (<100 TPY) Sources Affected by this Amendment: 100 manufactures

Percent in Nonattainment Area: 19%

Number of Large (≥ 100 TPY) Sources Controlled: None Percent in Nonattainment Area: N/A%

Name(s) and Location(s) (city and county) of Large (≥ 100 TPY) Sources Controlled by Rule *(Attach additional sheets as necessary)*: N/A

IV. EMISSION REDUCTION TECHNOLOGY

Does the Rule Include Emission Limits that are Continuous? ☒ Yes ☐ No

If Yes, Those Limits are in Section(s) (c)(1) of the Rule.

Other Methods in the Rule for Achieving Emission Reductions are: Restricting the 55 gallon per year exemption for products that are not Top and Trim Adhesives, nor Rubber Vulcanization Adhesives, beginning January 1, 2019.

V. OTHER REQUIREMENTS

The Rule Contains:

Emission Limits in Section(s): (c)(1) Work Practice Standards in Section(s): N/A
Recordkeeping Requirements in Section(s): (d) Reporting Requirements in Section(s): (f)(2)

VI. IMPACT ON AIR QUALITY PLAN

☐ No Impact ☐ Impacts RFP ☒ Impacts attainment

Discussion: The amended rule is expected to result in emission reductions of approximately 1.4 tons per day of VOC from the existing baseline of 10.5 tons per day VOC that will assist in attaining the 1997 8-hour ozone standard.

ATTACHMENT E

RESOLUTION NO. 17-17

A Resolution of the Governing Board of the South Coast Air Quality Management District (SCAQMD) certifying the Final Environmental Assessment (EA) for Proposed Amended Rule 1168 – Adhesive and Sealant Applications.

A Resolution of the SCAQMD Governing Board Amending Rule 1168 – Adhesive and Sealant Applications.

WHEREAS, the SCAQMD Governing Board has determined that a need exists to amend Rule 1168 – Adhesive and Sealant Applications to clarify rule language and reduce emissions from the use and sale of regulated products in order to help achieve air quality standards; and

WHEREAS, the SCAQMD Governing Board finds and determines that Proposed Amended Rule 1168 is considered a "project" pursuant to the California Environmental Quality Act (CEQA) per CEQA Guidelines Section 15002(k) – General Concepts, the three-step process for deciding which document to prepare for a project subject to CEQA; and

WHEREAS, the SCAQMD has had its regulatory program certified pursuant to Public Resources Code Section 21080.5 and CEQA Guidelines Section 15251(l), and has conducted a CEQA review and analysis of Proposed Amended Rule 1168 pursuant to such program (SCAQMD Rule 110); and

WHEREAS, the SCAQMD staff has prepared a Draft EA pursuant to its certified regulatory program and CEQA Guidelines Sections 15251, 15252, and 15070, setting forth the potential environmental consequences of Proposed Amended Rule 1168 and determined that the proposed project would not have a significant adverse effect on the environment; and

WHEREAS, the Draft EA was circulated for 30-day public review and comment period, from August 16, 2017 to September 15, 2017, and two comment letters were received; and

WHEREAS, the Draft EA has been revised to include comments received on the Draft EA and the responses, so that it is now a Final EA; and

WHEREAS, it is necessary that the adequacy of the Final EA, including responses to comments relative to the Draft EA, be determined by the SCAQMD Governing Board prior to its certification; and

WHEREAS, pursuant to CEQA Guidelines Section 15252 (a)(2)(B), since no significant adverse impacts were identified, no alternatives or mitigation measures are required and thus, a Mitigation Monitoring and Reporting Plan pursuant to Public Resources Code Section 21081.6 and CEQA Guidelines Section 15097, has not been prepared; and

WHEREAS, Findings pursuant to Public Resources Code Section 21081.6 and CEQA Guidelines Section 15091 and a Statement of Overriding Considerations pursuant to CEQA Guidelines Section 15093 were not prepared because the analysis shows that Proposed Amended Rule 1168 would not have a significant adverse effect on the environment, and thus, are not required; and

WHEREAS, the SCAQMD Governing Board voting to adopt Proposed Amended Rule 1168 has reviewed and considered the information contained in the Final EA and other supporting documentation, prior to its certification, and has determined that the document, including responses to comments, has been completed in compliance with CEQA; and

WHEREAS, the Final EA reflects the independent judgment of the SCAQMD; and

WHEREAS, the SCAQMD Governing Board finds and determines, taking into consideration the factors in Section (d)(4)(D) of the Governing Board Procedures (codified as Section 30.5(4)(D) of the Administrative Code), that the modifications which have been made to Proposed Amended Rule 1168 since the notice of public hearing was published do not significantly change the meaning of the proposed project within the meaning of Health and Safety Code Section 40726 and would not constitute significant new information requiring recirculation of the Draft EA pursuant to CEQA Guidelines Sections 15073.5 and 15088.5; and

WHEREAS, Proposed Amended Rule 1168 and supporting documentation, including, but not limited to, the Final Staff Report, the Final EA, and the Socioeconomic Impact Assessment, and this October 6, 2017 Board letter were presented to the SCAQMD Governing Board and the SCAQMD Governing Board has reviewed and considered the entirety of this information, as well as has taken and considered staff testimony and public comment prior to approving the project; and

WHEREAS, the SCAQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from Sections 39002, 40000, 40001, 40440, 40702, 40725 through 40728, 41508, and 41511 of the Health and Safety Code; and

WHEREAS, 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 public hearing and in the Final Staff Report; and

WHEREAS, the SCAQMD Governing Board has determined that a need exists to amend Rule 1168 to achieve further volatile organic compound (VOC) emission reductions for regulated products by implementing the 2016 Air Quality Management Plan (AQMP) Control Measure CTS-01: Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants in order to achieve the one-hour ozone standard by 2023, the 1997 eight-hour ozone standard by 2024, and the 2008 eight-hour standard by 2032; and

WHEREAS, the SCAQMD Governing Board has determined that Rule 1168, as proposed to be amended, is written and displayed so that its meaning can be easily understood by persons directly affected by them; and

WHEREAS, the SCAQMD Governing Board has determined that Rule 1168, as proposed to be amended, is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, or state or federal regulations; and

WHEREAS, the SCAQMD Governing Board has determined that Rule 1168, as proposed to be amended, does not impose the same requirements as any existing state or federal regulations, and the proposed amended rule is necessary and proper to execute the powers and duties granted to, and imposed upon, the SCAQMD; and

WHEREAS, Health and Safety Code Section 40727.2 requires the SCAQMD to prepare a written analysis of existing federal air pollution control requirements applicable to the same source type being regulated whenever it adopts, or amends a rule, and that the SCAQMD's comparative analysis of Proposed Amended Rule 1168 is included in the Final Staff Report; and

WHEREAS, the SCAQMD Governing Board, in amending the regulation, references the following statutes which the SCAQMD hereby implements, interprets or makes specific: Health and Safety Code Sections 40001(a) (air quality standards and enforcement of federal standards), 40440(a) (rules to carry out plan), 40440(b)(1) (BARCT), 40702 (adopt regulation to execute duties), and Federal Clean Air Act Section 116 (state standards at least as stringent as federal standards); and

WHEREAS, the SCAQMD Governing Board determines that there is a problem that Proposed Amended Rule 1168 will alleviate, (i.e., the South Coast Air Basin does not meet state or federal standards for ozone and PM2.5) and the proposed amendment will promote the attainment or maintenance of such air quality standards; and

WHEREAS, the SCAQMD Governing Board has determined that the Socioeconomic Impact Assessment, as attached to the Final Staff Report, of Proposed Amended Rule 1168 is consistent with the March 17, 1989 Governing Board Socioeconomic Resolution for rule adoption; and

WHEREAS, the SCAQMD Governing Board has determined that the Socioeconomic Impact Assessment, as attached to the Final Staff Report, is consistent with the provisions of Health and Safety Code Sections 40440.8, 40728.5, and 40920.6; and

WHEREAS, the SCAQMD Governing Board has determined that Proposed Amended Rule 1168 will result in increased costs to the affected industries, yet are considered to be reasonable, with a total annualized cost as specified in the Socioeconomic Impact Assessment, as attached to the Final Staff Report; and

WHEREAS, the SCAQMD Governing Board has actively considered the Socioeconomic Impact Assessment, as attached to the Final Staff Report, and has made a good faith effort to minimize such impacts; and

WHEREAS, the proposed amendments to Rule 1168 will help achieve emission reductions of VOCs from the various regulated product categories, estimated to be approximately 1.4 tons per day, and thus, the adoption of such amendments is necessary for achieving the federal and state standards for ozone and for implementing the AQMP; and

WHEREAS, the SCAQMD staff conducted a public workshop regarding Proposed Amended Rule 1168 on August 17, 2017; and

WHEREAS, the public hearing has been properly noticed in accordance with all provisions of Health and Safety Code Section 40725; and

WHEREAS, the SCAQMD Governing Board has held a public hearing in accordance with all provisions of law; and

WHEREAS, the SCAQMD Governing Board specifies the Manager for Rule 1168 as the custodian of the documents or other materials which constitute the record of proceedings upon which the adoption of the proposed amendments are based, which are located at the South Coast Air Quality Management District, 21865 Copley Drive, Diamond Bar, California; and

WHEREAS, stakeholders requested that the SCAQMD staff develop a guidance document for test method determination based on regulated product type and VOC content and staff is working with stakeholders; and

WHEREAS, the SCAQMD staff will conduct technology assessments, while working with members of the regulated industry, to assess feasibility of the VOC limit reductions set forth within Proposed Amended Rule 1168 in 2020 for Foam Insulation and Foam Sealants and in 2022 for the Acrylonitrile-Butadiene-Styrene to Polyvinyl Chloride Transition Cement, All Other Roofing Adhesive and Sealant, Chlorinated Polyvinyl Chloride Welding Cement, Polyvinyl Chloride Welding Cement, Single Ply Roof Membrane Adhesive and Sealant, and Top and Trim Adhesive categories; and

WHEREAS, Proposed Amended Rule 1168 will be submitted for inclusion into the State Implementation Plan; and

NOW, THEREFORE BE IT RESOLVED, that the SCAQMD Governing Board does hereby certify that the Final EA for Proposed Amended Rule 1168, including responses to comments, was completed in compliance with CEQA and the SCAQMD Rule 110 provisions and finds that the Final EA was presented to the SCAQMD Governing Board, whose members reviewed, considered and approved the information therein prior to acting on Proposed Amended Rule 1168; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board does hereby adopt, pursuant to the authority granted by law, Proposed Amended Rule 1168, as set forth in the attached, and incorporated herein by this reference; and

BE IT FURTHER RESOLVED, that because no significant adverse environmental impacts were identified as a result of implementing Proposed Amended Rule 1168, Findings pursuant to Public Resources Code Section 21081.6 and CEQA Guidelines Section 15091, a Statement of Overriding Considerations pursuant to CEQA Guidelines Section 15093, and a Mitigation Monitoring and Reporting Plan pursuant to Public Resources Code Section 21081.6 and CEQA Guidelines Section 15097 are not required; and

BE IT FURTHER RESOLVED, that the Governing Board directs staff to continue to collaborate with members representing the regulated industry to develop a guidance document for test method determination based on regulated product type and VOC content and bring the guidance document to the Governing Board for approval by the October 2018 Governing Board meeting; and

BE IT FURTHER RESOLVED, the Governing Board directs staff to review the manufacturer's formulation data and/or ASTM Test Method 7767 laboratory results for thin-film energy curable products to verify compliance with the VOC limits set forth in this rule; and

BE IT FURTHER RESOLVED, the Governing Board directs staff to consider the container size, application method, and use of the various products in these categories when evaluating the feasibility of future VOC limits for Foam Insulation and Foam Sealant products as part of the technology assessment; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board does hereby adopt, pursuant to the authority granted by law, Proposed Amended Rule 1168, as set forth in the attached, and incorporated herein by this reference; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board requests that Proposed Amended Rule 1168 be submitted into the State Implementation Plan; and

BE IT FURTHER RESOLVED, that the Executive Officer is hereby directed to forward a copy of this Resolution and Proposed Amended Rule 1168 to the California Air Resources Board for approval and subsequent submittal to the U.S. Environmental Protection Agency for inclusion into the State Implementation Plan.

AYES: Benoit, Burke, Buscaino, Cacciotti, Kuehl, Lyou, McCallon, Mitchell, Nelson, Parker, Robinson and Rutherford

NOES: None

ABSENT: Ashley

Date: October 6, 2017

DENISE GARZARO, CLERK OF THE BOARDS

SUMMARY
MINUTES OF THE BOARD OF THE
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

DENISE GARZARO, CLERK OF THE BOARDS

FRIDAY, OCTOBER 6, 2017

Notice having been duly given, the regular meeting of the South Coast Air Quality Management District Board was held in the Emerald Ballroom at the Millennium Biltmore Hotel Los Angeles, 506 South Grand Avenue, Los Angeles, California. Members present:

William A. Burke, Ed.D., Chairman
Speaker of the Assembly Appointee

Mayor Pro Tem Ben Benoit, Vice Chairman
Cities of Riverside County

Council Member Joe Buscaino
City of Los Angeles

Mayor Michael A. Cacciotti (Arrived at 9:15 a.m.)
Cities of Los Angeles County – Eastern Region

Supervisor Sheila Kuehl
County of Los Angeles

Dr. Joseph K. Lyou
Governor's Appointee

Mayor Pro Tem Larry McCallon
Cities of San Bernardino County

Council Member Judith Mitchell
Cities of Los Angeles County – Western Region

Supervisor Shawn Nelson
County of Orange

Dr. Clark E. Parker, Sr.
Senate Rules Committee Appointee

Council Member Dwight Robinson
Cities of Orange County

Supervisor Janice Rutherford
County of San Bernardino

Member absent:

Supervisor Marion Ashley
County of Riverside

CALL TO ORDER: Chairman Burke called the meeting to order at 9:05 a.m.

- Pledge of Allegiance: Led by Mayor Pro Tem McCallon

CONSENT CALENDAR

1. Approve Minutes of September 1, 2017 Board Meeting

2. Set Public Hearing November 3, 2017 to Consider Adoption of and/or Amendments to SCAQMD Rules and Regulations

   A. Certify Final Environmental Assessment and Adopt Proposed Rule 415 – Odors from Rendering Facilities

   B. Certify Final Environmental Assessment and Amend Rule 1420 – Emissions Standard for Lead

Budget/Fiscal Impact

3. Execute Contracts to Implement Advanced Building Energy Management Projects

4. Execute Contract to Assess Air Quality and Greenhouse Gas Impacts of Microgrid-Based Electricity System

5. Recognize Revenue, Execute Contracts for Electric Yard Tractor Replacements, Transfer Funds, Reimburse General Fund for Administrative Costs, and Issue Program Announcement for Commercial Lawn and Garden Equipment Exchange Program

6. Recognize and Transfer Funds, Execute and Amend Agreements for Installation and Maintenance of Air Filtration Systems, and Reimburse General Fund for Administrative Costs

7. Amend Award to Develop and Demonstrate Electric School Buses with Vehicle-to-Grid Capability

8. Recognize Revenue and Appropriate Funds for Improving Interpretation of PM2.5 Measurements From Satellites

9. Recognize Revenue, Transfer and Appropriate Funds, Purchase Equipment, Execute Contracts and Issue Purchase Orders to Address Science and Technology Advancement's Operational Needs for Metals Monitoring and Analysis

10. Issue, and If Necessary Re-Issue, Program Announcement for the Replacement of Heavy-Duty Diesel Trucks and Authorize Execution of Contracts Under Proposition 1B-Goods Movement Program

11. Issue Program Announcement for School Bus Replacements

12. Issue Purchase Order for Ingres Relational Database Management System Software Support

13. Authorize Purchase of Toxic Vapor Analyzers and Remove Various Fixed Assets from SCAQMD Inventory

14. Approve Contract Awards and Modifications Approved by MSRC

Action Item/No Fiscal Impact

15. Special Meeting of Health Effects of Air Pollution Foundation

Items 16 through 22 - Information Only/Receive and File

16. Legislative, Public Affairs and Media Report

17. Hearing Board Report

18. Civil Filing and Civil Penalties Report

19. Lead Agency Projects and Environmental Documents Received by SCAQMD

20. Approve Annual Report on AB 2766 Funds from Motor Vehicle Registration for FY 2015-16

21. Rule and Control Measure Forecast

22. Status Report on Major Ongoing and Upcoming Projects for Information Management

Mr. Nastri noted that staff was requesting that Item 2B be continued to the November 3, 2017 Board meeting.

Dr. Lyou announced his abstention on Item No. 4 because Southern California Gas Company is a potential source of income to him; on Item No. 5 because the Port of Long Beach is a potential source of income to him; on Item No. 6 because IQ Air is a potential source of income to him; on Item No. 7 because Bay Area Air Quality Management District is a potential source of income to him; and on Item No. 9 because the University of California Riverside is a potential source of income to him.

Mayor Pro Tem McCallon and Supervisor Nelson noted that they serve on the Board of Directors of the Southern California Regional Rail Authority which is involved with Item No. 14.

Agenda Item Nos. 6, 10, 11 and 21 were withheld for comment and discussion.

MOVED BY PARKER, SECONDED BY BUSCAINO, AGENDA ITEMS 1, 2A, 3, 4, 5, 7, 9, 12 THROUGH 20 AND 22 APPROVED AS RECOMMENDED, BY THE FOLLOWING VOTE:

AYES:	Benoit, Burke, Buscaino, Cacciotti, Kuehl, Lyou *(except Items #4, #5, #7 and #9)*, McCallon, Mitchell, Nelson, Parker, Robinson and Rutherford
NOES:	None
ABSTAIN:	Lyou *(Items #4, #5, #7 and #9)*
ABSENT:	Ashley

23. <u>Items Deferred from Consent Calendar</u>

6. Recognize and Transfer Funds, Execute and Amend Agreements for Installation and Maintenance of Air Filtration Systems, and Reimburse General Fund for Administrative Costs

Dr. Lyou left the room during discussion of Item No. 6.

Mayor Pro Tem McCallon inquired if schools in San Bernardino and Riverside Counties would be benefitting from this program.

Dr. Matt Miyasato, DEO/Science and Technology Advancement, responded that while specific schools have not been selected, communities within San Bernardino and Riverside counties have been identified as potential locations for school and residential air filters.

MOVED BY MCCALLON, SECONDED BY BENOIT, AGENDA ITEM 6 APPROVED, AS RECOMMENDED, AS SET FORTH BELOW, BY THE FOLLOWING VOTE:

AYES:	Benoit, Burke, Buscaino, Kuehl, McCallon, Mitchell, Nelson, Parker, Robinson and Rutherford
NOES:	None
ABSTAIN:	Lyou
ABSENT:	Ashley and Cacciotti

10. Issue, and If Necessary Re-Issue, Program Announcement for the Replacement of Heavy-Duty Diesel Trucks and Authorize Execution of Contracts Under Proposition 1B-Goods Movement Program

Harvey Eder, Public Solar Power Coalition, stated his opposition because natural gas heavy-duty trucks only provide 50 percent NOx emission reductions. He stressed the importance of seeking zero emission alternatives such as solar renewable trucks.

In response to Mr. Eder's comment, Dr. Phillip Fine, DEO/Planning, Rule Development and Area Sources, explained that the new natural gas engines to be funded are 90 percent cleaner than current tailpipe standards.

11. Issue Program Announcement for School Bus Replacements

Mr. Eder encouraged the Board to consider zero emission alternatives for the school bus replacements.

MOVED BY NELSON, SECONDED BY BUSCAINO, AGENDA ITEMS 10 AND 11 APPROVED AS RECOMMENDED, BY THE FOLLOWING VOTE:

AYES: Benoit, Burke, Buscaino, Kuehl, Lyou, McCallon, Mitchell, Nelson, Parker, Robinson and Rutherford

NOES: None

ABSENT: Ashley and Cacciotti

(Mayor Cacciotti arrived at 9:15 a.m.)

21. Rule and Control Measure Forecast

Dr. Lyou commented that in relation to potential upcoming chrome plating regulations, staff should research the ban on certain chrome plating activities that was recently adopted by the European Union to see what alternative methods might be available.

MOVED BY LYOU, SECONDED BY KUEHL, AGENDA ITEM 21 APPROVED AS RECOMMENDED, BY THE FOLLOWING VOTE:

AYES: Benoit, Burke, Buscaino, Cacciotti, Kuehl, Lyou, McCallon, Mitchell, Nelson, Parker, Robinson and Rutherford

NOES: None

ABSENT: Ashley

BOARD CALENDAR

24. Administrative Committee

25. Legislative Committee

26. Marine Port Committee

27. Mobile Source Committee

28. Stationary Source Committee

29. Technology Committee

30. Mobile Source Air Pollution Reduction Review Committee

31. California Air Resources Board Monthly Report

MOVED BY MITCHELL, SECONDED BY PARKER, AGENDA ITEMS 24 THROUGH 31, APPROVED AS RECOMMENDED, RECEIVING AND FILING THE COMMITTEE, MSRC AND CARB REPORTS, BY THE FOLLOWING VOTE:

AYES: Benoit, Burke, Buscaino, Cacciotti, Kuehl, Lyou, McCallon, Mitchell, Nelson, Parker, Robinson and Rutherford

NOES: None

ABSENT: Ashley

PUBLIC HEARING

32. Certify Final Environmental Assessment and Amend Rule 1168—Adhesive and Sealant Applications

Heather Farr, Program Supervisor/Planning, Rule Development and Area Sources, gave the staff presentation on Item 32.

Dr. Lyou inquired about Method 24 and reproducibility in UV cured coatings. Ms. Farr replied that Method 24, which was adopted in 1993, covers most UV curable products, the one exception is thin-film energy curable products.

Dr. Lyou added that he would propose a deadline of October 2018 for the test method guidance document to be brought back to the Board.

Dr. Parker inquired about the status of defining a sealant in certain applications which was previously a point of disagreement with industry.

Dr. Fine explained that spray foam insulation has been considered a sealant and the amendments to the rule clarify that definition. He added that this product is relatively new and once a technical assessment is conducted, an amendment to the rule may be brought back to the Board.

Council Member Buscaino inquired about products that have multiple test methods for determining compliance with VOC limits. Dr. Fine responded that a public process with stakeholders will be initiated in order to develop the test method guidance document. The intent is that each individual product will have one applicable test method which will be made clear by the guidance document.

The public hearing was opened; and the following individuals addressed the Board on Item 32.

Lindsay Stovall, American Chemistry Council Center for the Polyurethanes Industry, thanked staff for addressing industry input in the amendments and expressed concerns with identifying spray polyurethane insulation foam as a sealant. (Submitted Written Comments)

Doug Raymond, National Aerosol Association
Howard Berman, Tremco, Inc.
Expressed support for the rule amendments and thanked staff for working with the adhesive and sealant industries.

Fabio Castellani, Weld-On Adhesives, expressed support for the VOC limits for PVC and CPVC solvent cement that provide improvements to air quality. He added that Weld-On has invested in research and development to meet or exceed the VOC limits in Rule 1168 and these products are already available for purchase.

Curt Coleman, Southern California Air Quality Alliance, thanked staff for their work on developing the rule and requested more time for the sell-through period.

Rita Loof, RadTech International, expressed concern about test methods for UV/EV LED materials and requested more specificity in the rule. She also stated that recordkeeping requirements in the rule would be burdensome. (Submitted Written Comments)

Written Comments Submitted By:
American Coatings Association

There being no further public testimony on this item, the public hearing was closed.

Council Member Mitchell requested clarification on the test method guidance document and the time needed to prepare the document.

Dr. Fine responded that the document will be brought to the Board as quickly as possible after the public process with stakeholders is completed. He added that some of the test methods may come before the Board sooner than some of the more complex methods.

Council Member Mitchell inquired about the recordkeeping requirements and extending the sell-through and use-through time periods.

Dr. Fine replied that there are no new recordkeeping requirements for end users. Manufacturers will be required to report every three years through 2025, then every five years, with a sunset date in 2040.

Ms. Farr explained that the sell through and use-through time period is similar to provisions in other rules and typically products are sold through in the first year.

Dr. Lyou noted that any advantage gained by the companies who have already invested in research and development to reduce VOC emissions is eliminated by the extended implementation period which allows competing companies additional time to reformulate and comply with the rule. He added that information about compliant products should be provided on the District's website for consumer use.

Dr. Fine explained that time is needed to allow manufacturers to reformulate and make the technical assessments and noted that super compliant product information is publicly available on the District's website for architectural coatings under Rule 314.

Mr. Nastri responded that the District's website is currently being redesigned and compliant product information will be more readily accessible in the future.

Chairman Burke and Mayor Cacciotti suggested additional outreach and education to contractors, the Contractors State License Board, and other government agencies about the availability of low VOC products.

Mr. Nastri commented on the District's outreach to government agencies and private organizations.

Dr. Parker expressed concern about promoting specific products on the District's website.

Mr. Nastri responded that the District's AQ-SPEC website is a good example of effectively providing information without promoting one product over another.

Council Member Robinson expressed support for extending the use-through provisions in the Rule and inquired what outreach was done to industry during the rule development process.

Ms. Farr explained that outreach to industry on these amendments began in 2013 and continued to the present time, including numerous working group meetings and workshops.

Mr. Nastri commented that the sell-through provision is consistent with U.S. EPA provisions and the use-through provision could be extended to address concerns that have been raised.

Council Member Robinson inquired about recordkeeping and VOC emission reduction estimates provided in the AQMP.

Dr. Fine explained that the reporting requirement in the rule will provide an improved emission inventory and VOC emission reduction estimate.

Mayor Pro Tem Benoit noted that an additional speaker card had been submitted after the public comment period was closed.

MOVED BY LYOU, SECONDED BY CACCIOTTI, AGENDA ITEM NO. 32 APPROVED, ADOPTING RESOLUTION NO. 17-17 CERTIFYING THE FINAL ENVIRONMENTAL ASSESSMENT FOR PROPOSED AMENDED RULE 1168 AND AMENDING RULE 1168—ADHESIVE AND SEALANT APPLICATIONS, WITH THE MODIFICATION TO EXTEND THE USE-THROUGH PERIOD FROM THREE YEARS TO FOUR YEARS, AND SETTING A DEADLINE OF OCTOBER 2018 FOR THE TEST METHODS GUIDANCE DOCUMENT, BY THE FOLLOWING VOTE:

AYES: Benoit, Burke, Buscaino, Cacciotti, Kuehl, Lyou, McCallon, Mitchell, Nelson, Parker, Robinson and Rutherford

NOES: None

ABSENT: Ashley

Supervisor Nelson commented that the speaker who arrived late should be given the opportunity to provide public testimony, since the offsite location may have contributed to his late arrival.

SUPERVISOR NELSON MOVED TO RECONSIDER ITEM NO. 32 AND REOPEN THE PUBLIC HEARING ON THE ITEM, THE MOTION WAS SECONDED BY MAYOR CACCIOTTI AND PASSED BY THE FOLLOWING VOTE:

AYES: Benoit, Burke, Buscaino, Cacciotti, Kuehl, Lyou, McCallon, Mitchell, Nelson, Parker, Robinson and Rutherford

NOES: None

ABSENT: Ashley

The public hearing was reopened; and the following individual addressed the Board on Item 32.

Mark Brown, MPS Adhesives, commented on his experience reformulating PVC and CPVC pipe cements when Rule 1168 was originally adopted. He expressed concerns that some of the products displayed in the presentation do not meet ASTM standards.

Ms. Farr responded that the ASTM methods and standards for PVC, CPVC and ABS products will be reviewed as part of the technical assessment.

There being no further public testimony on this item, the public hearing was closed.

MOVED BY LYOU, SECONDED BY CACCIOTTI, AGENDA ITEM NO. 32 APPROVED, ADOPTING RESOLUTION NO. 17-17 CERTIFYING THE FINAL ENVIRONMENTAL ASSESSMENT FOR PROPOSED AMENDED RULE 1168 AND AMENDING RULE 1168—ADHESIVE AND SEALANT APPLICATIONS, WITH THE MODIFICATION TO EXTEND THE USE-THROUGH PERIOD FROM THREE YEARS TO FOUR YEARS, AND SETTING A DEADLINE OF OCTOBER 2018 FOR THE TEST METHODS GUIDANCE DOCUMENT, BY THE FOLLOWING VOTE:

AYES:	Benoit, Burke, Buscaino, Cacciotti, Kuehl, Lyou, McCallon, Mitchell, Nelson, Parker, Robinson and Rutherford
NOES:	None
ABSENT:	Ashley

PUBLIC COMMENT PERIOD – (Public Comment on Non-Agenda Items, Pursuant to Government Code Section 54954.3)

Mr. Eder commented on his litigation against the SCAQMD and CARB. He expressed support for investment tax credits for solar renewable products.

CLOSED SESSION

The Board recessed to closed session at 10:25 a.m., pursuant to Government Code sections:

- 54956.9(a) and 54956.9(d)(1) to confer with its counsel regarding pending litigation which has been initiated formally and to which the SCAQMD is a party. The actions are:

  Communities for a Better Environment v. South Coast Air Quality Management District, Los Angeles Superior Court Case No. BS169841; Safe Fuel and Energy Resources California, et al. v. South Coast Air Quality Management District, Los Angeles Superior Court Case No. BS169923 (Tesoro);

  People of the State of California, ex rel. SCAQMD v. Exide Technologies, Inc., Los Angeles Superior Court Case No. BC533528; and

  In re: Exide Technologies, Inc., U.S. Bankruptcy Court, District of Delaware, Case No. 13-11482 (KJC) (Bankruptcy Case).

Following closed session, General Counsel Kurt Wiese announced that a report of any reportable actions taken in closed session will be filed with the Clerk of the Board's office and made available to the public upon request.

ADJOURNMENT

There being no further business, the meeting was adjourned by Kurt Wiese at 10:50 a.m.

The foregoing is a true statement of the proceedings held by the South Coast Air Quality Management District Board on October 6, 2017.

Respectfully Submitted,

Denise Garzaro
Clerk of the Boards

Date Minutes Approved: November 3, 2017

Dr. William A Burke, Chairman

ACRONYMS

ABS = Acrylonitrile Butadiene Styrene
ASTM = American Society for Testing and Materials
CARB = California Air Resources Board
CEQA = California Environmental Quality Act
CPVC = Chlorinated Polyvinyl Chloride
CNG = Compressed Natural Gas
DEO = Deputy Executive Officer
FY = Fiscal Year
MSRC = Mobile Source (Air Pollution Reduction) Review Committee
NOx = Oxides of Nitrogen
PM2.5 = Particulate Matter ≤2.5 microns
PVC = Polyvinyl Chloride
RFP = Request for Proposals
U.S. EPA = United States Environmental Protection Agency
VOC = Volatile Organic Compound

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

(Adopted April 7, 1989)(Amended March 2, 1990)(Amended Feb. 1, 1991)
(Amended July 19, 1991)(Amended August 2, 1991)
(Amended December 4, 1992)(Amended December 10, 1993)
(Amended April 11, 1997)(Amended February 13, 1998)(Amended September 15, 2000)
(Amended June 7, 2002)(Amended July 12, 2002)(Amended October 3, 2003)
(Amended January 7, 2005)(Amended October 6, 2017)

RULE 1168. ADHESIVE AND SEALANT APPLICATIONS

(a) Purpose and Applicability

The purpose of this rule is to reduce emissions of volatile organic compounds (VOCs), toxic air contaminants, and stratospheric ozone-depleting compounds from the application of adhesives, adhesive primers, sealants, and sealant primers. This rule applies to any person who uses, sells, stores, supplies, distributes, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers, unless otherwise specifically exempted by this rule.

(b) Definitions

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

(1) ACRYLIC is a thermoplastic polymer or a copolymer of acrylic acid, methacrylic acid, esters of these acids, or acrylonitrile.

(2) ACRYLONITRILE-BUTADIENE-STYRENE (ABS) plastic is made by reacting monomers of acrylonitrile, butadiene, and styrene and is normally identified with an ABS marking.

(3) ABS TO POLYVINYL CHLORIDE (PVC) TRANSITION CEMENT is Plastic Welding Cement used to join ABS and PVC building drains or building sewers.

(4) ABS WELDING CEMENT is a Plastic Welding Cement that is used to join ABS pipe, fittings, and other system components, including, but not limited to, components for shower pan liner, drain, closet flange, and backwater valve systems.

(5) ADHESIVE is any substance that is used to bond one surface to another surface by attachment.

(6) ADHESIVE PRIMER is a film-forming material applied to a substrate, prior to the application of an adhesive or adhesive tape, to increase adhesion or film bond strength, promote wetting, or form a chemical bond with a subsequently applied adhesive.

(7) ADHESIVE TAPE is a backing material coated with an adhesive, and includes, but is not limited to, drywall tape, heat sensitive tape, pressure-sensitive adhesive tape, and water-activated tape.

(8) AEROSOL ADHESIVE is any adhesive packaged as an aerosol product in which the spray mechanism is permanently housed in a can designed for hand-held application where no ancillary hoses or spray equipment is used.

(9) AEROSOL PRODUCT is a pressurized spray system that dispenses product ingredients by means of a propellant contained in a product or a product's container, or by means of a mechanically induced force. Aerosol Products do not include Pump Spray.

(10) ARCHITECTURAL APPLICATION is the use of a regulated product on stationary structures, including mobile homes, and their appurtenances.

(11) ARCHITECTURAL APPURTENANCE is any accessory to a stationary structure, including, but not limited to, hand railings; cabinets; bathroom and kitchen fixtures; fences; rain-gutters and down-spouts; window screens; lamp-posts; heating and air conditioning equipment; other mechanical equipment; large fixed stationary tools; signs; motion picture and television production sets; and concrete forms.

(12) BIG BOX RETAILER is a physically large-chain retail outlet that is classified by the U.S. Department of Labor under North American Industry Classification System code 444110: Home Centers or identified in a list maintained by the Executive Officer.

(13) BUILDING ENVELOPE is the exterior and demising partitions of a building that enclose conditioned space.

(14) BUILDING ENVELOPE MEMBRANE ADHESIVES are used to adhere membranes applied to the building envelope to provide a barrier to air or vapor leakage through the building envelope that separates conditioned from unconditioned spaces. Building Envelope Membranes are applied to diverse materials, including, but not limited to, concrete masonry units (CMU), oriented stranded board (OSB), gypsum board, and wood substrates.

(15) CARPET PAD ADHESIVE is an adhesive used for the installation of a carpet pad (or cushion) beneath a carpet.

(16) CERAMIC, GLASS, PORCELAIN, AND STONE TILE ADHESIVE is an adhesive used for the installation of tile products.

(17) CHLORINATED POLYVINYL CHLORIDE (CPVC) plastic is a polymer of the chlorinated polyvinyl monomer that contains 67% chlorine and is normally identified with a CPVC marking.

(18) CPVC WELDING CEMENT is a Plastic Welding Cement that is used to join CPVC pipe, fittings, and other system components, including, but not limited to, components for shower pan liner, drain, closet flange, and backwater valve systems.

(19) CLEAR, PAINTABLE, AND IMMEDIATELY WATER-RESISTANT SEALANT is a compound with adhesive properties that contains no appreciable level of opaque fillers or pigments; transmits most or all visible light through itself when cured; is capable of being painted; is immediately resistant to precipitation upon application; and must meet the following criteria:

(A) Clarity of 15 turbidity units or less per ASTM D7315 - Determination of Turbidity Above 1 Turbidity Unit (TU) in Static Mode as manufactured and packaged;

(B) Color of Gardner 0 as tested by ASTM D1544 - Standard Test Method for Color of Transparent Liquids (Gardner Color Scale) or Platinum-Cobalt Color of 50 or less using ASTM D1209 - Standard Test Method for Color of Clear Liquids (Platinum-Cobalt Scale) as manufactured and packaged; and

(C) Compatible with paint per ASTM C1520 Standard Guide for Paintability of Latex Sealants.

(20) COMPUTER DISKETTE MANUFACTURING is the process where the fold-over flaps are glued to the body of a vinyl jacket.

(21) CONTACT ADHESIVE is an adhesive applied to two separate surfaces, allowed to dry before the two surfaces are placed in contact with each other, and forms an immediate bond after both adhesive-coated surfaces are placed in full contact with each other.

(22) CONSUMER PRODUCTS REGULATION is the regulation implemented by the California Air Resources Board (CARB) under Title 17 of the California Code of Regulations, Section 94507, et. seq.

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

(24) CYANOACRYLATE ADHESIVE is an acrylic adhesive that contains ethyl, methyl, methoxymethyl or other functional groupings of cyanoacrylate.

(25) DIP COAT is a method of application to a substrate by submersion into, and removal from, a bath.

(26) DISTRIBUTION CENTER is a warehouse or other specialized building, which is stocked with products (goods), to be redistributed to retailers, wholesalers, or directly to end-users.

(27) DRY WALL ADHESIVE is an adhesive used during the installation of gypsum dry wall to studs or solid surfaces.

(28) EDGE GLUE is an adhesive applied to the edge of multi-sheet carbonless forms prior to being fanned apart after drying.

(29) ELECTROSTATIC APPLICATION is a spray method where the atomized droplets are charged and subsequently deposited on the substrate by electrostatic attraction.

(30) ENERGY CURABLE ADHESIVES AND SEALANTS are single-component reactive products that cure upon exposure to visible-light, ultra-violet light, or to an electron beam. The VOC content of thin film Energy Curable Adhesives and Sealants may be determined by manufacturers using ASTM Test Method 7767 Standard Test Method to Measure Volatiles from Radiation Curable Acrylate Monomers, Oligomers, and Blends and Thin Coatings Made from Them.

(31) EXEMPT COMPOUNDS are as defined in Rule 102 – Definition of Terms.

(32) FACILITY means any permit unit or grouping of permit units or other air contaminant-emitting activities which are located on one or more contiguous properties within the District, in actual physical contact or separated solely by a public roadway or other public right-of-way, and are owned or operated by the same person (or by persons under common control). Such above-described groupings, if not contiguous, but connected only by land carrying a pipeline, shall not be considered one facility.

(33) FIBERGLASS is fine filaments of glass.

(34) FLOW COAT is an application method that coats an object by flowing a stream of regulated product over the object and draining off any excess product.

(35) FOAM INSULATION is an expanding foam that is sprayed into ceiling or wall cavities to provide thermal resistance or to minimize air infiltration.

(36) FOAM SEALANT is a foam used to fill and form a durable, airtight, water-resistant seal to common building substrates, such as wood, brick, concrete, foam board, and plastic.

(37) GRAMS OF VOC PER LITER OF REGULATED PRODUCT, LESS WATER AND LESS EXEMPT COMPOUNDS is the weight of VOC per combined volume of VOC and product solids, and can be calculated by the following equation:

Grams of VOC per Liter of Regulated Product, Less Water and Less Exempt Compounds =

$$\frac{W_s - W_w - W_{es}}{V_m - V_W - V_{es}}$$

Where:
- W_s = weight of volatile compounds, in grams
- W_w = weight of water, in grams
- W_{es} = weight of exempt compounds, in grams
- V_m = volume of material, in liters
- V_w = volume of water, in liters
- V_{es} = volume of exempt compounds, in liters

For reactive products, the VOC content is determined after curing. The grams of VOC per liter of any regulated product, except a low-solids product, shall be calculated by the following equation:

Grams of VOC per Liter of Regulated Product, Less Water and Less Exempt Compounds =

$$\frac{W_{rs} - W_{rw} - W_{res}}{V_{rm} - V_{rw} - V_{res}}$$

Where:
- W_{rs} = weight of volatile compounds not consumed during curing, in grams
- W_{rw} = weight of water not consumed during curing, in grams
- W_{res} = weight of exempt compounds not consumed during curing, in grams
- V_{rm} = volume of material prior to reaction, in liters
- V_{rw} = volume of water not consumed during curing, in liters
- V_{res} = volume of exempt compounds not consumed during curing, in liters

(38) GRAMS OF VOC PER LITER OF MATERIAL is the weight of VOC per volume of material, to be used for a low-solids product, and can be calculated by the following equation:

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

Where: W_s = weight of volatile compounds, in grams
W_w = weight of water, in grams
W_{es} = weight of exempt compounds, in grams
V_m = volume of material, in liters

For reactive products, the VOC content is determined after curing.

(39) GROUT is a cement-based sealant formulated to fill or seal gaps, including those associated with, but not limited to, tile installations.

(40) HAND APPLICATION METHODS is the application of a regulated product using hand held equipment. Such equipment includes paint brush, hand roller, trowel, spatula, dauber, rag, sponge, and mechanically- and/or pneumatic-driven syringe provided there is no atomization of the materials.

(41) HIGH-VOLUME, LOW-PRESSURE (HVLP) SPRAY is equipment used to apply a regulated product by means of a spray gun that is designed to be operated and that is operated between 0.1 and 10 pounds per square inch gauge (psig) air pressure measured dynamically at the center of the air cap and at the air horns.

(42) INDOOR FLOOR COVERING ADHESIVE is an adhesive used during the installation of a carpet or indoor flooring that is in an enclosure and is not exposed to ambient weather conditions during normal use.

(43) LOW-SOLIDS is any regulated product that contains less than one pound of solids per gallon of material (or 120 grams of solids per liter of material).

(44) MAINTENANCE is a routine process to keep equipment and machinery in working order or to prevent breakdowns.

(45) MANUFACTURING is the use of tools and labor to make things for sale.

(46) MARINE APPURTENANCES include, but are not limited to, a wood boardwalk, deck, dock, fender, lock gate, or other wooden structure specified for the marine environment.

(47) MARINE DECK SEALANT is any sealant that is applied to wooden marine decks and their appurtenances and is specified and used exclusively for the marine environment.

(48) MARINE DECK SEALANT PRIMER is any sealant primer that is applied to wooden marine decks and their appurtenances and is specified and used exclusively for the marine environment.

(49) MODIFIED BITUMINOUS PRIMER consist of bituminous materials, and a high flash solvent used to prepare a surface by (1) improving the adhesion and (2) absorbing dust from the surface for adhesive, or flashing cement bitumen membrane.

(50) MODIFIED BITUMINOUS MATERIALS are materials obtained from natural deposits of asphalt or residues from the distillation of crude oil petroleum or coal which consist mainly of hydrocarbons, and include, but are not limited to, asphalt, tar, pitch, and asphalt tile that are soluble in carbon disulfide.

(51) MULTI-PURPOSE CONSTRUCTION ADHESIVE is any adhesive to be used for the installation or repair of various construction materials, including, but not limited to, drywall, subfloor, panel, fiberglass reinforced plastic (FRP), ceiling tile, and acoustical tile.

(52) NON-STAINING PLUMBING PUTTY is a non-staining sealant formulated for use on natural surface materials that remains flexible and creates a waterproof seal when setting plumbing fixtures.

(53) OUTDOOR FLOOR COVERING ADHESIVE is an adhesive used during the installation of carpet or floor covering that is not in an enclosure and is exposed to ambient weather conditions during normal use.

(54) OZONE-DEPLETING COMPOUND is as defined in Rule 102.

(55) PANEL ADHESIVE is an adhesive used for the installation of plywood, pre-decorated hardboard (or tileboard), FRP, and similar pre-decorated or non-decorated panels to studs or solid surfaces.

(56) PERCENT VOC BY WEIGHT is the ratio of the weight of the VOC to the weight of the material, expressed as a percentage of VOC by weight. The percent VOC by weight can be calculated as follows:

$$\% \text{ VOC weight} = \frac{W_v}{W} \times 100$$

Where: W_v = weight of the VOCs, in grams

W = weight of material, in grams

(57) PERSON is as defined in Rule 102.

(58) PLASTIC ADHESIVE PRIMER is a material applied to CPVC and PVC plastic to prepare joining surfaces for the application of CPVC or PVC welding cements.

(59) PLASTIC WELDING CEMENT is the use of adhesives made of resins and solvents which are used to dissolve the surfaces of plastic, except ABS, CPVC, and PVC plastic, to form a bond between mating surfaces.

(60) PLASTIC FOAM is a foam constructed of plastics.

(61) PLASTICS are synthetic materials chemically formed by the polymerization of organic (carbon-based) substances. Plastics are usually compounded with modifiers, extenders, and/or reinforcers. They are capable of being molded, extruded, cast into various shapes and films, or drawn into filaments and are used to produce pipe, solid sheet, film, or bulk products.

(62) POLYCARBONATE is a thermoplastic resin derived from bisphenol A and phosgene, a linear polyester of carbonic acid, dihydroxy compound and any carbonate diester, or by ester interchange.

(63) POLYETHYLENE TEREPHTHALATE (PET, PETE) is a thermoplastic polyester formed from ethylene glycol by direct esterification or by catalyzed ester exchange between ethylene glycol and dimethyl terephthalate.

(64) POLYETHYLENE TEREPHTHALATE GLYCOL (PETG) is a glycol modified polyethylene terephthalate.

(65) POLYVINYL CHLORIDE (PVC) plastic is a polymer of the vinyl chloride monomer that contains 57 percent chlorine.

(66) POROUS MATERIAL is a substance which has tiny openings, often microscopic, in which fluids may be absorbed or discharged. Such materials include, but are not limited to, wood, fabric, paper, corrugated paperboard, and plastic foam.

(67) POTABLE WATER ARCHITECTURAL SEALANT is a sealant used in water treatment or water distribution applications required to comply with NSF/ANSI Standard 61: Drinking Water System Components – Health Effects.

(68) PRESSURE SENSITIVE ADHESIVE is an adhesive, typically coated on backings or release liners that forms a bond when pressure is applied, without the need for solvent, water, or heat.

(69) PRIVATE LABELER is the person, company, firm, or establishment (other than the toll manufacturer) identified on the label of a regulated product.

(70) PUMP SPRAY is a packaging system in which the product ingredients within the container are not under pressure and in which the product is expelled only while a pumping action is applied to a button, trigger, or other actuator.

(71) PVC WELDING CEMENT is a Plastic Welding Cement that is used to join PVC pipe, fittings, and other system components, including, but not limited to, components for shower pan liner, drain, closet flange, and backwater valve systems.

(72) QUANTITY AND EMISSIONS REPORT (QER) is the report specified in subparagraph (f)(2).

(73) REACTIVE PRODUCTS are regulated products composed, in part, of monomers that become integral parts of the cured product through chemical reaction. Reactive Products include, but are not limited to, polyurethane and two-component regulated products.

(74) REGULATED PRODUCT is an adhesive, adhesive primer, sealant, or sealant primer subject to this rule.

(75) REINFORCED PLASTIC COMPOSITE is a composite material consisting of plastic reinforced with fibers.

(76) REPAIR is an operation or activity to return a damaged object or an object not operating properly, to good condition.

(77) ROADWAY SEALANT is any sealant to be applied to streets, highways, and other surfaces, including, but not limited to, curbs, berms, driveways, and parking lots.

(78) ROLL COATER is a series of mechanical rollers that form a thin film on the surface roller, which is applied to a substrate by moving the substrate underneath the roller.

(79) RUBBER is any natural or manmade rubber-like substrate, and includes, but is not limited to, styrene-butadiene, polychloroprene (neoprene), butyl, nitrile, chlorosulfonated polyethylene, and ethylene propylene diene terpolymer.

(80) RUBBER FLOORING ADHESIVE is an adhesive that is used for the installation of flooring material in which both the back and top surfaces are made of synthetic rubber, and which may be in sheet or tile form.

(81) RUBBER VULCANIZATION ADHESIVE is a reactive adhesive used for rubber-to-substrate bonding achieved during vulcanization of the rubber elastomer at temperatures greater than 250°F. Vulcanized rubber adhesive does not include bonding previously vulcanized rubber.

(82) SEALANT is any material with adhesive properties that is designed to fill, seal, waterproof, or weatherproof gaps or joints between two surfaces. Sealants include caulks.

(83) SEALANT PRIMER is any film-forming product applied to a substrate, prior to the application of a sealant, to enhance the bonding surface.

(84) SHOE REPAIR, LUGGAGE AND HANDBAG ADHESIVE is an adhesive used to repair worn, torn, or otherwise damaged uppers, soles, and heels of shoes, or for making repairs to luggage and handbags.

(85) SINGLE PLY ROOF MEMBRANE ADHESIVE is any adhesive sealant to be used for the installation or repair of single ply roof membrane. Installation includes, but is not limited to, attaching the edge of the membrane to the edge of the roof and applying flashings to vents, pipes, or ducts that protrude through the membrane.

(86) SINGLE PLY ROOF MEMBRANE SEALANT is any sealant used for the installation or repair of single ply roof membrane.

(87) SOLVENT WELDING is the softening of the surfaces of two substrates by wetting them with solvents and/or adhesives, and joining them together through a chemical and/or physical reaction(s) to form a fused union.

(88) SPECIAL PURPOSE CONTACT ADHESIVE is a contact adhesive that is used to bond all of the following substrates to any surface: melamine covered board, metal, unsupported vinyl, Teflon, ultra-high molecular weight polyethylene, rubber, and wood veneer 1/16 inch or less in thickness.

(89) STRUCTURAL GLAZING ADHESIVE is any adhesive to be used to adhere glass, ceramic, metal, stone, or composite panels to exterior building frames.

(90) STRUCTURAL WOOD MEMBER ADHESIVE is an adhesive used for the construction of any load bearing joints in wooden joists, trusses, or beams.

(91) SUBFLOOR ADHESIVE is an adhesive used for the installation of subflooring material over floor joists.

(92) THIN METAL LAMINATING ADHESIVE is an adhesive for bonding multiple layers of metal to metal or metal to plastic in the production of

electronic or magnetic components in which the thickness of the bond line(s) is less than 0.25 mil.

(93) TIRE REPAIR is the expanding of a hole, tear, fissure, or blemish in a tire casing by grinding or gouging, applying adhesive, and filling the hole or crevice with rubber.

(94) TIRE TREAD ADHESIVE is any adhesive to be applied to the back of precured tread rubber and to the casing and cushion rubber, or to be used to seal buffed tire casings to prevent oxidation while the tire is being prepared for a new tread.

(95) TOLL MANUFACTURER is a regulated product manufacturer who produces regulated product for a private labeler.

(96) TOP AND TRIM ADHESIVE is an adhesive used during the installation of automotive and marine trim, including, but not limited to, headliners, vinyl tops, vinyl trim, sunroofs, dash covering, door covering, floor covering, panel covering, and upholstery.

(97) TOXIC AIR CONTAMINANT (TAC) is an air pollutant which may cause or contribute to an increase in mortality or serious illness, or which may pose a present or potential hazard to human health as listed by the Office of Environmental Health Hazard Assessment.

(98) TRAFFIC MARKING TAPE is preformed reflective tape that is applied to public streets, highways, and other surfaces, including, but not limited to, curbs, berms, driveways, and parking lots.

(99) TRAFFIC MARKING TAPE ADHESIVE PRIMER is any adhesive primer that is applied to surfaces prior to installation of traffic marking tape.

(100) TRANSFER EFFICIENCY is the ratio of the weight or volume of the regulated product solids adhering to an object to the total weight or volume, respectively, of the regulated product solids dispensed in the application process, expressed as a percentage.

(101) VINYL COMPOSITIONS TILE (VCT) is a material made from thermoplastic resins, fillers, and pigments.

(102) VEHICLE GLASS ADHESIVE PRIMER is a primer applied to vehicle glass or to the frame of a vehicle prior to installation or repair of the vehicle glass using an adhesive or sealant to improve adhesion to the pinch weld. For the purposes of this definition, a vehicle is a mobile machine that transports passengers or cargo, and includes, but is not limited to, automobiles, trucks, buses, motorcycles, trains, ships, and boats.

(103) VOLATILE ORGANIC COMPOUND (VOC) is as defined in Rule 102.

(104) WATERPROOF RESORCINOL GLUE is a two-part, resorcinol-resin-based adhesive used in applications where the bond line must be resistant to conditions of continuous immersion in fresh or salt water.

(105) WOOD FLOORING ADHESIVE is an adhesive used to install a wood floor surface, which may be in the form of parquet tiles, wood planks, or strip-wood.

(c) Requirements

(1) A person shall not use, sell, store, supply, distribute, offer for sale, or manufacture regulated products subject to the provisions of this rule, which contain VOC in excess of the limits specified in Table 1 below:

Table 1 – Regulated Product Categories and VOC Limits

Category	VOC Limits (g/L)[1]			
	Current	Upon Adoption	1/1/2019	1/1/2023
Adhesives				
Architectural Applications				
Building Envelope Membrane Adhesive	250			
Carpet Pad Adhesive	50			
Ceramic Glass, Porcelain, & Stone Tile Adhesive	65			
Cove Base Adhesive	50			
Dry Wall and Panel Adhesive	50			
Multi-Purpose Construction Adhesives	70			
Roofing				
Single Ply Roof Membrane Adhesive	250			200[2]
All Other Roof Adhesives	250			200[2]
Rubber Floor Adhesive	60			
Structural Glazing Adhesive	100			
Structural Wood Member Adhesive	140			
Subfloor Adhesive	50			
VCT and Asphalt Tile Adhesive	50			
Wood Flooring Adhesive	100			20
All Other Indoor Floor Covering Adhesives	50			
All Other Outdoor Floor Covering Adhesives	150		50	

Category	VOC Limits (g/L)[1]			
	Current	Upon Adoption	1/1/2019	1/1/2023
Computer Diskette Manufacturing Adhesive	350			
Contact Adhesive	80			
Edge Glue Adhesive	250			
Plastic Welding Cement				
ABS Welding Cement	325			
ABS to PVC Transition Cement	510			425[2]
CPVC Welding Cement	490			400[2]
PVC Welding Cement	510			425[2]
All Other Plastic Welding Cements	250		100	
Rubber Vulcanization Adhesive	250	850		250
Special Purpose Contact Adhesive	250			
Thin Metal Laminating Adhesive	780			
Tire Tread Adhesive	100			
Top and Trim Adhesive	250	540		250[2]
Waterproof Resorcinol Glue	250		170	
All Other Adhesives	250			
Substrate Specific Adhesives				
Metal	30			
Plastic Foams	50			
Porous Material (except wood)	50			
Wood	30			
Fiberglass	80			
Reinforced Plastic Composite	250		200	
Sealants				
Architectural Applications				
Clear, Paintable, and Immediately Water-Resistant Sealant	250	380		250
Foam Insulation	250			50[3]
Foam Sealant	250			50[3]
Grout	250	65		
Roadway Sealant	250			
Non-Staining Plumbing Putty	250	150		50
Potable Water Sealant	250	100		
Roofing				
Single Ply Roof Membrane Sealant	450			250[2]
All Other Roof Sealants	300			250[2]

Category	VOC Limits (g/L)[1]			
	Current	Upon Adoption	1/1/2019	1/1/2023
All Other Architectural Sealants	250		50	
Marine Deck Sealant	760			
All Other Sealants	420			250
Adhesive Primers				
Plastic	550			
Pressure Sensitive	250	785		
Traffic Marking Tape	150			
Vehicle Glass	250	700		
All Other Adhesive Primers	250			
Sealant Primers				
Architectural Applications				
Non Porous	250			
Porous	775			
Marine Deck	760			
Modified Bituminous	500			
All Other Sealant Primers	750			

1. VOC limits are expressed as grams of VOC per liter of regulated product, less water and less exempt compounds, as defined in paragraph (b)(37) except for low-solid regulated products where the VOC limit is expressed in grams per liter of material as defined in paragraph (b)(38).
2. Technology assessment will be conducted in 2022 and the Executive Officer shall report on the results of the technology assessment to the Stationary Source Committee prior to the implementation date.
3. Technology assessment will be conducted in 2020 and the Executive Officer shall report on the results of the technology assessment to the Stationary Source Committee prior to the implementation date.

(2) Regulated Product Categorization

(A) Adhesives not regulated by a specific adhesive category, shall be limited to the VOC limits listed under the Substrate Specific Adhesive category in Table 1, if anywhere on the regulated product container, on any sticker or label affixed thereto, or in any sales or advertising literature, any representation is made that the regulated product may be used, or is suitable for use, on that substrate. If the adhesive is used to bond dissimilar substrates together, the higher Substrate Specific Adhesive VOC limit shall apply.

(B) If anywhere on the regulated product container, on any sticker or label affixed thereto, or in any sales or advertising literature, any representation is made that the regulated product may be used, or is suitable for use, as a regulated product for which a VOC standard in a specific category is specified in Table 1, then the lowest VOC standard shall apply. This provision does not apply to Substrate Specific Adhesives.

(3) Sell-Through and Use-Through Provision

Any regulated product that is manufactured prior to the effective date of the applicable limit specified in Table 1 and that has a VOC content above that limit (but not above the limit in effect on the date of manufacture), may be sold, supplied, or offered for sale for up to three years after the specified effective date and used up to four years after the specified effective date.

(4) All regulated product containers shall be closed when not in use. Any VOC-laden application tools, such as a brush, pad, rag, cloth, or paper, used in the regulated product application, shall be stored and disposed of in closed containers when not in use.

(5) Solvent cleaning of application equipment, parts, products, tools, machinery, equipment, general work areas, and the storage and disposal of VOC-containing materials, used in cleaning operations shall be conducted pursuant to Rule 1171 - Solvent Cleaning Operations.

(6) Transfer Efficiency

A person shall not apply VOC-containing regulated product unless the regulated product is applied with properly operating equipment in accordance with operating procedures specified by either the equipment manufacturer or by use of one of the following methods:

(A) Electrostatic application; or

(B) Flow coat; or

(C) Dip coat; or

(D) Roll coat; or

(E) High-Volume, Low-Pressure (HVLP) spray; or

(F) Hand application methods; or

(G) Such other application methods as are demonstrated to the Executive Officer to be capable of achieving a transfer efficiency equivalent to or better than the method listed in subparagraph

(c)(6)(E) and for which prior written approval of the Executive Officer has been obtained.

(7) Control Devices

A person may comply with the provisions of paragraphs (c)(1), or (c)(6), or both, by using approved air pollution control equipment to apply a regulated product, provided:

(A) The control device reduces VOC emissions from an emission collection system by at least 95 percent by weight or the output of the air pollution control device is no more than 50 ppm VOC by volume calculated as carbon with no dilution; and

(B) The owner/operator demonstrates that the emission collection system collects at least 90 percent by weight of the VOC emissions generated by the sources of VOC emissions.

(8) A person may comply with the provisions of paragraph (c)(1) by means of an Alternative Emission Control Plan to apply a regulated product pursuant to Rule 108.

(9) The VOC content of regulated products that are applied with the use of refillable pressurized spray system are subject to the VOC limits of this rule.

(10) Except as provided in subdivision (i) and paragraphs (c)(3), (c)(7), and (c)(8), a person shall not store regulated products which contain VOC in excess of the limits specified in paragraph (c)(1).

(11) Containers used for mixing VOC-containing regulated products shall be kept closed at all times except when in use or when product is being added or removed.

(d) Recordkeeping Requirements

Records of regulated product usage shall be maintained pursuant to Rule 109.

(e) Test Methods

(1) The VOC content of regulated products shall be determined by the South Coast Air Quality Management District (SCAQMD) using the applicable test methods below. When a test method specifies it is inapplicable to a product category, it shall not be used for that inapplicable category. The Executive Officer will develop a Guidance Document to determine which test method will be used when two or more applicable test methods can be

used to demonstrate compliance with the rule. The selected test method will be based on product type, chemistry, and VOC content.

(A) VOC content may be determined by USEPA Reference Method 24 (Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coating, Code of Federal Regulations Title 40, Appendix A, utilizing Procedure B of ASTM Method D2369).

(B) VOC content may be determined by Method 304 (Determination of Volatile Organic Compounds (VOC) in Various Materials) in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" manual.

(C) Exempt compound content shall be determined by Method 303 in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" or ASTM Method D4457.

(D) VOC content may be determined by Method 313 (Determination of Volatile Organic Compounds VOC by Gas Chromatography-Mass Spectrometry) in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" manual.

(E) VOC content may be determined by 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).

(F) The VOC content of PVC, CPVC, ABS, ABS to PVC Transition Welding Cements, and plastic adhesive primers shall be determined by Method 316A in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples."

(G) The VOC content of cyanoacrylate adhesives shall be determined by Method 316B in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples."

(H) The VOC content of reactive adhesives may be determined by Appendix A to Subpart PPPP of 40 CFR Part 63—Determination of Weight Volatile Matter Content and Weight Solids Content of Reactive Adhesives.

(2) The efficiency of the control device and the VOC content measured and calculated as carbon in the control device exhaust gases shall be determined by USEPA'S Test Method 18, or CARB Method 422 for the determination

of emissions of Exempt Compounds and USEPA's Test Methods 25, 25A, SCAQMD's Method 25.1, or SCAQMD Test Method 25.3. (Determination of Total Gaseous Non-Methane Organic Emissions as Carbon) for the determination of total organic compound emissions. Emissions determined to exceed any limits established by this rule through the use of any of the above-referenced test methods shall constitute a violation of the rule.

(3) Viscosity shall be determined by ASTM D 1084- Standard Test Methods for Viscosity of Adhesives.

(4) The following classes of compounds: cyclic, branched, or linear, completely fluorinated alkanes; cyclic, branched, or linear, completely fluorinated ethers with no unsaturations; cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and sulfur-containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine, will be analyzed as exempt compounds for compliance with subdivision (c), only at such time as manufacturers specify which individual compounds are used in the regulated product formulations and identify the test methods, which, prior to such analysis, have been approved by the USEPA and the SCAQMD, that can be used to quantify the amounts of each exempt compound.

(5) Equivalent Test Methods

Other test methods determined to be equivalent after review by the Executive Officer, CARB, and the USEPA, and approved in writing by the District Executive Officer, may also be used.

(6) All test methods referenced in this subdivision shall be the version most recently approved by the appropriate governmental entities.

(f) Administrative Requirements

(1) Regulated products manufactured after January 1, 2019, shall display the following:

(A) Each container shall display the VOC content of the regulated product, as recommended for application. VOC content shall be displayed as grams of VOC per liter of regulated product, excluding water and exempt compounds, or grams of VOC per liter of material for low-solids products. The VOC content shall be determined by calculation based on product formulation or laboratory analysis using the applicable test method in subdivision (e).

(i) Regulated products subject to both the provisions of this rule and the Consumer Products Regulation may display the VOC content as percent VOC provided the regulated product has supplemental product documentation published from the manufacturer that displays the VOC content in grams of VOC per liter of regulated product.

(B) Each container or an associated product data sheet shall display a statement of the manufacturer's recommendations regarding thinning, reducing, or mixing with any other VOC containing material, if applicable. Mixing recommendations shall specify a ratio which results in a compliant, as applied, product.

(C) Each container shall display the date of manufacture of the contents or a date code indicating the date of manufacture. A manufacturer utilizing a date code shall file an explanation of each date code with the District Executive Officer.

(D) Each container of all Top and Trim Adhesives shall include the statement "For Top and Trim Uses Only" prominently displayed.

(E) Each container of all Rubber Vulcanization Adhesives shall include the statement "For Rubber Vulcanization Adhesive Uses Only" prominently displayed.

(F) Each container of all Pressure Sensitive Adhesive Primers shall include the statement "For Pressure Sensitive Adhesive Primer Uses Only" prominently displayed.

(G) Each container of all ABS to PVC Transition Cements shall include the statement "For ABS to PVC Transition Uses Only" prominently displayed.

(2) Reporting Requirements

(A) Reporting Timeline

A Quantity and Emission Report (QER) shall be submitted according to the reporting timeline identified in Table 2 below:

(i) Every three years, from the years 2019 to 2025.

(ii) Every five years, thereafter, until and including 2040.

Table 2: Reporting Timeline

Reporting Deadlines		
Manufacturers & Private Labelers	**Big Box Retailers & Distribution Centers**	**Reported Years**
September 1, 2019	May 1, 2019	2017, 2018
September 1, 2022	May1, 2022	2020, 2021
September 1, 2025	May 1, 2025	2023, 2024
September 1, 2030	May 1, 2030	2028, 2029
September 1, 2035	May 1, 2035	2033, 2034
September 1, 2040	May 1, 2040	2038, 2039

(B) General QER

A manufacturer or private labeler of regulated products shall submit to the District a QER of regulated product sales into or within the District according to the schedule in Table 2. The report shall include the following information:

(i) Product manufacturer (as listed on the label);

(ii) Product name and code;

(iii) Applicable Rule 1168 category;

(iv) The grams of VOC per liter of regulated product (less water and exempt solvents);

(v) The grams of VOC per liter of material;

(vi) Whether the product is waterborne or solvent-based;

(vii) Total annual volume sold into or within the District, including products sold through distribution centers located within or outside the District, reported in gallons for all container sizes;

(viii) For any regulated product with VOC content higher than the applicable limit in Rule 1168, an indication whether the product has been sold under any of the following provision of this rule:

(A) Sell-through provision;

(B) Low-Solids product;

(C) Exempted under subdivision (i);

(D) Complying with subparagraph (c)(7) – Control Device ; or

(E) Complying with subparagraph (c)(8) - Alternative Emission Control.

(C) Aerosol QER

The manufacturer or private labeler of aerosol adhesives and aerosol adhesive primers shall submit to the District a QER of aerosol adhesive and aerosol adhesive primer sales into or within the District according to the schedule in Table 2. The report shall include the following information:

(i) Product manufacturer (as listed on the label);

(ii) Product name and code;

(iii) Percent VOC by weight;

(iv) Total weight sold, including products sold through distribution centers located within or outside the District; and

(v) Container size of product.

(D) A corporate officer of the manufacturer or private labeler of regulated products, who previously reported under (f)(2)(B) and (f)(2)(C), that had no distribution or sales into or within the District for the specified reporting years in Table 2, must certify that fact in a letter and on company letterhead by the reporting deadline specified in Table 2.

(i) A manufacturer or private labeler of regulated products that has no intention to sell regulated products into or within the District in future years, must indicate that fact to be removed from future outreach efforts.

(ii) A manufacturer or private labeler of regulated products who resumes sales of regulated product into or within the District, must adhere to the reporting requirements specified in (f)(2)(B) and (f)(2)(C).

(E) Big Box Retailer or Distribution Center QER

A big box retailer or distribution center shall submit a QER to the regulated product manufacturer or private labeler, according to the schedule in Table 2. The QER must be electronically submitted, in a spreadsheet format and certified that all information reported is true and correct. The QER must contain the following information:

(i) The manufacturer or private labeler's product name and code; and

(ii) The quantity of each regulated product, aerosol adhesive, and aerosol adhesive primer distributed into the District.

(F) Facilities Using the 55 Gallon Exemption

For each calendar year (January 1 through December 31) beginning in 2017, the facility using or purchasing regulated products under the provisions of paragraph (i)(5)(C) shall submit to the District by September 1 of the following calendar year, an annual report of regulated product used under the provisions of paragraph (i)(5)(C) within the District. The report shall include the following information:

(i) Product manufacturer (as listed on the label);

(ii) Product name and code;

(iii) The grams of VOC per liter of regulated product (less water and exempt solvents);

(iv) The grams of VOC per liter of material;

(v) Unit size of product;

(vi) Total volume purchased, in gallons;

(vii) The name and address of the company or retailer where the products were purchased.

(3) Manufacturers, private labelers, or suppliers of regulated products shall maintain records to verify data used to determine VOC content in preparing their QER. The records shall be maintained for three (3) years and made available upon request by the Executive Officer. Such records shall include:

(A) Laboratory reports; or

(B) Formulation data used for VOC content calculations.

(4) Confidentiality of Information

Subject to the provisions of the California Public Records Act (Gov Code §§ 6250-6276.48) information submitted to the Executive Officer may be designated as confidential. The designation must be clearly indicated on the reporting form, identifying exactly which information is deemed confidential. District guidelines require a detailed and complete basis for such claim in the event of a public records request.

(g) Prohibition of Sales and Use

(1) Except as provided in subdivision (i), no person shall use, supply, sell, or offer for sale a regulated product in the District that contains chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene.

(2) On and after January 1, 2019, except as provided in subdivision (i), no person shall use, supply, sell, or offer for sale a regulated product in the District that contains Group II exempt compounds listed in Rule 102 in quantities greater than 0.1 percent by weight. This provision does not apply to cyclic, branched, or linear, completely methylated siloxanes.

(h) Rule 442 Applicability

Any regulated product which is exempt from all or a portion of this rule shall comply with the provisions of Rule 442.

(i) Exemptions

(1) The provisions of this rule shall not apply to:

(A) Adhesives, adhesive primers, sealants, or sealant primers, and associated application processes that are subject to Rule 1124;

(B) Adhesive tape;

(C) Regulated products shipped, supplied, or sold to persons for use outside the District; or

(D) Distribution centers that do not ship regulated products into or within the District.

(2) The provisions of this rule, except paragraphs (f)(2)(C), shall not apply to aerosol adhesives and primers dispensed from non-refillable aerosol spray systems.

(3) The provisions of this rule, except paragraphs (g)(1) and (g)(2), shall not apply to:

(A) Regulated products sold in quantities of one fluid ounce or less;

(B) Adhesives used to glue flowers to parade floats;

(C) Adhesives used to fabricate orthotics and prosthetics under a medical doctor's prescription; or

(D) Shoe repair, luggage, and handbag adhesives.

(4) The provisions of subdivision (c) shall not apply to:

(A) Research and development programs and quality assurance labs. Records shall be maintained in accordance with the provisions of subdivision (d) of this rule; or

(B) Solvent welding operations used in the manufacturing of medical devices.

(5) The provisions of paragraph (c)(1) shall not apply to the following:

(A) Adhesives used in tire repair;

(B) Adhesives and/or adhesive application processes in compliance with Rules 1104, 1106, 1128, 1130, and 1130.1;

(C) A facility that demonstrates that the total volume of noncompliant products is less than 55 gallons per facility per calendar year. A facility may not use this paragraph to exclude noncompliant adhesives used in architectural applications, contact adhesives, special purpose contact adhesives, and adhesives used on porous substrates. Effective January 1, 2019, a facility may not use this paragraph to exclude noncompliant rubber vulcanization adhesives and top and trim adhesives; or

(D) Regulated products used in the field installation and repair of potable water linings and covers at water treatment, storage, or water distribution facilities.

(6) The provisions of paragraph (c)(6) shall not apply to regulated products with a viscosity of 200 centipoise or greater.

(7) The provisions of subdivision (f) shall not apply to thermoplastic hot melt adhesives or to regulated products offered for sale as a dry mix, containing no polymer, which are ready for use or only mixed with water prior to use, and include, but are not limited to, grouts, cements, and mortars.

(8) The provisions of subdivisions (c) and (d), shall not apply to regulated products with a VOC content no more than 20 grams per liter, less water and less exempt compounds, or no more than 20 grams per liter material for low-solids regulated products.

(9) Until January 1, 2021, the provision of paragraph (g)(1) and (g)(2) shall not apply to solvent welding formulations containing methylene chloride used to bond hard acrylic, polycarbonate, and polyethylene terephthalate glycol plastic fabrications, provided:

(A) The concentration of methylene chloride in any solvent welding formulation does not exceed 60 percent by weight; and

(B) The purchase of all solvent welding products does not exceed 20 gallons per calendar year at a single facility, as demonstrated by purchase records and invoices of methylene chloride containing solvent welding formulations. Such records shall be made available to the Executive Officer upon request.

(10) The provisions of this rule shall not apply to regulated products, which weigh one pound or less, or consist of 16 fluid ounces or less and have VOC content limits in Section 94509(a) of the Consumer Products Regulation, unless they are:

(A) Incorporated into or used exclusively in the manufacture or construction of the goods or commodities, and not exempted in paragraph (i)(2); or

(B) Used in pollution-generating activities that take place at stationary sources, excluding maintenance and repair, and not exempted in paragraph (i)(2).

(11) As of January 1, 2018, the provisions of subdivision (c)(1) and (g) shall not apply to any manufacturer or supplier of regulated products provided the product was sold to an independent distributor that was informed in writing, including electronic formats, by the manufacturer or supplier, that the regulated product is not to be used in the South Coast Air Quality Management District. Manufacturers utilizing this provision shall maintain notification letters for three (3) years, which shall be made available to the Executive Officer or designee upon request.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

(Adopted April 7, 1989)(Amended March 2, 1990)(Amended Feb. 1, 1991)
(Amended July 19, 1991)(Amended August 2, 1991)(Amended December 4, 1992)
(Amended December 10, 1993)(Amended April 11, 1997)(Amended February 13, 1998)
(Amended September 15, 2000)(Amended June 7, 2002)(Amended July 12, 2002)
(Amended October 3, 2003)(Amended January 7, 2005)(Amended October 6, 2017)

RULE 1168. ADHESIVE AND SEALANT APPLICATIONS

(a) Purpose and Applicability

The purpose of this rule is to reduce emissions of volatile organic compounds (VOCs), ~~and~~ toxic air contaminants, and stratospheric ozone-depleting compounds ~~to eliminate emissions of chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene~~ from the application of adhesives~~,~~ ~~adhesive bonding primers~~, adhesive primers, sealants, and sealant primers~~, or any other primers~~. This rule applies to ~~all commercial and industrial~~any person who uses, sells, stores, supplies, distributes, offers for sale, or manufactures for sale any ~~sales and applications of~~ adhesives, ~~adhesive bonding primers,~~ adhesive primers, sealants, or sealant primers~~, or any other primers~~, unless otherwise specifically exempted by this rule.

(b) Definitions

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

(1) ACRYLIC is a thermoplastic polymer or a copolymer of acrylic acid, methacrylic acid, esters of these acids, or acrylonitrile.

(2) ACRYLONITRILE-BUTADIENE-STYRENE (ABS) plastic is made by reacting monomers of acrylonitrile, butadiene, and styrene and is normally identified with an ABS marking.

(3) ABS TO POLYVINYL CHLORIDE (PVC) TRANSITION CEMENT is Plastic Welding Cement used to join ABS and PVC building drains or building sewers.

(4) ABS WELDING CEMENT is a Plastic Welding Cement that is used to join ABS pipe, fittings, and other system components, including, but not limited to, components for shower pan liner, drain, closet flange, and backwater valve systems.

(~~3~~5) ADHESIVE is any substance that is used to bond one surface to another surface by attachment. ~~Adhesives include adhesive bonding primers, adhesive primers, adhesive primers for plastics, and any other primer.~~

~~(4) ADHESIVE BONDING PRIMER is an adhesive applied to a surface to improve the bond of subsequent adhesives and sometimes to inhibit corrosion.~~

(~~5~~6) ADHESIVE PRIMER is a ~~coating~~ film-forming material applied to a substrate, prior to the application of an adhesive or adhesive tape, to ~~provide a bonding surface~~ increase adhesion or film bond strength, promote wetting, or form a chemical bond with a subsequently applied adhesive.

(7) ADHESIVE TAPE is a backing material coated with an adhesive, and includes, but is not limited to, drywall tape, heat sensitive tape, pressure-sensitive adhesive tape, and water-activated tape.

~~(6) ADHESIVE PRIMER FOR PLASTIC is a material applied to a plastic substrate before applying an adhesive in order to obtain better adhesion.~~

~~(7) ADHESIVE PROMOTER is a coating applied to a substrate in a monomolecular thickness to promote wetting and form a chemical bond with the subsequently applied material.~~

~~(8) ADHESIVE SOLID is the nonvolatile portion of an adhesive that remains after heating a sample of the material at 110°C for one hour.~~

(~~9~~8) AEROSOL ADHESIVE ~~means~~ is any adhesive packaged as an aerosol product in which the spray mechanism is permanently housed in a ~~nonrefillable~~ can designed for hand-held application ~~without the need for~~where no ancillary hoses or spray equipment is used. ~~Aerosol adhesives include special purpose spray adhesives, mist spray adhesives, and web spray adhesives, as defined by the California Air Resources Board consumer products regulation found in Title 17 of the California Code of Regulations, beginning at Section 94507.~~

(9) AEROSOL PRODUCT is a pressurized spray system that dispenses product ingredients by means of a propellant contained in a product or a product's container, or by means of a mechanically induced force. Aerosol Products do~~es~~ not include Pump Spray.

~~(10) AEROSOL SPRAY CAN is a hand held, pressurized, non-refillable container which expels adhesives from the container in a finely divided spray when a valve on the container is depressed.~~

~~(11) AEROSPACE COMPONENT is the fabricated part, assembly of parts, or completed unit of any aircraft or space vehicle (excluding tires), and includes models, mock-ups, prototypes, and test coupons.~~

~~(12) AIRCRAFT means any machine designed to travel through the air, without leaving the earth's atmosphere, whether heavier or lighter than air, including airplanes, balloons, dirigibles, helicopters, and missiles.~~

~~(13) AIRCRAFT TIRE REPAIR is the repair and retreading of used tires used on aircraft. This includes the repair of damage to the tire casing, removal of old tread rubber and tread reinforcing materials, and application of new tread and tread reinforcing materials.~~

(~~14~~10) ARCHITECTURAL APPLICATION is the use of a regulated product ~~an adhesive, sealant, or adhesive or sealant primer~~ on stationary structures, including mobile homes, and their appurtenances.

(11) ARCHITECTURAL APPURTENANCE is any accessory to a stationary structure, including, but not limited to, hand railings; cabinets; bathroom and kitchen fixtures; fences; rain-gutters and down-spouts; window screens; lamp-posts; heating and air conditioning equipment; other mechanical equipment; large fixed stationary tools; signs; motion picture and television production sets; and concrete forms.~~Appurtenances to an architectural structure include, but are not limited to: hand railings, cabinets, bathroom and kitchen fixtures, fences, rain gutters and downspouts, and windows.~~

~~(15) ARCHITECTURAL SEALANT OR SEALANT PRIMER is any sealant or sealant primer applied to stationary structures, including mobile homes, and their appurtenances. Appurtenances to an architectural structure include, but are not limited to: hand railings, cabinets, bathroom and kitchen fixtures, fences, rain gutters and downspouts, and windows.~~

(12) BIG BOX RETAILER is a physically large-chain retail outlet that is classified by the U.S. Department of Labor under North American Industry Classification System code 444110: Home Centers or identified in a list maintained by the Executive Officer.

(13) BUILDING ENVELOPE is the exterior and demising partitions of a building that enclose conditioned space.

(14) BUILDING ENVELOPE MEMBRANE ADHESIVES are used to adhere membranes applied to the building envelope to provide a barrier to air or vapor leakage through the building envelope that separates conditioned from unconditioned spaces. Building Envelope Membranes are applied to diverse materials, including, but not limited to, concrete masonry units (CMU), oriented stranded board (OSB), gypsum board, and wood substrates.

(~~16~~15) CARPET PAD ADHESIVE is an adhesive used for the installation of a carpet pad (or cushion) beneath a carpet.

(~~17~~16) CERAMIC, GLASS, PORCELAIN, AND STONE TILE ADHESIVE is an adhesive used for the installation of ~~ceramic~~ tile products.

~~(18) CERAMIC TILES are a ceramic surfacing unit made from clay or a mixture of clay and other materials.~~

(~~19~~17) CHLORINATED POLYVINYL CHLORIDE (CPVC) plastic is a polymer of the chlorinated polyvinyl monomer that contains 67% chlorine and is normally identified with a CPVC marking.

(1~~7~~8) CPVC WELDING CEMENT is a Plastic Welding Cement that is used to join CPVC pipe, fittings, and other system components, including, but not limited to, components for shower pan liner, drain, closet flange, and backwater valve systems.

~~(20) COATING SOLID is the nonvolatile portion of a coating that remains after heating a sample of the material at 110oC for one hour.~~

(19) CLEAR, PAINTABLE, AND IMMEDIATELY WATER-RESISTANT SEALANT is a compound with adhesive properties that contains no appreciable level of opaque fillers or pigments; transmits most or all visible light through itself when cured; is capable of being painted; is immediately resistant to precipitation upon application; and must meet the following criteria:

(A) Clarity of 15 turbidity units or less per ASTM D7315 - Determination of Turbidity Above 1 Turbidity Unit (TU) in Static Mode as manufactured and packaged;

(B) Color of Gardner 0 as tested by ASTM D1544 - Standard Test Method for Color of Transparent Liquids (Gardner Color Scale) or Platinum-Cobalt Color of 50 or less using ASTM D1209 - Standard Test Method for Color of Clear Liquids (Platinum-Cobalt Scale) as manufactured and packaged; and

(C) Compatible with paint per ASTM C1520 Standard Guide for Paintability of Latex Sealants.

(2~~1~~0) COMPUTER DISKETTE MANUFACTURING is the process where the fold-over flaps are glued to the body of a vinyl jacket.

(2~~2~~1) CONTACT ADHESIVE is an adhesive applied to two separate surfaces, allowed to dry before the two surfaces are placed in contact with each other, and ~~brought together for adhesion and bonding with subsequent~~

~~pressure~~forms an immediate bond after both adhesive-coated surfaces are placed in full contact with each other.

(22) CONSUMER PRODUCTS REGULATION is the regulation implemented by the California Air Resources Board (CARB) under Title 17 of the California Code of Regulations, Section 94507, et. seq.

(23) COVE BASE ~~ADHESIVE~~ is ~~an adhesive used during the installation of cove base (or wall base), which is generally made of vinyl or rubber, on a wall or vertical surface at floor level~~a flooring trim unit, generally made of vinyl or rubber, having a concave radius on one edge and a convex radius on the opposite edge, that is used in forming a junction between the bottom wall course and the floor, to form an inside corner.

(24) CYANOACRYLATE ADHESIVE is ~~a single-component reactive diluent~~an acrylic adhesive that contains ~~at least 85 percent by weight~~ ethyl, methyl, methoxymethyl or other functional groupings of cyanoacrylate.

(25) DIP COAT is a method of application to a substrate by submersion into, and removal from, a bath.

(26) DISTRIBUTION CENTER is a warehouse or other specialized building, which is stocked with products (goods), to be redistributed to retailers, ~~to~~ wholesalers, or directly to end-users.

(27) DRY WALL ADHESIVE is an adhesive used during the installation of gypsum dry wall to studs or solid surfaces.

(28) EDGE GLUE is an adhesive applied to the edge of multi-sheet carbonless forms prior to being fanned apart after drying.

(29) ELECTROSTATIC APPLICATION is a spray method where the atomized droplets are charged and subsequently deposited on the substrate by electrostatic attraction.

(~~26~~30) ENERGY CURABLE ADHESIVES and SEALANTS are single-component reactive products that cure upon exposure to visible-light, ultra-violet light, or to an electron beam. The VOC content of thin film Energy Curable Adhesives and Sealants may be determined by manufacturers using ASTM Test Method 7767 Standard Test Method to Measure Volatiles from Radiation Curable Acrylate Monomers, Oligomers, and Blends and Thin Coatings Made from Them.

(31) EXEMPT COMPOUNDS are as defined in Rule 102 – Definition of Terms.

(~~27~~32) FACILITY means any permit unit or grouping of permit units or other air contaminant-emitting activities which are located on one or more

contiguous properties within the District, in actual physical contact or separated solely by a public roadway or other public right-of-way, and are owned or operated by the same person (or by persons under common control). Such above-described groupings, if not contiguous, but connected only by land carrying a pipeline, shall not be considered one facility.

(~~28~~33) FIBERGLASS is fine filaments of glass.

(34) FLOW COAT is an application method that coats an object by flowing a stream of regulated product over the object and draining off any excess product.

~~(29) FOAM is a rigid or spongy cellular mass with gas bubbles dispersed throughout.~~

(35) FOAM INSULATION is an expanding foam that is sprayed into ceiling or wall cavities to provide thermal resistance or to minimize air infiltration.

(~~35~~36) FOAM SEALANT is a foam used to fill and form a durable, airtight, water-resistant seal to common building substrates, such as wood, brick, concrete, foam board, and plastic.

~~(30) GLUE is a hard gelatin obtained from hides, tendons, cartilage, bones, or other parts of animals.~~

(3~~1~~7) GRAMS OF VOC PER LITER OF REGULATED ~~ADHESIVE OR SEALANT~~PRODUCT, LESS WATER AND LESS EXEMPT COMPOUNDS is the weight of VOC per combined volume of VOC and ~~adhesive or sealant~~product solids, and can be calculated by the following equation:

Grams of VOC per Liter of Regulated ~~Adhesive or Sealant~~Product, Less Water and Less

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

Where:	W_s	=	weight of volatile compounds, in grams
	W_w	=	weight of water, in grams
	W_{es}	=	weight of exempt compounds, in grams
	V_m	=	volume of material, in liters
	V_w	=	volume of water, in liters
	V_{es}	=	volume of exempt compounds, in liters

For ~~adhesives or sealants~~reactive products ~~that contain reactive diluents~~, the VOC content ~~of the adhesive or sealant~~ is determined after curing. The grams of VOC per liter of any regulated ~~adhesive or sealant~~product, except a low-~~-~~solids ~~adhesive or sealant~~product, shall be calculated by the following equation:

Grams of VOC per Liter of Regulated ~~Adhesive or Sealant~~Product, Less Water and Less

Exempt Compounds = $$\frac{W_{rs} - W_{rw} - W_{res}}{V_{rm} - V_{rw} - V_{res}}$$

Where: W_{rs} = weight of volatile compounds not consumed during curing, in grams

W_{rw} = weight of water not consumed during curing, in grams

W_{res} = weight of exempt compounds not consumed during curing, in grams

V_{rm} = volume of material prior to reaction, in liters

V_{rw} = volume of water not consumed during curing, in liters

V_{res} = volume of exempt compounds not consumed during curing, in liters

(3~~2~~8) GRAMS OF VOC PER LITER OF MATERIAL is the weight of VOC per volume of material, to be used for a low-solids ~~adhesive or sealant~~product, and can be calculated by the following equation:

Grams of VOC per Liter of Material = $$\frac{W_s - W_w - W_{es}}{V_m}$$

Where: W_s = weight of volatile compounds, in grams

W_w = weight of water, in grams

W_{es} = weight of exempt compounds, in grams

V_m = volume of material, in liters

For reactive products, the VOC content is determined after curing.

(39) GROUT is a cement-based sealant formulated to fill or seal gaps, including those associated with, but not limited to, tile installations.

(~~33~~40) HAND APPLICATION METHODS is the application of a regulated ~~adhesive or sealant~~product using ~~by manually~~ hand held equipment. Such equipment includes paint brush, hand roller, trowel, spatula, dauber, rag,

sponge~~s~~, and mechanically- and/or pneumatic-driven syringe~~s~~ ~~without~~ provided there is no atomization of the materials.

(~~34~~41) HIGH-VOLUME, LOW-PRESSURE (HVLP) SPRAY is equipment used to ~~spray~~ apply a regulated product ~~coating~~ by means of a spray gun that is designed to be operated and that is ~~that~~ operate~~s~~d between 0.1 and 10 pounds per square inch gauge (psig) air pressure measured dynamically at the center of the air cap and at the air horns.

(~~35~~42) INDOOR ~~CARPET~~ FLOOR COVERING ADHESIVE is an adhesive used during the installation of a carpet or indoor flooring that is in an enclosure and is not exposed to ambient weather conditions during normal use.

~~(36) LIGHT CURABLE ADHESIVES and SEALANTS are single-component reactive adhesives and sealants that cure upon exposure to visible light, ultra-violet light or to an electron beam.~~

(~~37~~43) LOW-SOLIDS ~~ADHESIVE~~ is any regulated ~~adhesive~~product that contains ~~which has~~ less than one pound of solids per gallon of material (or 120 grams of solids per liter of material).

~~(38) LOW-SOLIDS ADHESIVE PRIMER is an adhesive primer which has less than one pound of solids per gallon of material (or 120 grams of solids per liter of material).~~

(44) MAINTENANCE is a routine process to keep equipment and machinery in working order or to prevent breakdowns.

(45) MANUFACTURING is the use of tools and labor to make things for sale.

(46) MARINE APPURTENANCES include, but are not limited to, a wood boardwalk, deck, dock, fender, lock gate, or other wooden structure specified for the marine environment.

(~~39~~47) MARINE DECK SEALANT is any sealant that is ~~to be~~ applied to wooden marine decks and their appurtenances and is specified and used exclusively for the marine environment.

(~~40~~48) MARINE DECK SEALANT PRIMER is any sealant primer that is ~~to be~~ applied to wooden marine decks and their appurtenances and is specified and used exclusively for the marine environment.

(~~41~~49) MODIFIED BITUMINOUS PRIMER consist of bituminous materials, and a high flash solvent used to prepare a surface by (1) improving the adhesion and (2) absorbing dust from the surface for adhesive, or flashing cement bitumen membrane.

(~~42~~50) MODIFIED BITUMINOUS MATERIALS are materials obtained from natural deposits of asphalt or residues from the distillation of crude oil petroleum or coal which consist mainly of hydrocarbons, and include, but are not limited to, asphalt, tar, pitch, and asphalt tile that are soluble in carbon disulfide.

(~~43~~51) MULTI-PURPOSE CONSTRUCTION ADHESIVE is any adhesive to be used for the installation or repair of various construction materials, including, but not limited to, drywall, subfloor, panel, fiberglass reinforced plastic (FRP), ceiling tile, and acoustical tile.

(52) NON-STAINING PLUMBING PUTTY is a non-staining sealant formulated for use on natural surface materials that remains flexible and creates a waterproof seal when setting plumbing fixtures.

~~(44) NONMEMBRANE ROOF ADHESIVE is any adhesive to be used for the installation or repair of nonmembrane roofs. This category includes plastic or asphalt roof cement, asphalt roof coatings, and cold application cement.~~

~~(45) NONMEMBRANE ROOF SEALANT is any sealant to be used for installation or repair of nonmembrane roofs. This category includes plastic or asphalt roof cement, asphalt roof coatings, and cold application cement.~~

~~(46) ORTHOTICS AND PROSTHETICS are medical devices designed and fabricated to address human neuromuscular and structural skeletal problems in order to activate, supplement, or replace weakened, atrophied, or missing limbs.~~

(~~47~~53) OUTDOOR ~~CARPET~~ FLOOR COVERING ADHESIVE is an adhesive used during the installation of carpet or floor covering that is not in an enclosure and is exposed to ambient weather conditions during normal use.

(54) OZONE-DEPLETING COMPOUND is as defined in Rule 102.

(~~48~~55) PANEL ADHESIVE is an adhesive used for the installation of plywood, pre-decorated hardboard (or tileboard), ~~fiberglass reinforced plastic~~FRP, and similar pre-decorated or non-decorated panels to studs or solid surfaces.

(~~49~~56) PERCENT VOC BY WEIGHT is the ratio of the weight of the VOC to the weight of the material, expressed as a percentage of VOC by weight. The percent VOC by weight can be calculated as follows:

$$\%\ \text{VOC weight} = \frac{W_v}{W} \times 100$$

Where: W_v = weight of the VOCs, in grams

W = weight of material, in grams

(~~50~~57) PERSON is ~~any individual, firm, association, organization, partnership, business, trust, corporation, company, contractor, supplier, installer, user or owner, or any state or local governmental agency or public district or any other officer or employee thereof. Person also means the United States or its agencies to the extent authorized by Federal law~~as defined in Rule 102.

(58) PLASTIC ADHESIVE PRIMER is a material applied to CPVC and PVC plastic to prepare joining surfaces for the application of CPVC or PVC welding cements.

(~~51~~59) PLASTIC ~~CEMENT~~ WELDING CEMENT is the use of adhesives made of resins and solvents which are used to dissolve the surfaces of plastic, except ABS, CPVC, and PVC plastic, to form a bond between mating surfaces.

(~~52~~60) PLASTIC FOAM is a foam constructed of plastics.

(~~53~~61) PLASTICS are synthetic materials chemically formed by the polymerization of organic (carbon-based) substances. Plastics are usually compounded with modifiers, extenders, and/or reinforcers. They are capable of being molded, extruded, cast into various shapes and films, or drawn into filaments and are used to produce pipe, solid sheet, film, or bulk products.

(~~54~~62) POLYCARBONATE is a thermoplastic resin derived from bisphenol A and phosgene, a linear polyester of carbonic acid, dihydroxy compound and any carbonate diester, or by ester interchange.

(~~55~~63) POLYETHYLENE TEREPHTHALATE (PET, PETE) is a thermoplastic polyester formed from ethylene glycol by direct esterification or by catalyzed ester exchange between ethylene glycol and dimethyl terephthalate.

(~~56~~64) POLYETHYLENE TEREPHTHALATE GLYCOL (PETG) is a glycol modified polyethylene terephthalate.

~~(57) POLYURETHANE FOAMS are plastic foams, as defined in "Whittington's Dictionary of Plastics," page 329, and may be either rigid or flexible.~~

(~~58~~65) POLYVINYL CHLORIDE (PVC) plastic is a polymer of the ~~chlorinated~~ vinyl chloride monomer that contains 57 percent chlorine.

(~~59~~66) POROUS MATERIAL is a substance which has tiny openings, often microscopic, in which fluids may be absorbed or discharged. Such

materials include, but are not limited to, wood, fabric, paper, corrugated paperboard, and plastic foam.

(67) POTABLE WATER ARCHITECTURAL SEALANT is a sealant used in water treatment or water distribution applications required to comply with NSF/ANSI Standard 61: Drinking Water System Components – Health Effects.

(68) PRESSURE SENSITIVE ADHESIVE is an adhesive, typically coated on backings or release liners that forms a bond when pressure is applied, without the need for solvent, water, or heat.

(69) PRIVATE LABELER is the person, company, firm, or establishment (other than the toll manufacturer) identified on the label of a regulated product.

(70) PUMP SPRAY is a packaging system in which the product ingredients within the container are not under pressure and in which the product is expelled only while a pumping action is applied to a button, trigger, or other actuator.

~~(60) PRIMER is a material applied to a substrate to improve adhesion of subsequently applied adhesive.~~

~~(61) PROPELLANT is a fluid under pressure which expels the contents of a container when a valve is opened.~~

(71) PVC WELDING CEMENT is a Plastic Welding Cement that is used to join PVC pipe, fittings, and other system components, including, but not limited to, components for shower pan liner, drain, closet flange, and backwater valve systems.

(72) QUANTITY AND EMISSIONS REPORT (QER) is the report specified in subparagraph (f)(2).

(~~62~~73) REACTIVE ~~DILUENT~~ PRODUCTS are regulated products composed, in part, of monomers that become integral parts of the cured product through chemical reaction.~~is a liquid which is a VOC during application and one in which, through chemical and/or physical reactions, such as polymerization, 20 percent or more of the VOC becomes an integral part of a finished~~ . Reactive Products include, but are not limited to, polyurethane and two-component regulated products.

(74) REGULATED PRODUCT is an adhesive, adhesive primer, sealant, or sealant primer subject to this rule.

(75) REINFORCED PLASTIC COMPOSITE is a composite material consisting of plastic reinforced with fibers.

(76) REPAIR is an operation or activity to return a damaged object or an object not operating properly, to good condition.

(~~63~~77) ROADWAY SEALANT is any sealant to be applied to ~~public~~ streets, highways, and other surfaces, including, but not limited to, curbs, berms, driveways, and parking lots.

(~~64~~78) ROLL COATER is a series of mechanical rollers that form a thin ~~coating or adhesive~~ film on the surface roller, which is applied to a substrate by moving the substrate underneath the roller.

(79) RUBBER is any natural or manmade rubber-like substrate, and includes, but is not limited to, styrene-butadiene, polychloroprene (neoprene), butyl, nitrile, chlorosulfonated polyethylene, and ethylene propylene diene terpolymer.

(~~65~~80) RUBBER FLOORING ADHESIVE is an adhesive that is used for the installation of flooring material in which both the back and ~~the~~ top surfaces are made of synthetic rubber, and which may be in sheet or tile form.

(81) RUBBER VULCANIZATION ADHESIVE is a reactive adhesive used for rubber-to-substrate bonding achieved during vulcanization of the rubber elastomer at temperatures greater than 250°F. Vulcanized rubber adhesive does not include bonding previously vulcanized rubber.

~~(66) RUBBER FOAM is a foam constructed of natural or synthetic rubber.~~

(~~67~~82) SEALANT is any material with adhesive properties that is ~~formulated primarily~~ designed to fill, seal, ~~or~~ waterproof, or weatherproof gaps or joints between two surfaces. Sealants include ~~sealant primers and~~ caulks.

(~~68~~83) SEALANT PRIMER is any film-forming product applied to a substrate, prior to the application of a sealant, to enhance the bonding surface.

(~~69~~84) SHOE REPAIR, LUGGAGE AND HANDBAG ADHESIVE is an adhesive used to repair worn, torn, or otherwise damaged uppers, soles, and heels of shoes, or for making repairs to luggage and handbags.

~~(70) SHEET-APPLIED RUBBER LINING OPERATION is the hand application of sheet rubber lining to metal or plastic substrates in order to protect the underlying substrate from corrosion or abrasion. These operations also include laminating sheet rubber to fabric.~~

(~~71~~85) SINGLE-PLY ROOF MEMBRANE ADHESIVE is any adhesive sealant to be used for the installation or repair of single-ply roof membrane.

Installation includes, but is not limited to, attaching the edge of the membrane to the edge of the roof and applying flashings to vents, pipes, or ducts that protrude through the membrane.

(~~72~~86) SINGLE-PLY ROOF MEMBRANE SEALANT is any sealant ~~to be~~ used for the installation or repair of single-ply roof membrane ~~to the edge of the roof and applying flashings to vents, pipes, or ducts that protrude through the membrane~~.

(~~73~~87) SOLVENT WELDING is the softening of the surfaces of two substrates by wetting them with solvents and/or adhesives, and joining them together through a chemical and/or physical reaction(s) to form a fused union.

~~(74) SPACE VEHICLE is a vehicle designed to travel beyond Earth's atmosphere.~~

(~~75~~88) SPECIAL PURPOSE CONTACT ADHESIVE is a contact adhesive that is used to bond all of the following substrates to any surface: melamine covered board, metal, unsupported vinyl, Teflon, ultra-high molecular weight polyethylene, rubber, and wood veneer 1/16 inch or less in thickness.

(~~76~~89) STRUCTURAL GLAZING ADHESIVE is any adhesive to be used to adhere glass, ceramic, metal, stone, or composite panels to exterior building frames.

(~~77~~90) STRUCTURAL WOOD MEMBER ADHESIVE is an adhesive used for the construction of any load bearing joints in wooden joists, trusses, or beams.

(~~78~~91) SUBFLOOR ADHESIVE is an adhesive used for the installation of subflooring material over floor joists.

(~~79~~92) THIN METAL LAMINATING ADHESIVE is an adhesive for ~~process of~~ bonding multiple layers of metal to metal or metal to plastic in the production of electronic or magnetic components in which the thickness of the bond line(s) is less than 0.25 mil.

(~~80~~93) TIRE REPAIR is the expanding of a hole, tear, fissure, or blemish in a tire casing by grinding or gouging, applying adhesive, and filling the hole or crevice with rubber.

(~~81~~94) TIRE ~~RE~~TREAD ADHESIVE is any adhesive to be applied to the back of precured tread rubber and to the casing and cushion rubber, or to be used to seal buffed tire casings to prevent oxidation while the tire is being prepared for a new tread.

(95) TOLL MANUFACTURER is a regulated product manufacturer who produces regulated product for a private labeler.

(~~82~~96) TOP AND TRIM ADHESIVE is an adhesive used during the installation of automotive and marine trim, including, but not limited to, headliners, vinyl tops, vinyl trim, sunroofs, dash covering, door covering, floor covering, panel covering, and upholstery.

(97) TOXIC AIR CONTAMINANT (TAC) is an air pollutant which may cause or contribute to an increase in mortality or serious illness, or which may pose a present or potential hazard to human health as listed by the Office of Environmental Health Hazard Assessment.

(~~83~~98) TRAFFIC MARKING TAPE is preformed reflective tape that is ~~to be~~ applied to public streets, highways, and other surfaces, including, but not limited to, curbs, berms, driveways, and parking lots.

(~~84~~99) TRAFFIC MARKING TAPE ADHESIVE PRIMER is any adhesive primer ~~to be~~that is applied to surfaces prior to installation of traffic marking tape.

(~~85~~100) TRANSFER EFFICIENCY is the ratio of the weight or volume of the regulated ~~coating~~ product solids adhering to an object to the total weight or volume, respectively, of the regulated ~~coating~~ product solids ~~used~~ dispensed in the application process, expressed as a percentage.

(~~86~~101) VINYL COMPOSITIONS TILE (VCT) ~~means vinyl composition tile and~~ is a material made from thermoplastic resins, fillers, and pigments.

(102) VEHICLE GLASS ADHESIVE PRIMER is a primer applied to vehicle glass or to the frame of a vehicle prior to installation or repair of the vehicle glass using an adhesive or sealant to improve adhesion to the pinch weld. For the purposes of this definition, a vehicle is a mobile machine that transports passengers or cargo, and includes, but is not limited to, automobiles, trucks, buses, motorcycles, trains, ships, and boats.

~~(87) VISCOSITY is the internal friction of a liquid that makes it resistant to flow.~~

(~~88~~103) VOLATILE ORGANIC COMPOUND (VOC) is as defined in Rule 102~~ – Definition of Terms~~.

(104) WATERPROOF RESORCINOL GLUE is a two-part, resorcinol-resin-based adhesive used in applications where the bond line must be resistant to conditions of continuous immersion in fresh or salt water.

(~~89~~105) WOOD FLOORING ADHESIVE is an adhesive used to install a wood floor surface, which may be in the form of parquet tiles, wood planks, or strip-wood.

~~(90) WOOD PARQUET FLOORING is wood flooring in tile form constructed of smaller pieces of wood which are joined together in a pattern by the maker to form the tile.~~

~~(91) WOOD PLANK FLOORING is solid or laminated wood in plank form.~~

(c) Requirements

~~(1) Unless otherwise specified in paragraph (c)(2), a person shall not apply any adhesives, adhesive bonding primers, adhesive primers, or any other primer, which have a VOC content in excess of 250 g/L less water and less exempt compounds.~~

(~~2~~1) A person shall not ~~apply~~ use, sell, store, supply, distribute, offer for sale, or manufacture regulated products ~~adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, or any other primer,~~ subject to the provisions of this rule, which ~~have a~~ contain VOC ~~content~~ in excess of the limits specified in Table 1 below:

~~**VOC Limit*, Less Water and Less Exempt Compounds in Grams per Liter**~~

~~**Architectural Applications**~~	~~**Current VOC Limit**~~
~~Indoor Carpet Adhesives~~	~~50~~
~~Carpet Pad Adhesives~~	~~50~~
~~Outdoor Carpet Adhesives~~	~~150~~
~~Wood Flooring Adhesive~~	~~100~~
~~Rubber Floor Adhesives~~	~~60~~
~~Subfloor Adhesives~~	~~50~~
~~Ceramic Tile Adhesives~~	~~65~~
~~VCT and Asphalt Tile Adhesives~~	~~50~~
~~Dry Wall and Panel Adhesives~~	~~50~~
~~**Architectural Applications**~~	~~**Current VOC Limit**~~
~~Cove Base Adhesives~~	~~50~~
~~Multipurpose Construction Adhesives~~	~~70~~
~~Structural Glazing Adhesives~~	~~100~~
~~Single Ply Roof Membrane Adhesives~~	~~250~~

~~**Specialty Applications**~~	~~VOC LIMITS AND EFFECTIVE DATES**~~			
	~~**Current VOC Limit**~~	~~**1-1-05**~~	~~**7-1-05**~~	~~**1-1-07**~~
~~PVC Welding~~	~~510~~			
~~CPVC Welding~~	~~490~~			
~~ABS Welding~~	~~400~~		~~325~~	
~~Plastic Cement Welding~~	~~350~~	~~250~~		
~~Adhesive Primer for Plastic~~	~~650~~		~~550~~	
~~Computer Diskette Manufacturing~~	~~350~~			
~~Contact Adhesive~~	~~80~~			
~~Special Purpose Contact Adhesive~~	~~250~~			
~~Tire Retread~~	~~100~~			
~~Adhesive Primer for Traffic Marking Tape~~	~~150~~			
~~Structural Wood Member Adhesive~~	~~140~~			
~~Sheet Applied Rubber Lining Operations~~	~~850~~			
~~Top and Trim Adhesive~~	~~540~~			~~250~~

~~** The specified limits remain in effect unless revised limits are listed in subsequent columns.~~

~~For adhesives, adhesive bonding primers, or any other primer not regulated by the above two tables and applied to the following substrates, the following limits shall apply:~~

~~**Substrate Specific Applications**~~	~~**Current VOC Limit**~~
~~Metal to Metal~~	~~30~~
~~Plastic Foams~~	~~50~~
~~Porous Material (except wood)~~	~~50~~
~~Wood~~	~~30~~
~~Fiberglass~~	~~80~~

~~If an adhesive is used to bond dissimilar substrates together the adhesive with the highest VOC content shall be allowed.~~

~~**Sealants**~~	~~**Current VOC Limit**~~
~~Architectural~~	~~250~~
~~Marine Deck~~	~~760~~
~~Nonmembrane Roof~~	~~300~~

~~Roadway~~	~~250~~
~~Single-Ply Roof Membrane~~	~~450~~
~~Other~~	~~420~~

~~**Sealant Primers**~~	~~**Current VOC Limit**~~
~~Architectural~~	
~~Non Porous~~	~~250~~
~~Porous~~	~~775~~
~~Modified Bituminous~~	~~500~~
~~Marine Deck~~	~~760~~
~~Other~~	~~750~~

~~* For low-solid adhesives or sealants the VOC limit is expressed in grams per liter of material as determined in paragraph (b)(32); for all other adhesives and sealants, VOC limits are expressed as grams of VOC per liter of adhesive or sealant less water and less exempt compounds as determined in paragraph (b)(31).~~

Table 1 – Regulated Product Categories and VOC Limits

Category	**VOC Limits (g/L)[1]**			
	Current	**Upon Adoption**	**1/1/2019**	**1/1/2023**
Adhesives				
Architectural Applications				
Building Envelope Membrane Adhesive	250			
Carpet Pad Adhesive	50			
Ceramic Glass, Porcelain, & Stone Tile Adhesive	65			
Cove Base Adhesive	50			
Dry Wall and Panel Adhesive	50			
Multi-Purpose Construction Adhesives	70			
Roofing				
Single Ply Roof Membrane Adhesive	250			200[2]
All Other Roof Adhesives	250			200[2]
Rubber Floor Adhesive	60			
Structural Glazing Adhesive	100			
Structural Wood Member Adhesive	140			
Subfloor Adhesive	50			
VCT and Asphalt Tile Adhesive	50			
Wood Flooring Adhesive	100			20

Category	VOC Limits (g/L)[1]			
	Current	Upon Adoption	1/1/2019	1/1/2023
All Other Indoor Floor Covering Adhesives	50			
All Other Outdoor Floor Covering Adhesives	150		50	
Computer Diskette Manufacturing Adhesive	350			
Contact Adhesive	80			
Edge Glue Adhesive	250			
Plastic Welding Cement				
ABS Welding Cement	325			
ABS to PVC Transition Cement	510			425[2]
CPVC Welding Cement	490			400[2]
PVC Welding Cement	510			425[2]
All Other Plastic Welding Cements	250		100	
Rubber Vulcanization Adhesive	250	850		250
Special Purpose Contact Adhesive	250			
Thin Metal Laminating Adhesive	780			
Tire Tread Adhesive	100			
Top and Trim Adhesive	250	540		250[2]
Waterproof Resorcinol Glue	250		170	
All Other Adhesives	250			
Substrate Specific Adhesives				
Metal	30			
Plastic Foams	50			
Porous Material (except wood)	50			
Wood	30			
Fiberglass	80			
Reinforced Plastic Composite	250		200	
Sealants				
Architectural Applications				
Clear, Paintable, and Immediately Water-Resistant Sealant	250	380		250
Foam Insulation	250			50[3]
Foam Sealant	250			50[3]
Grout	250	65		
Roadway Sealant	250			
Non-Staining Plumbing Putty	250	150		50

Category	VOC Limits (g/L)[1]			
	Current	Upon Adoption	1/1/2019	1/1/2023
Potable Water Sealant	250	100		
Roofing				
Single Ply Roof Membrane Sealant	450			250[2]
All Other Roof Sealants	300			250[2]
All Other Architectural Sealants	250		50	
Marine Deck Sealant	760			
All Other Sealants	420			250
Adhesive Primers				
Plastic	550			
Pressure Sensitive	250	785		
Traffic Marking Tape	150			
Vehicle Glass	250	700		
All Other Adhesive Primers	250			
Sealant Primers				
Architectural Applications				
Non Porous	250			
Porous	775			
Marine Deck	760			
Modified Bituminous	500			
All Other Sealant Primers	750			

1. ~~For low-solid adhesives or sealants the VOC limit is expressed in grams per liter of material as determined in paragraph (b)(32); for all other adhesives and sealants,~~ VOC limits are expressed as grams of VOC per liter of ~~adhesive or sealant~~regulated product, less water and less exempt compounds, as ~~determined~~ defined in paragraph (b)(~~31~~37) except for low-solid regulated products where the VOC limit is expressed in grams per liter of material as defined in paragraph (b)(38).

2. Technology assessment will be conducted in 2022 and the Executive Officer shall report on the results of the technology assessment to the Stationary Source Committee prior to the implementation date.

3. Technology assessment will be conducted in 2020 and the Executive Officer shall report on the results of the technology assessment to the Stationary Source Committee prior to the implementation date.

(2) Regulated Product Categorization

(A) Adhesives not regulated by a specific adhesive category, shall be limited to the VOC limits listed under the Substrate Specific Adhesive category in Table 1, if anywhere on the regulated product container, on any sticker or label affixed thereto, or in any sales or

advertising literature, any representation is made that the regulated product may be used, or is suitable for use, on that substrate. If the adhesive is used to bond dissimilar substrates together, the higher Substrate Specific Adhesive VOC limit shall apply.

(B) If anywhere on the regulated product container, on any sticker or label affixed thereto, or in any sales or advertising literature, any representation is made that the regulated product may be used, or is suitable for use, as a regulated product for which a VOC standard in a specific category is specified in Table 1, then the lowest VOC standard shall apply. This provision does not apply to Substrate Specific Adhesives.

(3) Sell-Through and Use-Through Provision

Any regulated product that is manufactured prior to the effective date of the applicable limit specified in Table 1 and that has a VOC content above that limit (but not above the limit in effect on the date of manufacture), may be sold, supplied, or offered for sale for up to three years after the specified effective date and used up to four years after the specified effective date.

(~~3~~4) ~~Containers used to dispose of VOC-laden cloth or paper used in stripping cured adhesives or sealantsshall bein closed containers except when depositing or removing the contents of VOC-laden cloth or paper from the container.~~All regulated product containers shall be closed when not in use. Any VOC-laden application tools, such as a brush, pad, rag, cloth, or paper, used in the regulated product application, shall be stored and disposed of in closed containers when not in use.

~~(4) Solvent Cleaning Operations; storage and disposal of VOC-containing materials shall be conducted in accordance with the provisions of Rule 1171 - Solvent Cleaning Operations.~~

(5) Solvent cleaning of application equipment, parts, products, tools, machinery, equipment, general work areas, and the storage and disposal of VOC-containing materials, used in cleaning operations shall be conducted pursuant to Rule 1171 - Solvent Cleaning Operations.

(6~~5~~) Transfer Efficiency

A person shall not apply VOC-containing regulated ~~adhesives or sealants~~ product unless the ~~adhesive or sealant~~regulated product is applied with properly operating equipment in accordance with operating procedures specified by either the equipment manufacturer or ~~the Executive Officer.~~

~~Application of adhesives or sealants shall be accomplished only~~ by ~~the~~ use of one of the following methods:

(A) Electrostatic application; or

(B) Flow coat; or

(C) Dip coat; or

(D) Roll coat~~er~~; or

(E) High-Volume, Low-Pressure (HVLP) spray; or

(F) Hand application methods; or

(G) Such other ~~adhesive or sealant~~ application methods as are demonstrated to the Executive Officer to be capable of achieving ~~at least 65 percent transfer efficiency~~ a transfer efficiency equivalent to or better than the method listed in subparagraph (c)(6)(E) and for which prior written approval of the Executive Officer has been obtained~~; or~~.

~~(H) For adhesives and sealants with a viscosity of 200 centipoise or greater, as applied, airless spray, air-assisted airless, and air-atomized spray may also be used.~~

(7~~6~~) Control Devices

A person may comply with the provisions of paragraphs (c)(1), ~~(c)(2),~~ or (c)(~~5~~6), or ~~all three~~both, by using approved air pollution control equipment to apply a regulated product, provided: ~~that the VOC emissions from such operations and/or materials are reduced by at least 80 percent overall, by weight.~~

(A) The control device reduces VOC emissions from an emission collection system by at least 95 percent by weight or the output of the air pollution control device is no more than 50 ppm VOC by volume calculated as carbon with no dilution; and

(B) The owner/operator demonstrates that the emission collection system collects at least 90 percent by weight of the VOC emissions generated by the sources of VOC emissions.

(8~~7~~) A person may comply with the provisions of paragraph (c)(1) ~~and paragraph (c)(2)~~ by means of an Alternative Emission Control Plan to apply a regulated product pursuant to Rule 108.

~~(8) If anywhere on the container of any adhesive or sealant, on any sticker or label affixed thereto, or in any sales or advertising literature, any representation is made that the adhesive or sealant may be used for any~~

~~another source specific rule application, for which there is a lower VOC standard, then the lowest VOC standard shall apply.~~

(9) The VOC content of regulated ~~adhesives and sealants~~products that are applied with the use of refillable pressurized ~~containers~~ spray system are subject to the VOC limits of this rule.

(10) Except as provided in subdivision (i) and paragraphs (c)(3), (c)(7), and (c)(8), a person shall not store regulated products which contain VOC in excess of the limits specified in paragraph (c)(1).

(11) Containers used for mixing VOC-containing regulated products shall be kept closed at all times except when in use or when product is being added or removed.

(d) Recordkeeping Requirements

~~Notwithstanding provisions of subdivision (i), records~~ Records of regulated product usage shall be maintained pursuant to Rule 109.

(e) ~~Methods of Analysis~~Test Methods

(1) The VOC content of ~~cleaning materials and~~regulated ~~adhesives or sealants~~products shall be determined by the South Coast Air Quality Management District (SCAQMD) using the applicable test methods below. When a test method specifies it is inapplicable to a product category, it shall not be used for that inapplicable category. The Executive Officer will develop a Guidance Document to determine which test method will be used when two or more applicable test methods can be used to demonstrate compliance with the rule. The selected test method will be based on product type, chemistry, and VOC content.

(A) ~~using~~ VOC content may be determined by USEPA Reference Method 24 (Determination of Volatile ~~matter~~ Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coating, Code of Federal Regulations Title 40, Appendix A, utilizing Procedure B of ASTM Method D2369).~~, or the~~

(B) ~~SCAQMD~~ VOC content may be determined by Method 304 (Determination of Volatile Organic Compounds (VOC) in Various Materials) in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" manual.

(C) Exempt compound content shall be determined by Method 303 in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" or ASTM Method D4457.

(D) VOC content may be determined by Method 313 (Determination of Volatile Organic Compounds VOC by Gas Chromatography-Mass Spectrometry) in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" manual.

(E) VOC content may be determined by 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).

(F) The VOC content of PVC, CPVC, ABS, ABS to PVC Transition Welding Cements, and plastic adhesive primers shall be determined by Method 316A in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples."

(G) The VOC content of cyanoacrylate adhesives shall be determined by Method 316B in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples."

(H) The VOC content of reactive adhesives may be determined by Appendix A to Subpart PPPP of 40 CFR Part 63—Determination of Weight Volatile Matter Content and Weight Solids Content of Reactive Adhesives.

~~(2) The exempt compound's content shall be determined by Methods 302 and 303 in the South Coast Air Quality Management District's (SCAQMD) "Laboratory Methods of Analysis for Enforcement Samples" or ASTM Method D4457-85.~~

~~(3) The VOC content of PVC, CPVC, and ABS pipe cements, adhesive primer for plastic shall be determined by Method 316A in the South Coast Air Quality Management District's (SCAQMD) "Laboratory Methods of Analysis for Enforcement Samples."(4) The VOC content of cyanoacrylate adhesives shall be determined by Method 316B in the South Coast Air Quality Management District's (SCAQMD) " Laboratory Methods of Analysis for Enforcement Samples."~~

~~(f) Test Methods~~

(~~1~~2) The efficiency of the control device and the VOC content measured and calculated as carbon in the control device exhaust gases shall be determined

by USEPA'S Test Method 18, or ~~Air Resources Board (~~CARB~~)~~ Method 422 for the determination of emissions of Exempt Compounds and USEPA's Test Methods 25, 25A, SCAQMD's Method 25.1, or SCAQMD Test Method 25.3. (Determination of Total Gaseous Non-Methane Organic Emissions as Carbon) for the determination of total organic compound emissions. Emissions determined to exceed any limits established by this rule through the use of any of the above-referenced test methods shall constitute a violation of the rule.

(~~2~~3) Viscosity ~~will~~ shall be determined by ASTM D 1084-~~88~~ Standard Test Methods for Viscosity of Adhesives.

(~~3~~4) The following classes of compounds: cyclic, branched, or linear, completely fluorinated alkanes; cyclic, branched, or linear, completely fluorinated ethers with no unsaturations; cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and sulfur-containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine, will be analyzed as exempt compounds for compliance with subdivision (c), only at such time as manufacturers specify which individual compounds are used in the ~~coating~~ regulated product formulations and identify the test methods, which, prior to such analysis, have been approved by the USEPA and the SCAQMD, that can be used to quantify the amounts of each exempt compound.

(5) Equivalent Test Methods

Other test methods determined to be equivalent after review by the Executive Officer, CARB, and the USEPA, and approved in writing by the District Executive Officer, may also be used.

(6) All test methods referenced in this subdivision shall be the version most recently approved by the appropriate governmental entities.

~~(g) Prohibition of Specifications~~

~~(1) A person shall not solicit or require any other person to use, in the District, any adhesives or sealants or combination of adhesives or sealants in violation of the requirements of this rule.~~

~~(2) The requirements of this paragraph shall apply to all written or oral agreements executed or entered into after July 1, 1989.~~

(f) Administrative Requirements

(1) Regulated products manufactured after January 1, 2019, shall display the following:

(A) Each container shall display the VOC content of the regulated product, as recommended for application. VOC content shall be displayed as grams of VOC per liter of regulated product, excluding water and exempt compounds, or grams of VOC per liter of material for low-solids products. The VOC content shall be determined by calculation based on product formulation or laboratory analysis using the applicable test method in subdivision (e).

(i) Regulated products subject to both the provisions of this rule and the Consumer Products Regulation may display the VOC content as percent VOC provided the regulated product has supplemental product documentation published from the manufacturer that displays the VOC content in grams of VOC per liter of regulated product.

(B) Each container or an associated product data sheet shall display a statement of the manufacturer's recommendations regarding thinning, reducing, or mixing with any other VOC containing material, if applicable. Mixing recommendations shall specify a ratio which results in a compliant, as applied, product.

(C) Each container shall display the date of manufacture of the contents or a date code indicating the date of manufacture. A manufacturer utilizing a date code shall file an explanation of each date code with the District Executive Officer.

(D) Each container of all Top and Trim Adhesives shall include the statement "For Top and Trim Uses Only" prominently displayed.

(E) Each container of all Rubber Vulcanization Adhesives shall include the statement "For Rubber Vulcanization Adhesive Uses Only" prominently displayed.

(F) Each container of all Pressure Sensitive Adhesive Primers shall include the statement "For Pressure Sensitive Adhesive Primer Uses Only" prominently displayed.

(G) Each container of all ABS to PVC Transition Cements shall include the statement "For ABS to PVC Transition Uses Only" prominently displayed.

(2) Reporting Requirements

(A) Reporting Timeline

A Quantity and Emission Report (QER) shall be submitted according to the reporting timeline identified in Table 2 below:

(i) Every three years, from the years 2019 to 2025.

(ii) Every five years, thereafter, until and including 2040.

Table 2: Reporting Timeline

Reporting Deadlines		
Manufacturers & Private Labelers	**Big Box Retailers & Distribution Centers**	**Reported Years**
September 1, 2019	May 1, 2019	2017, 2018
September 1, 2022	May1, 2022	2020, 2021
September 1, 2025	May 1, 2025	2023, 2024
September 1, 2030	May 1, 2030	2028, 2029
September 1, 2035	May 1, 2035	2033, 2034
September 1, 2040	May 1, 2040	2038, 2039

(B) General QER

A manufacturer or private labeler of regulated products shall submit to the District a QER of regulated product sales into or within the District according to the schedule in Table 2. The report shall include the following information:

(i) Product manufacturer (as listed on the label);

(ii) Product name and code;

(iii) Applicable Rule 1168 category;

(iv) The grams of VOC per liter of regulated product (less water and exempt solvents);

(v) The grams of VOC per liter of material;

(vi) Whether the product is waterborne or solvent-based;

(vii) Total annual volume sold into or within the District, including products sold through distribution centers located within or outside the District, reported in gallons for all container sizes;

(viii) For any regulated product with VOC content higher than the applicable limit in Rule 1168, an indication whether the

product has been sold under any of the following provision of this rule:

(A) Sell-through provision;

(B) Low-Solids product;

(C) Exempted under subdivision (i);

(D) Complying with subparagraph (c)(7) – Control Device ; or

(E) Complying with subparagraph (c)(8) - Alternative Emission Control.

(C) Aerosol QER

The manufacturer or private labeler of aerosol adhesives and aerosol adhesive primers shall submit to the District a QER of aerosol adhesive and aerosol adhesive primer sales into or within the District according to the schedule in Table 2. The report shall include the following information:

(i) Product manufacturer (as listed on the label);

(ii) Product name and code;

(iii) Percent VOC by weight;

(iv) Total weight sold, including products sold through distribution centers located within or outside the District; and

(v) Container size of product.

(D) A corporate officer of the manufacturer or private labeler of regulated products, who previously reported under (f)(2)(B) and (f)(2)(C), that had no distribution or sales into or within the District for the specified reporting years in Table 2, must certify that fact in a letter and on company letterhead by the reporting deadline specified in Table 2.

(i) A manufacturer or private labeler of regulated products that has no intention to sell regulated products into or within the District in future years, must indicate that fact to be removed from future outreach efforts.

(ii) A manufacturer or private labeler of regulated products who resumes sales of regulated product into or within the District, must adhere to the reporting requirements specified in (f)(2)(B) and (f)(2)(C).

(E) Big Box Retailer or Distribution Center QER

A big box retailer or distribution center shall submit a QER to the regulated product manufacturer or private labeler, according to the schedule in Table 2. The QER must be electronically submitted, in a spreadsheet format and certified that all information reported is true and correct. The QER must contain the following information:

(i) The manufacturer or private labeler's product name and code; and

(ii) The quantity of each regulated product, aerosol adhesive, and aerosol adhesive primer distributed into the District.

(F) Facilities Using the 55 Gallon Exemption

For each calendar year (January 1 through December 31) beginning in 2017, the facility using or purchasing regulated products under the provisions of paragraph (i)(5)(C) shall submit to the District by September 1 of the following calendar year, an annual report of regulated product used under the provisions of paragraph (i)(5)(C) within the District. The report shall include the following information:

(i) Product manufacturer (as listed on the label);

(ii) Product name and code;

(iii) The grams of VOC per liter of regulated product (less water and exempt solvents);

(iv) The grams of VOC per liter of material;

(v) Unit size of product;

(vi) Total volume purchased, in gallons;

(vii) The name and address of the company or retailer where the products were purchased.

(3) Manufacturers, private labelers, or suppliers of regulated products shall maintain records to verify data used to determine VOC content in preparing their QER. The records shall be maintained for three (3) years and made available upon request by the Executive Officer. Such records shall include:

(A) Laboratory reports; or

(B) Formulation data used for VOC content calculations.

(4) Confidentiality of Information

Subject to the provisions of the California Public Records Act (Gov Code §§ 6250-6276.48) information submitted to the Executive Officer may be

designated as confidential. The designation must be clearly indicated on the reporting form, identifying exactly which information is deemed confidential. District guidelines require a detailed and complete basis for such claim in the event of a public records request.

(~~h~~g) Prohibition of Sales and Use

~~(1) On and after September 1, 2001, except as provided in subdivision (j), paragraphs (c)(6) and (c)(7) no person shall use, supply, sell, or offer for sale an adhesive, sealant, or adhesive or sealant primer for use in the District that at the time of sale exceeds the applicable VOC limits specified in paragraphs (c)(1) and (c)(2).~~

(~~2~~1) ~~On and after January 1, 2004~~Except as provided in subdivision (i), no person shall use, supply, sell, or offer for sale ~~an adhesive, sealant, or adhesive or sealant primer for use~~a regulated product in the District that contains chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene.

(~~3~~2) ~~The prohibition of sales and use as specified in paragraphs (h)(1) and (h)(2) shall not apply to the following:~~On and after January 1, 2019, except as provided in subdivision (i), no person shall use, supply, sell, or offer for sale a regulated product in the District that contains Group II exempt compounds listed in Rule 102 in quantities greater than 0.1 percent by weight. This provision does not apply to cyclic, branched, or linear, completely methylated siloxanes.

~~(A) Adhesives and sealants shipped, supplied or sold to persons for use outside the District;~~

~~(B) Any manufacturer of adhesives or sealants, provided that the manufacturer has complied with the labeling requirements of Rule 443.1 Labeling of Materials Containing Organic Solvents, and the product is not sold directly to a user located in the District, or the product was sold to an independent distributor or a sales outlet located in the District that is not a subsidiary of, or under the control of the manufacturer, and was informed in writing by the manufacturer about the compliance status of the product with Rule 1168;~~

~~(C) Adhesives and Sealants that contain less than one percent by weight of methylene chloride; or~~

~~(D) Solvent welding formulations containing methylene chloride used to bond hard acrylic, polycarbonate, and polyethylene terephalate glycol plastic fabrications, provided:~~

~~(i) The concentration of methylene chloride in any solvent welding formulation does not exceed 60 percent by weight; and~~

~~(ii) The purchase of all solvents welding products does not exceed 20 gallons per calendar year at a single facility, as demonstrated by purchase records and invoices of methylene chloride containing solvent welding formulations. Such records shall be made available to the Executive Officer or his representative upon request.~~

-(~~i~~h) Rule 442 Applicability

Any regulated ~~adhesive, sealant, adhesive or sealant operation, or person,~~product which is exempt from all or a portion of this rule shall comply with the provisions of Rule 442.

(~~j~~i) Exemptions

(1) ~~The provisions of paragraph (c)(1) and paragraph (c)(2) shall not apply to the following:~~The provisions of this rule shall not apply to:

(A) ~~Adhesives used in tire repair; or~~ Adhesives, adhesive primers, sealants, or sealant primers, and associated application processes that are subject to Rule 1124;

(B) ~~Adhesives and/or adhesive application processes in compliance with Rules 1104, 1106, 1128, 1130 and 1130.1.;~~Adhesive tape;

(C) Regulated products shipped, supplied, or sold to persons for use outside the District; or

(D) Distribution centers that do not ship regulated products into or within the District.

(2) ~~The provisions of this rule shall not apply to aerospace components that are subject to Rule 1124.~~ The provisions of this rule, except paragraphs (f)(2)(C), shall not apply to aerosol adhesives and primers dispensed from non-refillable aerosol spray systems.

(3) ~~The provisions of paragraph (c)(5) and subdivision (d) shall not be applied to the application of adhesives or sealants that contain less than 20 g/L of~~

~~VOC per liter of adhesives, less water and less exempt compounds.~~The provisions of this rule, except paragraphs (g)(1) and (g)(2), shall not apply to:

(A) Regulated products sold in quantities of one fluid ounce or less;

(B) Adhesives used to glue flowers to parade floats;

(C) Adhesives used to fabricate orthotics and prosthetics under a medical doctor's prescription; or

(D) Shoe repair, luggage, and handbag adhesives.

(4) ~~The provisions of this rule shall not apply to any facility that uses less than one pint of total adhesives and sealants in any one day so long as the products were purchased prior to September 15, 2000.~~ The provisions of subdivision (c) shall not apply to:

(A) Research and development programs and quality assurance labs. Records shall be maintained in accordance with the provisions of subdivision (d) of this rule; or

(B) Solvent welding operations used in the manufacturing of medical devices.

(5) ~~The provisions of subdivision (c) shall not apply to research and development programs and quality assurance labs, provided that:~~The provisions of paragraph (c)(1) shall not apply to the following:

(A) ~~A record is kept of:~~Adhesives used in tire repair;

~~(i) The date when the adhesives and sealants are used, and the type of application(s); and~~

~~(ii) The amount of adhesives and sealants used and the VOC content of such adhesives and sealants; and~~

~~(iii) The amount of solvents used and VOC content of such solvents; and~~

~~(iv) The manufacturer/suppliers identification and type of material; and~~

(B) ~~Such records shall be retained in accordance with the provisions of subdivision (e) of this rule.~~ Adhesives and/or adhesive application processes in compliance with Rules 1104, 1106, 1128, 1130, and 1130.1;

(C) A facility that demonstrates that the total volume of non-compliant products is less than 55 gallons per facility per calendar year. A facility may not use this paragraph to exclude non-compliant

adhesives used in architectural applications, contact adhesives, special purpose contact adhesives, and adhesives used on porous substrates. Effective January 1, 2019, a facility may not use this paragraph to exclude non-compliant rubber vulcanization adhesives and top and trim adhesives; or

(D) Regulated products used in the field installation and repair of potable water linings and covers at water treatment, storage, or water distribution facilities.

(6) ~~The provisions of paragraph (c)(1) and paragraph (c)(2) shall not apply to a facility that demonstrates that the total volume of non-compliant adhesives, adhesive primers, adhesive bonding primers, sealants, and sealant primers is less than 55 gallons per facility per rolling 12-month period. On and after September 1, 2001, a facility may not use this paragraph to exclude non-compliant adhesives used in architectural applications, contact adhesives, special purpose contact adhesives, and adhesives used on porous substrates.~~The provisions of paragraph (c)(6) shall not apply to regulated products with a viscosity of 200 centipoise or greater.

(7) ~~The provisions of this rule, except paragraph (h)(2), shall not apply to adhesives used to glue flowers to parade floats.~~The provisions of subdivision (f) shall not apply to thermoplastic hot melt adhesives or to regulated products offered for sale as a dry mix, containing no polymer, which are ready for use or only mixed with water prior to use, and include, but are not limited to, grouts, cements, and mortars.

(8) ~~The provisions of subdivision (c) shall not apply to solvent welding operations used in the manufacturing of medical devices.~~ The provisions of subdivisions (c) and (d), shall not apply to regulated products with a VOC content no more than 20 grams per liter, less water and less exempt compounds, or no more than 20 grams per liter material for low-solids regulated products.

(9) ~~The provisions of this rule shall not apply to aerosol adhesives and primers dispensed from aerosol spray cans.~~Until January 1, 2021, the provision of paragraph (g)(1) and (g)(2) shall not apply to solvent welding formulations containing methylene chloride used to bond hard acrylic, polycarbonate, and polyethylene terephthalate glycol plastic fabrications, provided:

(A) The concentration of methylene chloride in any solvent welding formulation does not exceed 60 percent by weight; and

(B) The purchase of all solvent welding products does not exceed 20 gallons per calendar year at a single facility, as demonstrated by purchase records and invoices of methylene chloride containing solvent welding formulations. Such records shall be made available to the Executive Officer upon request.

~~(10) The provisions of paragraph (c)(1) and paragraph (c)(2) shall not apply to any adhesive used exclusively for thin metal laminating operations, provided that the adhesive contains less than 780 grams of VOC per liter of adhesive, less water and less exempt compounds, as applied, and the facility uses a total of three gallons per day or less of these adhesives.~~

~~(11) The provisions of this rule, except paragraph (h)(2) and subdivision (d), shall not apply to light curable adhesives and sealants with a VOC content no more than 50 grams per liter, less water and less exempt compounds.~~

~~(12) The provisions of this rule, except paragraph (h)(2), shall not apply to the use of cyanoacrylate adhesives.~~

(~~13~~10) The provisions of this rule shall not apply to ~~adhesives and sealants~~regulated products, which weigh one pound or less, or consist of 16 fluid ounces or less and ~~subject~~ have VOC content limits in Section 94509(a) of ~~to~~ the ~~California Air Resources Board consumer~~ Consumer ~~products~~ Products ~~regulation~~ Regulation~~found in Title 17 of the California Code of Regulations, beginning at Section 94507~~, unless they are:

(A) Incorporated into or used exclusively in the manufacture or construction of the goods or commodities, and not exempted in paragraph (i)(2); or

(B) Used in pollution-generating activities that take place at stationary sources, excluding maintenance and repair, and not exempted in paragraph (i)(2).

(~~14~~11) ~~Until October 1, 2003, the provisions of paragraph (c)(1) and paragraph (c)(2) shall not apply to solvent welding of flexible ductwork, at which time the VOC limit shall be 250 grams per liter, less water and less exempt compounds.~~ As of January 1, 2018, the provisions of subdivision (c)(1) and (g) shall not apply to any manufacturer or supplier of regulated products provided the product was sold to an independent distributor that was informed in writing, including electronic formats, by the manufacturer or supplier, that the regulated product is not to be used in the South Coast Air Quality Management District. Manufacturers utilizing this provision shall

maintain notification letters for three (3) years, which shall be made available to the Executive Officer or designee upon request.

~~(15) A person may sell or apply a non-complying VOC-containing or methylene chloride-containing product for one year after the applicable effective date in paragraph (c)(2) for VOC-containing adhesives and sealants, and for one year after the applicable effective date of paragraph (h)(2) or subparagraph (h)(3)(D) for methylene chloride-containing adhesives and sealants, provided:~~

~~(A) The product complies with the previous applicable VOC limit,~~

~~(B) The product was manufactured prior to the effective date, and~~

~~(C) The date of manufacture or a code indicating that date is clearly displayed on the product.~~

~~(16) The provisions of this rule, except paragraph (h)(2), shall not apply to adhesives used to fabricate orthotics and prosthetics under a medical doctor's prescription.~~

~~(17) The provisions of this rule, except paragraph (h)(2), shall not apply to shoe repair, luggage and handbag adhesives.~~

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STATE OF CALIFORNIA
County of Los Angeles

I am a citizen of the United States, I am over the age of eighteen years, and not a party to or interested in the above-entitled matter. I am the principal clerk of the printer of INLAND VALLEY DAILY BULLETIN, a newspaper of general circulation printed and published daily for the City of Pomona, County of Los Angeles, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Los Angeles, State of California, on the date of June 15, 1945, Decree No. Pomo C-606. The notice, of which the annexed is a true printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

9/6/17

I declare under the penalty of perjury that the foregoing is true and correct.

Executed at Rancho Cucamonga, San Bernardino Co. California

This 6 Day of September, 20 17

Brenda Wade

Signature

(Sp NOTICE OF PUBLIC HEARING nly)

PROPOSED ADOPTION OF, OR AMENDMENT TO, THE RULES AND REGULATIONS OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT AND PROPOSED SUBMISSION INTO THE STATE IMPLEMENTATION PLAN

RE: Proposed Amended Rule 1168 – Adhesive and Sealant Applications

NOTICE IS HEREBY GIVEN that a public hearing on the matter of adoption of rules and regulations for the South Coast Air Quality Management District (SCAQMD), or the amendments thereto, will be held on Friday, October 6, 2017 in the Emerald Ballroom at the Millennium Biltmore Hotel Los Angeles, 506 South Grand Avenue, Los Angeles, CA, 90071, at 9:00 a.m., at which time evidence will be taken and all interested persons will be heard by the SCAQMD Board.

NOTICE IS FURTHER GIVEN that the SCAQMD is considering the adoption of Proposed Amended Rule 1168 – Adhesive and Sealant Applications. The proposed amended rule will revise VOC content limits for various adhesive/sealant categories, include reporting and labeling requirements, clarify rule language and applicability, harmonize language and requirements with state and federal regulations affecting the same type of products, add test methods, remove, modify or add certain exemptions, and prohibit Group II exempt compounds as defined in Rule 102 – Definition of Terms. The proposed amendments will reduce volatile organic compound emissions by approximately 1 ton per day by implementing portions of Control Measure CTS-01- Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants from the 2016 Air Quality Management Plan.

NOTICE IS FURTHER GIVEN that the proposed amendments to Rule 1168 – Adhesive and Sealant Applications will be submitted to the California Air Resources Board and the United States Environmental Protection Agency for inclusion into the State Implementation Plan.

NOTICE IS FURTHER GIVEN that the proposed amendments to Rule 1168 – Adhesive and Sealant Applications implement Sections 110, 172, and 183(e) of the Clean Air Act.

NOTICE IS FURTHER GIVEN that a written analysis pursuant to Health and Safety Code Section 40727.2 has been prepared that identifies all existing federal air pollution control requirements, all SCAQMD existing and proposed rules and regulations, and all pollution control requirements and guidelines that apply to the same equipment or source type as the rule proposed for adoption.

NOTICE IS FURTHER GIVEN that the SCAQMD staff has prepared documents, for consideration by the SCAQMD Board, including:
Proposed Amended Rule 1168 – Adhesive and Sealant Applications
Staff Report for Proposed Amended Rule 1168 – Adhesive and Sealant Applications
Environmental Assessment for Proposed Amended Rule 1168 – Adhesive and Sealant Applications, prepared pursuant to the California Environmental Quality Act
Socioeconomic Assessment for

r.LP8-12/01/

A000004549248

1 301786

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NOTICE IS FURTHER GIVEN that at the conclusion of the public hearing, the SCAQMD Board may make other modifications to Proposed Amended Rule 1168 – Adhesive and Sealant Applications, which are justified by the evidence presented, or may decline the amendments.

Questions, comments, or requests for clarification regarding Proposed Amended Rule 1168 – Adhesive and Sealant Applications can be directed to Nicole Silva, Planning, Rule Development and Area Sources, SCAQMD, 21865 Copley Drive, Diamond Bar, CA 91765, nsilva@aqmd.gov, (909) 396-3384. All CEQA inquiries can be directed to Diana Thai, CEQA Section, Planning, Rule Development and Area Sources, SCAQMD, 21865 Copley Drive, Diamond Bar, CA 91765, dthai@aqmd.gov or by calling (909) 396-3443. All inquiries regarding the Socioeconomic Assessment can be directed to Shah Dabirian, Socioeconomic Section, Planning, Rule Development and Area Sources, SCAQMD, 21865 Copley Drive, Diamond Bar, CA 91765, sdabirian@aqmd.gov, (909) 396-3076.

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DATED: August 30, 2017
DENISE GARZARO
Clerk of the Boards
9/6/17
CNS-3047886#
INLAND VALLEY DAILY BULLETIN/LA 1004495

(When required)
RECORDING REQUESTED BY AND MAIL TO:

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CAROLE WAYMAN
SCAQMD/CLERK OF THE BOARD
21865 COPLEY DRIVE (EO -1ST FLR)
DIAMOND BAR, CA - 91765-4178

DJ#: 3047884

PROOF OF PUBLICATION

(2015.5 C.C.P.)

State of California)
County of Los Angeles) ss

Notice Type: HRG - NOTICE OF HEARING

Ad Description:
PAR 1168 PUBLIC HEARING

I am a citizen of the United States and a resident of the State of California; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer and publisher of the LOS ANGELES DAILY JOURNAL, a newspaper published in the English language in the city of LOS ANGELES, county of LOS ANGELES, and adjudged a newspaper of general circulation as defined by the laws of the State of California by the Superior Court of the County of LOS ANGELES, State of California, under date 04/26/1954, Case No. 599,382. That the notice, of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

09/06/2017

Executed on: 09/06/2017
At Los Angeles, California

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Signature

Email *A0000045450015*

NOTICE OF PUBLIC HEARING

PROPOSED ADOPTION OF, OR AMENDMENT TO, THE RULES AND REGULATIONS OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT AND PROPOSED SUBMISSION INTO THE STATE IMPLEMENTATION PLAN

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DATED: August 30, 2017
DENISE GARZARO
Clerk of the Boards
9/6/17

DJ-3047884#

ORANGE COUNTY REPORTER
~ SINCE 1921 ~

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CAROLE WAYMAN
SCAQMD/CLERK OF THE BOARD
21865 COPLEY DRIVE (EO -1ST FLR)
DIAMOND BAR, CA - 91765-4178

OR#: 3047885

PROOF OF PUBLICATION

(2015.5 C.C.P.)

State of California)
County of ORANGE) ss

Notice Type: HRG - NOTICE OF HEARING

Ad Description:

PAR 1168 PUBLIC HEARING

I am a citizen of the United States and a resident of the State of California; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer and publisher of the ORANGE COUNTY REPORTER, a newspaper published in the English language in the city of SANTA ANA, county of ORANGE, and adjudged a newspaper of general circulation as defined by the laws of the State of California by the Superior Court of the County of ORANGE, State of California, under date 06/20/1922, Case No. 13421. That the notice, of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

09/06/2017

Executed on: 09/06/2017
At Los Angeles, California

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Signature

Email

* A 0 0 0 0 0 4 5 4 5 0 1 7 *

NOTICE OF PUBLIC HEARING

PROPOSED ADOPTION OF, OR AMENDMENT TO,
THE RULES AND REGULATIONS OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
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DATED: August 30, 2017
DENISE GARZARO
Clerk of the Boards
9/6/17

OR-3047885#

THE PRESS-ENTERPRISE

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SEP 15 2017

Publication(s): The Press-Enterprise

PROOF OF PUBLICATION OF

Ad Desc.: / 3047887

I am a citizen of the United States. I am over the age of eighteen years and not a party to or interested in the above entitled matter. I am an authorized representative of THE PRESS-ENTERPRISE, a newspaper in general circulation, printed and published daily in the County of Riverside, and which newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of Riverside, State of California, under date of April 25, 1952, Case Number 54446, under date of March 29, 1957, Case Number 65673, under date of August 25, 1995, Case Number 267864, and under date of September 16, 2013, Case Number RIC 1309013; that the notice, of which the annexed is a printed copy, has been published in said newspaper in accordance with the instructions of the person(s) requesting publication, and not in any supplement thereof on the following dates, to wit:

09/06/2017

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date: September 06, 2017
At: Riverside, California

Legal Advertising Representative, The Press-Enterprise

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P.O. Number: 3047887

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NOTICE OF PUBLIC HEARING PROPOSED ADOPTION OF, OR AMENDMENT TO, THE RULES AND REGULATIONS OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT AND PROPOSED SUBMISSION INTO THE STATE IMPLEMENTATION PLAN

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Clerk of the Boards
9/6/17
CNS-3047887#
THE PRESS ENTERPRISE

SAN BERNARDINO COUNTY SUN

290 N D STREET STE 102, SAN BERNARDINO, CA 92401
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SCAQMD/CLERK OF THE BOARD
21865 COPLEY DRIVE (EO -1ST FLR)
DIAMOND BAR, CA - 91765-4178

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(2015.5 C.C.P.)

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County of SAN BERNARDINO) ss

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Email *A0000045450 19*

SB #: 3047888

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Findings and Comparative Analysis for Proposed Amended Rule 1168 – Adhesive and Sealant Applications, included in the Staff Report

NOTICE IS FURTHER GIVEN that the above documents are available on the SCAQMD website at www.aqmd.gov/home/regulations/rules/proposed-rules, or may be obtained from the SCAQMD's Public Information Center located in the SCAQMD headquarters lobby, or the SCAQMD's publication request line at (909) 396-2039 or from: Fabian Wesson - Assistant Deputy Executive Officer/Public Advisor, South Coast AQMD, 21865 Copley Drive, Diamond Bar, CA 91765, (909) 396-2432, PICrequests@aqmd.gov.

NOTICE IS FURTHER GIVEN that at the conclusion of the public hearing, the SCAQMD Board may make other modifications to Proposed Amended Rule 1168 – Adhesive and Sealant Applications, which are justified by the evidence presented, or may decline the amendments.

Questions, comments, or requests for clarification regarding Proposed Amended Rule 1168 – Adhesive and Sealant Applications can be directed to Nicole Silva, Planning, Rule Development and Area Sources, SCAQMD, 21865 Copley Drive, Diamond Bar, CA 91765, nsilva@aqmd.gov, (909) 396-3384. All CEQA inquiries can be directed to Diana Thai, CEQA Section, Planning, Rule Development and Area Sources, SCAQMD, 21865 Copley Drive, Diamond Bar, CA 91765, dthai@aqmd.gov or by calling (909) 396-3443. All inquiries regarding the Socioeconomic Assessment can be directed to Shah Dabirian, Socioeconomic Section, Planning, Rule Development and Area Sources, SCAQMD, 21865 Copley Drive, Diamond Bar, CA 91765, sdabirian@aqmd.gov, (909) 396-3076.

Interested persons may attend and submit oral or written statements at the Board Hearing. Twenty-five (25) copies of all written materials must be submitted to the Clerk of the Board. Individuals who wish to submit written comments for review prior to the hearing must submit such comments to the Clerk of the Board, 21865 Copley Drive, Diamond Bar, CA, 91765-4178, (909) 396-2500, or to cob@aqmd.gov on or before Tuesday, September 26, 2017. Electronic submittals will only be accepted if no more than 10 pages including attachments; and in MS Word, plain or HTML format.

DATED: August 30, 2017
DENISE GARZARO
Clerk of the Boards
9/6/17

SBS-3047888#

ATTACHMENT G

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Final Staff Report for

PROPOSED AMENDED RULE 1168 – ADHESIVE AND SEALANT APPLICATIONS

Dated: October 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 major VOC reduction was in the September 2000 amendment, although the last rule amendment was in January 2005. The rule currently limits VOC content in 41 categories of adhesives, adhesive primers, 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 approximately 10.5 ~~tons per day~~tpd. 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 South Coast Air Quality Management District (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 Leadership in Energy and Environmental Design (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 to clarify the current rule language and assess the feasibility of VOC reductions that would ~~capitalize on~~reflect 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~~April 2017. The assessment resulted in the ~~Governing Board~~Stationary Source Committee ~~taking~~ recommending 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~~ resumed 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 product sales in the SCAQMD to improve the emissions inventory and to assess product market share. The survey was designed and conducted with 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:

- Revise, delete, and add certain definitions.
- Amend VOC limits for certain adhesives, adhesive primers, sealants, and sealant primers and allow for a three-year sell-through/use-through provision.
- 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, Big Box retailers, and distribution centers who sell regulated products, aerosol adhesives, and adhesive primers into or within the District; and
  - Facilities that use non-compliant product under the 55 gallons per year exemption (subparagraph (i)(5)(C)).
- Prohibit the use of Group II Exempt Solvents as defined in SCAQMD Rule 102 – Definition~~s~~ of Terms, except volatile methyl siloxanes.
- Include a technology assessment for the following categories:
  - Foam Sealants
  - Plastic ~~Cement~~ Welding Cement, including ABS to PVC Transition Cement ~~Welding~~, CPVC ~~Cement~~ Welding Cement, and PVC ~~Cement~~ Welding Cement
  - Roofing products, including All Other Roof Adhesives, Single-Ply Roof Membrane Adhesives, All Other Roof Sealants, and Single-Ply Roof Membrane Sealants

  - Top and Trim Adhesives

- Remove, ~~limit~~modify, or add exemptions, including clarifying that consumer products are exempt from the rule if the unit of product, less packaging, weighs one pound or less, or consists of 16 fluid ounces or less, and there is a VOC limit in the CPR; except for the following uses:
  - Products incorporated into or used exclusively in the manufacture of goods or commodities, not exempted in paragraph (i)(2); and
  - Products used in pollution-generating activities that take place at stationary sources ~~(including area sources)~~, excluding maintenance and repair, not exempted in paragraph (i)(2).
- Retain ~~Include~~ streamlined recordkeeping options for regulated products with VOC content of 20 grams per liter (g/L) or less.
- Retain ~~E~~exemption for 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. 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, 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)
- 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 area sources, which are small sources that do not have permits, stationary sources, which include small sources with permits, and larger facilities that report as part of the Annual Emissions Reporting (AER) Program because they 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 sealant usage is primarily for architectural applications, which are not normally subject to SCAQMD permitting requirements. Additionally, the adhesive and sealant emissions also result from those smaller sources that may be more apt to take advantage of a 55 gallon per year exemption from VOC content limits provided for in the rule. This exemption allows facilities to use up to 55 gallons of non~~-~~compliant product per year.

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 draft "tBAc Assessment White Paper", which was ~~initially~~ released in ~~October 2016~~April 2017. As a result of that work, the ~~Governing Board adopted~~Stationary Source Committee recommended 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 five 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 inventory and rule development.

CARB CONSUMER PRODUCTS REGULATION AND SCAQMD RULE 1168

The proposed rule language includes clarifications on the applicability of the rule to those products included in the CARB CPR by modifying the language in the ~~e~~Exemption section. The current

rule language exempts products subject to the CARB CPR from Rule 1168 requirements. Staff is proposing to clarify this exemption, in paragraph (i)(10):

> "(10) The provisions of this rule shall not apply to regulated products which weigh one pound or less, or consist of 16 fluid ounces or less and have VOC content limits in Section 94509(a) of the ~~California Air Resources Board~~ Consumer Products Regulation ~~found in Title 17 of the California Code of Regulations, beginning at~~ Section ~~94507~~, unless they are:
>
> (A) Incorporated into or used exclusively in the manufacture or construction of the goods or commodities~~,~~ and not exempted in paragraph (i)(2); or
>
> (B) Used in pollution-generating activities that take place at stationary sources ~~(including area sources)~~, excluding maintenance and repair and not exempted in paragraph (i)(2) ~~of the stationary source~~."

The proposed clarification serves to explicitly state the District's regulatory authority regarding Rule 1168. However, clarifying this interpretation has caused concern and uncertainty regarding which products and uses are regulated by the CARB CPR and which products and uses are regulated by SCAQMD Rule 1168. The CARB CPR regulates adhesives and sealants explicitly defined within the regulation that weigh one pound or less or consist of 16 fluid ounces or less. 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
  - Chemically Curing, non-aerosol, and
  - Nonchemically Curing, non-aerosol.

The definitions of each of these broad categories list subcategories that are explicitly included and excluded from the definition. Those definitions were vital in determining the extent to which Rule 1168 could regulate subcategories that are included in the CARB CPR. Generally, 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.

In addition, during the 2013/2014 rule amendment process, ~~District~~ staff received further clarification on SCAQMD authority through 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."*

CARB further made it clear in that letter that SCAQMD has regulatory authority to regulate VOC emissions from "stationary sources such as manufacturing facilities," even if those products are consumer products used at that site, provided they are incorporated into or 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 "incorporated into or 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.

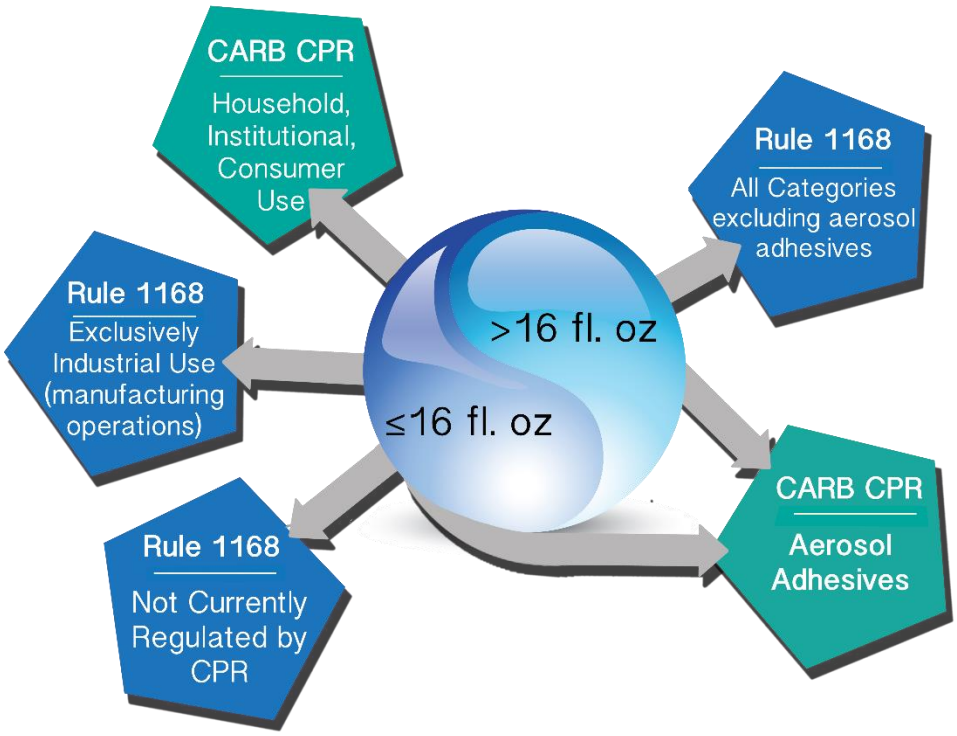
Rule 1168 is written and implemented consistently with other SCAQMD VOC rules, such as Rule 1171 – Solvent Operations. The applicability of ~~subjectivity to~~ SCAQMD VOC rules ~~versus~~ or CARB CPR is consistent with the SCAQMD's long standing implementation and interpretation of applicability between 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 incorporated into or used to manufacture or construct goods or commodities, regardless of size, are regulated under Rule 1168 ~~if those activities do not make use of products regulated by the CARB CPR~~. Figure 1 below summarizes the applicability of the two regulations.

Figure 1: Comparison of SCAQMD Rule 1168 Applicability to CARB CPR

~~SCAQMD Rule 1168 Applicability Compared to 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~~ or SCAQMD Rule 1168. For all applicable products greater than 16 fluid ounces, SCAQMD Rule 1168 applies because the CARB CPR does not apply. Aerosol adhesives are currently regulated by CARB.

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

Table 1: Comparison of SCAQMD Rule 1168 Applicability to CARB CPR

~~SCAQMD Rule 1168 Applicability versus the CARB CPR~~

Category	RULE 1168	CPR
Adhesives		
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	✓	✓
Roofing		
All Other Roof Adhesive	✓	✓

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

Category	RULE 1168	CPR
Plastic	✓	
Pressure Sensitive	✓	
Traffic Marking Tape	✓	
Vehicle Glass	✓	
All Other Adhesive Primers	✓	
Sealant Primers		
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 incorporated into or 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~~. Although they have adhesive properties, their *primary purpose* is not to *bond* one surface to another but to fill, seal, ~~or~~ waterproof, or weatherproof gaps or joints between two surfaces. Staff is proposing to align the definition of a sealant with the CARB and OTC definition by including "weatherproof". This will also further clarify that foam insulation is applicable to Rule 1168.

Further, s~~S~~ealants do not include products that are 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 ~~'s~~ 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. Staff conducted a voluntary survey, designed in cooperation with interested stakeholders including trade 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 SWA VOC is determined using a weighted average, based on sales volume, to give more influence to the products that have higher market share. 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)
Adhesives		
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
Roofing		
Single-Ply Roof Membrane Adhesive	250	152
All Other Roof Adhesives	250	127
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
Wood Flooring Adhesive	100	51
All Other Indoor Floor Covering Adhesives	50	18
All Other Outdoor Floor Covering Adhesives	150	15
Computer Diskette Manufacturing Adhesive	350	Limited Data

Category	Current VOC Content Limit (g/L)	Regulatory SWA VOC Content (g/L)
Contact Adhesive ~~Adhesive~~	80	70
Edge Glue ~~Adhesive~~	250	Limited Data
Plastic Welding Cement		
ABS Welding Cement	325	325
ABS to PVC Transition Cement	510	Limited Data
CPVC Welding Cement	490	490
PVC Welding Cement	510	510
All Other Plastic Welding Cements	250	Limited Data~~504~~
Rubber Vulcanization Adhesive	850	Limited Data
Special Purpose Contact Adhesive	250	163
Thin Metal Laminating Adhesive	780	Limited Data
Tire Tread Adhesive	100	Limited Data
Top and Trim Adhesive	250	619*
Waterproof Resorcinol Glue	250	Limited Data
All Other Adhesives	250	150
Substrate Specific Adhesive Applications		
Metal	30	5
Plastic Foams	50	13
Porous Material (except wood)	50	12
Wood	30	5
Fiberglass	80	75
Reinforced Plastic Composite	250	27
Sealants		
Architectural Applications		
Clear, Paintable, and Immediately Water-Resistant Sealant	250	Limited Data
Foam Sealant	250	153
Grout	250	60
~~Insulating Foam Sealant~~	~~250~~	~~Limited Data~~
Roadway Sealant	250	70
Non-Staining Plumbing Putty	250	Limited Data
Roofing		
Single Ply Roof Membrane Sealants	450	153
All Other Roof Sealants	300	219
All Other Architectural Sealants	250	65
Marine Deck Sealant	760	Limited Data
All Other Sealants	420	326
Adhesive Primers		
Plastic	550	546
Pressure Sensitive	785	Limited Data

Category	Current VOC Content Limit (g/L)	Regulatory SWA VOC Content (g/L)
Traffic Marking Tape	150	Limited Data
Vehicle Glass	700	Limited Data
All Other Adhesive Primers	250	42
Sealant Primers		
Architectural Applications		
Non Porous	250	Limited Data
Porous	775	Limited Data
Marine Deck	760	Limited Data
Modified Bituminous	500	Limited Data
All Other Sealant Primers	750	Limited Data

* These products were exclusively sold under the 55 gallon per year exemption, according to the survey.

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, sealants, and sealant primers. Furthermore, the rule applies to "any person who *uses*, sells, stores, supplies, distributes, offers for sale or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers, unless otherwise specifically exempted by this rule." Staff added "distributes" for clarity.

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~~Consumer Products (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
- 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

The following definitions are revised or added for clarification or to be more consistent with the CARB CPR and OTC Model Rule.

- ABS to PVC Transition Cement
- ABS Welding Cement
- Adhesive
- Adhesive Primer
- Adhesive Tape
- Aerosol Adhesive
- Aerosol Product
- Architectural Application
- Architectural Appurtenance
- Big Box Retailer
- Building Envelope
- Building Envelope Membrane Adhesives
- Ceramic, Glass, Porcelain, and Stone Tile
- CPVC Welding Cement
- Clear, Paintable, and Immediately Water-Resistant Sealant
- Contact Adhesive

- Consumer Products Regulation
- Cove Base
- Cyanoacrylate Adhesive
- Dip Coat
- Distribution Center
- Edge Glue
- Electrostatic Application
- Energy Curable Adhesive and Sealant
- Exempt Compounds
- Flow Coat
- Foam Insulation
- Foam Sealant
- Grams of VOC per liter of regulated product, less water and less exempt compounds
- Grams of VOC per liter of material
- Grout
- Hand Application Methods
- HVLP Spray
- Indoor Floor Covering Adhesive
- ~~Insulating Foam~~
- Low-Solids
- Maintenance
- Manufacturing
- Marine Appurtenances
- Marine Deck Sealant
- Marine Deck Sealant Primer
- Non-Staining Plumbing Putty
- Outdoor Floor Covering Adhesive
- Ozone-Depleting Compound
- Person
- Plastic Adhesive Primer
- Plastic Welding Cement
- Plastics
- Polyethylene Terephthalate
- Pump Spray
- PVC
- Potable Water Architectural Sealant
- Pressure Sensitive Adhesive
- Private Labeler
- PVC Welding Cement
- Reactive Products
- Regulated Product
- Reinforced Plastic Composite
- Repair
- Rubber

- Rubber Vulcanization Adhesive
- Sealant
- Single ~~-p~~Ply Roof Membrane Sealant
- Toll Manufacturer
- Toxic Air Contaminant
- Traffic Marking Tape Adhesive Primer
- Transfer Efficiency
- Vinyl Compositions Tile
- Vehicle Glass Adhesive Primer
- Waterproof Resorcinol Glue

The following is a summary of the substantial rule definition changes. Throughout the rule, the phrase 'adhesives and sealants' was replaced with the phrase 'regulated products' to clarify that requirements apply to adhesives, adhesive primers, sealants, and sealant primers. Those and other minor definitions changes are included in the summary below:

- 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.
- ABS Welding Cement – The definition was added to be consistent with the other Plastic ~~Cement~~ Welding Cement categories that define the type of plastic first and then define the category.
- 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.
- Adhesive Tape – This term was defined as these tapes are proposed for exemption from the rule.
- Aerosol Adhesive – This term was modified for clarity to remove specific categories in the CARB CPR to prevent need for amending the rule in the future if CARB modifies their aerosol adhesives. In addition, the definitions of Aerosol Product and Pump Spray, from the CARB CPR, were included to support the definition of Aerosol Adhesive.
- Architectural Appurtenance – The definition was made consistent with the terminology used in Rule 1113 – Architectural Coatings.
- 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 from '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 – The definition was added to harmonize with the OTC.
- Clear, Paintable, and Immediately Water-Resistant Sealant – A product category and VOC content limits have been included for the products excluded from the CPR.
- Contact Adhesive – This definition was revised to harmonize with the CPR definition of this term.
- 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.
- Cove Base – The ~~-~~definition was amended to be consistent with the OTC.
- 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"~~'~~.
- Electrostatic Application – This term ~~-~~was defined as it is included in the transfer efficiency section.
- 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.
- Exempt Compounds – This definition was revised to add the name of Rule 102, which is referenced in the definition.
- Flow Coat – The definition was added to specify method of application.
- Foam Insulation – This definition was originally included as "insulating foam" and revised to foam insulation. The definition was included to clarif~~t~~y that foam insulation is applicable to the rule.
- Foam Sealant~~ and Insulating Foam~~ – Thi~~se~~s definition~~s~~ was~~ere~~ included to clarify that foam sealants are applicable to the rule~~with specific VOC limits~~.
- Grout – Added to define a new category of sealants.
- Manufacturing, Maintenance, and Repair – These definitions are included to clarify the applicability of the rule.
- Marine Appurtenances – This term was included to clarify what products are classified as marine adhesives and sealants.

- Non-Staining Plumbing Putty - Added to the rule to define new category of sealants.
- ~~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.
- Person – This term was revised to reference the definition in Rule 102.
- Plastic Adhesive Primer – This definition was included to clarify the function of plastic adhesive primers.~~Products subject to this definition must meet the specifications of ASTM F656.~~
- Plastics – This definition was expanded.
- 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 – The definition was added to harmonize with the OTC.
- 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, sealants, and sealant primers whenever this term is utilized.
- Reinforced Plastic Composite and Waterproof Resorcinol Glue – Added to address RACM/BACM requirements.
- Rubber – This definition was added, as there are several references to rubber adhesives.
- 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.
- Sealant – This definition was modified to mirror with the OTC and CARB.
- Single-Ply Roof Membrane Sealant – This definition was amended based on stakeholder feedback.
- Thin Metal Laminating Adhesive – This definition was amended to describe a type of adhesive product instead of the process as previously defined.
- Toll Manufacturer – This definition was added to clarify how a Private Labelers is defined for the purposes of this rule.

- 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 3 through 11 and Figures 2 through 17). Please note for the following histograms: the dashed red line indicates the future proposed VOC limits, the x-axis is the VOC distribution, in g/L, and the y-axis represents the sales volume or product count. Available future compliant products, i.e., products that meet the proposed VOC limits, 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 ~~3~~425 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 425 g/L limit for the PVC welding cement and 400 g/L for the CPVC welding cement categories 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~~ with a VOC content below 325 g/L and a product marketed to the irrigation market for PVC and CPVC ~~at 400 g/L~~below the future limit for those categories. Based on stakeholder feedback, the definitions for these categories were changed from the preliminary draft proposal to allow flexibility in the reformulation of the products. Some of the uses of the plastic welding cements must meet requirements in the plumbing code, the adoption of the lower limits is contingent on altering the required ASTM methods (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%), according to the ASTM methods listed in the plumbing code. Stakeholders indicated they would work on modifying the ASTM standards. ~~District s~~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 – All Other Outdoor Floor Covering Adhesives

Most of the reviewed All Other 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 All Other Indoor Floor Covering Adhesives so that all other 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 below shows a list of future compliant products and sales volume and product count distributions.

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

Product Name	VOC Content (g/L)
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
Proposed:	**50**

Adhesive - Architectural Applications – All Other Roof Adhesives

All Other Roof Adhesives consist of roofing products excluding Single-Ply Roof Membrane Adhesives. However, some products categorized as All 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 All Other Roof Adhesive category may be necessary. The proposed VOC limit for this category is 200 g/L. Staff proposed a future technology assessment to determine if sub-categorization for this category are warranted.

The table and two figures below show a list of future compliant products and sales volume and product count distributions.

Table 4: All Other Roof Adhesives Less Than or Equal to Proposed VOC Limit

Product Name	VOC Content (g/L)
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
Proposed:	**200**

Figure 2: All Other Roof Adhesives Sales Volume

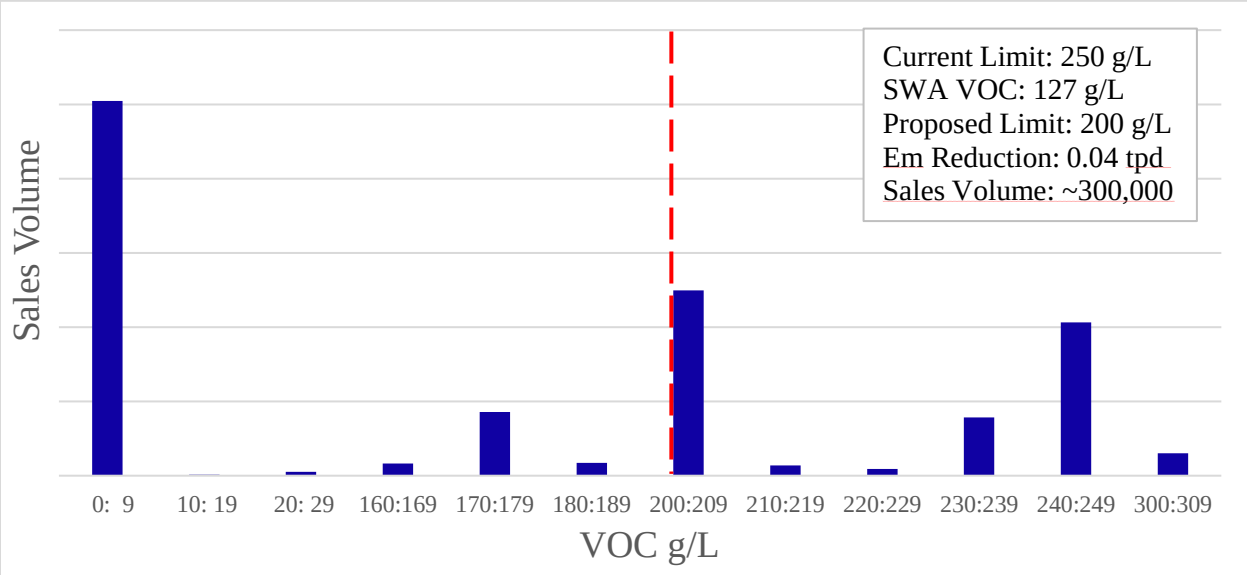
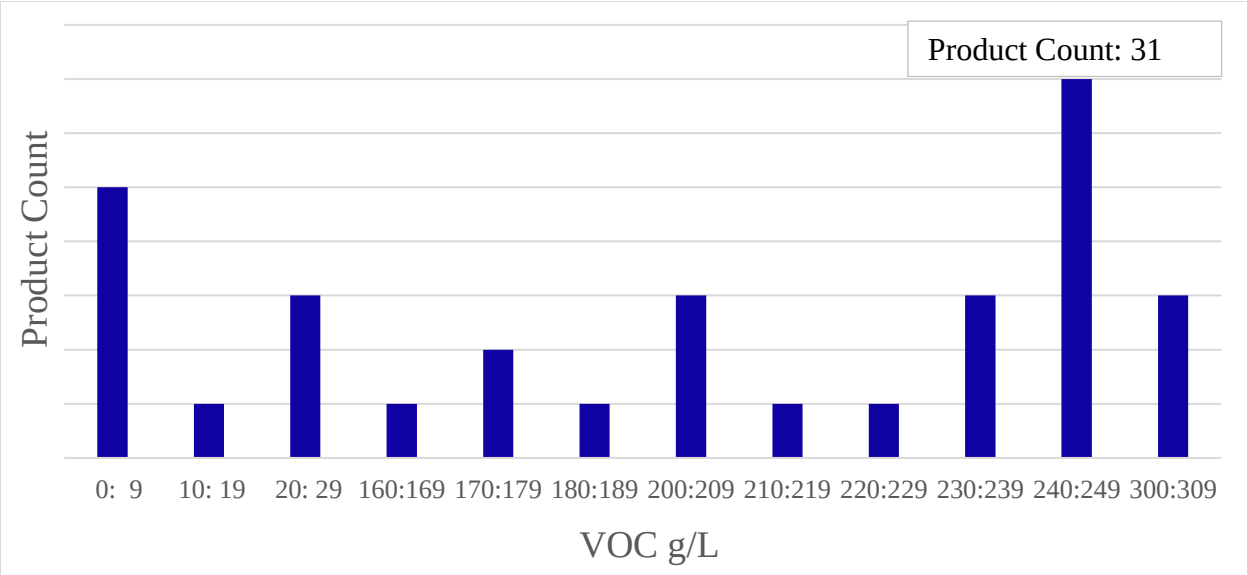


Figure 3: All Other Roof Adhesives Product Count



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 of the market share. Staff proposed a future technology assessment to determine if sub-categorization for this category are warranted.

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			
	Proposed:	**200**			

Figure 4: Single- Ply Roof Adhesive Sales Volume

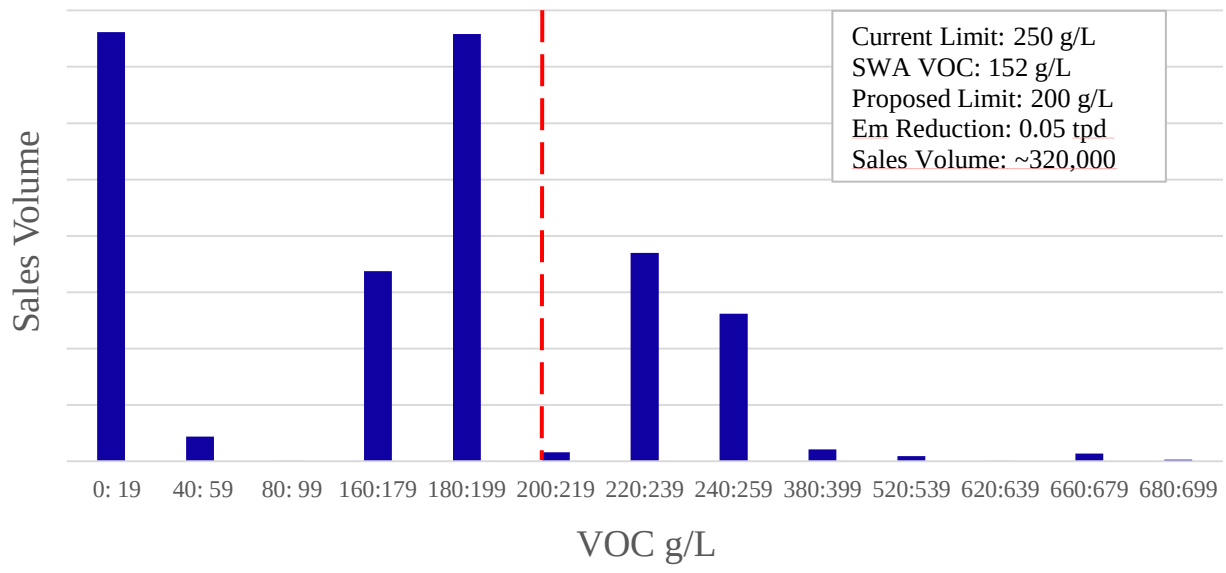
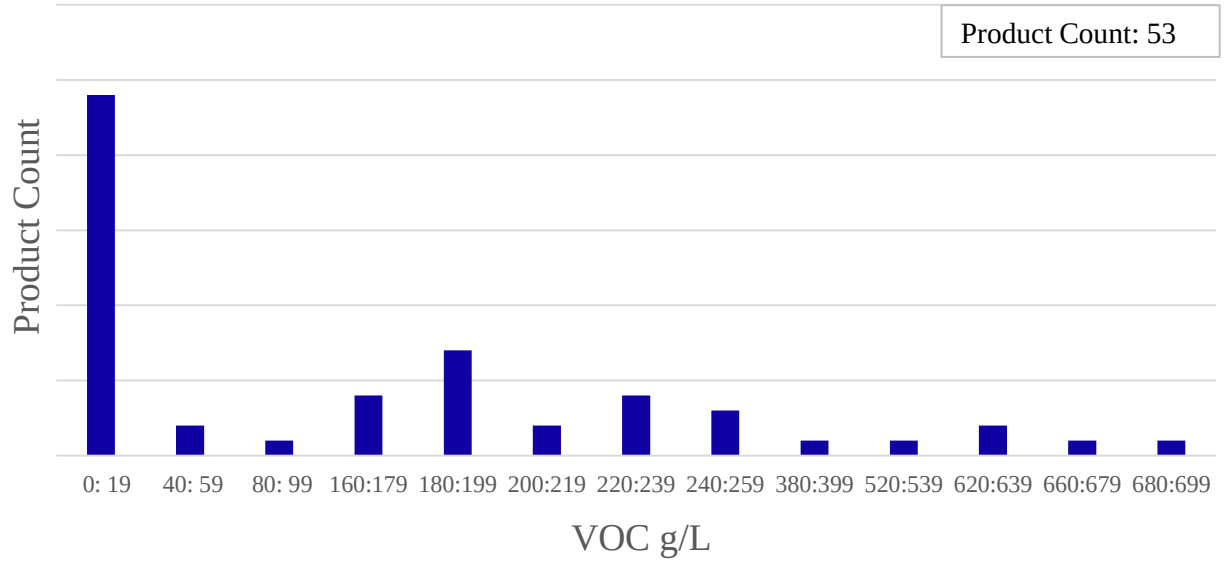


Figure 5: Single- Ply Roof Adhesive Product Count



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 or Equal to Proposed VOC Limit

Product Name	VOC Content (g/L)
AAT Problemsolver EW - Engineered Wood Flooring Adhesive	<1
APAC 979	15
APAC 999	20
DriTac 1001 All in One	0
Roberts R1509 Wood & Bamboo Flooring Adhesive	<1
TEC Woodlock	0
Titebond 771-Step Wood Flooring Adhesive 7719A	20
USG Durock Wood Flooring Adhesive	2
WF Taylor 2020 Wood Master Engineered Floor Adhesive	19
WF Taylor Meta-Tec MS-Plus	0
Proposed:	**20**

Figure 6: Wood Flooring Adhesive Sales Volume

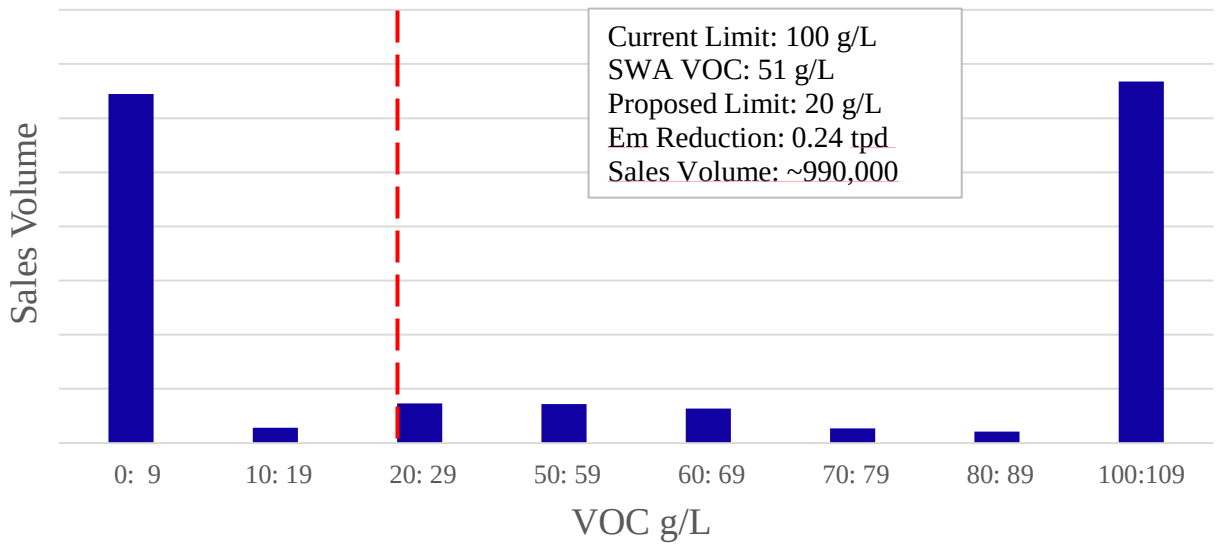
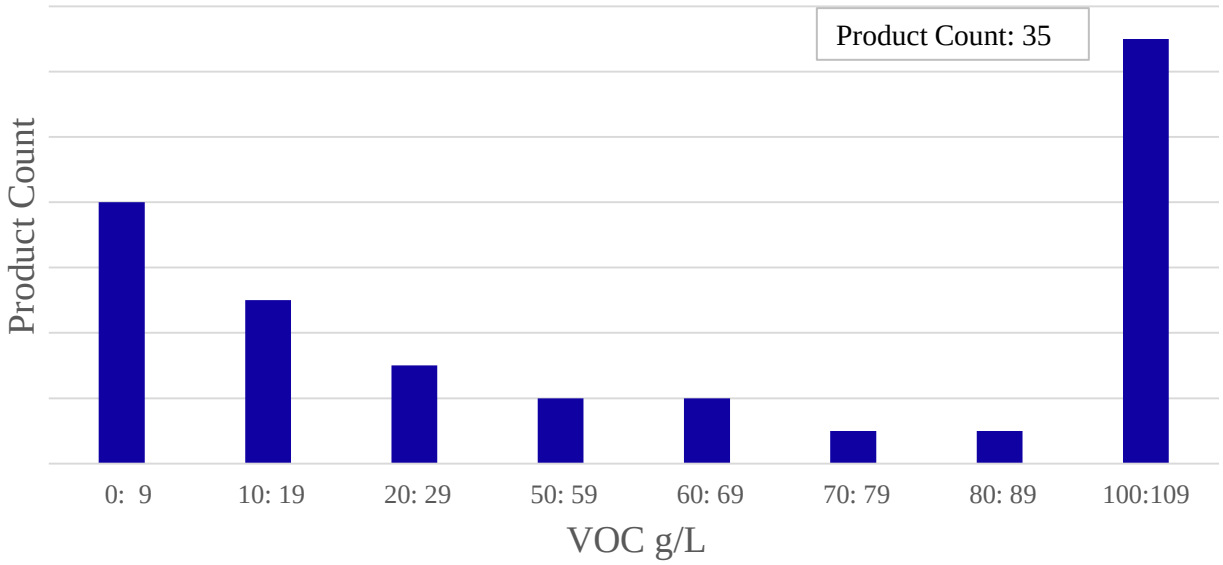


Figure 7: Wood Flooring Adhesive Product Count



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 2023 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. Staff is confident that the removal of the 55 gallon exemption will result in manufacturers reformulating to the 250 g/L future limit but because of the past issues, staff will conduct a technology assessment to ensure the 250 g/L limit is feasible.

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, and 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 2023 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 Sealants and ~~Insulating~~ Foam Insulation

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. Staff is proposing to include two categories of expanding foam sealants: 'foam sealants' that are typically used to fill small gaps around windows, doors, and floor and are typically supplied in aerosol cans and 'insulating foams' that are typically supplied in large canisters, applied by professionals, and sprayed into wall cavities to provide thermal insulation or minimize air infiltration.

The foam itself is typically a one-component or two-component polyurethane that 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 these two categories, which fall under the default VOC limit of 250 g/L. Staff is proposing to reduce the VOC limit of the foam sealant 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 insulating foams, which are already formulated between 0 – 50 g/L, will have a VOC limit of 50 g/L upon rule adoption.~~

Based on a comment letter submitted to the Stationary Source Committee on September 13, 2017 from the American Chemistry Council and subsequent discussions, staff is revising the proposed amendment as follows:

- Rename "insulating foam" "foam insulation,"
- Streamline the definition for foam insulation to reflect current practices in the industry, and
- Upon adoption, the VOC limit for foam sealants and insulation foams will be 250 g/L, reduced to 50 g/L effective January 1, 2023, based on the results of the technology assessment

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

Product Name	VOC Content (g/L)	Aerosol
Clayton Touch n Foam	155	Yes
DAPtex Plus Multi-Purpose Foam Sealant	167	Yes
DOW Froth Pak	< 20	No
Henkel OSI WINTeQ Foam	177	Yes
Red Devil Foam & Fill Minimal Expanding	150	Yes
Red Devil Foam & Fill Triple Expanding	150	Yes
Proposed:	**200/50**	

Figure 8: Foam Sealants Sales Volume

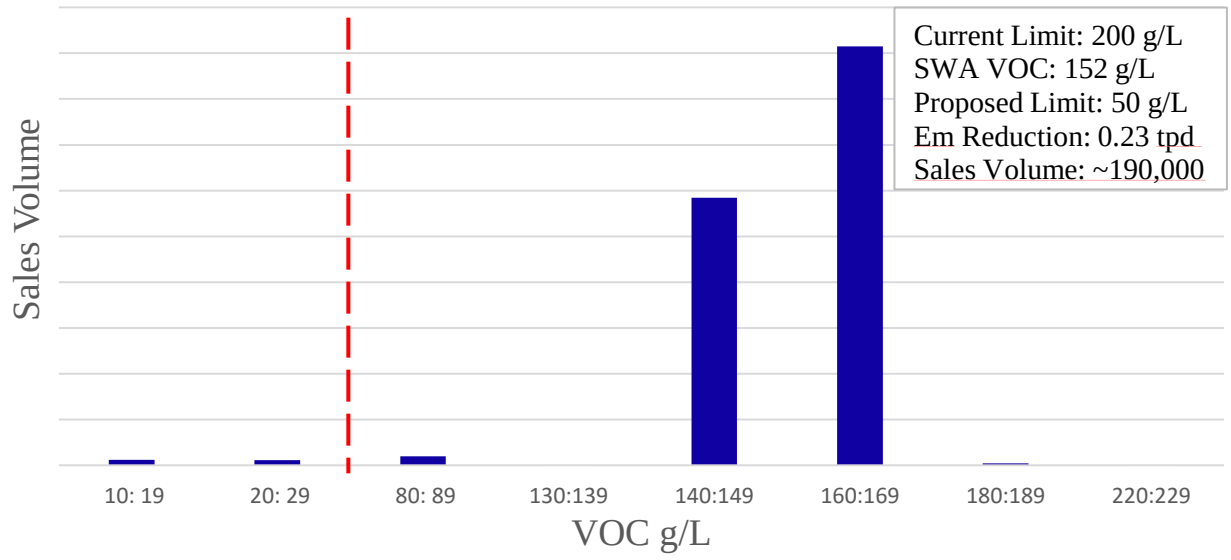
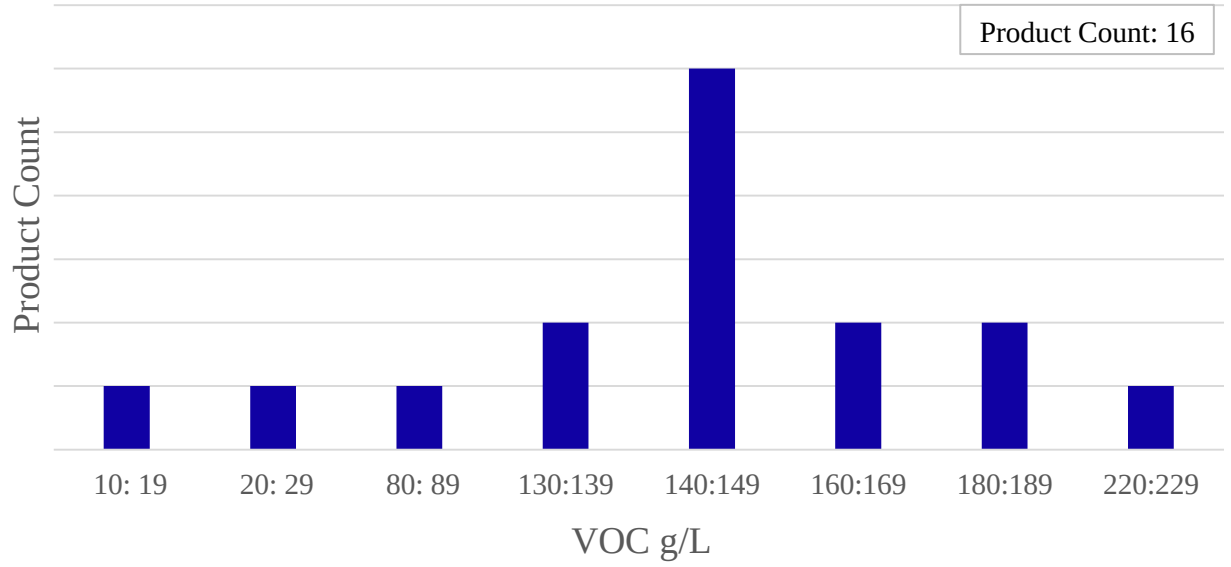


Figure 9: Foam Sealants Product Count



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 be moisture free. The higher-VOC solvent based products are 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. Staff proposed a future technology assessment to determine if sub-categorization for this category are warranted.

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

Product Name	VOC Content (g/L)	Immediately Water Resistant
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
Proposed:	**250**	

Figure 10: All Other Roof Sealant Sales Volume

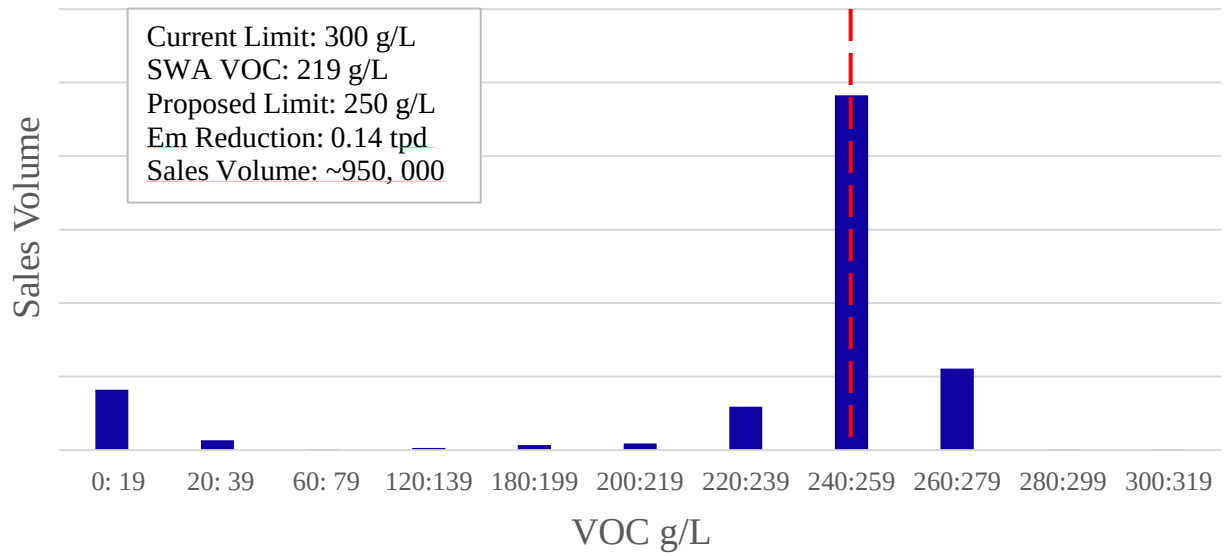
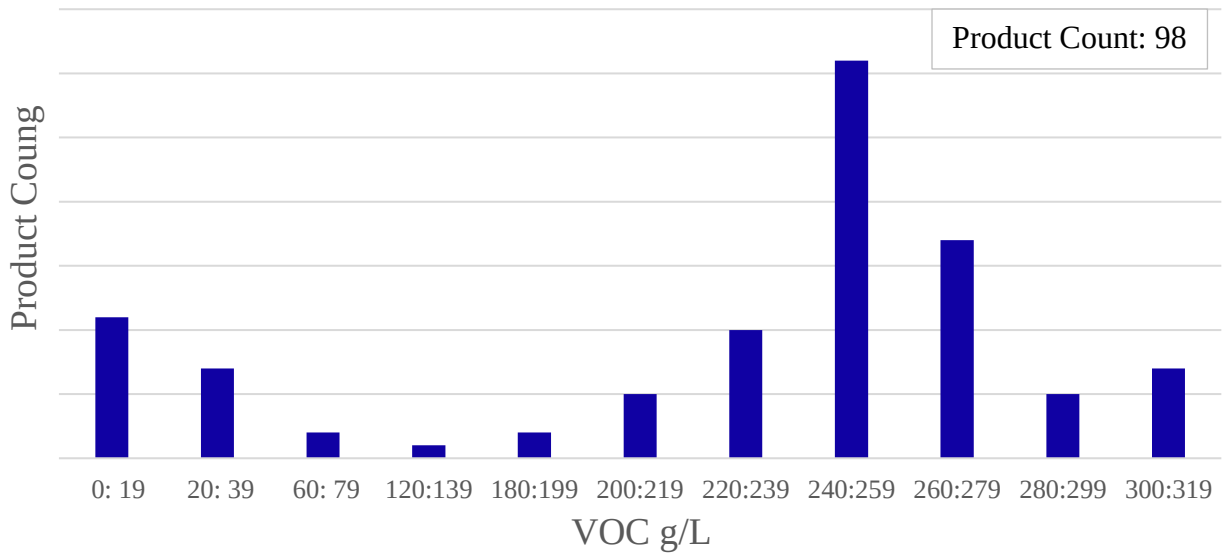


Figure 11: All Other Roof Sealant Product Count



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 All Other Roofing Sealant products. The proposed VOC limit is 250 g/L. Staff proposed a future technology assessment to determine if sub-categorization for this category are warranted.

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
Proposed:	**250**	

Figure 12: Single- Ply Roof Sealant Sales Volume

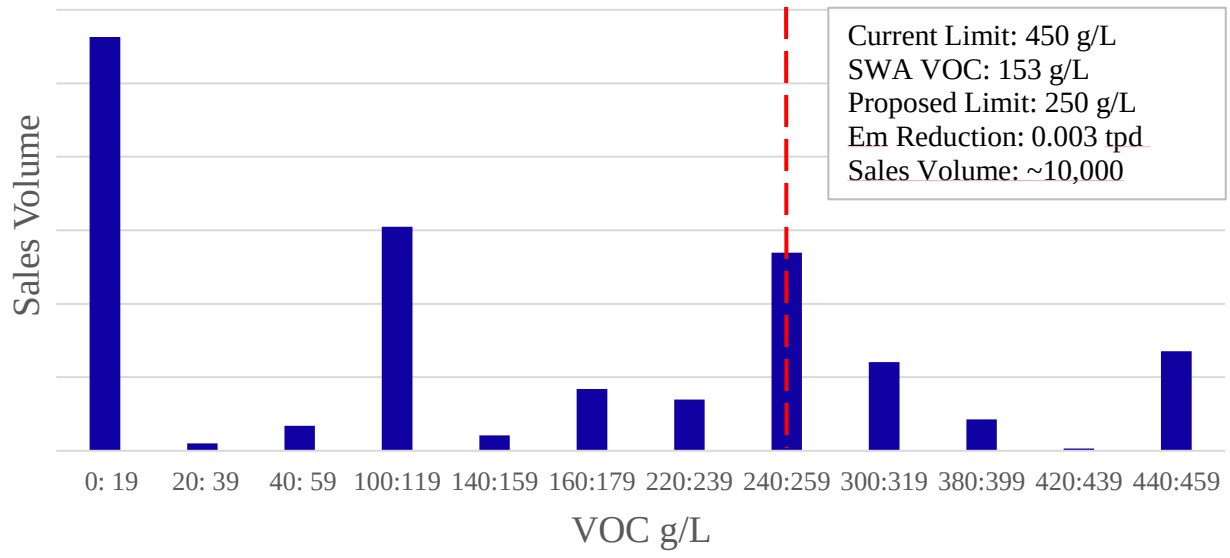
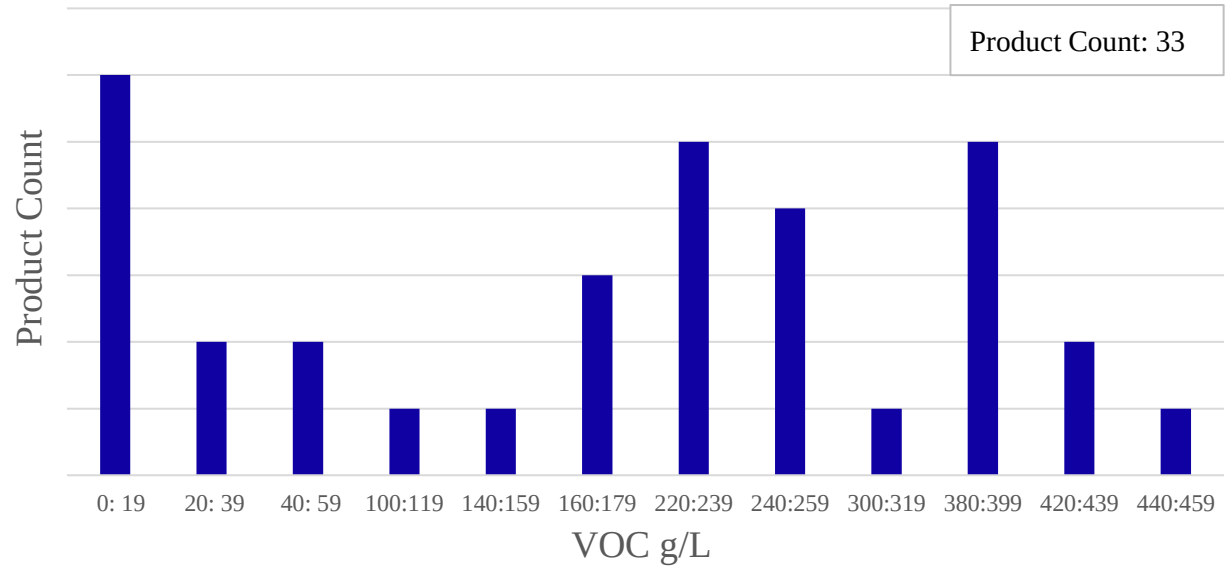


Figure 13: Single- Ply Roof Sealant Product Count



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

Product Name	VOC Content (g/L)
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
Proposed:	**50**

Figure 14: All Other Architectural Sealants Sales Volume

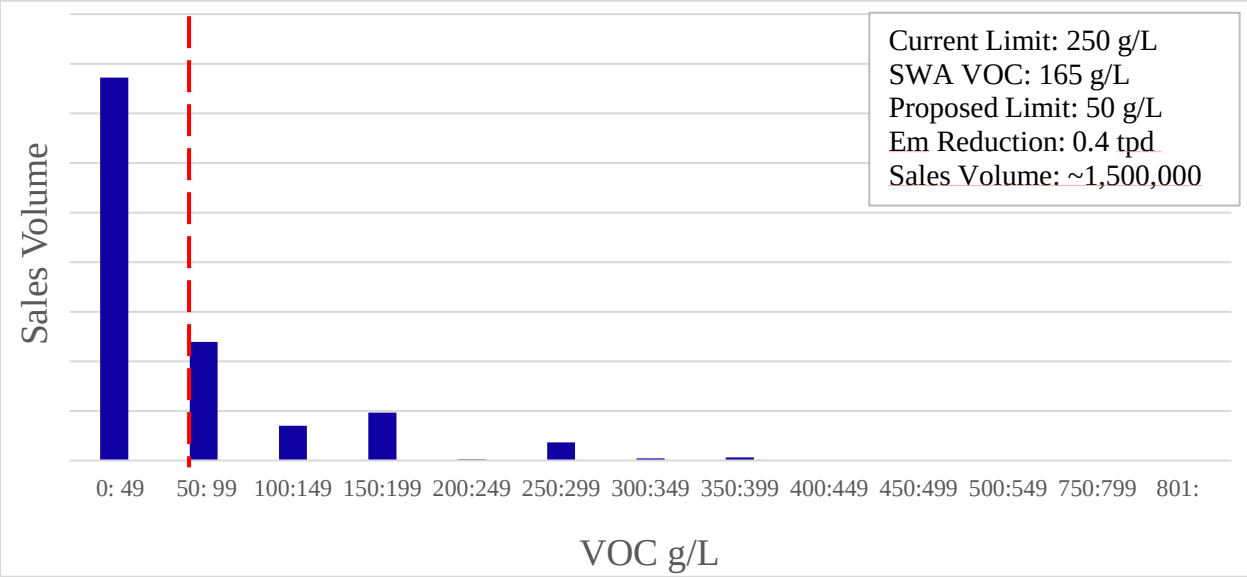
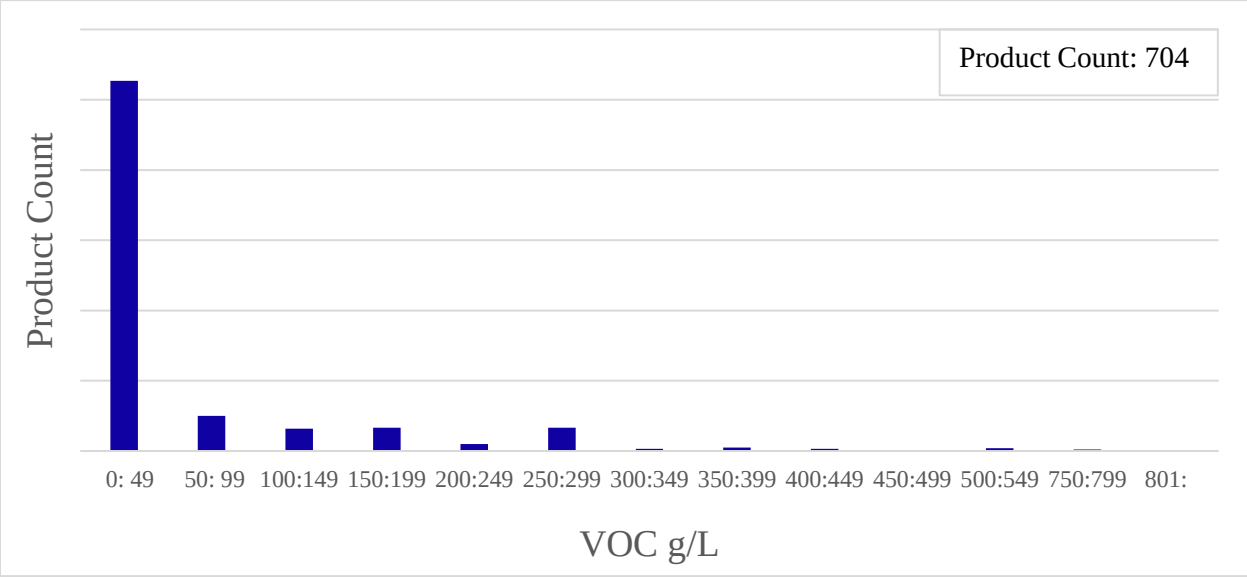


Figure 15: All Other Architectural Sealants Product Count



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

Product Name	VOC Content (g/L)
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
Proposed:	**250**

Figure 16: All Other Sealants Sales Volume

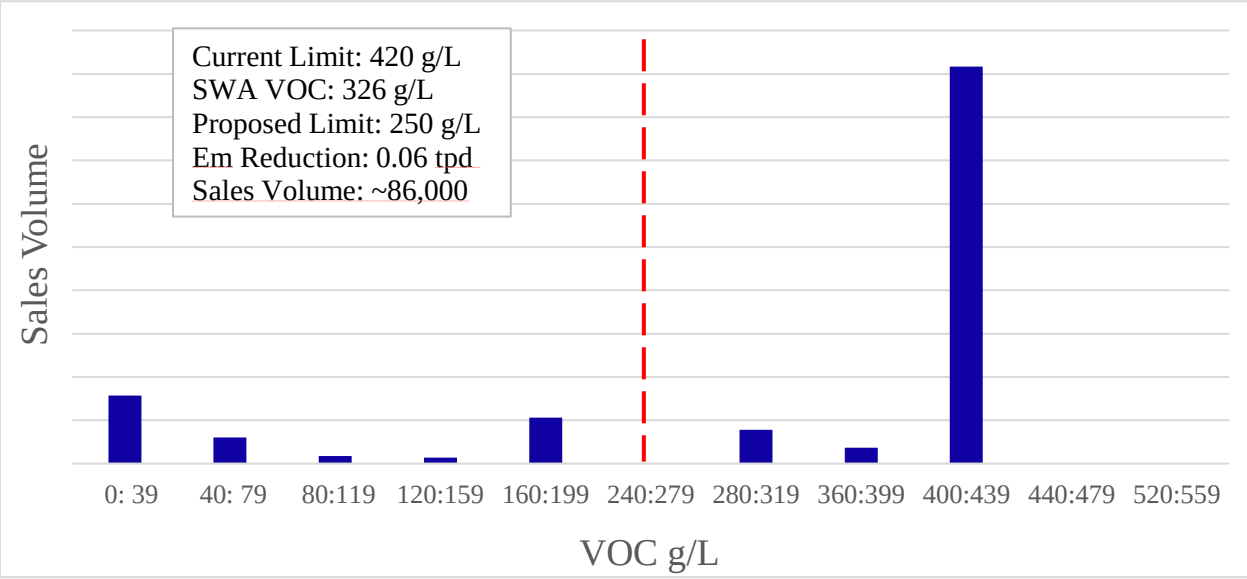
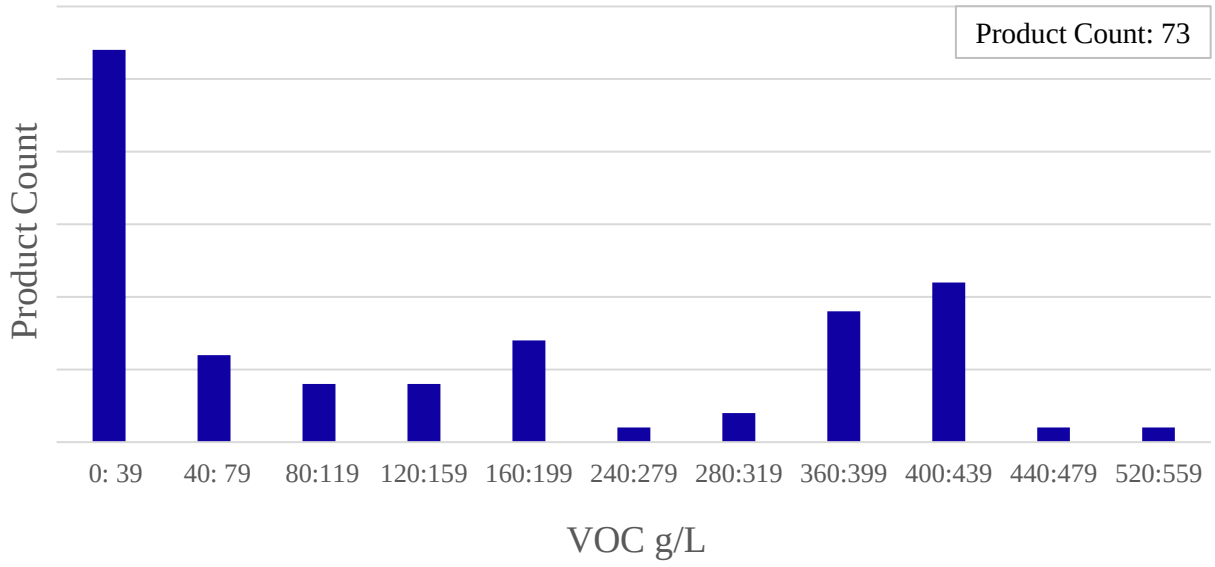


Figure 17: All Other Sealants Product Count



Proposed VOC Content Limits

The proposed changes to VOC limits for regulated products are provided in the table below. The proposed limits will go into effect on or before January 1, 2023. 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 Cement categories, Foam Insulation, Foam Sealants, Roofing categories, and Top and Trim Adhesives. The proposed changes in plastic welding cement categories, which include ABS to PVC Transition Cement, CPVC Welding Cement, and PVC Welding Cement, 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. Staff will also conduct a technology assessment for roofing categories, which include Single-Ply Roof Membrane Adhesive, Single-Ply Roof Membrane Adhesives, All Other Roof Adhesives, and All Other Roof Sealants, to allow staff to work with industry to assess their request for specified subcategories to be defined, evaluated, and created.

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 Cements 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 Cements to 100 g/L to address the cellulosic plastic welding and SAN categories. Staff is 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	1/1/2023
Adhesives				
Architectural Applications				
Building Envelope Membrane Adhesive	250			
Roofing				
Single-Ply Roof Membrane Adhesive	250			200*
All Other Roof Adhesives	250			200*
Wood Flooring Adhesive	100			20
All Other Outdoor Floor Covering Adhesive	150		50	
Edge Glue ~~Adhesive~~	250			
Plastic Welding Cement				
ABS to PVC Transition Cement	510			~~3~~425*
CPVC Welding Cement	490			400*
PVC Welding Cement	510			425*
All Other Plastic Welding Cements	250		100	
Rubber Vulcanization Adhesive	250	850		250
Top and Trim Adhesive	250	540		250
Waterproof Resorcinol Glue	250		170	
Substrate Specific Adhesive Applications				
Reinforced Plastic Composite	250		200	
Sealants ~~\~~				
Architectural				
Clear, Paintable, and Immediately Water Resistant Sealant	250	380		250
Foam Insulation	250			50*
Foam Sealant	250			50*
Grout	250	65		
~~Insulating Foam Sealant~~	~~250~~	~~50~~		

Category	VOC Content Limit (g/L)			
	Current	Upon Rule Adoption	1/1/2019	1/1/2023
Non-Staining Plumbing Putty	580	150		50
Potable Water Sealant	250	100		
Roofing				
Single Ply Roof Membrane Sealant	450			250*
All Other Roof Sealants	300			250*
All Other Architectural Sealants	250		50	
All Other Sealants	420			250
Adhesive Primers				
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 the most 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 three-–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 the exemption subdivision, paragraph (i)(6).

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)

Methods

Staff included clarification in the test method section before the list of test methods. Rule 1168 applies to many product types and lists several VOC test methods, not all of which are appropriate for each type of product. Staff expanded paragraph (e)(1) to explicitly state that a test method will not be used if the test method specifically states it is not appropriate for a product type or product chemistry. Examples include~~s~~ SCAQMD Method 313, which specifically states it is not to be used for Ultraviolet/Electron Beam (UV/EB)-cured coatings, and Subpart PPPP of 40 CFR Part 63, which states it is not appropriate for one-part moisture cured urethane adhesives. In addition, language was added to clarify how the SCAQMD addresses samples that could be analyzed by several different test methods. This rule applies to diverse products and chemistries and many products are analyzed by a series of test methods to determine the most appropriate test method. The decision is based on product type (adhesive or sealant, one-part or two-part, reactive products or non-reactive), VOC content, and sometimes the specific chemistry (energy curable products, cyanoacrylate adhesives). For some products, the choice of test methods is very clear, PVC Welding Cement is always analyzed by SCAQMD Method 316A. For some products however, staff must go through ~~it is~~ a multi-step process to determine the most appropriate VOC test method. There is only one VOC method that is most appropriate for each product. SCAQMD planning and laboratory staff will work with the stakeholders to develop a guidance document to clarify which products ~~types~~ are tested by which test method and ~~if deemed necessary,~~ will seek Governing Board approval for the guidance document.

Three additional VOC content methods are also 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 a 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. If compliance staff were to come across such a product in the field, they would contact the manufacturer and ask for formulation data, including the results of ASTM 7767 if used. SCAQMD laboratory staff could speciate the sample on the GC/MS to confirm some of the raw materials contained in the formulation data to qualitatively confirm the veracity of the formulation data. To be clear, the GC/MS VOC Method 313, which can be used to quantitate the VOC of certain adhesives and sealants, cannot be used for energy curable products due to their reactive nature. At this time, staff is not aware of any thin-film energy curable adhesives or sealants but when these products becoame 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 ounce 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. 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. Staff is proposing for each report to include the previous two years of sales to provide a more complete inventory but address stakeholder feedback regarding the challenges of reporting past sales data. The QERs will have the reported years separated, e.g., the 2017 sales must be distinguished from the 2018 sales. Staff will develop spreadsheets, similar to those provided for the 2013/2014 survey for reporting purposes to assist those subject to reporting.

Table 13: Reporting Timeline

Reporting Deadlines		Reported Years
Manufacturers or Private Labelers	Big Box Retailers & Distribution Centers	
September 1, 2019	May 1, 2019	2017, 2018
September 1, 2022	May1, 2022	2020, 2021
September 1, 2025	May 1, 2025	2023, 2024
September 1, 2030	May 1, 2030	2028, 2029
September 1, 2035	May 1, 2035	2033, 2034
September 1, 2040	May 1, 2040	2038, 2039

The QER for regulated products will include the following information:

- Product manufacturer (as labeled)
- Product name and code
- Applicable Rule 1168 category
- The grams of VOC per liter of regulated product (less water and exempt solvents)

- The grams of VOC per liter of material
- ~~Utilization of Sell-Through Provision~~
- ~~Designation as to whether or not the product is Low Solids~~
- Whether the product is waterborne or solvent based)
- Total annual 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
- Whether the product was sold under a specific provision of the rule:
    - Sell-through provision
    - Low-Solids ~~P~~product
    - Exemption under paragraph (i)
    - Complying with subparagraph (c)(7) – Control Device
    - Complying with subparagraph (c)(8) – Alternative Emission Control

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, which 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
- Percent VOC by weight
- Total weight sold, including products sold through distribution centers located within or outside the District
- Container size of product

The exemptions for aerosol adhesives and primers does not include adhesives and primers that are applied with the use of refillable pressurized spray systems, as stated in subparagraph (c)(9). The aerosol adhesive exemption specifies that the exemption only applies to non-refillable aerosol spray systems.

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
- The grams of VOC per liter of regulated product (less water and exempt solvents)
- The grams of VOC per liter 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.

Staff included subparagraph (f)(4) on confidentiality of information that states that information submitted under the reporting requirements can be designated as confidential.

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. This is further explained in the ~~e~~Exemption section of this report.

The requirements in subparagraph (g)(1) were moved to subparagraph (c)(1) for clarity and consistency.

Exemptions

The provisions of the Exemption section, whether they were retained, newly proposed, or modified, have been rearranged and organized for clarity. Exemptions included in subdivision (b) Definitions, paragraph (c)(5) Transfer Efficiency, and subdivision (g) Prohibition of Sale and Use

were moved to subdivision (i) Exemption. The exemptions from specific requirements were grouped together and organized by subdivision for clarity.

The exemption for adhesive tapes, that was proposed in the definition of an adhesive was removed, as it is included in (i)(1)(b). The exemption for adhesive tapes and papers was included because those products do not have an appreciable VOC content. This exemption does not include primers for such products.

The proposed Prohibition of Sale section previously contained an exemption for products shipped, supplied, or sold to persons for use outside of the District, this was moved to (i)(1)(C). The exemption makes it clear that products shipped for use out of the District are exempt from all provisions of the rule, not just the prohibition of sale.

The subparagraph requiring manufacturers or suppliers of regulated product to maintain notification letters demonstrating due diligence in notifying those who are purchasing product, whether for resale or to the end-~~-~~user, was also moved to the Exemption section. ~~District s~~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 proof of exemption from this rule. Lastly, the provision with the proposed revision including a sunset date for those products containing methylene chloride was moved from the prohibition section to the ~~e~~Exemption section. Staff also proposed an exemption in section (i)(1)(E) 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.

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 to 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.

Staff is also proposing an exemption for regulated products sold in quantities of one fluid ounce or less to mirror the similar size exemption from the CARB CPR for their regulated product.

Effective January 1, 2019, 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 proposed exemptions in sections (i)(5)(D) and (i)(7), to address a high-VOC adhesive used in small volumes for critical infrastructure repair and exempting products that would not contain VOC, respectively.

The proposed rule maintains an exemption from recordkeeping, subdivision (d), for products that contain 20 g/L or less VOC content. The streamlined requirement is intended to be an incentive for users to switch to lower VOC regulated products.

Finally, as previously stated in this report, staff removed the proposed language from the Purpose and Applicability section regarding regulated products subject to the CARB CPR and included that clarification in the proposed ~~e~~Exemption section. 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 incorporated into or used exclusively in the manufacture or construction of the goods or commodities, or used in pollution-generating activities at stationary sources, which include area sources, such as in 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 of consumer product 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. The proposed language is written to explicitly state that those products with established VOC limits in the CARB CPR are exempt from the provisions of this rule.

KEY CONCERNS

Stakeholders have brought several concerns to staff's attention through working group meetings, comment letters, conference calls, and emails. Staff addressed many of those concerns and addresses formal comment letters later in this report. This section highlights those key concerns.

The CARB CPR and Rule 1168 Jurisdiction

Stakeholders were concerned with the proposed language in the Purpose and Applicability and Exemption subdivisions referencing the CARB CPR. The regulated industry felt the SCAQMD was expanding the scope of the rule and overreaching its regulatory authority by including consumer products. This concern is the result of a fundamental misunderstanding of the state and local regulation and default VOC limits in the current rule. ~~District s~~Staff is not proposing to expand its regulatory authority, but instead, is clarifying the rule to reflect how it is interpreted by the SCAQMD and CARB as detailed in the correspondence letter.

There are two key aspects of the misunderstanding: the default VOC limit in Rule 1168 and what products are not regulated by the CARB CPR. The current version of Rule 1168 contains a default VOC limit of 250 g/L in paragraph (c)(1). All adhesives that are not specified in the tables must meet that existing and default VOC limit. The proposed amended rule includes the default 250 g/L in the table of standards for several subcategories of adhesives as 'all other' limits (e.g. all other roof adhesives~~, all other outdoor floor adhesives~~), but does not change current applicability and enforceable limit. To the second point, local air districts have the authority to regulate consumer products that are not regulated by the CARB CPR; therefore, any products that are exempted or do not have a VOC limit in the CARB CPR can be regulated by the local air districts.

Some stakeholders believed that products explicitly exempted or not specifically defined by the CARB CPR were also exempt from local air districts because they are consumer products and consumer products are regulated by CARB. However, consumer products not regulated by the CARB CPR can be regulated by the local air districts[1]. Any adhesive or sealant not regulated by the CARB CPR fall under Rule 1168. If there is not a specific category in the table of standards, then the product is subject to the default VOC limit. A clear example of this longstanding regulatory construct is pipe cements, which are not included in the CARB CPR so use of those products, regardless of size, where they are purchased, how they are marketed, or who uses them, is subject to Rule 1168.

Reporting Requirement

Another key concern expressed by stakeholders is the reporting requirements. Stakeholders expressed that annual reporting is too burdensome. Staff worked to establish a balance between obtaining the necessary data while minimizing the impact on the regulated industry.

Accurate inventory data is critical for planning and the majority of emissions from adhesives and ~~sealers~~ sealants come from consumer products not subject to the CPR and small facilities not subject to the -SCAQMD AER program. Both of these use categories are not typically subject to SCAQMD permitting or recordkeeping requirements. Thus there is very limited data available to determine the adhesive emission inventory, product availability, or product trends.

To address the lack of data, the SCAQMD conducted a voluntary survey of product sales as part of rule development in 2013. The initial results from the survey were somewhat inconclusive because of limited participation. Further steps were taken to require some larger adhesive and sealant manufacturers to provide sales information. The information collected indicates that the emission inventory is significantly higher ~~, approximately 300% greater~~ than the 2016 AQMP estimate. Additionally, there were some categories where the sales data showed some trends towards lower VOC adhesive and sealant technologies, particularly in products used for architectural and construction applications.

The mandatory reporting demonstrated clear benefits: enhanced understanding of the primary categories contributing to adhesive and sealant emissions and the widespread availability of low-VOC products in many applications. Stakeholders participating in the rule development process acknowledged the usefulness stating, "With regard to the proposed reporting and recordkeeping provisions, ASC and its members understand South Coast's interest in developing some type of mandatory reporting requirements for companies that are marketing their products in the district. The question remains should the type of detailed reporting…be required on an annual basis…A more cost-effective approach would be a requirement that companies participate in such reporting on a five-year schedule or one year prior to the District undertaking a revision to the rule."[2] Similarly, the American Coatings Association stated, "While the ACA recognizes the importance of a meaningful and accurate database to determine the status of current adhesive and sealant

[1] http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1168/carb_cpr_correspondence.pdf?sfvrsn=4

[2] Adhesive and Sealant Council letter to SCAQMD, January 14, 2014

technology, it must also be recognized that annual reporting is extremely costly and burdensome to manufacturers…Consequently, ACA recommends that SCAQMD consider a reporting cycle of three (3) years. Reporting every 3 years will allow the SCAQMD sufficient data on these products to monitor and track technology trends sufficiently."[3]

SCAQMD staff has responded to these industry recommendations by proposing to require manufacturer reporting initially on a three-year cycle transitioning to a five-year cycle. This strikes a balance between the~~ SCAQMD's~~ need for accurate emission information and the burden of reporting on manufacturers. In addition, the reporting requirement is proposed to sunset ~~at~~ in 2040.

Some stakeholders have requested that as an additional incentive, reporting should not be required of products with an ultra-low VOC content of less than 20 g/L. However, without the reporting data provided by the manufacturers of these products, it would not be possible to determine accurate emission inventories or observe trends in the use of ultra-low VOC content products. Alternatively, staff has provided an incentive by exempting all other requirements for businesses using ultra-low VOC content products. This would encourage the use and sales of ultra-low VOC content products ideally offsetting the costs of reporting.

Staff tried to find a compromise that would ~~give staff~~provide sufficient information for planning and inventory but lessen the burden on the regulated industry. The following demonstrates the evolution of the reporting requirements proposed by staff to reach a consensus:

Staff ~~p~~Proposal:	Industry Feedback:
Initial Proposal: Annual Reporting 2018 – 2020 Bi-Annual Reporting No ~~S~~sunset d~~D~~ate Indefinite ~~R~~reports	Bi-Annual Reporting but 2 years data
Second Proposal: Bi-Annual Reporting 2018 – 2024 Then ~~E~~**e**very 5 years Indefinite ~~R~~reports	Report e~~E~~very 3 years, include sunset date
Third Proposal: Report ~~E~~**e**very 3 years 2019 – 2025 Then ~~E~~**e**very 5 years Reports **i**~~I~~nclude **p**~~P~~rior 3 years sales 6 ~~R~~reports in 21 years	Report e~~E~~very 5 years It is challenging to report older data (three years of data especially going back to 2016)
Final Proposal: Report ~~E~~**e**very 3 years 2019 – 2025 Then ~~E~~**e**very 5 years Reports ~~I~~**i**nclude **P**rior 2 years sales	

[3] American Coatings Association letter to SCAQMD, January 16, 2014

6 ~~R~~reports in 21 years Sunset 2040	

As a comparison to the proposed reporting, the following table compares the reporting requirements in other SCAQMD VOC regulations:

PAR 1168	Rule 1113/314	Rule 1143
Fees		
None	~ $2 million annually	None
Report Frequency		
Every 3 years 2019 – 2025 Every 5 years 2025 - 2040 6 ~~R~~reports in 21 years	Annual	Annual
Sunset Date		
2040	None	None
Approximate Emission Inventory		
10.5 tpd	11 tpd	7.3*

*Estimated inventory projected for 2014 when Rule 1143 was adopted with annual reporting requirements.

Foam Insulation

The American Chemistry Council requested that insulating foams should not be included in the rule amendments because insulating foams are not considered "sealants" by industry, as their *primary* purpose is not to fill a gap, but rather, to insulate. Staff acknowledges that these products are used for insulation but to serve that function, they must *fill the gap* in the wall cavity; therefore, they meet the current sealant definition. The proposed amendment addresses this uncertainty by including a definition for foam insulation. To address their concern, staff consulted the CARB Consumer Products Regulation and the Ozone Transport Commission Model Rule for Consumer Products, both of which include "weatherproof gaps" in the definition of a sealant, which further supports the treatment of foam insulations as sealants. Staff is proposing to harmonize the definition of sealant in PAR 1168 with the CARB Consumer Products Regulation and the Ozone Transport Commission Model Rule, as stakeholders have requested; thus further clarifying that insulating foams fall under Rule 1168.

PVC Welding Cement Proposed Limit

A concern was raised regarding the current availability of PVC Welding Cements meeting the proposed VOC limit of 425 g/L. Staff based the proposed VOC limit on two products that are currently available in the marketplace. The pipe welding industry is dominated by four major manufacturers; two of the leading manufacturers have commercial products at the proposed VOC limit currently available at retail outlets. For example, Oatey

reformulated their All Purpose Cement from 510 g/L to below 325 g/L in 2016. All Purpose cements are used to weld ABS, CPVC, and PVC. In addition, there is a product currently available to the irrigation market for PVC and CPVC that is below the proposed future limit.

The proposed VOC limit reductions are not effective until January 1, 2023, allowing five years for product reformulation, testing, and certification. The proposed rule also includes a technology assessment so staff can evaluate the progress of the reformulation efforts and report to the Board.

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 District's Annual Emissions Report program, and by examining survey data provided by adhesive and sealant manufacturers and suppliers in 2013.

According to the 2016 AQMP, the 2017 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 information on 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~~tpd as detailed in the table below.

Table 14: Estimated VOC Emission Inventory

Emission Source	Emissions (tons per day)	Total Sales
Adhesives	6.0	7,200,000
Sealants	4.5	3,800,000
Total	**10.5**	**11,000,000**

CONTROL TECHNOLOGY

Compliance with PAR 1168 is expected to be met with manufacturers reformulating regulated products by substituting certain chemicals with other chemicals that contain less VOCs, less or no toxics, and no stratospheric ozone-depleting compounds. The manufacturers will have considerable flexibility, and may use any compliant alternative reformulation, in order for their product to meet the VOC limits in PAR 1168. Physical modifications to or new installations of manufacturing equipment, including the installation of control equipment, would not be expected to be needed in order to reformulate products.

For certain categories, there are existing products that meet the proposed lower VOC content limits so reformulation is practicable. For some other categories, technology-forcing reformulation will be necessary and in those cases, the proposed rule provides ample time (e.g., five years) and possibly a technology assessment to determine the status of the ongoing reformulation efforts. Finally, end-users can comply with the rule using alternative options such as the 55-gallon per year exemption; control devices, such as emission collection systems; or an Alternative Emission Control Plan.

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, Plastic Welding Cements, and Reinforced Plastic Composite Adhesives. Also proposed is to increase the VOC content limit for Top and Trim Adhesives and Rubber Vulcanization Adhesives.

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)			
	Upon Adoption	2019	2023	Total Reduction (tpd)
All Other Architectural Sealants		0.37		0.37
Clear, Paintable, and Immediately Water Resistant Sealant			0.02	0.02
CPVC Welding Cement			0.01	0.01
Foam Sealant			0.23	0.23
All Other Roof Adhesives			0.04	0.04

Category	Emission Reductions (tpd)			
	Upon Adoption	2019	2023	Total Reduction (tpd)
All Other Roof Sealants			0.14	0.14
All Other Sealants			0.06	0.06
PVC Welding Cement			0.18	0.18
Rubber Vulcanization Adhesive			0.06	0.06
Single- Ply Roof Adhesive			0.05	0.05
Single Ply Roof Membrane Sealant			0.003	0.003
Top and Trim Adhesive	-0.21		0.21	
Wood Flooring Adhesive			0.24	0.24
Totals:	**-0.21**	**0.37**	**1.16**	**1.38**

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

PAR 1168 will partially implement 2016 AQMP measures CTS-01 and MCS-01.

COST-EFFECTIVENESS AND INCREMENTAL COST-EFFECTIVENESS

The cost--effectiveness is estimated at $12,400 per ton of VOC reduced, which is in the range of recently amended VOC rules and less than $30,000 per ton of VOC cost-effectiveness in the 2016 AQMP. The detailed analysis can be found in the Socioeconomic Assessment.

Staff evaluated the incremental cost--effectiveness of further reductions from adhesives and sealants and determined that greater emissions reductions would not be cost--effective at this time. For this analysis, staff considered reducing the VOC content from plastic welding. Unlike a typical adhesive which consist of a sticky substance that bonds two surfaces together, plastic welding uses a solvent to temporarily dissolve/soften plastic so it can adhere to itself or another plastic (ABS, CPVC, PVC, SAN). If a near-zero VOC alternative could be developed for plastic welding, an additional one tpd VOC reduction could be achieved. Plastic welding is used on many types of products including building drains, sewers, pipes, irrigation systems, shower pans, and other building components. A functional change to solvent welding would yield significant VOC reductions but would also require a fundamental change to the materials being bonded. Not only would there be the cost of product development, which would have to go beyond product reformulation to identify an alternative technology, but there is a cost of developing the new building materials, testing protocols, certifications, and training for the end-users. Staff estimates that the incremental cost for the adhesives would be slightly higher than the current estimate for reformulating the plastic welding cement, is approximately $3/gallon. The cost to redesign the building materials for the plastics that is used for pipe, flooring, roofing etc. would be significant due to the volume of product sold. Annually, 10 billion pounds of vinyl products are sold in the United States. Based on population, over 500 million pounds are sold in the SCAQMD. If only 5% of that vinyl is used in building materials that would need to be redesigned or altered and the incremental cost was $1/pound, that would represents over 25 million pounds of products and the overall cost/ton reduction would be over $100,000/ton.

Further VOC content reductions beyond the current proposal for regulated products is possible but would result in a significant increase in cost. Staff estimates that the cost-~~-~~effectiveness would more than double for the addition reduction. In the future, such low-VOC technologies may emerge and evolve, thus making further VOC reductions cost-~~-~~effective.

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 Guidelines Sections 15252 and 15070 and SCAQMD Rule 110, the SCAQMD has prepared an Environmental Assessment (EA) for PAR 1168. The environmental analysis in the Draft EA concluded that PAR 1168 would not generate any significant adverse environmental impacts and therefore, no alternatives or mitigation measures are required. The Draft EA was released for a 30-day public review and comment period from August 16, 2017 to September 15, 2017. Two comment letters were received from the public relative to the Draft EA and responses to the comments have been prepared. The comment letters and the responses to the comments have been included in Appendix B of the Final EA.~~Responses to comments will be prepared for any comment letters that are received relative to the Draft EA.~~

Subsequent to ~~the public review and comment period,~~release of the Draft EA, ~~will be updated to reflect any~~ modifications were made ~~that are made~~ to the proposed project. ~~and the Draft EA will be converted to a Final EA. The comment letters and the individual responses to the comments will be included in an appendix to the Final EA. The Final EA will be included as an attachment to the Governing Board package. The SCAQMD Governing Board must review the adequacy of the Final EA, including responses to comments, prior to certification of the Final EA and adoption of PAR 1168.~~ Staff has reviewed the modifications to the proposed project and concluded that none of the modifications constitute significant new information or a substantial increase in the severity of an environmental impact, nor do they provide new information of substantial importance relative to the Draft EA. As a result, these revisions do not require recirculation of the EA pursuant to CEQA Guidelines Sections 15073.5 and 15088.5. Therefore, the Draft EA is now a Final EA and is included as an attachment to the Board package. The Board must review the adequacy of the Final EA, including responses to comments, prior to certification of the Final EA and amending Rule 1168.

COMMENTS AND RESPONSES

Public Workshop Comments

Public Workshop Commenter #1: Doug Raymond – National Aerosol Association

Commented that the foam sealant limits should be eliminated, as there is currently no available VOC test method.

Response to Public Workshop Comment 1:

The SCAQMD lab is currently undergoing test method development for products applicable to foam sealants and will work with industry on this challenge. The test method issue will be further addressed at the time of the technology assessment.

Public Workshop Commenter #2 – Rita Loof~~,~~ - RadTech International

The commenter expressed the following:

1. Requested the test method for thin film UVEB Curable products, ASTM Test Method 7767 to be included in the Test Methods section of the rule.
2. Suggested the guidance document receive Governing Board approval.
3. Believes the proposed reporting is overly burdensome and costly to the manufacturer.
4. Believes low-VOC products should be exempted from the labeling and reporting requirements.

Response to Public Workshop Comment 2-1

Please see the detailed discussion in the test method section of this report.

Response to Public Workshop Comment 2-2:

Staff ~~is willing~~will ~~to~~ bring the VOC Guidance Document to the Governing Board for approval ~~if the working group deems necessary~~.

Response to Public Workshop Comment 2-3

Please see the detailed discussion in the key issues section of this staff report on the reporting requirements.

Response to Public Workshop Comment 2-4

Please see the detailed discussion in the key issues section of this staff report on the need to have all products reported to have a full profile of the emissions inventory. It is critical that this inventory includes near zero VOC, low-VOC, and higher_-VOC products. Although the commenter believes that requiring low-VOC product manufacturers to report would be a disincentive for manufacturers from selling within the District, staff believes the opposite would result. When staff has a full profile to evaluate reported emissions and incorporate that data in future rule development, those low-VOC products would be the long standing products that would then have a greater share of the marketplace for complying with SCAQMD rules. Although the commenter expressed their lack of support for Rule 314, this companion rule has proven to be vital and extremely effective in reducing VOC emissions from Architectural Coatings and has led to less stringent rule making.

Public Workshop Comment 3: Amber Coluso – Port of Los Angeles

The commenter expressed the following:

1. Please include labeling requirements for the Safety Datasheets (SDS).

2. There are limited products available specifically for the marine environment and often they have to use non-marine products for marine use. It is very hard to use a waterborne product in a marine environment. They would prefer to have a category specific for a marine adhesive instead of combining it with the automotive category, as is the case for top and trim adhesives.

Response to Public Workshop Comment 3-1

The SCAQMD does not have the authority over what is included on SDS.

Response to Public Workshop Comment 3-2

For low volume use where a high-VOC product is needed, the 55 -gallon per year exemption is available. The proposed VOC limit for ~~t~~Top and ~~t~~Trim ~~a~~Adhesives~~ limit~~, which applies to automotive and marine use, will increase to 540 g/L upon rule adoption. Staff is proposing to lower the limit back to 250 g/L by 2023. The proposed VOC limit reduction will also include~~s~~ a technology assessment. At the time of the assessment, staff will specifically inquire about the adhesives available for marine use and carve out a higher limit or exemption if needed.

Public Workshop Comment 4: Will Lorenz – General Coatings and the Roof Coatings Manufacturers Association

Industry viewed Clear, Paintable, and Immediately Water-Resistant category as unregulated, but now staff is proposing 250 g/L by 2023. The commenter suggested that the limit should be at 380 g/L in 2019, delaying the 250 g/L until 1/1/2023, with a technology assessment.

Response to Public Workshop Comment 4

Staff proposed a 380 g/L limit upon adoption, but will not propose a technology assessment as this product is currently subject to Rule 1168, at a VOC limit of 250 g/L. The proposal will forego compliance with 250 g/L until 2023. A further discussion is included in the response to written comment below in section 2-2.

Written C~~c~~omments ~~Received after the Public Workshop~~

Comment Letter #1

CSPA
Representing Household & Institutional Products
Aerosol - Air Care - Cleaners - Polishes
Automotive Care - Antimicrobial - Pest Management

August 2, 2017

via e-mail - nsilva@aqmd.gov

Ms. Nicole Silva
Planning, Rule Development, and Area Sources
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Subject: Proposed Amended Rule 1168[1]

Dear Ms. Silva:

The Consumer Specialty Products Association (CSPA)[2] appreciates the opportunity to review and comment on the South Coast Air Quality Management District (AQMD or the District) proposed amended Rule 1168 (PAR). Numerous CSPA member companies manufacture and/or market consumer products that are used in the District, and are engaging in a review of the draft proposal.

The overwhelming majority of CSPA member companies' products are subject to the provisions of the Air Resources Board's (ARB's) comprehensive statewide Consumer Products Regulations.[3] Thus, CSPA has concerns about how PAR 1168 interfaces with the current ARB

[1] The text of Preliminary Draft Rule dated July 21, 2017 is posted on the AQMD website at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1168/PAR1168.pdf

[2] The Consumer Specialty Products Association (CSPA) is the premier trade association representing the interests of companies engaged in the manufacture, formulation, distribution and sale of more than $100 billion annually in the U.S. of familiar consumer products that help household and institutional customers create cleaner and healthier environments. CSPA member companies employ hundreds of thousands of people globally. Products CSPA represents include disinfectants that kill germs in homes, hospitals and restaurants; air fresheners, room deodorizers and candles that eliminate odors; pest management products for home, lawn and garden, and pets; cleaning products and polishes for use throughout the home and institutions; products used to protect and improve the performance and appearance of automobiles; aerosol products and a host of other products used every day. Through its product stewardship program, Product Care®, and scientific and business-to-business endeavors, CSPA provides its members a platform to effectively address issues regarding the health, safety and sustainability of their products. For more information, please visit www.cspa.org.

[3] *See* Regulation for Reducing Emissions from Consumer Products 17 CCR §§ 94507-94571; and Alternative Control Plan Regulation for Consumer Products and Aerosol Coating Products 17 CCR §§ 94540-55.

1667 K Street, NW, Suite 300, Washington, DC 20006 | www.cspa.org | p.202-872-8110 f. 202-223-2636

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regulations for adhesive and sealant products. In addition, CSPA has specific technical concerns with PAR 1168.

1. The inclusion of "All Other" product subcategories in Paragraph C, "Table 1 – Regulated Product Categories and VOC Limits" lacks the requisite precision for a fairly enforceable regulation. In addition, the use of such a vague and all-encompassing term is too imprecise for the AQMD to accurately calculate emission reductions.

1-1 CSPA has serious concerns about the broad over-reach and inherent compliance issues related to the proposed limits for "All Other" subcategories in PAR 1168 (*e.g.*, "All Other Sealants"). As the ARB noted in the June 16, 2014, letter to Dr. Chang, "Definitions are necessary because it is important to distinguish the universe of products that are subject to the VOC standards from those that are not subject to standards." [4] The frequent use of the broad and amorphous term "All Other" in "Table 1 – Regulated Product Categories and VOC Limits" is contrary to the fundamental premise of an environmental regulation like Rule 1168: clearly identifying a particular regulatory standard that applies to a specifically defined product category. Absent such clarity manufacturers, distributors, retailers, and users of the products to cannot reasonably understand and comply with the regulation; and thus, the regulation cannot be enforced fairly by the AQMD.

Moreover, the vaguely defined "All Other" subcategories lacks the requisite precision for the AQMD to accurately calculate emission reductions that will be achieved by the new limits on the volatile organic compound (VOC) content of adhesive and sealant products.

Therefore, CSPA urges the AQMD to delete any and all references to "All Other" product subcategories in Paragraph C, "Table 1 – Regulated Product Categories and VOC Limits."

2. As currently drafted, PAR 1168 could frustrate companies' compliance efforts by creating a patchwork of potentially conflicting statewide and District regulations.

1-2 California leads the nation in the effort to reduce the impacts of air pollution. Since 1989, CSPA has worked cooperatively with ARB to develop VOC and reactivity limits that apply to numerous and broad categories of consumer products while maintaining the technical and commercial feasibility of the products. Those efforts have resulted in more than 50% reduction in VOC emissions from consumer products, which has contributed to the improvement in air quality throughout the entire State of California.[5] In addition, the AQMD's regulations have improved the health and quality of life for all residents in the South Coast Air Basin.

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[4] Letter from Ellen Peter, Esq., Chief Counsel, ARB, to Dr. Elaine Chang, Deputy Director, AQMD (June 16, 2014) at p. 3

[5] ARB regulations establish VOC limits for broad categories of consumer product; when fully effective, these regulations will reduce VOC emissions by about 50 percent compared to 1990 levels. *See* "Staff Report: Initial Statement of Reasons for Proposed Rulemaking Proposed Amendments to the Antiperspirants and Deodorants Regulation, the Consumer Products Regulation, the Aerosol Coating

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1-2 con't The Health and Safety Code gives the ARB authority to regulate consumer products, and defines a "consumer product" as ". . . a chemically formulated product used by household and institutional consumers. . . ." [6] Moreover, in exercising its authority to implement this statutory mandate, the ARB has interpreted the term "consumer products" to include "institutional products" or "industrial and institutional (I&I) products" (*i.e.*, chemically formulated products used by institutional consumers).[7]

1-3 As currently drafted, PAR 1168 would expand the scope of the current District regulation to include ***any*** non-manufacturing uses of consumer products that are not subject to VOC limits established by the ARB Consumer Products Regulations.[8] Such regulatory action would circumvent the California Legislature's clearly worded mandate that consumer products should be subject to regulations that are "commercially and technologically feasible and necessary" [9] and could create a patchwork of potentially conflicting statewide regulations (measured by percent VOC by weight) and District regulations (VOC content measured by grams per liter).

3. Technical Concerns.

1-4 **Purpose and Applicability – PAR Paragraph (a):** CSPA suggests including clarification similar to that found in Rule 1113 stating "that is intended to be field applied with the District." And so it would read, This rule applies to ~~all commercial and industrial~~ any person who sells, stores, supplies, offers for sale or manufactures for sale any ~~sales and applications of~~ adhesives, ~~adhesive bonding primers,~~ adhesive primers, sealants, or sealant primers, ~~or any other primers,~~ unless otherwise specifically exempted by this rule **that is intended to be field applied within the District.**

1-5 **Definitions – PAR Paragraph (b)(7) Aerosol Adhesive:** CSPA suggests language reflecting innovation in the aerosol industry to include aerosol products manufactured and marketed in containers other than cans, including plastic containers. Thus, the sentence would read: AEROSOL ADHESIVE ~~means~~ is any adhesive packaged as an aerosol product in which the spray mechanism is permanently housed in a ~~nonrefillable~~ **container** designed for hand-held application . . .

1-6 **Administrative Requirements – PAR Paragraph (f):** CSPA appreciates the discussions at the AQMD Working Group meetings regarding the reporting requirement and requests that the

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Products Regulation, the Tables of MIR Values, Test Method 310, and Proposed Repeal of the Hairspray Credit Program" (August 7, 2013) at Executive Summary–2.

[6] Cal Health & Safety Code § 41712(a)(1).

[7] 17 CCR § 94508(a)(77).

[8] *See* PAR 1168 Paragraphs (a) and (i)((11).

[9] *See* Cal Health & Safety Code § 41712(b). The Health and Safety Code authorizes and requires ARB to adopt regulations to achieve the maximum feasible reduction in VOCs emitted by consumer products if the regulations are: (1) necessary to attain state and federal ambient air quality standard; and (2) commercially and technologically feasible and necessary.

CSPA Comments – Proposed Amended Rule 1168
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1-6 con't

frequency and the specific information requested be revised to lessen the administrative burdens on those who must report. CSPA urges the District to survey industry no more frequently than every five years, beginning with the year of rule adoption. During the interim years, population growth factors or economic indicators could be used to estimate product sales and use, as the California Air Resources Board does.

Thank you for your consideration of our concerns. Please contact us by phone (202-872-8110) or e-mail (jyost@cspa.org and kpower@cspa.org) if you have questions about issues presented in these comments. We look forward to working constructively with you during this rulemaking proceeding.

Respectfully,

Joseph T. Yost
Vice President
Strategic Alliances & Industry Relations

Kristin Power
Senior Vice President
State Government Relations
& Public Policy

cc: Ravi Ramalingam, P.E., Chief, Consumer Products and Air Quality Assessment Branch, Air Quality Planning and Science Division, Air Resources Board
CSPA Air Quality Committee
American Coatings Association
Adhesives and Sealants Council

Response 1-1

Please see the discussion in the key comment section for a further discussion.

The current rule language has default VOC limits and categories similar to the "all other" categories in the current proposal of PAR 1168. In subparagraph (c)(1) of the 2005 version of Rule 1168, a default limit of 250 g/L is set for "adhesives, adhesive bonding primers, adhesive primers, or any other primer" that do not have a VOC limit listed within the rule. The current version of the rule has several tables for the various general categories of regulated product. Staff is proposing to remove the default clause previously listed as (c)(1), and incorporate that limit throughout a single table (Table 1 in subparagraph (c)(1)), which is similar to other SCAQMD VOC rules.

Staff proposed certain "all other" categories to reflect those current limits listed within Rule 1168. The "all other adhesives" category is set at 250 g/L to maintain the current default limit listed in (c)(1) of the current rule. The "All Other Roof Adhesives" category replaced the "nonmembrane roof adhesive" category, which has a current limit of 250 g/L. The "All Other Roof Sealant" category replaced the "nonmembrane roof sealant" category, thus having a current limit of 300 g/L as in the current version of the rule. The sealant category of "All Other Architectural Applications" is set at 250 g/L to maintain the current rule limit of 250 g/L for "~~a~~Architectural ~~s~~Sealants." The "~~a~~All ~~o~~Other ~~s~~Sealant" category is proposed to reflect the current rule limit of 420 g/L for "~~All~~ Other Sealants."

Response 1-2

When staff began the rule development process in 2013, staff acknowledged industry's concern regarding the statewide and regional regulations ~~of~~ for consumer products. Staff worked with CARB regarding clarification on the applicable jurisdiction of the CARB CPR and Rule 1168 and received clarification through the 2014 CARB correspondence letter referenced in this staff report. In that correspondence letter, CARB stated that if CARB regulations do not specify a VOC standard that applies to a product, then CARB does not regulate the VOC content of that product and local air ~~D~~districts have the authority to adopt their own VOC standards of that product, regardless of whether or not it is a consumer product. This interpretation is in harmony with SCAQMD's interpretation of the regulatory authority. Pipe cements for example, are not regulated by the CARB CPR, although they are consumer products, and have long been regulated by SCAQMD.

Staff is not proposing to regulate consumer products regulated by the CARB CPR. Staff is clarifying that all adhesive, adhesive primer, sealant, and sealant primer products, are subject to Rule 1168 if the product is not regulated by the CARB CPR, regardless of size, or if used at a stationary source.

Response 1-3

Staff is not proposing to expand the scope of Rule 1168, but clarifying that all adhesive, adhesive primer, sealant, and sealant primer products, not regulated by the CARB CPR, regardless of size, are subject to Rule 1168. This is consistent with recent rule making activities, such as the adoption of Rule 1143 – Consumer Paint Thinners & Multi-Purpose Solvents in 2009 where staff adopted

a rule that is applicable to consumer products because those products were not regulated by the CARB CPR. Although California Health and Safety Code, ~~s~~Section § 41712 authorizes CARB to regulate certain consumer products, local air districts retain the authority to adopt VOC standards for any consumer product category for which CARB has not already adopted a standard. See Cal. Health & Safety Code, Section § 41712(f). The SCAQMD has the authority to regulate any adhesives or sealants not regulated by the CARB CPR. Response 1-4

In response to including clarification similar to language found in Rule 1113 – Architectural Coatings, PAR 1168 is intended to reduce volatile organic compounds (VOC) from various sources beyond just "field applied" applications. The SCAQMD has coating rules that distinguish field application (Rule 1113) and shop applications (e.g. Rule 1107 – Coating of Metal Parts and Products and Rule 1136 – Wood Products Coatings). In contrast, Rule 1168 applies to both field and shop application of ~~adhesive and sealant~~regulated products, such as the manufacture of goods or commodities and repair work (shoe repair, ~~or~~ furniture repair, etc.).

Response 1-5

Staff appreciates the commenter's suggestion, but staff will retain the language defining "Aerosol Adhesive" as it is the same definition as the CARB CPR. The proposed rule is retaining the exemption for aerosol adhesives; therefore, it is important that the definition mirror the CARB CPR definition.

Response 1-6

Please see further discussion in the ~~k~~Key ~~issues~~ Concerns section of this staff report.

Staff revised the initial proposal of annual reporting to reports being submitted every three years until 2025, then every five years thereafter, until the proposed sunset date of 2040. The proposed frequency has taken into consideration the burden reporting may cause on industry, by reducing the number of proposed reports from 21 reports (if submitting annually) from 2019 to 2040, to six reports being submitted during that same timeframe. Annual reporting is the best option to ensure an accurate inventory, but staff is trying to address the concerns of industry.

Comment Letter #2

RCMA ROOF COATINGS MANUFACTURERS ASSOCIATION

www.roofcoatings.org

August 17, 2017

Nicole Silva
Planning, Rule Development & Area Sources
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178

RE: Proposed Amended Rule 1168; RCMA Public Comments

Dear Ms. Silva:

The Roof Coatings Manufacturers Association (RCMA)[1] and its member companies appreciate the opportunity to comment the South Coast Air Quality Management District's (SCAQMD) Proposed Amended Rule 1168. RCMA appreciated that District staff has updated its Rule 1168 regulatory language to reflect stakeholder comments made in written and oral form during the Working Group process. We have the following comments for the public workshop:

1. **Reporting and Labels of Consumer Products in an Industrial Setting**
   RCMA feels strongly that the California Air Resources Board (CARB) Consumer Products has governing authority over consumer products used in the State including ones proposed for industrial settings. We are concerned that future jurisdiction issues will prevent manufacturers from properly harmonizing units and restrict utilization of methods to calculate VOC limits, in order to demonstrate compliance with this rule.

   2-1 In discussions with SCAQMD, RCMA appreciates that the District has proposed to allow "g/L" labeling on supplemental product documentation so that manufacturers are still able to continue to label for CARB and be compliant with Rule 1168. However, since most consumer sealants and adhesives utilize "% VOC by weight" as their VOC unit, the proposed draft still requires manufacturers to calculate VOC content for both sets of regulations to demonstrate compliance. This can lead to confusion in the marketplace, as manufacturers will constantly be faced with determining which regulations apply to their product, and which limit, label, and VOC calculation method should be employed.

   Thus, RCMA requests that SCAQMD allow manufacturers to employ their existing method ("% VOC by weight") when calculating VOC limits to determine compliance with Rule 1168. This would allow SCAQMD to move forward with its interpretation of its authority, while also minimizing negative impacts on manufacturers.

[1] RCMA has served as the national trade association representing a large majority of the manufacturers of asphaltic and solar reflective roof coatings and the suppliers to the roof coatings industry. Roof coatings protect commercial and residential roofs against water, chemicals, and physical damage. This can extend the life of the roof system, reducing building-owner costs and tear-off waste. Roof coatings have numerous benefits to energy use and the environment. Reflective roof coatings lead to lower roof temperatures, which in turn reduce the Urban Heat Island Effect, air conditioning costs, and peak energy use. The vast majority of RCMA member companies are family-or employee-owned, privately held small businesses.

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2-2

2. **Creation of "Clear, Paintable, Immediately Water-Resistant" Category in Table 1**
The implementation of this category has RCMA very concerned. Previously, there was no SCAQMD limit or category established for these products under the current Rule 1168. In discussions with staff, there was an assumption that prior to this category's creation, these products would currently meet "All Other Architectural Applications" category at 250 g/L. As an association that represents manufacturers, we have been unable to find products in the Basin that are clear, paintable, immediately water-resistant, effective, and meet the 250 g/L limit. Since there are no products that meet the proposed limit, RCMA believes that the 250 g/L limit is unfeasible and technology forcing. Furthermore, this reinforces the ambiguity of the "all-other" category where adhesive and sealants are subject to restricted limits without determining whether technological feasibility applies.

In the 2nd Working Group presentation, there was a proposal for SCAQMD to "raise" the limit to 380 g/L, based on the sales weighted average of products in a survey currently sold in the South Coast basin. We find this to be a guess at best and without a technology assessment, we have no other reason to know if products that perform within this new category are technologically feasible to get to a lower VOC.

RCMA proposes two things: (1) the 380 g/L limit for "Clear, Paintable, Immediately Water-Resistant" be moved to effective on "1/1/2019" and the proposed 250 g/L limit be moved to "1/1/2023" with the added note that it is dependent on the results of a technology assessment; (2) complete a technology assessment for "Clear, Paintable, Immediately Water-Resistant" products to ensure that they can meet the 250 g/L limit and still be effective before the limit goes into effect.

It is unrealistic and anti-competitive to immediately impose a limit on these products without giving industry time to reformulate and clarify the confusion for the supply chain and consumers on what the limit would be on these products.

2-3

3. **Test Methodology**
It appears that paragraph (e)(6) has been imported from Rule 1113: "when more than one test method is specified for testing, a violation of ***any*** of the test methods used would constitute a violation of this rule." However, Rule 1113 applies to architectural coatings products (i.e. products that are wide ranging but fairly homogenous in their application techniques and packaging).

In contrast, Rule 1168 products are far more specific by technologies, applications, packaging, and uses. Therefore, industry needs to know what test methods the various products are being measured with if SCAQMD allows manufacturers to use equivalent test methods. This current language for test methodology is not properly focused on defining VOC compliance. Instead, we believe this "any" wording as making this 1168 revision contentious and potentially creating an unfounded enforcement concern

RCMA would like to propose the District create a stakeholder group to discuss which test methods would be appropriate for each product category, and suggests revising or removing section (e)(6).

The Association appreciates the positive relationships we have built with the South Coast Air Quality Management District and looks forward to continuing collaboration to work toward improved air quality and achievable regulatory activities.

Sincerely,

Chelsea Ritchie
Director of Legislative and Regulatory Affairs
Roof Coatings Manufacturers Association (RCMA)
750 National Press Building
529 Fourteenth Street, NW
Washington, D.C. 20045

Response 2-1

Manufacturers and private labelers that manufacture regulated product applicable to Rule 1168 currently have to comply with the VOC content set forth by the rule in the units of grams per liter (g/L). Other agencies may elect to allow manufacturers to list the VOC content of their product by weight percent, but SCAQMD VOC rules require that the VOC content be according to g/L to ensure proper and consistent enforcement. Since there may be products that are applicable and in compliance with the CARB CPR, but incorporated into or used exclusively in the manufacture of the goods or commodities, SCAQMD staff proposed the alternative to container labeling by listing the VOC content in supplemental documentation from the manufacturer. Staff has also explained to industry that there are products considered consumer products that are exempted from the CARB CPR, and thus subject to Rule 1168. Staff will retain the g/L in the table of standards, and in the requirements for labeling and reporting as explained throughout this staff report.

Response 2-2

Staff disagrees with industry's belief that those products that are classified as Clear, Paintable, and Immediately Water Resistant Sealant are unregulated by Rule 1168. To address this misunderstanding of the regulatory authority over this category, staff received clarification from CARB through the CARB correspondence letter. Staff categorizes these products as Architectural Sealants, with the current limit of 250 g/L. Although industry felt that these products were unregulated, SCAQMD has always viewed these products as subject to Rule 1168, regardless of size.

Staff recognizes that products categorized as Clear, Paintable, and Immediately Water Resistant Sealants do not meet the limit of 250 g/L, but has given industry ample notice that these products are applicable to Rule 1168 and would be clarified by explicitly defining a category in PAR 1168. Furthermore, staff delayed enforcement against this category of products in an effort to work with industry to reach compliance with the requirements of this rule.

This rule amendment process began in 2013, at which point the affected industry was aware of the SCAQMD's interpretation of the regulation and the intention to reduce the VOC limit. Staff had proposed to reduce the VOC limit to 50 g/L by January 1, 2018 for these products to align the VOC limit with the future VOC limit for architectural sealants. The current proposal is to reduce the VOC limit to 250 g/L by January 1, 2023 so they comply with the current VOC limit. Whiles industry had four years to conduct research and development, the current proposal allows an additional six years before the lower VOC limit becomes effective with a less drastic VOC limit reduction.

Further, many low-VOC sealants are clear and immediately waterproof, or paintable and immediately waterproof, so end-~~-~~users have products available to meet the need of having an immediately waterproof sealant. The SCAQMD is ~~in~~an e~~E~~xtreme non-a~~A~~ttainment area for ozone, so all VOC reductions must be considered.

Response 2-3

Staff recognizes the concern created with including the previously proposed language for Multiple Test Methods in (e)(6) and removed that language. Staff is proposing to create a guidance

document to explain the test method determination based on type of product, chemistry, and VOC content. Staff agrees with the comment that a stakeholder group should be formed to discuss the creation of the guidance document and will seek Governing Board approval ~~if deemed necessary~~.

Comment Letter #3

THE ADHESIVE AND SEALANT COUNCIL
SECURING THE FUTURE®

August 30, 2017

Ms. Nicole Silva
Air Quality Specialist
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4182

Dear Ms. Silva:

The Adhesive and Sealant Council (ASC) is a North American trade association representing 121 manufacturers of adhesives, sealants and suppliers of raw materials to the industry. As director of government relations for ASC, I appreciate the opportunity to offer comments on the South Coast Air Quality Management District's (SCAQMD) proposed revision to Rule 1168.

Section (a): Purpose and Applicability
Since 2014 ASC has been concerned with the AQMD's decision to expand the scope of Rule 1168 to include non-manufacturing uses of consumer products for which there is no volatile organic compound limit (VOC) mandated by the California Air Resources Board's (CARB) *Regulation for Reducing Emissions from Consumer Products.* This decision will result in consumer adhesive and sealant products presently not regulated by CARB being subject to the South Coast's "all other" category of 250 g/l without any technological feasibility considerations.

3-1

Subsequently this will create a sense of confusion among manufacturers, distributors, retailers and the end user community as two how these two regulations interrelate and what parties may be held responsible for future violations. As one example, smaller regional manufacturers marketing products into California, designed only for the consumer market, may be unaware they are committing a violation within the confines of the South Coast.

Consumer adhesives and sealants are marketed in a wide range of retail venues throughout the district and manufacturers of these products have no control overwho purchases these products and how they are used. At some future point SCAQMD enforcement staff may find such products being used inappropriately in a manufacturing facility yet the current rule proposal provides no absolution for an unknowing product manufacturer who could then be subject to financial penalties.

ASC urges that South Coast reconsider adding consumer products not presently regulated by CARB to this rule.

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Section (c): Requirements

It is ASC's understanding from discussions with its members that for the most part the latest proposed VOC limits will be manageable but there are some applications that still raise serious concerns.

One application category of concern is the Wood Flooring Adhesive limit being reduced from the current 100 g/l to 20 g/l in 2021. While water-based products will most likely meet that lower limit, it is unclear whether these types of products will address all the types of situations by which wood flooring must be bonded. There are certain challenging bonding situations where the adhesives require either a polyurethane or another solvent-based alternative is required.

Some examples would include:

3-2

- Solid wood planking that is now available in widths of 24";
- Engineered wood flooring -- most subflooring in new construction is not absorbent enough for water-based adhesives thus when this type flooring wider than 3" it is likely to cup with anything less than higher solvent alternative;
- Bamboo flooring.

In addition, most water-based adhesives are formulated outside of the South Coast and shipped into California in unheated transportation. Water-based materials susceptible to freeze-thaw conditions could be compromised during shipping in winter months and more likely to fail particularly when attempting to bond more challenging applications.

One final comment with regard to the Wood Flooring Adhesives issu;, it should be pointed out that SCAQMD's *Draft Staff Report for Rule 1168,* issued in July 2017, lists eleven wood flooring adhesive products that would meet the new 20 g/l limit (page 22). Discussions with our members seem to indicate that at least two and possibly more of these products are not generally classified as wood flooring adhesives. ASC asks that SCAQMD staff review this list again and determine how many of these products actually meet the Rule 1168 definition of Wood Flooring Adhesive.

Another area of concern is the spray foam sealant category. First, it is important to note that while the rule proposal seems to address only polyurethane foam sealant and ignores Latex-based foam sealants. These Latex-based foam sealants are products that greatly differ from the polyurethane foam sealant products, in terms of chemistry, application and market share.

3-3

Unlike polyurethane products, these products would need a freeze-thaw stable chemical such as ethylene glycol, propylene glycol or an alcohol as their ingredient in order to protect the product from freeze cycles. These freeze-thaw stable chemicals are VOC's, thus contributing to the overall VOC content of the product. Additionally, the Latex-based foam sealant products are used in smaller indoor applications by those consumers who would prefer the use of an MDI free

2

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foam sealant. These products are almost never used by the facilities in the district in a manner that would constitute a non-consumer use.

Making up less than one percent of the foam sealant market, regulating the Latex-based foam sealant category would not offer much VOC emission reductions in the district. The proposed 50 g/L VOC limit for the Foam Sealant category assumes a successful reformulation of the category where a non-VOC propellant is used to dispense the foam. Even should a hydrocarbon propellant with a non-VOC delivery system be successfully commercialized, Latex-based foam products would still have enough VOC's in their formulation as freeze-thaw stable chemicals that would render the product noncompliant under this proposed rule.

3-3 con't

Considering that Latex-based foam sealants are the only MDI free foam sealant options available to those consumers who do not want to risk exposure to MDI for health reasons, regulating these products would place them out of these customers' ability to purchase.

We strongly recommend the agency to treat the Latex-based foam sealants as a separate product category by explicitly excluding it from the Foam Sealant definition and subject the category to the default VOC limit of 250 g/L.

With regard to spray polyurethane foam limit that would assign 200 g/l limit upon adoption of the rule and a reduction 50 g/l in 2023, ASC believes this reduction to the lower limit is not practical and seems arbitrary given the present delivery agents available.

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One proven alternative, HFC-134a, has been eliminated as a result of the U.S Environmental Protection Agency's (EPA) Significant New Alternatives Policy regulations on foam blowing agents. Current available hydrofluoroolefins (HFOs) that have been suggested do not meet product performance requirements because they lack appropriate vapor pressure. Any blowing agent used in insulating foam sealant aerosol cans must not only help the product create the insulating foam by producing closed cells in the foam, it must also behave as a propellant that will remove the entire product from the can to avoid product waste. The current HFOs are not drop-in replacements that will allow these products to meet these requirements. Foam sealant product change developments and building code testing require a minimum of 3 to 5 years for conversion.

Currently the proposed rule would initiate a technology assessment to be conducted by January 1, 2022 with a report on the results of the technology assessment be reported to the District's Stationary Source Committee prior to the January 1,2023 proposed implementation date. ASC suggests removing the 50 g/l VOC limit from the proposal until a technology assessment actually finds that a lower VOC limit is warranted. At that time a lowered limit can be implemented in a future rule with an acceptable timetable.

Finally, the proposed 'foam sealant' category requires further refinement. As written in the draft, the two distinct product types are mixed and would create confusion to the regulated community. ASC proposes the following changes to correctly address the aerosol foam sealant can products as outlined in the Preliminary Draft Staff Report:

3

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3-3 con't

(35) FOAM SEALANT is ~~a~~ an aerosolized one component pre-polymerized foam used to fill and form a durable, airtight, water-resistant seal to common building substrates such as wood, brick, concrete, foam board and plastics. ~~Foam sealant includes insulating foam.~~

~~(43) INSULATING FOAM is polymer-containing material injected into wall cavities to provide thermal resistance and sound reduction.~~

3-4

ASC recognizes the District's efforts to update the VOC limit for the Top and Trim Adhesive category but we believe these products still need a transition period to reformulate these products to meet the proposed VOC limit. The introduction of new raw materials will create logistical challenges and would put added strains on our members' facilities, especially when inventories of the old raw materials and other related items such as product labels and containers have not yet been exhausted. Product labels are preprinted and would typically take about 3 months to develop and get ready for production. ASC realizes that these challenges do not arise from the proposed VOC limit going into effect upon adoption, but from the potentially very short transition period relating to the exclusion of the Top and Trim Adhesive category from the low volume exemption under (i)(7). While we strongly support the exclusion of the Top and Trim category from this exemption, we believe the industry would need more time to transition into the new VOC limit. The proposed January 1, 2018 date for this exclusion would become unworkable if this proposed rule is adopted in the later parts of Calendar Year 2017. We recommend modifying the text in (i)(7) to read as follows:

…. ~~Effective January 1, 2018, a~~A facility may not use this paragraph to exclude non-compliant rubber vulcanization adhesives and top and trim adhesives one year after the date this rule is adopted.

3-5

One other area of concern in the Requirements Section is the District's decision to limit the sell-through and use through-period to three years from the point the rule takes effect. While the Council recognizes that most of the products regulated by Rule 1168 are rapidly sold and utilized, the latest proposal does not assign a responsibility for disposal of "orphaned" products remaining on the shelves beyond the three-year limit. ASC believes an unlimited sell-through period is appropriate in this situation.

Section (f) Administrative Requirements

ASC recognizes that South Coast has made concessions with regard to reporting requirements timetable proposal but the District also should recognize that even the most recent proposal will represent an extremely burdensome information request for our members.

3-6

For example, it appears that the District will not allow product grouping and require that individual products. In the past larger companies have grouped and reported very similar products with different technologies that still are very close in VOC content. By now requiring that these products be reported individually, companies will be confronted with further administrative burdens that will provide no real additional understanding to the District staff. While companies may report volumes of products *shipped* into the District, there is no real ability to know what volume of these products are actually *sold* in the District.

4

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3-6 con't This expensive and labor intensive exercise whether it be every three years or every five years, will still remain a remarkable cost burden to adhesive and sealant manufacturers that may provide very limited additional information to the District staff.

3-7 Another concern that ASC members have is new requirement that end users report information related to the existing 55-gallon exemption. Several ASC members have noted to us that they sell products covered by these requirements through distributors and, therefore do not have a direct relationship with these end users. This will require that these distributorships be responsible for explaining to those impacted by the rule the reporting requirements, and our members are unsure whether some distributorships will have the willingness or expertise to explain the new requirements to those using our members' products.

Section (i): Exemptions

3-8 With regard to exemptions ASC would like to recognize and thank the District for clarifying that Rule 1168 does not apply to adhesive tapes as well as maintaining the aerosol adhesive that allows the use of specialized products need by various industries within the South Coast.

If you have any questions, please contact me at 301/986-9700 ext. 112

Respectfully submitted,

Mark Collatz
Director of Government Relations

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Response 3-1

See the ~~k~~Key ~~comment~~ Concerns section of this staff report and responses to comments 1-1, 1-2, and 1-3.

Staff also would like to acknowledge the commenter's request to "reconsider adding consumer products not presently regulated by CARB to this rule." Although language has been added to provide clarity to the existing exemption regarding the CARB CPR, SCAQMD always considered products excluded from the CARB CPR to be regulated by Rule 1168. The position SCAQMD has regarding its regulatory authority over regulated products that are excluded from the CARB CPR was further supported by the CARB correspondence letters.

Response 3-2

Staff based the proposal on the survey data, which showed that about half of the currently available products meet the future proposed VOC limit. The survey did not include product type (waterborne or solvent based), so no assumptions on formulation from the data can be made.

With respect to freeze/thaw stability agents, staff has reviewed numerous technical data sheets for products that will meet the proposed limits and has found that a significant percentage of them are freeze/thaw stable. While adding co-solvents is one method to enhance freeze/thaw stability, there are other, non-VOC methods as well. Freeze thaw is not a significant issue in the SCAQMD, but shipping of products can be an issue. On a recent visit to a large distribution center, staff noted many containers of different regulated products that stated they are not freeze thaw stable. Therefore, the manufacturers and distributors have mechanism to prevent freezing during shipping and storage.

The list of products in the staff report is just a subset of products found through internet searches or based on the survey responses and is not intended to be a comprehensive list of future compliant products.

Based on this comment and the high sales volume of product that must be reformulated, staff will delay the effective date until January 1, 2023.

Response 3-3

Foam sealants include both latex and polyurethane foams. Most SCAQMD product categories are not specific to a particular chemistry but to the *use* of the product. Most discussions regarding foam sealants focus on polyurethane chemistries because the majority of products are polyurethane. Concerning the methylene diphenyl diisocyanate (MDI) in the foam, the one component urethanes contain pre-polymerize polyurethane so there is no exposure to free MDI in those products.

Concerning HFC-134a, staff wants to point out the Significant New Alternative Policy or SNAP regulation was recently overturned. Staff is not encouraging the use of compounds with a high Global Warming Potential but wanted to make this clarification.

Staff removed the 200 g/L requirement to be effective upon adoption and instead proposed a 250 g/L current limit for Foam Sealants with a 50 g/L limit effective in 2023 and 50 g/L limit for Insulating Foam. Staff proposed a ~~5~~five year implementation timeline to allow time for reformulation. The initial proposed amendment in 2014 included a 20 g/L VOC limit with an effective date of January 1, 2018. The current proposal for the Foam Sealant category is a 50 g/L VOC limit effective January 1, 2023 and includes a technology assessment for staff to evaluate the progress of reformulation. Staff developed this limit and timeframe with stakeholder feedback on what is feasible. Staff amended the proposal to include an early technology assessment in 2020 to gauge progress on reformulation efforts.

Staff included a separate definition for insulating foam, and changed the definition of foam sealant accordingly. Based on a comment letter submitted to the Stationary Source Committee on September 13, 2017 from the American Chemistry Council and subsequent discussions, staff revised the proposal to rename "insulating foam" "foam insulation" with a 250 g/L VOC limit.

Response 3-4

Staff agrees and is proposing an effective date of January 1, 2019.

Response 3-5

Staff would like to clarify that the three-~~-~~year ~~proposed~~ sell-through and use-through provisions begin when the reduced VOC limit for a particular category becomes effective. An unlimited sell-through provision is inconsistent with other consumer product regulations and with the shelf life of these products. Products do not have an unlimited shelf life; therefore, unlimited sell-through is not warranted.

Response 3-6

See comment 1-6.

Staff ~~has~~ proposed similar reporting requirements to ~~that which is included in~~ Rule 314 – Fees for Architectural Coatings, which exclude grouping. Although Rule 314 originally allowed grouping, staff found that grouping led to inaccurate reporting (during audits manufacturers could not explain which products were grouped) and can be an issue when verifying compliance (if a manufacturer groups products, inspection staff has no way to verify is any specific product was reported).

Response 3-7

Rule 1168 has always had a prohibition of sale for regulated products. This prohibition of sale extends to the manufacturer and the supplier, whether that be the direct sale from the manufacturer to the distributor, or the distributor to the end-~~-~~user. If a product was marketed for sale for noncompliant use, then the point of sale could be responsible for violation of the rule.

The 55-~~-~~gallon per year exemption applies to the end-~~-~~user. SCAQMD enforcement staff will ensure that the end-~~-~~users are complying with this regulation. If the end-~~-~~user ~~were~~ was violating the exemption by using more than 55-~~-~~gallons per year, the violation would be on the end-~~-~~user

unless it can be proven that the manufacturer or distributor knowingly provided more than 55-gallons per year of a non-compliant product to a facility.

Response 3-8

Staff appreciates the commenter's support of the proposed exemption for adhesive tape.

Comment Letter #4

Southern California Air Quality Alliance

August 30, 2017

SENT VIA E-MAIL

Nicole Silva
Air Quality Specialist
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: SCAQMD Proposed Amended Rule 1168

Dear Ms. Silva:

Members of the Southern California Air Quality Alliance have been actively participating in the rule development process for proposed amended Rule 1168. I have also attended many of the working group meetings, either in person or via teleconference. We appreciate the willingness of SCAQMD staff to consider and address our concerns.

4-1 After reviewing the latest version of the proposed rule amendments, we have one concern remaining: the "sell through" provision contained in subparagraph (c)(3) of the proposed amendments. Our concern is not so much with the "sell through" provision *per se*, but with its applicability to "use" of the product as well. As the rule language currently reads, it is possible for a person to legally purchase a product at the end of the "sell through" period and not be able to legally use it the next day. It is likely that most of the products subject to the rule will have date codes showing when they were manufactured which are not readily decipherable by the purchaser and we believe it is unfair to the purchaser to impose liability for use of product that was only recently purchased but beyond the three year "sell through" period.

We therefore request that an additional "use through" period be provided beyond the "sell through" period. We would suggest an additional 1-2 years.

Thank you for your consideration of this request.

Very truly yours

Curtis L. Coleman, Esq.
Executive Director
Southern California Air Quality Alliance

6601 Center Drive West
Suite 500
Los Angeles, CA 90045
Attn: Curtis L. Coleman
(310) 348-8186 Ph
(310) 670-1229 Fax
colemanlaw@earthlink.net

Response 4-1

Please see response to comment 3-5.

The three-year sell-through period allows the manufacturer, distributor, and end--user to decrease the inventory of remaining stock within the "shelf-life" of the products. The majority of the products manufactured before the VOC limit change is sold within in the first year of the sell-through period. The remaining two years provides a buffer to sell/use any remaining products so the manufacturer does not have to go to each retailer to collect old unsold containers. Staff feels the three-year time period is ample for both sell-through and use-through.

Comment Letter #5

SPRI SINGLE PLY ROOFING INDUSTRY | ERA EPDM ROOFING ASSOCIATION

July 17, 2017

Nicole Silva
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Dear Ms. Silva:

On behalf of the **Single Ply Roofing Industry (SPRI)** and the **EPDM Roofing Association (ERA)**, we are providing joint comments on Proposed Amended Rule (PAR) 1168 – Adhesive and Sealant Applications (06/09/17 draft). The SPRI and the ERA are trade associations representing the manufacturers of commercial roofing products; member lists may be found on our websites. The Associations appreciate this opportunity to comment on PAR 1168 with an eye toward allowing the South Coast Air Quality Management District (District) to substantially achieve its emissions reductions goals while maintaining an economically vibrant local roofing industry.

The SPRI and ERA have been active in all aspects of the rulemaking on PAR 1168, including attending working group meetings, workshops and providing comments for the District staff's consideration in its forthcoming environmental assessment. The ERA and SPRI very much appreciate the generosity of the SCAQMD staff to take phone calls from and have meetings with our staff and members to answer questions and clarify issues. The Associations are committed to improving air quality as evidenced by our work with the Northeast and Mid-Atlantic states as they adopted their new VOC regulations over the past ten years.

As we will explain in more detail below, the SPRI and ERA do not support the currently proposed limits of 200 g/L VOC on single-ply adhesives, 250 g/L on single-ply sealants and is also concerned about the proposed 200 g/L limit in the other roofing adhesive category. These limits are not realistic for all products contained in the product categories because products used in many roofing applications are developed for use in very specific situations, with specific products and installation methods, and for specific purposes. The roofing industry has a high percentage of adhered roofs. EPDM and PVC systems are generally put down as adhered; with PVC is in the 50% range and EPDM in the 65% range. TPO has less adhered systems but has more total square footage of adhered than EPDM and PVC combined.

5-1 If the District adopts these proposed limits, the life expectancy of many roofs will be shortened, roofing costs may increase significantly, employment in the roofing industry may be limited (particularly in cooler months) and in some cases the integrity of roofs may be compromised. The resulting socio-economic impacts on the local roofing industry could be severe and would be unjustified. The ERA and SPRI propose alternative limits of 250 g/L and 450 g/L on some applications in some product categories in an effort to help the District achieve its goals without these adverse impacts. In addition, the ERA and SPRI are offering to collaborate with the District on the development of subcategories of the product categories in order to distinguish among the difference in adhesives and sealants.

Below we elaborate on these and other specific issues raised by PAR 1168, I'd like to provide an overview of single-ply roofing systems and some of the general challenges associated with PAR 1168.

Single-Ply Roofing Systems: Adhered & Mechanically Attached Systems

Adhered single ply roofing systems are also very common in the commercial roofing industry. Adhered systems have also been offered by many manufacturers for decades. An adhered single ply roofing system utilizes an adhesive to bond the roofing membrane to the roof deck or a substrate such as rigid insulation board or other cover board. These include wood fiber board, gypsum board, polyisocyanurate board, plywood, OSB or other cover boards to name a few. The insulation and/or cover board can be mechanically attached to the structural deck (dependent on deck type) or adhered to the deck using an adhesive. If the cover board is mechanically attached, it is typically fastened in a specific pattern which distributes the load equally across a typical 4ft by 8ft board. Fastening patterns and fastener frequency is dictated by many design factors which include the design wind speed, building height and other factors which are very important and detailed in the building code. Once the cover board or insulation is fastened or adhered to the roof deck, a single ply membrane can be adhered to the cover board/insulation using adhesive. The adhesive can be from many different classes of adhesive depending on the local site conditions. Adhesives are offered in a variety of compositions but the most widely used are solvent based contact adhesives.

5-1 con't

Mechanically attached as the name implies, is designed so that the membrane is attached to the roof deck by means of a mechanical fastening. The fastening is utilized to secure the membrane through the cover board or insulation to the structural roof deck of a building. The cover board or insulation is also mechanically attached to the roof deck using separate fasteners and plates. The resulting system attachment concentrates the wind loads on the membrane at these fastening rows. The deck type, fastener, plate and/or bar and membrane dictate the maximum wind load performance of a mechanically attached system. Even with mechanically attached roof assemblies, some adhesives, primers or cleaners are required. For example, most parapet wall applications still require the use of adhesives for membrane attachment.

There are some significant performance differences between an adhered system and a mechanically fastened system. Some of the key differences are as follows:

- An adhered single ply roofing system offers the highest wind uplift ratings in the industry. Depending on the complete roofing assembly, wind uplift ratings in excess of 225 psf are common. This is very important in the design of roofing assemblies in high wind speed areas. For example, these areas would include buildings located in hurricane prone areas, high rise buildings (in excess of 50ft.), buildings located adjacent to mountain ranges and areas adjacent to large bodies of water, to name a few. Mechanically attached roofing systems have to be fastened in very narrow fastener rows with high fastener densities to achieve a wind uplift rating in the same range. The maximum adhered uplift available is in excess of 900psf.

- An adhered single ply roofing system provides improved wind uplift load distribution across the roof. When an adhered system is installed, the fastened or adhered cover board or insulation distributes the wind uplift load symmetrically across the entire roof. A mechanically attached roofing system "point" loads the roof at the fastening rows. Point loading typically limits the roofing system design depending on the actual deck type and specific deck attachment. (note –

Factory Mutual Insurance Company recently limited the fastener row spacing of mechanically attached systems over metal deck due to "point" loading).

- Puncture resistance of an adhered roofing system is typically significantly greater than a mechanically attached roofing system. When the membrane is adhered to a cover board, there is an additive effect to resisting puncture from elements such as hail. Since a mechanically attached membrane is loose between the fastening rows, this reduces the puncture resistance of the membrane in most cases.

- Since an adhered system is adhered or fastened to the roof deck at a uniform rate, the system moves with the building as expansion and contraction occur during the course of the day. Temperature swings of 30°F or more can create a significant amount of movement in a building. Mechanically attached systems are subject to more localized movement since the attachment method concentrates loads in rows.

5-1 con't

As illustrated in the attached schematics, while there are hundreds of combinations that make up a roofing system and a roofing assembly, it can be grossly simplified into the four types shown. The urethane adhesive used to secure the insulation in many assemblies will skew your "Single Ply Roofing Membrane Adhesives" sales volume data because urethane adhesives are primarily used for insulation or cover board attachment. Using less insulation is simply not a good option for the thermal performance of the roofing assembly and energy performance of the building, even in a temperate climate like Southern California. Urethane adhesives can be used for Single Ply Membrane, but may be limited to attaching fleece-backed membranes. Fleece-backed membrane is a highly specialized roof system that is typically higher in cost. Transitioning to fleece-backed systems is not a feasible option for the industry, neither for the roofing contractor nor the building owner.

General Challenges with PAR 1168

The following basic concepts about the roofing industry should help you understand our specific comments on PAR 1168.

- Not all adhesives are alike, having been designed for ultimate bond with specific membranes; and not all of them can be used with every roofing assembly and/or for the same purposes. 20% of products would meet the VOC criteria, but the membrane type would be limited to fleece-backed membrane for urethane systems which presents a significant product restriction to the consumer.
- Further complicating matters, 30% of the sealants that DO meet the VOC criteria ALSO require a primer.
- 80% of the products currently in the marketplace would be eliminated. Some of these eliminated products are used in vertical applications. ALL roofs have parapets of some sort or other vertical applications. In these instances, products with currently permitted VOC levels are needed to be able to handle this level of detail.
- The roof system is an integral part to the overall building envelop, protecting the buildings occupants and contents from the elements. Roofing adhesives and sealants were designed to adhere and maintain a watertight seal over a wide range of weather extremes for 20-30 years. These adhesives and sealants are used to install large areas of roofs in the South Coast district that impact numerous buildings. The estimated emissions reduction of PAR 1168 for Single Ply

5-1 con't

and Non-Membrane Roofing Adhesives and Sealants is ~0.2TPD, which is a fraction of the emissions reduction achieved for Wood Flooring Adhesives, Foam Sealants, Architectural Sealants, and PVC Welding (~1TPD reduction).

- Polymers used in adhesive formulations vary due to membrane type, and solvents used in dispersing polymers are specific. For example, solvents used for neoprene polymer (used in EPDM adhesives) are xylene and toluene. Other solvents like hexane and heptane are used in the formulation as drying agents.
- There are functional limitations with exempt solvents, such as low flash points, higher dry-times, potential increase in blistering, high costs, limited availability and excessive pungent odor.
- Application concerns include longer dry-times with water based adhesives and urethanes used in ribbon applications process and fleece-backed materials.
- Some products have usage limitations based on climatic conditions; for example, the average lows in the South Coast Air Basin during December – February are such that some low VOC products can be used only between 10am-2pm during those months. In addition, even during those times when the ambient temperature may go above the temperature required to use the product, the surface temperature of the roof may remain cooler due to night-time radiative cooling. A white paper by the Director of Technology at Johns Manville, Zebonie Sukle, found the following:
    - Case studies demonstrating field issues with water-based and low VOC adhesives at temperatures below 55 degrees.
    - Lab testing and field data that demonstrates concerns when using water-based adhesive at temperatures less than 60 degrees with dew points of 45 and higher.
    - Application issues with the "spreadability" of low VOC adhesives at temperatures less than 60 degrees.

  Compiled reports from both Associations' members indicate installation-related performance issues with water-based and low VOC adhesives and sealants in the following states: Alabama, Georgia, Florida, Nevada, North Carolina, Texas, and California. Of the cases in California at least three roofs are ***located in the South Coast Air Quality Management District***.
- Some products have shipping and storage limitations; for example, some water-based and low VOC products must be shipped at and stored at or above 60 degrees. If adhesives are shipped from a cold climate, they must not freeze during shipment and the product will be ruined and will need to be thrown out. Solvent based adhesives can be exposed to below freezing temperatures and then be brought up to room temperature and used, but water-based adhesives cannot. Therefore, even if application temperatures are high enough to install, getting the product to the customer can be an issue in the winter. The vast majority of roofing adhesives in the market today are manufactured in Indiana, Ohio, and Pennsylvania. In addition, not every distribution center and/or roofing contractor's warehouse are climate controlled.
- Various professionals in the roofing industry have discussed issues with excessive rooftop moisture from concrete decking. Again, problems have been experienced in Southern California with base flashings adhered to concrete substrates (such as walls) with excess moisture using water based bonding adhesives (which are often mated too soon to hasten application, thus trapping moisture from the adhesive) to concrete substrates with excessive moisture often results in un-adhered areas. Solvent based bonding adhesives are much more forgiving in this regard (see article "Moisture Problems Overhead").
- Many of the challenges associated with the use of water-based and LOW VOC products are related to temperature. While the climate of SCAQMD is generally temperate, temperatures

5-1 con't

drop below 50 degrees with some regularity and below 40 degrees on occasion. Based on the challenges outlined in the Sukle research and detailed in case studies, roofing contractors in SCAQMD are going to encounter significant delays during periods of cold weather if they are required to use products that meet the proposed standards.

- While all of our manufacturing members offer some adhesives that meet the proposed standard, those particular products cannot be used in every roofing assembly and for every application. In particular, limiting the product availability of adhesives will likely force a move to only one type of roofing installation with a smaller number of components, thereby significantly limited availability for the Southern California consumer.

General Challenges with PAR 1168 and Proposed Limits

5-2

- The current VOC limit for **roofing sealants** is 450 g/L. PAR 1168 would reduce that limit to 250 g/L. Unfortunately, some sealants critical to most roofing applications are not available in such low VOC concentrations, and they are not expected to be available in the foreseeable future. In particular, cut edge sealant cannot meet the proposed 250 g/L limit. Moreover, there are some other specialized sealants used in some roofing applications that cannot meet the proposed limit. If the limit applies to all sealants uniformly, then the associated roofing applications will not be available in the District, severely restricting roofing options. The ERA and SPRI **propose the development of subcategories for the product categories and that the limit remain at 450 g/L for some of these subcategories.**

5-3

- The current VOC limit for **roofing adhesives** is 250 g/L. PAR 1168 would reduce that limit to 200 g/L. Unfortunately, adhesives critical to roofing applications that carry 30-year warranties are not available in such low VOC concentrations, and they are not expected to be available in the foreseeable future. If this limit applies to all roofing adhesives uniformly, then roofing applications will be limited to those that carry shorter 10- to 20-year warranties. This will result in more frequent re-roofing and increased roofing costs in the District, as compared with surrounding areas. These cost increases would certainly have a negative impact on the local roofing industry, in terms of both sales and employment. Roofs that are also replaced more frequently will negatively impact air quality by the transportation needed to deliver materials for the new roof and by transporting the old roof to the landfill. Moreover, low VOC adhesives have long curing times and temperature restrictions that only allow them to be used in warmer weather, which likely would significantly reduce the length of the roofing season, with negative impacts on sales and employment.
  The SPRI and ERA **propose the development of subcategories for the product categories and that the limit remain at 250 g/L for most adhesives.** There is a sub-category of products, insulation adhesives, where there is sufficient product availability below 100 g/l.

5-4

- To determine if we can lower the VOC content of products to less than the proposed limits will require significant development efforts by all manufacturers. Since manufacturers warrant many roof systems for upwards of 30 years, they must conduct the proper studies to ensure that any new adhesive will perform over that period of time. This work includes laboratory studies, field studies and code testing with such entities as Factory Mutual and Underwriters Laboratories. This development work can easily exceed a 2-3 year time frame. After the development and approval processes, then time is needed to bring the products to the marketplace and train roofing contractors in the unique application methods of these new, lower VOC products. Therefore, the Associations **request that single-ply and other roofing adhesives have the effective implementation date of January 1, 2023.**

5-5

- In addition, as referenced above, the ERA and SPRI would like to propose subcategories for the product categories. However, the roofing manufacturing community needs adequate time to evaluate the technical merits of the proposed VOC standards for 50 categories of adhesives and sealants and provide feedback to the agency on the merits of the proposed subcategories. Therefore, the SPRI and ERA **request a three month time period to develop the next set of comments on these subcategories and can provide this information the SCAQMD by September 30, 2017.**

Conclusion

The Single Ply Roofing Industry (SPRI) and the EPDM Roofing Association (ERA), very much appreciate the generosity of the SCAQMD staff to take phone calls from and have meetings with our staff and members to answer questions and clarify issues. The SPRI and ERA are committed to improving air quality and continuing to work with SCAQMD staff to maintain an economically vibrant local roofing industry.

Thank you for your time.

Sincerely,

Ellen Thorp

Ellen Breipohl Thorp
Associate Executive Director
EPDM Roofing Association

Mike Ennis

Mike Ennis
Technical Director
Single Ply Roofing Industry

cc: Mike Ducharme, Carlisle SynTec, Inc.; Chair, EPDM Roofing Association
Zeb Sukle, Johns Manville; President-Elect, Single Ply Roofing Industry

August 30, 2017

Nicole Silva
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Dear Ms. Silva:

5-6 On behalf of the **Single Ply Roofing Industry (SPRI)** and the **EPDM Roofing Association (ERA)**, we are providing joint comments on Proposed Amended Rule (PAR) 1168 – Adhesive and Sealant Applications (06/09/17 draft). The SPRI and the ERA are trade associations representing the manufacturers of commercial roofing products; member lists may be found on our websites. The Associations appreciate this opportunity to comment on PAR 1168 with an eye toward allowing the South Coast Air Quality Management District (District) to substantially achieve its emissions reductions goals while maintaining an economically vibrant local roofing industry.

The SPRI and ERA have been active in all aspects of the rulemaking on PAR 1168, including attending working group meetings, workshops and providing comments for the District staff's consideration in its forthcoming environmental assessment. The Associations are committed to improving air quality as evidenced by our work with the Northeast and Mid-Atlantic states as they adopted their new VOC regulations over the past ten years.

The purpose of this letter is to serve as a supplement to our communication dated July 17, 2017, to identify a new set of subcategories that is applicable to the single-ply roofing industry, and to set the VOC limits that the single-ply roofing industry can achieve in each subcategory.

(continued on next page)

The charts below detail these subcategories and limits.

Adhesives

Sub Category 2	Current VOC	PAR 1168 proposes	ERA-SPRI proposes
Single-Ply Roof Membrane Bonding Adhesive (Current)	250	200 by 2021	
Smooth Single-Ply Membrane Adhesive	-		stay at 250
Fleece Backed Single-Ply Membrane Adhesive	-		200 by 2019
Bituminous Membrane Adhesive	-		stay at 250
Insulation / Cover Board Adhesive	-		100 by 2019
Bituminous Flashing Adhesive			stay at 250

Sealants

Sub Category	Current VOC	PAR 1168 proposes	ERA-SPRI proposes
Single-Ply Roof Membrane (Current)	450	250 by 2021	
Single-Ply Roof Membrane - Lap Sealant / In-Seam Sealant	-		stay at 450
Single-Ply Roof Membrane - Cut Edge Sealant	-		250 by 2019
Single-Ply Roof Membrane OTHER - Non-Skinning / Non-Curing Water Block Sealant (water cut off mastic and term bar applications)	-		250 by 2021
Single-Ply Roof Membrane OTHER - Penetration Sealant (Pitch Pocket / Liquid Flashing)	-		250 by 2021
Bituminous Roofing Sealants	300		stay at 300

Primers

Sub Category 1	Sub Category 2	Current VOC	PAR 1168 proposes	ERA-SPRI Proposes
				-
Adhesive Primers	All other Adhesive Primers (includes Single Ply Membrane Primers)	250	250	
Adhesive Primers	Bituminous Membrane Primer (for Adhesive and Sealant)			increase to 350 (consistent with 1113)
Sealant Primers	All other Sealant Primers	750	750	

Conclusion

The Single Ply Roofing Industry (SPRI) and the EPDM Roofing Association (ERA), very much appreciate the generosity of the SCAQMD staff to take phone calls from and have meetings with our staff and members to answer questions and clarify issues. The SPRI and ERA are committed to improving air quality and continuing to work with SCAQMD staff to maintain an economically vibrant local roofing industry. We'd be happy to schedule another call with a small group to discuss any questions/concerns you may have.

Thank you for your time.

Sincerely,

Ellen Thorp

Ellen Breipohl Thorp
Associate Executive Director
EPDM Roofing Association

Mike Ennis

Mike Ennis
Technical Director
Single Ply Roofing Industry

cc: Mike Ducharme, Carlisle SynTec, Inc.; Chair, EPDM Roofing Association
Zeb Sukle, Johns Manville; President-Elect, Single Ply Roofing Industry

Response 5-1

Staff appreciates the time spent by the commenter and the associations to give a thoughtful background explanation about the roofing industry and various roofing system applications.

Response 5-2

Staff is always willing to work with stakeholder to consider niche applications that may need higher VOC limits. This process takes time, as staff has to research the subcategories and begin the collaborative process of drafting new definitions. This process should occur at the beginning of the rule amendment. In this case, the process began in 2013/2014 when staff was proposing significant VOC reductions to roofing categories, with the inclusion of several exempt compounds. When staff removed the proposal to include new exempt compounds, staff changed the proposal to modest VOC reductions.

At this time, staff is proposing to extend the effective date of the lower VOC content limits to January 1, 2023 regarding roofing sealants, both Single-_Ply Roof Membrane Sealants and All Other Roofing Sealants, and including a technology assessment to evaluate the potential subcategories the commenter suggests in Comment 5-6. Staff will incorporate the data received from reporting submittals in 2019, in addition to future stakeholder meetings regarding the technology assessment, to evaluate future possible subcategories for this category as well as other roofing categories.

Response 5-3

See response to comment 5-2. Staff is also proposing extending the effective date for roofing adhesives, which include the Single-_Ply Roof Membrane Adhesives and All Other Roofing Adhesives, and a technology assessment for these categories to evaluate potential subcategories.

Response 5-4

Staff is proposing to extend the effective date of a lower VOC content limit for the four roofing categories to January 1, 2023.

Response 5-5

Staff spoke with the commenters regarding the time requested to suggest potential new subcategories. Given the thoughtful response from the commenter in this letter, staff has proposed a technology assessment for the roofing categories to fully evaluate and define potential new roofing subcategories prior to the proposed effective dates for VOC reductions.

Response 5-6

See response to 5-2.

Staff appreciates the commenter's efforts to provide suggested subcategories for the roofing categories within the given comment period. Although subcategories were suggested, staff was not provided supplemental documentation to define or evaluate those subcategories, nor –the

market share of those subcategories. The technology assessment is being proposed in lieu of creating new subcategories and allow time to properly define and evaluate these proposed new roofing subcategories.

Comment Letter #6

AmericanCoatings ASSOCIATION℠

August 31, 2017

Nicole Silva
Planning, Rule Development & Area Sources
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178

RE: Proposed Amended Rule 1168 Public Workshop; ACA Comments

Dear Ms. Silva:

The American Coatings Association (ACA)[1] submits the following comments regarding South Coast Air Quality Management District's (SCAQMD) Public Workshop on Proposed Amended Rule 1168. ACA appreciates the opportunity to provide comments on Rule 1168's proposed regulatory text and VOC standards. As always, our goal is to meet the District's need to maximize VOC reductions and provide top quality adhesive and sealant products for customers in the South Coast basin. We look forward to assisting SCAQMD throughout this rulemaking process.

ACA submits the following comments:

1. **ACA Reiterates its Earlier Written Comments**

ACA understands that SCAQMD has updated its Rule 1168 regulatory language to reflect several stakeholder comments that were made in both written and oral form before and during past Working Group meetings and at the Public Workshop. However, a number of our written comments were not specifically responded to and we want to reiterate the positions taken in those comments.[2] Comments that have not been responded to include:

6-1 - SCAQMD's inclusion of consumer products used in industrial settings to Rule 1168;
6-2 - Extending the compliance date for Rubber Vulcanization Adhesives;
6-3 - Modifying definitions;
6-4 - Changing the Aerosol Test Method Back to CARB Method 310;
6-5 - Extending the time for limits of new categories instead of having the limits apply upon adoption (i.e. foam sealant, grout, potable water, and clear, paintable, immediately water resistant);
6-6 - Using an initial baseline survey, supplemented by external data, rather than imposing the current reporting requirements;
6-7 - Requiring manufacturers to submit the volume of regulated products with the VOC content higher than the applicable limit;
6-8 - Adding unit harmonization;

[1] The American Coatings Association (ACA) is a voluntary, nonprofit trade association working to advance the needs of the paint and coatings industry and the professionals who work in it. The organization represents paint and coatings manufacturers, raw materials suppliers, distributors, and technical professionals. ACA serves as an advocate and ally for members on legislative, regulatory, and judicial issues, and provides forums for the advancement and promotion of the industry through educational and professional development services.
[2] ACA Written Comments submitted via email to Nicole Silva on 6/21/2017, 7/6/2017, and 8/2/2017.

901 New York Avenue, NW – Suite 300 West | Washington, DC 20001 | 202-462-6272

6-9 - Including a later labeling compliance date;
6-10 - Removing facility reporting; and
6-11 - Standardizing the notification requirements.

Additionally, as stated previously, ACA believes that the estimated emissions reduction of 1.43 tpd is negligible compared to the burden that the Rule 1168 requirements impose on the regulated community.[3]

2. ACA Requests a Technology Assessment for the Clear, Paintable, and Immediately Water-Resistant Product Category

6-12 In Table 1, the category of "Clear, Paintable, Immediately Water-Resistant" is listed as having a current limit of 250 g/L because of the already-existing "All Other Architectural Applications" category. Upon adoption, SCAQMD proposes to raise the limit to 380 g/L, which appears to be the sales weighted average of products currently sold in the South Coast basin (as determined by the SCAQMD 2013/2014 Survey).[4] Since there are no products that meet the proposed 250 g/L limit, ACA believes that this limit that becomes effective in 2021 is technology forcing. At this time, there are no products that are clear, paintable, immediately water-resistant, effective, and meet the 250 g/L limit. SCAQMD has limited data on these products, as well. Thus, ACA requests that SCAQMD complete a technology assessment for "Clear, Paintable, Immediately Water-Resistant" products to ensure that they can meet the 250 g/L limit and still be effective before the limit goes into effect in 2021.

As ACA has reiterated in previous comments, survey/manufacturer reporting data should not be used to determine which limits are technologically feasible. Technology assessments are extremely important because they indicate which products are really working and performing as labeled. As such, ACA requests that SCAQMD complete a technology assessment for the "Clear, Paintable, Immediately Water-Resistant" product category before the proposed 250 g/L limit goes into effect in 2021.

3. Test Methods

6-13 ACA appreciates Staff's removal of paragraph (e)(6) and the clarification that has been made to paragraph (e)(1). ACA supports the revised language in paragraph (e)(1). However, we would like more clarification and information about the guidance document that was mentioned during the Public Workshop. We appreciate that SCAQMD will be seeking stakeholder input in the development of the guidance document that will clarify which product types are tested by which test method. As always, ACA is happy to discuss which test methods would be appropriate for each product category.

4. ACA Requests the Following Changes to the Reporting Requirements

6-14 ACA appreciates how receptive SCAQMD has been in working with industry to come up with fair and reasonable reporting requirements under Rule 1168. However, as we have stated before, we still have issues with the reporting requirements in section (f)(2) as written. District Staff has repeatedly stressed the importance of collecting accurate adhesive and sealant inventory data for planning purposes. ACA fully understands the need for SCAQMD to gather this information, especially because the 2016 AQMP severely underestimated this inventory of regulated products. But, as we have stated several times

[3] SCAQMD Preliminary Draft Staff Report (July 2017), page 42.
[4] SCAQMD Working Group Meeting #2 Presentation.

2

before, compiling the information at the level of detail that the District is requiring will be extremely costly in time, money, and resources for our industry.

ACA acknowledges SCAQMD's stance that the Rule 1168 reporting requirements will not be as burdensome on industry as expected. However, we respectfully disagree. The most recent version of the rule requires distributors to report. From our understanding, SCAQMD included this provision in the hopes that it may lessen the burden on industry. But rather than lessening the burden, this creates an extra step for both manufacturers and distributors to ensure that their reports are accurate and complete. For larger companies, this issue will be especially pronounced because they have a widespread network of distributors and regulated products for which they will have to compile information. The reporting requirements remain very burdensome for industry as currently written.

Thus, as requested previously, we ask that SCAQMD allow for manufacturers to use alternate options such as "California Population Factors" or other tools to reduce the burden on our members associated with reporting. We acknowledge that SCAQMD VOC limits are different than those limits in neighboring districts, but this approach will still give both manufacturers and SCAQMD a general sense of the amount of products sold in the South Coast basin.

Thank you for your consideration of our concerns. Please do not hesitate to contact us if you have any questions.

Sincerely,

Rhett Cash
Counsel, Government Affairs

Raleigh Davis
Assistant Director, Environmental Health and Safety

3

Response 6-1

Please see the ~~k~~Key Concerns ~~issues~~ section in this staff report and responses to comments 1-1, 1-2, and 1-3.

Response 6-2

In the commenter's August 2, 2017 letter, the commenter requested staff to extend the proposed effective date for the 250 g/L VOC limit for Rubber Vulcanization Adhesives to January 1, 2022. The commenter requested this to parallel the 2014 proposal, which had proposed four years for reformulation (2014-2019). Staff received verbal support from other stakeholders stating that the proposed 2021 effective date is feasible. Staff has further revised the effective date to 2023. Staff would like to point out to industry that the proposal of 250 g/L was initially proposed October 23, 2013, which will have given industry ten years to reformulate to meet the proposed 2023 deadline.

Response 6-3

Staff has modified many definitions based on stakeholder feedback. Regarding those that the commenter has pointed out in previous letters:

- Aerosol Adhesive – See response to comment 1-6.
- Big Box Retailer – Staff appreciates the comment and included the "~~"~~North American Industry Classification System code 444110: Home Centers."~~".~~ This definition differs from the current definition in Rule 314 but was proposed during the 2015 amendment. Unrelated to that suggested definition change, the rule was not amended at that time. The North American Industry Classification System or NAICS codes have largely replaced Standard Industrial Classification (SIC) codes so it is a more appropriate reference. The next time Rule 314 is amended, this definition will be changed.

Response 6-4

Stakeholders requested CARB Test Method 310 be included to measure the VOC content of aerosols. When staff removed the proposal to limit the exemption, staff did not see a need to include that test method. The proposed amendment includes VOC limits for foam sealants and ~~insulating~~ foam~~s~~ insulation, but CARB Method 310 does not include a methodology for measuring the VOC of expanding foams. SCAQMD laboratory staff is working to develop a method for these materials and will work with stakeholders during the method development.

Response 6-5

Staff modified the original proposed effective dates for various categories, which had lower VOC limits with effective dates upon adoption. Staff retained various reduced VOC limits for those categories in which survey data or industry has demonstrated that the proposed limits would be achievable upon adoption. When staff sets a VOC limit to be effective upon adoption, it is to reflect what is currently available in the field, not to achieve emission reductions. If a stakeholder demonstrated there were products that did not meet that limit, staff made adjustments to address those products.

Response 6-6

The baseline voluntary product survey had poor response from many market segments. With the limited survey response, staff was forced to rely upon other methods of determining product availability including shelf surveys and product literature. Staff proposed the reporting schedule with the initial three year frequency, as suggested by this commenter during a working group meeting. Although staff is proposing a particular schedule for manufacturers, private labelers, Big Box retailers, and distribution centers, staff believes that an annual report for products with unlimited VOC content sold under the 55 gallon per year exemption is still warranted as it will identify problem areas within the rule and deter overuse of the exemption.

Response 6-7

The reporting requirement applies to all products sold into or within the SCAQMD. As with many rules, there are exemptions that allow for products to be sold that exceed the current VOC limits (e.g. small use exemptions – 55 gallons, alternative compliance options, alternative VOC limit for low-solids products). Staff is including a mechanism for the manufacturers to report these products with a qualifier to indicate that they are not selling non-compliaint product but products that fall under one of the exemptions. This is consistent with the reporting under Rule 314, which contains similar flags for products sold under the small container exemption, the 4,000 foot exemptions, or low solids products.

Response 6-8

The VOC limits for Rule 1168 have been in "g/L" since adoption, and staff is not proposing to change that at this time. The g/L unit of measure is consistent for VOC limits in SCAQMD VOC rules. Please also see response to comment 2-1.

Staff understands that the CARB CPR requires that VOC limits are listed in "weight percent of VOC," and staff has proposed to allow an alternative to labeling requirements in "g/L" provided the manufacturer include "g/L" units on supplemental documentation.

Response 6-9

Staff agrees and is proposing a January 1, 2019 effective date for labeling requirements.

Response 6-10

Facilities using or applying regulated product within the District currently have to comply with Rule 109 – Recordkeeping for Volatile Organic Compound Emissions to adhere to the provision in paragraph (d) of the rule. The facility reporting requirement is only for those utilizing the 55-gallon per year exemption, and would just require those records to be submitted to the District. These reports will be used by staff to evaluate compliance with the 55 gallon/year exemption, as well as understanding if there are regulated products that are consistently sold above the VOC limits and need to be addressed. This reporting requirement will also ensure that staff has an accurate inventory as staff can compare end-user reporting to what is reported by the manufacturers and private labelers.

Response 6-11

~~District staff~~Staff will not include explicit requirements for a manufacturer, supplier, or distributor to demonstrate written proof that the regulated products exceeding the VOC limits will not be sold or used within the SCAQMD's jurisdiction. In past rule making, stakeholders requested the rules not be prescriptive but allow flexibility for complying with the requirements. Staff will provide a guidance document on the District's webpage, which will provide options to demonstrate compliance with this section of the rule.

Response 6-12

See Response to Comment 2-2.

Response 6-13

See Response to Comment 2-3.

Please see the ~~t~~Test ~~m~~Method section in this report for a more detailed discussion of the guidance document development.

Response 6-14

See Response to Comment 1-6.

Staff proposed Big Box retailers and ~~Distributor~~ distribution centers to submit reports to the manufacturers based on feedback during working group meeting that the manufacturers cannot determine where their products ultimately are sold when they sell to a distribution center. There is a similar construct in Rule 314. Stakeholders indicated that they do not know where products are ultimately sold when shipped to the Big Box distribution center, so staff included a reporting requirement for the Big Box retailers to report to the manufacturers. Unlike architectural coatings, adhesives and sealants are not predominantly sold at Big Box stores so the proposal also includes distribution centers. The intent of the reporting is to provide accurate information to the District.

Comment Letter #7

RADTECH
THE ASSOCIATION FOR UV&EB TECHNOLOGY

August 31, 2017

Mr. Michael Krause
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Re: Public comments to Proposed Amended Rule 1168—Adhesives

Dear Mike:

RadTech International hereby reiterates the comments we have made in writing and during the public consultation process on proposed amended rule (PAR) 1168. We were thankful that staff expressed a willingness to make changes to the proposal presented at the most recent public consultation meeting. However, we are disheartened that staff's position regarding our two main issues (1) Inclusion of test method for enforcement purposes and (2) Exemption from the overly prescriptive recordkeeping requirements; remains unchanged.

Inclusion of Test Methods for UV/EB/LED

RadTech commends the district for including a definition for energy curable materials in Section (b)(28) of the proposed rule and providing clarification regarding test methodology. However, we cannot support the concept of creating two different mechanisms (one for "information-only" and one for enforcement) to test materials. RadTech urges the inclusion of ASTM D7767-11 in both the Definition and the Test Method section of the rule. ASTM D7767-11 is the best tool available today to measure VOC emissions from UV/EB thin film materials. We had previously reached consensus with the district regarding the inapplicability of Method 24 and SCAQMD Method 313 to UV/EB materials. Thus, we would suggest that an additional sub-section (K) be added to Section (e)(1) to read as follows:

7-1

(K) The VOC content of Energy Curable Adhesives and Sealants shall be determined by ASTM Test Method D7767-11- Standard Test Method to Measure Volatiles from Radiation Curable Acrylate Monomers, Oligomers, and Blends and Thin Coatings Made from Them.

Additionally, the rule includes a method for "thick film" adhesives which is not applicable to UV/EB/LED materials. The following language would ensure clarity:

(L) The VOC content of Non-Thin Film Energy Curable Adhesives and Sealants shall be determined by ASTM Test Method D5403-93- Standard Test Methods for Volatile Content of Radiation Curable Materials.

7-1 Con't Staff has stated that the ASTM method is not a "direct" method but, the GCMS alternative is also an indirect method. It does not allow VOC's from a cured coating to be measured at the end use location and using the end use cure conditions (which includes backing, geometry, source, line speed, environment (air or nitrogen), etc.). The GCMS method has a level of uncertainty in the correlation to real emissions in use. As per a request from district staff in 2013, we have provided you with a procedure to calculate VOC's from a fully formulated product using ASTM D7767-11.

Exemption from Reporting & Recordkeeping

7-2 We urge the district to provide incentives to companies who reduce their emissions by exempting UV/EB/LED materials that exceed the rule requirements. We are supportive of the concept of reducing recordkeeping burdens for those materials and believe those operations should not be subjected to the same labeling and recordkeeping requirements as their higher emitting counterparts. We request that UV/EB/LED materials containing 50 grams per liter of VOC or less, be exempted from the Administrative Requirements in Section (f)(1) and the Reporting Requirements in Section (f)(2) of PAR 1168. In 2021, the lowest limit in the rule will be 20 grams per liter and as such, we would be open to lowering the limit to 20 grams per liter in 2021 to ensure consistency. We are especially concerned with the consequences of this proposal on the medical device industry as it may hamper the manufacture of life saving medical products.

7-3 We have seen how overly prescriptive regulations have had the unintended consequences of driving business out of the basin. As a result, emissions from goods movement have increased as products are manufactured elsewhere and either shipped in or trucked into the basin. Thus, there is a correlation between the exodus of manufacturing from the Basin and emissions associated with goods movement. We ask that you analyze the emissions impact of goods movement as part of the CEQA process in the rule.

Guidance Document

7-4 We were recently informed that staff intends to provide additional clarifications on rule language interpretation, after rule adoption via a "Guidance Document". Although well intentioned, we are not supportive of this concept because there is no assurance that the Board will be involved. For lack of a better term, this would amount to "underground" rulemaking. If a rule needs a guidance document to interpret it after the board has adopted it, the rule itself is not sufficiently clear and thus does not meet the requirements for Clarity in the Health and Safety Code.

We appreciate your attention to these issues and look forward to a productive rulemaking effort.

Sincerely

Rita M. Loof
Director, Environmental Affairs

Cc: Wayne Nastri, Nicole Silva, Heather Farr, Barbara Radlein

Response 7-1

Please see the ~~t~~Test ~~m~~Method section of this report for the discussion on why ASTM 7767 cannot be used as an enforcement method. Regarding the GC/MS test method, that method does directly measure the VOCs of the fully formulated coating obtained in the field. Staff is aware that all test methods have a degree of uncertainty, and addresses that uncertainty with precision and bias studies. The issue with ASTM 7767 is the testing is not conducted on the fully formulated ~~coatings~~ regulated product that can be obtained in the field, but rather on the various components of the product.

Regarding the clarification for ASTM D5403, that method is included in SCAQMD Method 304 but is not explicitly referenced in the rule. Staff acknowledges that method is not appropriate for thin~~-~~-film energy curable adhesives or sealants, and added a discussion in ~~the~~ this ~~Draft Staff R~~report.

Response 7-2

Staff would like to encourage the use of ultra-low VOC products, which staff defines as well below 50 g/L. Super compliant architectural coatings are defined as less than 10 g/L VOC of coating, Rule 314 exempts coatings less than 5 g/L VOC of material, Clean Air Solvents and Clean Air Cleaner Choices are certified if they contain less than 25 g/L of solvent. As stated, this proposal contains a record-keeping exemption for regulated products that contain less than 20 g/L. These products cannot be excluded from the labeling requirements as labeling is how compliance staff verifies rule compliance in the field. Concerning reporting, if the manufacturers did not report these products, it would not be possible to determine accurate emission inventories or observe trends in the use of ultra-low VOC content products.

Response 7-3

See CEQA Final EA for an evaluation of impacts.

Response 7-4

As stated in this~~e~~ staff report, the working group will ~~determine~~ bring the Guidance Document to the ~~necessity of~~ Governing Board for approval ~~for the guidance document~~.

Comment Letter #8

To summarize our comments (also dated 8-31-17) as a manufacturer of clear, paintable, immediately water resistant sealants we are proposing the following changes regarding the latest draft rule language for Rule 1168:

8-1 **1. (Item #1 in our comments)**
In Table 1 the 1/1/2021 level of 250 g/L level for Clear, Paintable, Immediately Water Resistant (CPIWR) sealants does not include a technology assessment. Please add an asterisk denoting a technology assessment for these products because there is no known technology today that will allow for this lowered VOC limit, and no products in this category that can meet this lowered VOC limit.

8-2 **2. (Item #2 in our comments)**
The definition of "clear" in the Clear, Paintable, Immediately Water Resistant category should be further defined. Clear, paintable, immediately water resistant materials will have clarity of 15 NTU or less per ASTM D7315 and color of Gardner 0 as tested by ASTM D1544 or Platinum-Cobalt Color of 50 or less using ASTM D1209 as manufactured and packaged.

8-3 **3. (Item #3 in our comments)**
Referring again to Table 1 in PAR 1168, it is our recommendation that because the CPIWR category does not exist under the "Current 2005 Version" of Rule 1168, the "Current 2005 Version" VOC limit number of 250 g/L should be removed for CPIWR sealants in Table 1.

8-4 **4. Further information on sales reporting (Item #4 in our comments)**
It is not clear from the current revisions to Rule 1168 how to comprehensively report sales in your district for manufacturers like us that sell via 2-step distributors. We often do not know what retailers have our products, let alone the sales of those products. We are requesting that SCAQMD provide further thoughts, recommendations, and solutions to give clarity in the process. The reporting process as currently written could give SCAQMD suspect data until a solid reporting system is agreed upon, built, and tested for functionality.

Please feel free to contact us if you have questions or need further clarity on the issues we have discussed.

Regards,

Darci Kunard and Andy Spoelstra
Sashco, Inc.

Response 8-1

See response to comment 2-2.

Response 8-2

Staff appreciates the feedback and revised the definition for Clear, Paintable, and Immediately Water-Resistant to include test methods and benchmarks to distinguish when a product is "clear" and "paintable."~~.~~

Response 8-3

The CARB correspondence letters were written to clarify when a consumer product can be regulated by the local air districts, e.g., what it means if a product is excluded from a definition or does not have a VOC limit. These letters express disagreement with industry's stance that products

that were excluded from the CARB CPR, such as Clear, Paintable, and Immediately Water-Resistant Sealants, were "regulated" by the CARB CPR. The correspondence letters support SCAQMD's understanding of its regulatory authority over consumer products and which products are excluded from the CARB CPR.

Although staff understands that the commenter took the position of interpreting both regulations as excluding Clear, Paintable, and Immediately Water-Resistant Sealants, the position of both agencies was made clear to stakeholders during the 2013/2014 rule amendment process. This is not a recent interpretation from either agency.

Clear, Paintable, and Immediately Water-Resistant Sealants, still fall under the definition of sealants. Those products, such as those sold by the commenter, would be classified as architectural sealants. Since there is a limit for architectural sealants in the current version of the rule, and the marketing literature for the commenter's products support that categorization, it is SCAQMD's position that these products have always been regulated by the SCAQMD's Rule 1168.

Response 8-4

See response to comments 6-14.

The reporting will be similar to that of Rule 314. Stakeholders commented that they do not know the final destination of a product if it is send to a distribution center either within or out of the SCAQMD. To address this uncertainty, the Big Box retailers ~~Stores~~ and ~~Distributors~~ distribution centers will report the sales volume of products that was sold into or within the SCAQMD. If the manufacturer can determine the final destination of their products based on their current systems, they do not have to rely on the Big Box ~~Store~~ retailer or ~~Distributor~~ distribution center r~~R~~eports. If not, the manufacturer can compile their direct sales but use the Big Box ~~Store~~ retailer and ~~Distributor~~ distribution center ~~R~~reports to determine the sales that could have been distributed outside the SCAQMD. Staff will also conduct more outreach after the proposed rule has been approved to further educate stakeholders as to what their specific requirements are in regards to the proposed reporting.

Comment Letter #9

SAGE ATC
ENVIRONMENTAL CONSULTING

August 28, 2017

Sent by e-mail to
N.Silva@aqmd.gov
with original by US Mail

South Coast AQMD
21865 Copley Drive
Diamond Bar, CA 91765-4178

Attn: Nicole Silva, Air Quality Specialist

RE: COMMENTS ON PROPOSED CHANGES TO RULE 1168
ROOFING ADHESIVES IN PRESSURIZED CANISTERS

As requested at the workshop held August 17, 2017 to discuss changes in South Coast AQMD Rule 1168, Sage ATC Environmental Consulting LLC (Sage ATC) is submitting the following comments for consideration.

Scope of Comments

Sage ATC represents a manufacturer who desires clarification on determining Volatile Organic Compound (VOC) content for two distinct urethane roofing adhesive products delivered under pressure from canister systems.

9-1

1. A single canister pressurized system containing a suspension of a diisocyanate compound, propellant and an amount of exempt or nonexempt VOC compound (dependent on application) that are applied through a hose and discharged from a nozzle to react by polymerization with water vapor in air to become an adhesive once released from the canister.

2. A two canister pressurized system with each canister containing one material that is mixed through a nozzle which then hardens in a polymerization process to form a polyurethane (typical example: Part 1 methylene diphenyl diisocyanate and Part 2 diethylene glycol, or similar hydroxyl containing compound). Discharge occurs via a separate delivery line from each canister through a manifold at a spray gun, thus discharging a reacting product to the work surface. Mixing occurs in the spray gun through a static mixer (motionless mixer) nozzle for delivery to the work surface.

These products will need to be tested in order to determine their VOC content to certify that they meet both the existing and proposed standards for roofing adhesives. Although considerable amount of discussion on test methods occurred during the workshop, I am concerned that our specific application for materials found in pressurized canisters has not yet been adequately addressed.

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Specific Comments

9-2 1) Both the existing and proposed changes to Rule 1168 do not include a category specifically for roofing adhesives delivered by a pressurized system, such as a 5-gallon canister. It does not appear that the pressurized product in the canister would qualify for listing as an aerosol. We would like to see a new category created for this type of pressurized product, which is much different than the traditional "mop-on" roofing adhesives that the AQMD may be familiar with.

9-3 2) The test methods do not appear to give adequate guidance on how to proceed with determining the VOC content of a pressurized canister.

3) Any test procedure that is referenced or developed for these product found in pressurized containers should recognize that these materials contain reactive products that should be evaluated for VOC content after curing.

9-4 4) Since the definition of a Reactive Diluent, as found in renumbered definition No. 72, has been replaced with Reactive Product, it appears that the use of reactive diluent found in renumbered definition 36 should also be replaced with reactive product, i.e. to read:

"for regulated products that contain reactive ~~diluent~~ products"

9-5 5) A new definition should be added for the term "Reactive Adhesive" which is used in Test Methods Section (e)(1)(H).

9-6 6) A worked example of how the various components of the equation for VOC content would be determined in the case of a pressurized canister containing reactive products would appear to be quite helpful as guidance for properly determining the VOC content and compliance with the Rule.

I would be please to discuss and clarify these comments as necessary. Please feel free to contact me at (760) 724-5732.

Sincerely,

Sage ATC Environmental Consulting LLC

Paul A. Weir
Senior Engineer
Certified Permitting Professional B4341

Roofing Adhesive Silvalett 1

Response 9-1

Staff would need further information regarding the adhesive systems described in the letter to definitively state how the adhesives would be tested. Staff welcomes further discussions with the manufacturer. Typical urethane systems can be tested by EPA Method 24. If the propellant is a VOC, it must be included in the VOC calculation. The manufacturer can rely on formulation data as well as laboratory testing to demonstrate compliance with the method.

Response 9-2

While Rule 1168 does not specifically address adhesives delivered by a pressurized canister, if the product meets the definition of an adhesive (any substance that is used to bond one surface to another surface by attachment), it would fall under Rule 1168. The specific category depends on the use of the product, not the delivery mechanism, unless the application is specifically exempted in subdivision (i).

Response 9-3

The VOC content is dependent on the product inside the canister and the type of propellant used. Staff can include further information in the guidance document it will develop and encourages the manufacturer ~~will~~ to participate in that future process.

Staff is very familiar with conducting VOC testing on reactive products.

Response 9-4

Thank you for this comment, staff concurs and amended the definition.

Response 9-5

Staff amended the definition of reactive products to clarify that it includes adhesives, adhesive primers, sealants, and sealant primers. Test method (e)(1)(H) is for a sandwich method where the product is placed between two substrates. That method is not applicable to sealants; therefore, it specifies reactive adhesives.

Response 9-6

Staff will work to include the suggested example in the guidance document.

Comment Letter #10

American Chemistry Council | Center for the Polyurethanes Industry

August 31, 2017

Nicole Silva
Air Quality Specialist
Planning, Rule Development & Area Sources
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178

Re: Proposed Amended Rule 1168 – Adhesive and Sealant Applications

Via: Electronic Mail

Dear Ms. Silva:

10-1 The American Chemistry Council's Center for the Polyurethanes Industry[1] (CPI) appreciates the opportunity to provide these comments to the South Coast Air Quality Management District (SCAQMD) in response to the Proposed Amended Rule 1168 – Adhesive and Sealant Applications. CPI thanks SCAQMD for its willingness to meet with our organization; these comments build upon the discussion with SCAQMD during our meeting on August 30, 2017. Our comments focus on the definition of the foam sealant product category, and the proposed 50 g/L volatile organic compound (VOC) content limit for January 1, 2023. Additionally, CPI offers several technical corrections to Table 7 of the Preliminary Draft Staff Report. CPI intends these comments to be constructive to help ensure that the final rule is both technically accurate and feasible in its implementation.

Foam sealants increase energy efficiency of buildings, which in turn reduces emissions of greenhouse gases and helps California meet both its climate and energy efficiency goals. More specifically, in 2006, California passed the California Global Warming Solutions Act of 2006 (AB 32) which sought to reduce greenhouse gas emission to 1990 levels by 2020. This was followed by Governor Brown signing Executive Order B-30-15 in August 2015, which seeks to reduce greenhouse gas emissions 40% below 1990 levels by 2030. California's landmark SB 350 requires that the State double its energy efficiency, and building code, Title 24, requires that all new residential construction in the State be zero net energy-ready. Any implementation of a 50 g/L VOC content limit could significantly alter the availability of foam sealants in South Coast and hinder the State's progress towards the aforementioned goals. Given that up to 40

[1] The Center for the Polyurethanes Industry (CPI) of the American Chemistry Council serves as the voice of the polyurethanes industry in North America, promoting its development and coordinating with polyurethane trade associations across the globe. The polyurethane industry supports research and initiatives that serve its communities and customers. The business of polyurethane is a $26.5 billion enterprise and a key element of the U.S. economy. The industry operates in more than 1,000 locations in the U.S. and directly employs more than 46,500. A major job creator in the U.S., each job in the polyurethanes industry yields five more jobs indirectly for an approximate total of 235,000 jobs supported.

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percent of a building's energy is lost due to air infiltration,[2] foam sealants provide a simple and cost effective method to increase a building's energy efficiency.

1. **Product Definitions**

The proposed definition for "foam sealant" is overly broad and does not provide the needed specificity to the regulated community.

One component (1K) foam sealants contain pre-polymerized polyurethane foam and blowing agents used to form the cellular structure of the foam. There are two distinct types of 1K foam sealants: those found in aerosol cans (between 12oz and 29oz) and those found in canisters (between 10 pounds and 25 pounds). Aerosol cans of foam sealant, often referred to as "foam in a can," generally use hydrocarbon (HC) gas as the propellant *and* the foam blowing agent. In contrast, canisters generally use hydrofluorocarbons (HFCs) as the foam blowing agent. Because 1K canisters do not use HC propellant / blowing agents,[3] they tend to be low VOC products, often as low as 50 g/L, or lower.

10-2 Two component (2K) low pressure (LP) foam sealants come in kits of two canisters. The "A-side" contains methylene diphenyl isocyanate (MDI), and the "B-side" contains a mixture of polyols, blowing agents and other additives. The blowing agents used in 2K foam sealant kits are generally HFCs or Hydrofluoroolefins (HFOs). Similar to the 1K canisters these products tend to be low VOC products, 50 g/L or below.

Because spray polyurethane foam (SPF) insulation is not a sealant, 2K SPF insulation products do not fall within the scope of Rule 1168. Therefore, the reference to, and definition of, "insulation foam" should be removed from the proposal. In Rule 1168, SCAQMD defines sealants as:

> SEALANT is any material with adhesive properties that is formulated primarily to fill, seal, or waterproof gaps or joints between two surfaces. Sealants include caulks. Sealant does not include any sealer that is applied as a continuous coating.

SPF insulation is used to insulate a building, not to seal gaps or joints. During our August 30, 2017 meeting, SCAQMD representatives implied that applying SPF insulation into a wall cavity is considered filling or sealing the gap between the studs in a wall or joists in an attic. This interpretation of "gap," is overly expansive and will allow SCAQMD to regulate any product that is applied in vacant space between two objects.

[2] https://www.energystar.gov/index.cfm?c=new_homes_features.hm_f_reduced_air_infiltration
[3] 1K foam sealant canisters often use HFC-134a as the blowing agent. EPA exempts HFC-134a from the definition of a VOC. (See 40CFR51.100(s)).

CPI comments to SCAQMD Re: Rule 1168
August 31, 2017
Page 3

Both types of 1K foam sealants and 2K LP foam sealants are not insulation products. Therefore, CPI proposes the following changes:

(35) FOAM SEALANT is a foam used to fill and form a durable, airtight, water resistant seal to common building substrates such as wood, brick, concrete, foam board and plastics. ~~Foam sealant includes insulating foam.~~

10-2 con't ~~(43) INSULATING FOAM is polymer-containing material injected into wall cavities to provide thermal resistance and sound reduction.~~

When developing VOC content restrictions for the foam sealant category, SCAQMD must consider the different types of foam sealant formulations. 1K aerosolized cans, 1K canisters, and 2K LP sealants are all different products. 1K aerosol cans contain HC blowing agent, that also serves as the propellant. The HC generally drives the VOC content. 1K canisters and 2K LP sealants use HFCs or HFOs as the blowing agent and therefore are significantly lower in VOC content, as previously mentioned.

2. VOC Content Limits

Because 1K aerosol cans of foam sealant ("foam in a can") use HC as the propellant *and* blowing agent, there is not a drop-in substitute for HC propellants readily available. Any mandated change to a lower VOC propellant would require a complete reformulation to ensure adequate foam quality and functionality, and possibly result in a complete re-qualification, re-evaluation and re-listing, per the local building code.

Given the uncertain regulatory landscape of HFCs,[4] HC propellants remain the only technically viable chemistry that provides the necessary pressure to apply the foam sealant. Typically, 10-3 industry needs 3 to 5 years to transition to a new formulation. This time frame includes research, design and testing, as well as time to seek the necessary approvals under local building code requirements. CPI commends SCAQMD's inclusion of a provision to conduct a technology assessment, however, the assessment should be used to make reliable and informed decision making and must be conducted significantly prior to any implementation of lower VOC content limit to allow the market sufficient time to transition.

As manufacturers have indicated, no market-ready "foam in a can" formulation currently exists that replaces HC propellants; therefore, transitioning to the proposed foam sealant VOC limit of 50 g/L on January 1, 2023 will likely be disruptive and unworkable. CPI believes that the 50 g/L limit is not currently feasible, and therefore requests that SCAQMD withdraw the proposed 50 g/L limit and conduct a technology assessment on lower VOC propellants for 1K foam sealants. A new proposed rule could result if the District finds that the necessary technology exists. Conducting the technology assessment and issuing a new proposal, if needed, will provide the necessary regulatory certainty to manufacturers.

[4] See *Mexichem Fluor v. EPA*, U.S. Court of Appeals, DC Circuit, August 8, 2017.

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To address these concerns, CPI suggests the following changes to the proposed regulations:

Category	VOC Limits (g/L)*				
	Current	Upon Adoption	1/1/2019	1/1/2021	1/1/2023
Foam Sealant	250	200			~~50~~**

*VOC limits are expressed as grams of VOC per liter of regulated products less water and less exempt compounds as determined in paragraph (b)(36) except for low-solid regulated products where the VOC limit is expressed in grams per liter of material as determined in paragraph (b)(37).

**Technology assessment will be conducted by January 1, 2022 and the Executive Officer shall report on the results of the technology assessment to the Stationary Source Committee prior to ~~the~~ January 1, 2023 ~~implementation date~~. SCAQMD will issue a proposed Rule 1168 to implement any new VOC content limits.

10-3 In the alternative, SCAQMD can consider developing a more feasible timeline for the technology assessment. CPI proposes that SCAQMD conduct the technology assessment by January 1, 2019, and report the results to the Stationary Source Committee by January 1, 2020. This will give industry 3 years to reformulate, if SCAQMD determines that the necessary technology exists. If the assessment cannot be conducted by January 2019, any proposed content limit date should be adjusted to at least January 1, 2025.

In this alternative approach, CPI proposes:

Category	VOC Limits (g/L)*				
	Current	Upon Adoption	1/1/2019	1/1/2021	1/1/2023 (or 1/1/25)
Foam Sealant	250	200			50**

*VOC limits are expressed as grams of VOC per liter of regulated products less water and less exempt compounds as determined in paragraph (b)(36) except for low-solid regulated products where the VOC limit is expressed in grams per liter of material as determined in paragraph (b)(37).

**Technology assessment will be conducted by January 1, 2019 ~~2022~~ and the Executive Officer shall report on the results of the technology assessment to the Stationary Source Committee prior to ~~the~~ January 1, 2020 ~~2023~~ ~~implementation date~~.

3. Corrections to the Draft Staff Report

CPI offers the following changes to the Preliminary Draft Staff Report:

> The foam sealant itself is typically one component pre-polymerized polyurethane or two component kits ~~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.

10-4

Table 7 of the Preliminary Draft Staff Report contains several errors needing correction:

- the VOC content of DAP Kwik Foam is 194 g/L, not 19 g/L.
- Canadian Industrial Distributors One-Component Polyurethane Cylinder Foam and Fomo Handifoam 40 aerosol cans are no longer on the market.
- Hilti CF812 contains propellant using a mixture of three hydrocarbons at level of 5%-15% each. The VOC content reported in Table 7 may be incorrect.
- TACC Miracle FoamSeal 2100A and ITW TACC Miracle FoamSeal F6400 LVR are structural adhesives and should be removed from Table 7.
- Tiger Foam and Icynene LD50 are manufactured as multiple types of polyurethane foam products. The 2K SPF products are not foam sealants. Table 7 should be updated to include the specific product that is being referenced with the correct VOC content.

CPI welcomes the opportunity to further discuss the points raised above with SCAQMD prior to the publication of the final Rule 1168. Please contact me at stephen_wieroniey@americanchemistry.com or (202) 249-6617 with questions or requests for additional information.

Respectfully submitted,

Stephen Wieroniey
Director

Response 10-1

Staff is not proposing to limit the use of foam sealants but to reduce the VOC content of those products. Staff has not been presented with any information that would indicate a lower VOC product that uses a non-VOC propellant would be less effective at the increasing energy efficiency of the building.

Response 10-2

The definition of a sealant is any material with adhesive properties that is formulated primarily to fill, seal, or waterproof gaps. Insulating foams fill the wall cavity, the gap between two joists or studs; therefore, insulating foams are within the scope of Rule 1168. Based on the August 30th meeting and in response to the commenter's request, staff did create a separate category to distinguish insulating foams from foam sealants and amended the foam sealant definition. It is common for a product category to include many different chemistries, as well as single component and multi-component products. The categories are created to describe the use of the products and the future effective dates for lower VOC limits are to set a limit on when the high-VOC products can be used in our jurisdiction.

Based on a comment letter submitted to the Stationary Source Committee on September 13, 2017 from the American Chemistry Council and subsequent discussions, staff reviewed the definition of "sealant" in the CARB CPR and the OTC Model Rule. Both regulations have the same definition and it includes "weatherproofing". Staff is proposing to align the definition in PAR 1168 with those regulations. As stated previously in this report, staff made an effort to harmonize PAR 1168 definitions with both CARB and the OTC. The definition change also provides further clarification that foam insulation; previously referred to as "insulating foam," fall within the applicability of Rule 1168. The proposed definition change is the following:

> SEALANT is any material with adhesive properties that is ~~*formulated primarily*~~ designed to fill, seal, ~~*or*~~ waterproof, or weatherproof gaps or joints between two surfaces. Sealants include ~~sealant primers and~~ caulks.

This is not a significant change as insulating foams were included in the proposed amendment since the rule process began in 2013. This change will clarify and harmonize the definitions. Per the commenter's request after Stationary Source Committee, staff revised the name for "insulating foams" to "foam insulation" and proposed a 250 g/L VOC limit upon adoption, which will be reduced to 50 g/L based on the results of the technology assessment.

Response 10-3

Staff already proposed a ~~5~~five year implementation timeline for foam sealants to allow time for reformulation. The initial proposed amendment in 2014 included a 20 g/L VOC limit with an effective date of January 1, 2018. The current proposal is a 50 g/L VOC limit effective January 1, 2023 and includes a technology assessment for staff to evaluate the progress of reformulation of foam sealants. Staff developed this limit and timeframe with stakeholder feedback on what is feasible. Staff did amend the proposal to include an early technology assessment, in 2020, to gauge

progress on reformulation efforts. The first reporting year in 2019 will be critical to understand the status of the affected categories and lower VOC reformulation.

Response 10-4

Staff appreciates the suggestions and made correction to the staff report.

Comment Letter #11 Summary

The following is a summary of the comment letter received from Bostik, Inc on Augusts 31, 2017.~~"~~

Comment 11-1:

While there are wood flooring adhesives that meet the 20 g/L VOC limits, the performance properties were not considered when proposing this VOC limit.

Comment 11-1:

Not all product chemistries have applicable test methods.

Comment 11-3:

Bostik understands that VOC limits must be lowered to meet air quality goals and suggests the SCAQMD either: lower VOC limits to reflect the sales weighted average, adopt separate VOC limits for water-based and solvent-based adhesives or extend the compliance date until 2023.

Response 11-1

See comment response 3-2.

Response 11-2

Staff is aware that there is currently no accepted test method measuring certain niche products and looks forward to working with the manufacturers to address this deficiency. This is a pre-existing issue and is not the result of any of the proposed changes to Rule 1168.

Response 11-3

Staff appreciates the suggestions; however, if the VOC limits are simply lowered to reflect the sales weighted average or allow higher VOC limits for solvent based chemistries, no actual emission reductions would be achieved. Although s~~S~~taff feels there are adequate products available that meet the future proposed VOC limit, staff understands the other concerns included in this comment letter and is ~~so is not~~ proposing to delay the implementation date to January 1, 2023 for several categories.

Comment Letter #12

Sika Corporation

August 29, 2017

Ms. Nicole Silva
Air Quality Specialist
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Comment on Rule 1168 proposed changes

Dear Ms. Silva:

Sika Corporation is submitting comments for the District's review regarding the proposed changes to Rule 1168. Below are our comments.

I. **Wood Flooring Adhesive VOC limit:**

We believe the proposed limit and effective date for wood flooring adhesives are too demanding for industry to comply with.

Sika does not add what is considered a "solvent" but instead a lower boiling hydrocarbon that contributes to 100% of the VOC level we currently find in these Wood Floor Bonding Products. Our R&D already has made concerted efforts to substitute many other higher boiling liquids to lower the VOC, but when we do so, we significantly decrease the elongation and toughness of the adhesive. We have not been able to find higher boiling hydrocarbons that sufficiently plasticize and cut the viscosity of these formulated systems. Most likely durability in the application will be sacrificed as well
12-1 with the reduced toughness. We have also experienced the separation issues as noted.

Sika produces products which meet customers' highest expectations of quality and robust durability though careful technical and application development. While Sika intends to diligently work on providing products that meet these requirements, it will take substantial time and significant effort to find technical solutions which currently are not apparent for these very low VOC limits. Not only does solvent improve adhesion in urethane based wood flooring adhesives, but it also allows the material to be applied easier which benefits both the contractor and the consumer. This is a major consideration for contractors because a high viscous product takes more time and effort to apply than a low viscous product. Even small changes to application process can compound the difficulty of a large scale installation, such as a new apartment building.

Sika Corporation, 201 Polito Avenue, Lyndhurst NJ 07071, USA
Tel: 201 933 8800, Fax: 201 933 9379, www.sikausa.com

12-1 con't

As part of product development, our R&D department has evaluated the performance of similar industry products. It has been noted that low-VOC moisture-curing products are consistently more difficult to apply than products with higher VOC values. Our R&D department has also noted that replacing too much solvent with other low density liquids (e.g. plasticizer) will result in separation, a decreased shelf life and poor product quality. The reduction of VOC values from 100 g/L to 20 g/L is a severe reduction based on a small sample size (10 products). The drastic reduction will require a change in technology which will impact the product performance in a negative way.

Sika respectfully requests that the District keep the VOC limit at 50 g/L as previously discussed in the first working group and that the effective date be January 1st, 2021. We believe the reduction from 100 g/L to 50 g/L would be reasonable to assist in reducing emissions within the District.

II. **Architectural Sealant VOC limit:**

12-2

We respect the District's reasoning for reducing the Architectural Sealant limit from 250 g/L to 50 g/L outlined in the Preliminary Draft Staff Report. However, we ask the District to consider a gradual limit reduction to allow more time to re-formulate products, especially highly specialized products. Sika proposes an initial reduction to 175 g/L effective on January 1st, 2019, a reduction to 100 g/l effective on January 1, 2021 and then a final reduction to 50 g/L effective on January 1, 2023. This approach should allow Sika, as well as other companies, to allocate the necessary R&D resources to reformulate products while maintaining the product quality.

III. **Reporting frequency:**

12-3

Sika suggests that reporting be required every five years for the previous two years, as products and technologies do no change significantly from year to year. The data collected every five years would be sufficient for the District to accurately evaluate VOC trends in products and follow reductions in total emissions. Frequent reporting is burdensome and time consuming for businesses to organize the relevant information.

IV. **Rule timeline:**

12-4

To provide industry with more time to understand and prepare for the proposed rule, we respectfully request that the final public hearing be moved to December.

Sika is also in support of a reporting exemption for low VOC products. We understand that the low VOC product information is necessary for the District to evaluate technological trends. As a compromise we suggest less frequent reporting requirements specifically for low VOC products.

-2-

V. **Labeling**

12-5 We understand the addition of a manufacturing date is necessary for the implementation of a sell-through period, which we are in support of. However, our packaging only includes an expiration date, which is consistently one-year after the manufacturing date. This topic was briefly mentioned during the second working group, but we ask for further clarification as to whether an expiration date is sufficient for this requirement.

VI. **Non-Compliant Products Stored in the District**

12-6 We ask for a final clarification on the manufacturer's culpability in reference to the storage of non-compliant products which will be used outside of the District. During the second working group, the District Counsel explained that a letter from the manufacturer noting the product's non-compliance is acceptable in conjunction with the 55-gallon per year exemption reporting from the distributor. Would a written statement from a manufacturer to a customer also relieve liability for storing non-compliant products in warehouses within the District?

Please feel free to contact me at (201) 508-6761 should you have any questions regarding our comments.

Sincerely,

Victor Dino, CHMM
Vice President, EHS

-3-

Response 12-1

See response to comment 3-2.

Response 12-2

Staff appreciates the proposal but based on the survey data, believes there is sufficient data to justify the lower VOC limit by 2019. Further, feedback staff receives from stakeholders is usually not to include interim VOC limits because that leads to double the reformulation work. At this stage in the amendment, staff is hesitant to propose such a change.

Response 12-3

See response to comment 1-6.

Response 12-4

Please see the ~~k~~Key Concerns~~issues~~ section in this staff report and response to comment 7-2 regarding reporting of low-VOC products.

Staff noted the request to delay the Board Hearing until December. This amendment will be brought to the Stationary Source Committee on September 15, 2017, they will determine if the amendment needs to be delayed.

Response 12-5

Staff proposed a labeling requirement that includes either the date of manufacture or a date code indicating the date code of manufacture. The manufacturer can use the expiration date as the date code provided they file with the Executive Officer of the District an explanation of each date code, as required in subparagraph (f)(1)(C).

Response 12-6

Staff included a proposed exemption for those products that manufacturers or suppliers state, in written notification, are not to be sold in SCAQMD jurisdiction. The manufacturer or supplier is required to maintain this written notification for up to three years, to demonstrate proof of exemption.

Comment #13

Dear Ms. Silva,

Below is further explanation of the comments I had spoken about earlier at the Rule 1168 workshop.

13-1

1. Please require VOC content to be included with SDS literature. Because the manufacturers place the VOC content on the label, they feel they no longer need to include the VOC content to their SDS literature. This becomes a problem since most end users would have to physically check each products VOC from the label rather than easily looking up the VOC on the SDS. Also it makes it difficult to provide supporting documentation for the AER or to an inspector if the SDS does not have the VOC listed for the products.

13-2

2. Resorcinol is used to make wooden marine boats/vessels. The City of Los Angeles Harbor Department (Port of Los Angeles, AKA Port) uses wooden boats, skiffs, and ponts (vessels are 16 feet long or smaller) as part of daily maintenance operations. These things are basically made out of marine plywood, nails, and resorcinol. The difference between marine plywood and exterior plywood is that marine plywood is coated in resorcinol. The resorcinol is what keeps the boat held together and water-proof. These ponts and skiffs are used by Port maintenance staff to do construction or repair under/on docks and other structures in our waterways. The wooden boats are used by our surveyors to check the condition of our structures and obtain samples. Wooden vessels are used in place of other material boats because in case if there is a leak the boat would continue to float and workers would be able to wait above water for help to arrive. Aluminum or fiberglass boats would sink, requiring immediate rescue of the workers, and a dive team to recover the vessel. The Port uses resorcinol to maintain and construct these wooden boats ourselves.

   The manufacturer that we used to get the resorcinol (DAP) no longer makes it. DAP's resorcinol VOC was 171 g/L (on label but not listed on SDS which points back to my first concern). We still have some DAP resorcinol, but once we run out we will have to purchase a different manufacturer brand. Their new product, Weldwood Plastic Resin Glue, does not advertise that is for marine use, see attached product data sheet. So if we use this product and it does not hold up to a marine environment, DAP will just say that it was not meant for a marine environment even though it is the replacement for their resorcinol product line.

   The only other resorcinol my Boat Carpentry staff can find is Aerodux Resorcinol Resin Kit, see attached SDS. The VOC listed is the Material VOC rather than Coating VOC (without water & exempt compounds) as 330.5 g/L which is above the 250 g/L limit that SCAQMD is stating resorcinol fell under. I do not know if their coating VOC would meet the 250 g/L limit, but since the value is normally higher without water and exempt compounds there is low probability it would. Resorcinol is only used for wooden products so the manufacturer probably classifies it as a marine deck sealant which has a coating VOC limit of 760 g/L. If there are other manufacturers that SCAQMD might know about that has compliant resorcinol we will gladly use it.

   As I stated above, resorcinol is a key product for maintaining our wooden boats, which are used in daily maintenance of our infrastructure. We use it only for repair or to build a replacement vessel, which is maybe once a year at most. Actual amount used to rebuild a boat would depend on the size but generally we stay

under 55 gallons, so I do not know if that means we can qualify for the 55 gallon exemption especially since we use other products that contain VOCs for our other operations.

3. Another concern is the use of adhesives on the marine vessels. We use a lacquer based DAP Original Contact Cement (pint/quart size) to repair things on our marine vessels and other items exposed to a marine environment. This product's VOC is 459 g/L, see attached SDS. They do not market it as a marine adhesive which is what we consider it as, but as a multi-purpose adhesive. See link to their website.

   http://www.dap.com/dap-products-ph/weldwood-original-contact-cement/

   This makes it difficult as an end user, since it meets VOC limits for top & trim adhesive in the new rule. However, since the proposed rule requires the product to meet the VOC limit that is the lowest limit for what the product is marketed, then the VOC limit for this product would fall under Multi-Purpose Construction Adhesive which is only 70 g/L making this particular product not compliant. They make a water-based product that meets this requirement, but the water-based version does not last in a marine environment. All water-based products in a marine environment start to lose their adhesion from all the moisture in the surrounding environment. This is especially true at the Port since our equipment is in a marine environment 24 hours a day, 7 days a week. So if boat carpentry staff glues something using the water-based product, within weeks/months it starts to come undone. Our staff has started to have real concerns about vessels falling apart in the water because we are having to use compliant products that do not meet our needs. We lose time, money, and productivity because we have to redo the work since it is a safety hazard not to complete the repairs. Also since they make a compliant water-based product, we have concerns that DAP will then stop making the lacquer-based version and the Port would only have the water-based product option that does not work in our environment. 13-3

   By having the lowest limit be the default, it makes it difficult for us to find products for marine use since manufacturers are marketing the products we use for multi-purpose or general use now, which defaults to lower VOC limits than what a marine product can have. The rule should include an exemption to the lowest marketed VOC limit category for end users using products for marine purposes as long as they meet the already existing marine adhesive/sealant categories or SCAQMD should add a specific marine adhesive only category so manufacturers can market a marine only adhesive.

   Our boat carpentry staff have not been able to find a similar product that has worked in the marine environment. If SCAQMD has a list of any products that they have found that are compliant and serve the same function, we will gladly test them to see if they can be a suitable replacement for the DAP Original Contact Cement.

If you have any other questions or more explanation, please feel free to contact me. I've cc'ed our Boat Carpentry supervisor, John Radovcich, who would be able to go into more detail of how these products are used and why water-based products are not meeting our needs.

Thank You,

Amber Coluso
Air Quality Environmental Specialist
Port of Los Angeles
Environmental Management Division
425 S. Palos Verdes St.
San Pedro, CA 90731
Office: (310) 732-3950
Fax: (310) 547-4643
acoluso@portla.org

Response 13-1

The SCAQMD does not have the authority over what is included on SDS.

Response 13-2

The SCAQMD is required to lower to VOC limit for the Waterproof Resorcinol Glue due to RACM/BACM requirments. The 55 -gallon per year exemption is an option for low-use applications if no other compliant products are available.

Response 13-3

The proposed VOC limit for Ttop and Ttrim Aadhesives limit, which applies to automotive and marine use, will increase to 540 g/L upon rule adoption. Staff is proposing to lower the limit back to 250 g/L by 2023. The VOC limit reduction includes a technology assessment. At the time of the assessment, staff will specifically inquire about the adhesives available for marine use and carve out a higher limit or exemption if needed.

Comment Letter #14

The Dow Chemical Company
Midland, MI 48674
U.S.A.

August 9, 2017

Heather Farr
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Comments on the Proposed Amendment to Rule 1168

Dear Ms. Farr,

The Dow Chemical Company appreciates the opportunity to provide input on the proposed changes to Rule 1168 to South Coast Air Quality Management District (SCAQMD).

The Dow Chemical Company is driving innovations that extract value from material, polymer, chemical and biological science to help address many of the world's most challenging problems such as the need for clean water, clean energy generation and conservation, and increasing agricultural productivity. Dow's integrated, market-driven, industry-leading portfolio of specialty chemical, advanced materials, agrosciences and plastics businesses delivers a broad range of technology-based products and solutions to customers in approximately 180 countries and in high-growth sectors such as packaging, electronics, water, coatings and agriculture. In 2016, Dow had annual sales of over $48 billion and employed approximately 49,000 people worldwide. The Company's more than 6,000 product families are manufactured at 179 sites in 35 countries across the globe.

Dow respectfully submits the following written comments concerning the Proposed Amended Rule 1168. In addition to these comments, Dow completely agrees with and supports the comments sent to SCAQMD by both the American Coatings Association and the Consumer Specialty Products Association.

Overall, we have some concerns with the proposed amendment, particularly with respect to its potential impact on the Insulating Foam Sealant market, and the proposed VOC limit for these products that is not technically or economically feasible with today's technologies. These concerns are further articulated below.

1. The phrase "weigh less than one pound and consist of less than 16 fluid ounces" in Section (a) "Purpose and Applicability" should be revised to read "weigh one pound or less and consist 16 fluid ounces or less".

14-1

Insulating Foam Sealants for consumers are commonly sold in 16 oz. cans by retailers. If the rule is left as currently proposed (less than one pound and less than 16 fl. oz.), SCAQMD will be interfering in the sales of only some retailers thus interfering in free market practices. This change is needed to align with paragraph (i)(11) and with the California Air Resources Board's (CARB) Consumer Product regulation.

2. Insulating Foam Sealants provide significant benefits by reducing greenhouse gas emissions and saving energy. Additional regulation of these products could have significant adverse impact.

Both CARB and the US Ozone Transport Commission recognize the importance of Insulating Foam Sealants in reducing greenhouse gas emissions, and they continue to exempt these products from severe VOC limits. SCAQMD should continue to exempt these products also.

14-2

Dow is a major producer of highly efficient building insulation and air sealing products, such as one component polyurethane Insulating Foam Sealant. As a leader in energy efficient residential and commercial construction, California relies upon these products not only to reduce energy costs for California consumers and business owners, but also to help California reach its aggressive reduction goals in greenhouse gas (GHG) emissions from the buildings sector.

Insulating Foam Sealant products are valuable building products and can help California meet other air quality and climate-focused goals. With respect to buildings, the state has set ambitious goals for improving energy efficiency. The California Energy Commission is working toward the goal of zero net energy for all new residential construction by 2020.[1] Governor Brown recently signed legislation aimed at increasing energy efficiency for existing buildings in the state.[2]

The typical U.S. home has gaps and cracks that stretch a half-mile long.[3] These gaps and cracks reduce home energy efficiency by allowing conditioned air – which citizens have paid to heat and cool – to escape as unwanted external air sneaks in. Proper insulating and air sealing, which often includes application of Insulating Foam Sealants, increases home energy efficiency and can help lower home energy bills by up to 30%.[4]

[1] California's New Residential Zero Net Energy Action Plan. Available at: http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/eesp/res_zne_action+plan.htm.
[2] Clean Energy and Pollution Reduction Action of 2015 (SB-350).
[3] energystar.gov
[4] Residential Energy Services Network (RESNET) Savings will vary.

[5]http://energy.gov/sites/prod/files/2014/09/f18/61628_BK_EERE-EnergySavers_w150.pdf

SCAQMD should carefully select its VOC emission reduction strategies to ensure that actions do not have the unintended consequences of deselecting energy efficiency products like Insulating Foam Sealants and other spray polyurethane foams.

3. The proposed 2023 "Foam Sealant" VOC limit of 50 g/L is not practical and seems to be an arbitrarily selected target.

There is no readily available/drop-in alternative to the currently used hydrocarbons in one component Insulating Foam Sealants, which typically have VOCs less than 200 g/L. It is not clear how the target VOC limit of 50 g/L was selected.

14-3

One proven alternative, HFC-134a, cannot be used today due to U.S. EPA SNAP regulations on foam blowing agents. Currently available HFOs have been suggested, however they do not meet product performance requirements as they do not have the appropriate vapor pressures. Any blowing agent used in the Insulating Foam Sealants aerosol cans must not only help the product create the insulating foam by creating closed cells in the foam, it must also behave as the propellant for getting the entire product out of the can to avoid product waste. The HFOs fall short on meeting these requirements.

The proposed rule states that a "technology assessment will be conducted by January 1, 2022 and the Executive Officer shall report on the results of the technology assessment to the Stationary Source Committee prior to the January 1, 2023 implementation date". Without the results of the technology assessment showing that a 50 g/L VOC is feasible, the selection of this limit seems arbitrary. We suggest that the 50 g/L VOC limit be removed from the proposed rule. If the 2022 technology assessment finds that a lower

VOC limit is warranted, then the lowered VOC limit can be implemented in a future rule amendment. Dow respectfully requests the opportunity to participate in any future technology assessment that impacts Insulating Foam Sealants.

4. SCAQMD is likely confusing two different products, two component and one component polyurethane foams.

The current definition of 'Foam Sealant' covers both one component and two component systems. These two VERY different products can NOT be addressed under the same VOC restriction. They are completely different technologies.

14-4

a. Two-component spray polyurethane foam (2K-SPF) products include both insulations and insulating foam sealants and are sold in containers that are typically larger than one pound (i.e. tanks and drums). Dow's 2K-SPF products are very low VOC, at or near zero, as they have special required application tools and must use non-flammable blowing agents.
b. One component polyurethane "Insulating Foam Sealants" are sold by Dow typically in 12, 16, and ~25 oz. Aerosol Cans; these products use a blend of hydrocarbons for the propellant and foaming agent.

Dow recommends that SCAQMD take time to meet with industry to better define the "Foam Sealant" category, and again highly encourages SCAQMD to exclude Insulating Foam Sealants as done by CARB for the reasons previously noted.

14-5

5. Dow appreciates the sell-through provision of Section (c)(3) and agrees with it as written.

6. The reporting requirements found in Section (f)(2)(B) regarding reporting is a serious concern to Dow.

This requirement creates a significant burden for industry and creates concerns over the handling of confidential business information. The request for such data generates a large number of questions:

- How will the sales information collected by the District be handled and stored?
- What is the purpose of the information collection?
- What will be done with the data?
- How will SCAQMD guarantee the confidentiality of the sales data?

14-6

Additionally under (viii) it notes that "the annual quantity of each product including products sold through big box retailers with distribution centers located within or outside the District";

- Does this mean that SCAQMD expects Dow to provide our entire national sales data to the "Big Box Stores"?
- Why does SCAQMD need such national data?
- Since SCAQMD is proposing to require the "Big Box Stores" to report on their sales of the products within the district, why would the manufacturer be expected to provide national sales data or any data at all, that is sold through those stores?
- How will SCAQMD ensure that ALL data provided to them by retailers and facilities is kept as business confidential even if the retailer or facility fails to properly mark the data as such?
- Also, what is the guarantee of confidentiality through the proposed electronic submission of data by the Big Box Retailers?

This type of confidential information could negatively impact the manufactures if not properly handled. Lastly, this reporting is over burdensome.

Thank you for your consideration of these concerns. If you have any questions about the concerns raised in this letter please contact me by phone at 989.496.5398 or by email at Lee.French@DowCorning.com.

Respectfully,

Lee French
Regulatory SME
The Dow Chemical Company

Response 14-1

Thank you for the feedback, staff made this change in the rule.

Response 14-2

Please see response to comment 10-1.

Response 14-3

Please see response to comment 3-3 and 10-3.

Response 14-4

Please see response to comment 10-2.

Response 14-5

Staff appreciates the support.

Response 14-6

Please see the ~~k~~Key ~~issues~~ Concerns section in this staff report and response to comments 1-6, 3-6, 6-7, 6-14, and 8-4.

~~Subject to confidentiality,~~ Information submitted to the Executive Officer may be designated as confidential under the provisions of the California Public Records Act (Govt. Code § 6250-6276.48) ~~information submitted to the Executive Officer may be designated as confidential~~. The designation must be clearly indicated on the reporting form, identifying exactly which information is deemed confidential. SCAQMD staff will use a reporting spreadsheet, similar to what was used

for the survey, with an area to indicate the information is confidential; therefore, manufacturers have the ability to indicate that their data is confidential before they electronically submit their QER. The SCAQMD staff believes that the District's Guidelines for Implementing the California Public Records Act, which were adopted by the Governing Board on May 6, 2005 and amended on July 5, 2013 specifically with reference to trade secrets, adequately protect confidential information from misappropriation. The SCAQMD will request a justification from the entity claiming confidential information. The SCAQMD shall evaluate the justification, any other information at its disposal, and determine if the justification supports the claim that the material is in fact trade secret under Gov. Code Sec. 6254 and Sec. 6254.7. If the SCAQMD determines that the claim of confidentiality is not meritorious or is inadequately supported by the evidence, the SCAQMD shall promptly notify, by certified mail and email, the entity who claimed confidential status that the justification is inadequate and that the information will be released after 21 calendar days from the date of such notice unless the person claiming trade secret brings a legal action to preclude such release.~~.~~ The SCAQMD considers sales volume data confidential and is cautious to protect that data.

The SCAQMD has ~~strategies~~ procedures in place for protecting the confidentiality of information claimed as confidential. The SCAQMD has been handling confidential and trade secret information for many years without incident. The SCAQMD's computer systems are protected from outside attackers, and access by internal staff is controlled and audited. A security assessment was recently conducted which found no vulnerabilities from outside attackers. Controls for internal access include strong passwords, domain account authentication, limiting access to authorized users with proper role, antivirus software with updates, security software updates, and physical security.

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. As discussed in this report, the CARB CPR regulates certain consumer product adhesives and sealants throughout the state of California and the OTC has a Model Rule that applies to adhesives and sealants.

	PAR 1168	CARB Consumer Products Regulation	U.S. EPA Control Techniques Guideline for Miscellaneous Industrial Adhesives	Ozone Transport Commission Model Rule for ~~Adhesives and Sealants~~Consumer Products
Applicability	All use of adhesives, adhesive primers, sealants, or sealant primers excluding consumer and institutional use where the units of product, less packaging, weigh one pound or less 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.	Adhesives and sealants where the units of product, less packaging, weigh one pound or less and consist of 16 fluid ounces or less, that are sold for consumer and institutional use.	Voluntary guidelines to states to develop regulation to address adhesives used for industrial operations.	Sale and manufacture of consumer adhesives, adhesive primers, sealants, and sealant primers; and use restrictions that apply primarily to commercial/industrial applications.
Requirements	• VOC limits for adhesives used in architectural applications, industrial operations, and substrate specific applications. VOC limits for sealants used in architectural applications, roadway, and other applications. VOC limits for adhesive and sealant primers • Most restrictive clause for products subject to multiple VOC limits	• VOC limits for adhesives and sealants sold as consumer products for personal or institutional use • Three year sell through for products on shelf prior to effective date of rule • Most restrictive clause for products subject to multiple VOC limits	• VOC limits for adhesives, sealants and primers used in industrial operations • Minimum transfer efficiency requirements • Minimum air pollution capture and control efficiency of 85% • Trash and debris containing VOC must be in closed containers • Containers used for mixing shall be closed except when in use	• VOC limits for adhesives used in architectural applications, industrial operations, and substrate specific applications. VOC limits for sealants used in architectural applications, roadway, and other applications. VOC limits for adhesive and sealant primers • Limit on VOC content of solvents used for cleaning, surface preparation or stripping

	PAR 1168	CARB Consumer Products Regulation	U.S. EPA Control Techniques Guideline for Miscellaneous Industrial Adhesives	Ozone Transport Commission Model Rule for ~~Adhesives and Sealants~~Consumer Products
	• Three year sell through for products on shelf prior to effective date of rule • Trash and debris containing VOC must be in closed containers • Minimum transfer efficiency requirements • Minimum air pollution capture efficiency of 90%; minimum air pollution reduction efficiency of 95% • Alternative Emission Control Plan • Storage restrictions for non-compliant products • Containers used for mixing shall be closed except when in use		• Closed containers for cleaning solvent storage	• VOC content limit for solvents used to clean application equipment and requirements to clean in enclosed cleaning system • Minimum air pollution capture and control efficiency of 85% • Trash and debris containing VOC must be in closed containers
Recordkeeping	Daily recordkeeping	None	None	Monthly recordkeeping
Administrative	• Container labeling of VOC content and date of manufacture • Sales reporting from manufacturers, private labelers, big box retailers, and distribution centers • Annual reporting of sales utilizing 55 gallon per year exemption	• Container labeling of VOC content and date of manufacture • Sales reporting from manufacturers	• None	• Container labeling of VOC content
Prohibitions	• Prohibition of sale of products that do not meet VOC content limit	• Prohibition of sale of products that do not meet VOC content limit	• No atomization of cleaning solvent	• Prohibition of sale of products that do not meet VOC content limit

	PAR 1168	CARB Consumer Products Regulation	U.S. EPA Control Techniques Guideline for Miscellaneous Industrial Adhesives	Ozone Transport Commission Model Rule for ~~Adhesives and Sealants~~Consumer Products
	• Prohibition of sale of products containing certain chlorinated compounds • Prohibition of sale of products containing certain exempt compounds	• Prohibition of sale of products containing certain chlorinated compounds • Prohibition of sales of adhesives with any chemical compound that has a Global Warming Potential of 150 or greater		
Exemptions	• Exemption for adhesives and sealants subject to other source specific rules • Record keeping exemption (end-user) for products that contain less than 20 g/L VOC content • Exemption for containers less than one ounce • Rule does not apply to use in research and development • Exemption for products in certain categories when used in quantities of 55 gallons per year or less • Exemption for parade floats • Rule does not apply to consumer products used for personal or institutional use if regulated by CARB Consumer Product Regulation • Exemption for certain miscellaneous uses	• Exemption for solvents defined as low vapor pressure • Exemption for containers less than one ounce	• None	• Rule does not apply to use in research and development • Rule does not apply to consumer products used for personal or institutional use if regulated by another agency • Exemption for products that contain less than 20 g/L VOC content • Exemption for contact adhesives sold in volumes of one gallon or less • Exemption for certain miscellaneous uses • Rule does not apply to uses where annual emissions are less than 200 pounds per year • Exemption for products when used in quantities of 55 gallons per year or less

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 in the 2016 AQMP and needed 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, 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

1. California Air Resources Board, *Regulation for Reducing Emissions from Consumer Products* (January 2015). https://www.arb.ca.gov/consprod/regs/2015/article_2_final_1-22-15.pdf.

2. SCAQMD. *Final 2016 Air Quality Management Plan* from: http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp

3. SCAQMD. *tBAc Assessment White Paper* (~~2016~~2017, ~~October~~April). Retrieved from http://www.aqmd.gov/home/regulations/compliance/vocs/tbac-assessment

4. NAICS Association. (2013, November). from http://www.naics.com/index.html

5. California Air Resources Board. *Correspondence letter from Ellen Peter to Dr. Elaine Chang* (2014, June). http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1168/carb_cpr_correspondence.pdf

6. California Air Resources Board. Advisory 307: Industrial & Institutional Products Definition Clarification (2002, November). https://www.arb.ca.gov/enf/advs/advs307.pdf

7. Cocker, David. *Air Quality Impacts of Low Vapor Pressure-Volatile Organic Compounds*: https://www.arb.ca.gov/research/single-project.php?row_id=65165

8. Vo, Uyen-Uyen T.; Morris, Michael P. *Non-Volatile, Semi-Volatile, or Volatile: Redefining Volatile for Volatile Organic Compounds* from http://www.aqmd.gov/docs/default-source/planning/architectural-coatings/redefining-volatile-for-vocs.pdf

9. Ozone Transport Commission. *OTC Model Rule for ~~Adhesives and Sealants~~Consumer Products* (2010~~09~~) ~~http://www.otcair.org/upload/Documents/Model%20Rules/OTC_Adhesives_and_Sealants_Model_Rule_Final.doc~~ http://www.otcair.org/upload/Documents/Model%20Rules/OTC%20CP%20Model%20Rule%202012%20CLEAN_vs2010.2012%2005%2010.pdf

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

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).

AmericanCoatings ASSOCIATION℠

October 6, 2017

Governing Board Members
c/o Denise Garzaro, Clerk of the Boards
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178

RE: Proposed Amended Rule 1168; ACA Comments to the Governing Board

Dear Chairman Burke and Governing Board Members:

The American Coatings Association (ACA)[1] is unable to attend South Coast Air Quality Management District's (SCAQMD) Governing Board Meeting on October 6, 2017, where Proposed Amended Rule 1168 is expected to be discussed. Therefore, ACA submits the following comments to the Governing Board regarding ACA's stance on Proposed Amended Rule 1168. ACA appreciates the opportunity to provide these comments on Rule 1168's proposed regulatory text and VOC standards in leiu of attending the Governing Board Meeting. As always, our goal is to meet the District's need to maximize VOC reductions and provide top quality adhesive and sealant products for customers in the South Coast basin. We look forward to assisting SCAQMD throughout this rulemaking process.

ACA submits the following comments:

1. **Reporting Requirements**

ACA appreciates how receptive SCAQMD has been in working with industry to come up with fair and reasonable reporting requirements under Rule 1168. However, we still have concerns with the reporting requirements in section (f)(2). District Staff has repeatedly stressed the importance of collecting accurate adhesive and sealant inventory data for planning purposes. ACA fully understands the need for SCAQMD to gather this information, especially because the 2016 AQMP severely underestimated this inventory of regulated products. But, compiling the information at the level of detail that the District is requiring will be extremely costly in time, money, and resources for our industry.

Therefore, we ask that SCAQMD allow for manufacturers to use alternate options, such as "California Population Factors," or other tools that will help reduce the burden on industry associated with reporting. We acknowledge that SCAQMD VOC limits are different than those limits in neighboring districts, but this approach will still give both manufacturers and SCAQMD a general sense of the amount of products sold in the South Coast basin.

[1] The American Coatings Association (ACA) is a voluntary, nonprofit trade association working to advance the needs of the paint and coatings industry and the professionals who work in it. The organization represents paint and coatings manufacturers, raw materials suppliers, distributors, and technical professionals. ACA serves as an advocate and ally for members on legislative, regulatory, and judicial issues, and provides forums for the advancement and promotion of the industry through educational and professional development services.

2. **ACA Requests a Technology Assessment for the Clear, Paintable, and Immediately Water-Resistant Product Category**

In Table 1, the category of "Clear, Paintable, Immediately Water-Resistant" is listed as having a current limit of 250 g/L because of the already-existing "All Other Architectural Applications" category. Upon adoption, SCAQMD proposes to raise the limit to 380 g/L, which appears to be the sales weighted average of products currently sold in the South Coast basin (as determined by the SCAQMD 2013/2014 Survey).[2] Then, in 2023, SCAQMD intends to lower the limit back to 250 g/L.

ACA appreciates that the District has allotted two extra years for industry to reformulate this product category to meet the proposed lower limit of 250 g/L in 2023 instead of 2021. However, ACA still believes that this new limit that becomes effective in 2023 is technology forcing since there are no products that currently meet the 250 g/L limit. At this time, there are no products that are clear, paintable, immediately water-resistant, effective, **and** meet the 250 g/L limit. SCAQMD has limited data on these products, as well. Technology assessments can be extremely beneficial to both SCAQMD and industry because they indicate which products are really working and performing as labeled. Thus, ACA requests that SCAQMD complete a technology assessment for "Clear, Paintable, Immediately Water-Resistant" products to ensure that they can meet the 250 g/L limit and still be effective before the limit goes into effect in 2023.

Thank you for your consideration of our concerns. Please do not hesitate to contact us if you have any questions.

Sincerely,

Rhett Cash
Counsel, Government Affairs

Raleigh Davis
Assistant Director, Environmental Health and Safety

Cc: Nicole Silva, Planning, Rule Development & Area Sources
Heather Farr, Program Supervisor, VOC Rules

[2] SCAQMD Working Group Meeting #2 Presentation.

American Chemistry Council | Center for the Polyurethanes Industry

October 2, 2017

SCAQMD Governing Board
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178

Re: Proposed Amended Rule 1168 – Adhesive and Sealant Applications

Via: Electronic Mail

Dear Governing Board Members:

The American Chemistry Council's Center for the Polyurethanes Industry[1] (CPI) appreciates the opportunity to provide comments to the South Coast Air Quality Management District (SCAQMD) in response to the Proposed Amended Rule 1168 – Adhesive and Sealant Applications. CPI thanks SCAQMD staff for their willingness to meet with us and to consider potential changes to the proposed amendments in response to our comments on foam sealants. CPI supports a majority of the negotiated language in the October 6, 2017 Governing Board draft of the proposed amendments to Rule 1168. CPI appreciates that SCAQMD has raised the "upon adoption" VOC limit to 250 g/L which will better enable all foam sealants to be compliant when the proposed amendments are adopted. CPI supports the inclusion of a technology assessment, to be conducted in 2020, to determine the feasibility of the January 1, 2023 implementation of the 50 g/L VOC content limit in the covered products.

We remained concerned, however, with SCAQMD's intended approach with regard to the regulation of "foam insulation." Spray Polyurethane Foam (SPF) insulation does not meet the applicable definition of a sealant and should not be considered a regulated product under Rule 1168.

CPI has worked since mid-August to provide SCAQMD staff an overview of the multiple types of polyurethane foam products. Although CPI understands SCAQMD's intention to regulate all polyurethane foam sealants under the "foam sealant" category, it is likely that the results of the technology assessment will demonstrate the need for different VOC content limits for different polyurethane foam sealant products. Based on current technology, aerosol cans of foam sealant may not be able to comply with the 50 g/L VOC content limit on January 1, 2023.

[1] The Center for the Polyurethanes Industry (CPI) of the American Chemistry Council serves as the voice of the polyurethanes industry in North America, promoting its development and coordinating with polyurethane trade associations across the globe. The polyurethane industry supports research and initiatives that serve its communities and customers. The business of polyurethane is a $26.5 billion enterprise and a key element of the U.S. economy. The industry operates in more than 1,000 locations in the U.S. and directly employs more than 46,500. A major job creator in the U.S., each job in the polyurethanes industry yields five more jobs indirectly for an approximate total of 235,000 jobs supported.

Foam sealants are a unique category because although the products serve a similar function, multiple factors drive a consumer's decision to purchase a product. For example, if a consumer is planning to seal several small cracks in the foundation of their home, the consumer will likely purchase an aerosol can of foam sealant. In contrast, if the consumer is planning to weatherize their entire home, the consumer would like hire a weatherization professional who would use a low-pressure SPF kit. In this situation, the volume of the product needed is driving the product selection. Therefore, CPI supports the Board Resolution stating that the technology assessment will consider "product volume, application method, and use of various foam sealants" when determining the feasibility of complying with the 50 g/L VOC limit.

Two component (2K) SPF insulation, the product described by the "foam insulation" term, increases energy efficiency of buildings, which in turn reduces emissions of greenhouse gases and helps California meet both its climate and energy efficiency goals. More specifically, in 2006, California passed the California Global Warming Solutions Act of 2006 (AB 32) which sought to reduce greenhouse gas emission to 1990 levels by 2020. Governor Brown also signed Executive Order B-30-15 in August 2015, which seeks to reduce greenhouse gas emissions 40% below 1990 levels by 2030. California's landmark SB 350 requires that the State double its energy efficiency. Title 24 of the California Building Code, requires that all new residential construction in the State be net zero energy-ready. Given that up to 40 percent of a building's energy is lost due to air infiltration,[2] SPF insulation provides a simple and cost-effective method to increase a building's energy efficiency and aid the State in meetings its climate goals. The uncertainty introduced into Rule 1168 by including SPF insulation is problematic and may affect consumers' willingness to turn to a product that is a key resource in the fight against climate change.

In the currently approved language of Rule 1168, SCAQMD defines sealants as:

> *SEALANT is any material with adhesive properties that is formulated primarily to fill, seal, or waterproof gaps or joints between two surfaces. Sealants include caulks. Sealant does not include any sealer that is applied as a continuous coating.*

The primary purpose of 2K SPF insulation is to insulate a building, not to seal gaps or joints. Therefore, 2K SPF insulation as not a "sealant" under the current regulations.

During our August 30, 2017, meeting, SCAQMD representatives implied that applying 2K SPF insulation into a wall cavity is considered filling or sealing the gap between the studs in a wall or joists in an attic.

In the draft staff report, responding to CPI's comments, SCAQMD states:

> *Insulating foams fill the wall cavity, the gap between two joists or studs; therefore, insulating foams are within the scope of Rule 1168.*

[2] https://www.energystar.gov/index.cfm?c=new_homes_features.hm_f_reduced_air_infiltration

These two conclusions ignore the *primary* reason that 2K SPF insulation products are formulated and applied in buildings – to serve as insulation.

CPI sent a letter to the Stationary Sources Committee (SSC) on September 13, 2017 which clarified that:

> *Even though SPF insulation's versatility enables it to fill wall cavities and joist gaps in some circumstances, these properties are not the primary function of SPF insulation. Because the primary function of SPF insulation does not meet the applicable definition of a sealant, 2K SPF insulation products do not fall within the scope of Rule 1168. Therefore, the reference to, and definition of, "insulating foam" should be removed from the draft amendments prior to approval by the Stationary Sources Committee.*

In response, SCAQMD staff explained to the SSC that the definition of "sealant" in the proposed amendments to Rule 1168 had been updated to state:

> *SEALANT is any material with adhesive properties that is ~~formulated primarily~~ designed to fill, seal, or waterproof or weatherproof gaps or joints between two surfaces. Sealants include sealant primers and caulks.*

This change to the definition of "sealant" significantly changes the scope of the regulations and will implement new legal requirements (VOC content limits and reporting requirements) on manufacturers without adequate public notice and opportunity to provide input during the regulatory process. Although SCAQMD staff has stated that this change has been intended since 2013, because SPF insulation is not "primarily used to seal gaps or joints" that intent was not clear. This ambiguity is reflected in the fact that CPI and its members have never understood SPF insulation to be regulated under Rule 1168 because SPF insulation is not a "sealant" as defined by Rule 1168. Therefore, prior to the Governing Board approving the proposed amendments to Rule 1168, the definition of "foam sealant" should be updated to not reference "foam insulation," and the definition of "foam insulation" should be removed from the proposal.

CPI welcomes the opportunity to further discuss the points raised above with SCAQMD prior to the publication of the final Rule 1168. Please contact me at stephen_wieroniey@americanchemistry.com or (202) 249-6617 with questions or requests for additional information.

Respectfully submitted,

Stephen Wieroniey
Director

ATTACHMENT H

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Final Environmental Assessment for Proposed Amended Rule 1168 – Adhesive and Sealant Applications

September 2017

SCAQMD No. 08162017DT
State Clearinghouse No: 2017081031

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PREFACE

This document constitutes the Final Environmental Assessment (EA) for Proposed Amended Rule (PAR) 1168 – Adhesive and Sealant Applications. A Draft EA was released for a 30-day public review and comment period from August 16, 2017 to September 15, 2017. Analysis of PAR 1168 in the Draft EA did not result in the identification of any environmental topic areas that would be significantly adversely affected. Two comment letters were received from the public regarding the analysis in the Draft EA. The comment letters received relative to the Draft EA and responses to individual comments are included in Appendix B of this document.

In addition, subsequent to release of the Draft EA, modifications were made to PAR 1168 and some of the revisions were made in response to verbal and written comments received during the rule development process. To facilitate identification, modifications to the document are included as underlined text and text removed from the document is indicated by ~~strikethrough~~. To avoid confusion, minor formatting changes are not shown in underline or strikethrough mode.

Staff has reviewed the modifications to PAR 1168 and concluded that none of the revisions constitute: 1) significant new information; 2) a substantial increase in the severity of an environmental impact: or, 3) provide new information of substantial importance relative to the draft document. In addition, revisions to the proposed project in response to verbal or written comments would not create new, avoidable significant effects. As a result, these revisions do not require recirculation of the document pursuant to CEQA Guidelines Section 15073.5 and 15088.5. Therefore, this document now constitutes the Final EA for PAR 1168.

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CHAPTER 1

PROJECT DESCRIPTION

Introduction

California Environmental Quality Act

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Project Description

INTRODUCTION

The California Legislature created the South Coast Air Quality Management District (SCAQMD or District) in 1977[1] as the agency responsible for developing and enforcing air pollution control rules and regulations in the South Coast Air Basin (Basin) and portions of the Salton Sea Air Basin and Mojave Desert Air Basin. By statute, the SCAQMD is required to adopt an air quality management plan (AQMP) demonstrating compliance with all federal and state ambient air quality standards for the District[2]. Furthermore, the SCAQMD must adopt rules and regulations that carry out the AQMP[3]. The AQMP is a regional blueprint for how the SCAQMD will achieve air quality standards and healthful air and the 2016 AQMP[4] contains multiple goals promoting reductions of criteria air pollutants, greenhouse gases, and toxics. In particular, the 2016 AQMP includes control measure CTS-01: Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants, which identifies Rule 1168 – Adhesive and Sealant Applications, a rule that regulates volatile organic compounds (VOC), as having the potential to achieve additional VOC emission reductions. In addition, the 2016 AQMP also includes control measure MCS-01: Application of All Feasible Measures Assessment, which seeks to achieve emission reductions from all pollutants, including VOCs. Proposed amended Rule (PAR) 1168 has been developed to partially implement CTS-01 and MCS-01.

Rule 1168 applies to anyone who uses, sells, stores, supplies, offers for sale or manufactures for sale any adhesives and sealants. Adhesives and sealants are primarily used for architectural applications and the majority of emissions come from a broad range of small volume users in manufacturing, commercial, and consumer applications. Approximately 3,000 regulated products were reported in a survey conducted in 2013. Staff believes this may be an underrepresentation of the total number of affected regulated products based on stakeholder input and products found by SCAQMD staff the field.

The following industry sectors, as classified by the North American Industry Classification System (NAICS) code, make extensive use of products subject to Rule 1168:

- 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)

[1] The Lewis-Presley Air Quality Management Act, 1976 Cal. Stats., ch. 324 (codified at Health and Safety Code Section 40400-40540).
[2] Health and Safety Code Section 40460(a).
[3] Health and Safety Code Section 40440(a).
[4] SCAQMD, 2016 Air Quality Management Plan. http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf

- 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)
- 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).

PAR 1168 would further reduce emissions of volatile organic compounds (VOCs), toxic air contaminants, and stratospheric ozone-depleting compounds from adhesives, adhesive primers, sealants, and sealant primers. PAR 1168 will clarify applicability; revise, delete, and add definitions; lower VOC limits for certain categories and allow for a three-year sell-through and use-through; add new product categories with corresponding VOC content limits; require products marketed for use under varying categories to be subject to the lowest VOC limit; prohibit the storage of non-compliant products, unless for shipment outside of the SCAQMD; add test methods for analyzing VOC content; add labeling requirements; include reporting requirements for manufacturers, private labelers, Big Box retailers, distribution centers, and facilities that use a 55 gallon per year exemption; prohibit the use of Rule 102 Group II exempt solvents, except volatile methyl siloxanes; include a technology assessment for certain product categories; remove, modify~~restrict~~, or add exemptions; include streamlined recordkeeping options for products with a VOC content of less than 20 grams per liter; and allow products with a viscosity of 200 centipoise or greater to be exempted from transfer efficiency requirements.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA), California Public Resources Code Section 21000 *et seq.*, requires environmental impacts of proposed projects to be evaluated and feasible methods to reduce, avoid or eliminate significant adverse impacts of these projects to be identified and implemented. The lead agency is the "public agency that has the principal responsibility for carrying out or approving a project that may have a significant effect upon the environment"

(Public Resources Code Section 21067). Since PAR 1168 is a SCAQMD-proposed amended rule, the SCAQMD has the primary responsibility for supervising or approving the entire project as a whole and is the most appropriate public agency to act as lead agency (CEQA Guidelines[5] Section 15051(b)).

CEQA requires that all potential adverse environmental impacts of proposed projects be evaluated and that methods to reduce or avoid identified significant adverse environmental impacts of these projects be implemented if feasible. The purpose of the CEQA process is to inform the lead agency, responsible agencies, decision makers, and the general public of potential adverse environmental impacts that could result from implementing PAR 1168 (the proposed project) and to identify feasible mitigation measures or alternatives, when an impact is significant.

Public Resources Code Section 21080.5 allows public agencies with regulatory programs to prepare a plan or other written documents in lieu of an environmental impact report once the Secretary of the Resources Agency has certified the regulatory program. The SCAQMD's regulatory program was certified by the Secretary of Resources Agency on March 1, 1989, and has been adopted as SCAQMD Rule 110 – Rule Adoption Procedures to Assure Protection and Enhancement of the Environment.

PAR 1168 has been crafted to further reduce emissions of VOCs, toxic air contaminants, and stratospheric ozone-depleting compounds from adhesives, adhesive primers, sealants, and sealant primers. Because PAR 1168 requires discretionary approval by a public agency, it is a "project" as defined by CEQA[6]. The proposed project will reduce emissions of VOCs, toxic air contaminants, and stratospheric ozone-depleting compounds, and will provide an overall environmental benefit to air quality. However, SCAQMD's review of the proposed project also shows that implementation of PAR 1168 may ~~also~~ create secondary adverse effects on the environment either directly or indirectly ~~because~~ to the following areas: 1) the air quality and GHG impacts ~~were determined to be less than the significance thresholds as~~ analyzed in Section III – Air Quality and Greenhouse Gases; 2) the hazards and hazardous materials impacts ~~were determined to be less than significant as~~ analyzed in Section VIII – Hazards and Hazardous Materials; 3) the increased water usage and wastewater ~~was determined to be less than significant as~~ analyzed in Section IX – Hydrology and Water Quality; 4) public services such as fire protection and police protection ~~were determined to be less than the significance thresholds as~~ analyzed in Section XIV – Public Services. SCAQMD's review of these secondary adverse effects shows that PAR 1168 would not have a significant adverse effect on the environment. Thus, the type of CEQA document appropriate for the proposed project is an Environmental Assessment (EA). The EA is a substitute CEQA document, prepared in lieu of a Negative Declaration (CEQA Guidelines Section 15252), pursuant to the SCAQMD's Certified Regulatory Program (CEQA Guidelines Section 15251(l); SCAQMD Rule 110). The EA is also a public disclosure document intended to: 1) provide the lead agency, responsible agencies, decision makers and the general public with information on the environmental impacts of the proposed project; and, 2) be used as a tool by decision makers to facilitate decision making on the proposed project.

Thus, the SCAQMD, as lead agency for the proposed project, prepared a Draft EA pursuant to its Certified Regulatory Program. The Draft EA includes a project description in Chapter 1 and an Environmental Checklist in Chapter 2. The Environmental Checklist provides a standard tool to identify and evaluate a project's adverse environmental impacts and the analysis concluded that

[5] The CEQA Guidelines are codified at Title 14 California Code of Regulations Section 15000 *et seq.*
[6] CEQA Guidelines Section 15378

no significant adverse impacts would be expected to occur if PAR 1168 is implemented. Because PAR 1168 will have no statewide, regional or areawide significance, no CEQA scoping meeting is required to be held for the proposed project pursuant to Public Resources Code Section 21083.9(a)(2). Further, pursuant to CEQA Guidelines Section 15252, since no significant adverse impacts were identified, no alternatives or mitigation measures are required.

The Draft EA was~~is being~~ released for a 30-day public review and comment period from August 16, 2017 to September 15, 2017 and two comment letters were received. All comments received during the public comment period on the analysis presented in the Draft EA ~~will~~have been responded to and are included in ~~an~~ A~~a~~ppendix B to this~~e~~ Final EA.

Subsequent to release of the Draft EA for public review and comment, minor modifications were made to PAR 1168 and some of the revisions were made in response to verbal and written comments received during the rule development process. The modifications include: 1) minor changes made for rule clarification, including definition additions and revisions; 2) the addition of technology assessments for various product categories; 3) the reorganization of various provisions and sections of the rule; 4) extended effective dates for proposed VOC limit reductions; and 5) the proposal of more moderate VOC limit reductions for several categories. Staff reviewed the modifications to PAR 1168 and concluded that none of the modifications constitute significant new information or a substantial increase in the severity of an environmental impact, nor provide new information of substantial importance relative to the draft document. The Draft EA concluded no significant adverse environmental impacts and the revisions to PAR 1168 in response to verbal or written comments would not create new, avoidable significant effects. As a result, these minor revisions do not require recirculation of the EA pursuant to CEQA Guidelines Section 15073.5 and 15088.5.

Prior to making a decision on the adoption of PAR 1168, the SCAQMD Governing Board must review and certify the Final EA as providing adequate information on the potential adverse environmental impacts that may occur as a result of adopting PAR 1168.

PROJECT LOCATION

Adhesives and sealants are used in a wide range of industries and are primarily used for architectural applications. Rule 1168 currently applies to all commercial and industrial sales and applications of adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, or any other primers, unless otherwise exempted by the rule.~~any person who sells, stores, supplies, offers for sale or manufacturers for sale any regulated products within SCAQMD's jurisdiction~~. PAR 1168 will clarify that the rule applies ~~applicability~~ to any person who uses, sells, stores, supplies, offers for sale or manufactures for sale any regulated products ~~also include all uses of regulated products~~ within SCAQMD's jurisdiction, unless otherwise exempted by the rule. ~~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 (CPR).~~ The majority of emissions comes from these uses come from area sources and consumer uses that are occurring throughout the SCAQMD's jurisdiction. The SCAQMD has jurisdiction over an area of approximately 10,743 square miles, consisting of the four-county South Coast Air Basin (Basin) (Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino counties), and the Riverside County portions of the Salton Sea Air Basin (SSAB) and Mojave Desert Air Basin (MDAB). The Basin, which is a subarea of SCAQMD's jurisdiction, is bounded

by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto mountains to the north and east. It includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. The Riverside County portion of the SSAB is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley. A federal nonattainment area (known as the Coachella Valley Planning Area) is a subregion of Riverside County and the SSAB that is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east (see Figure 1-1).

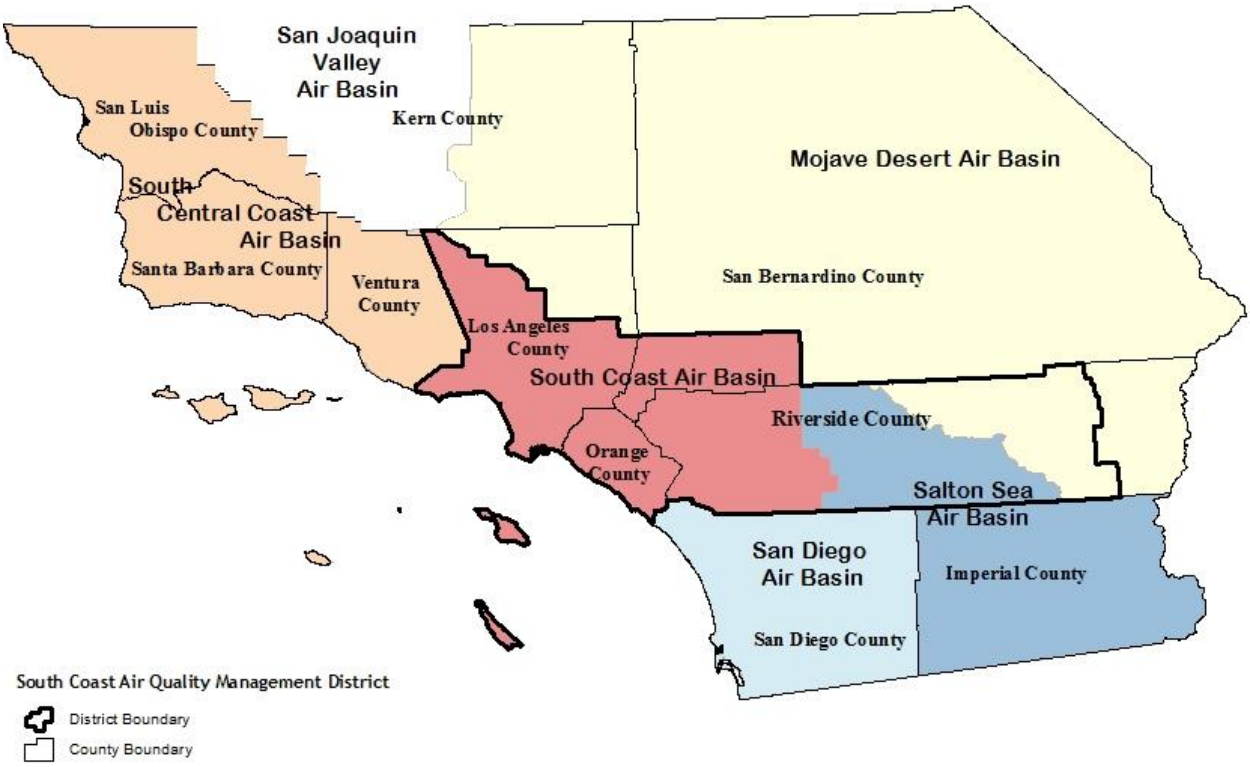

Figure 1-1
Southern California Air Basins

PROJECT BACKGROUND

Rule 1168 was first adopted in April 1989 to control VOC emissions from adhesive applications. Rule 1168 has been amended 13 times with the last amendment occurring in January 2005. An adhesive is a substance that is used to bond one surface to another by attachment, excluding the application of subsequent coatings. 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 reactive chemistries. They can vary from contact type adhesives to pressure sensitive adhesives. In 1997, the categories of sealants and sealant primers were incorporated into Rule 1168. Although s~~S~~ealants have~~are~~ similar properties to adhesives, their primary purpose is not to bond one surface to another, but to ~~except that they must also~~ fill, seal or waterproof gaps or joints between two surfaces. Over the past six amendments, dating back to 1998, Rule 1168 was revised to also include the following

categories of adhesive products: acrylonitrile-butadiene-styrene (ABS), polyvinyl chloride (PVC), chlorinated polyvinyl chloride (CPVC), and Top and Trim Adhesives. Rule 1168 currently limits the VOC content for 41 product categories and is applicable to adhesives and sealants used during manufacturing and to consumer products that are not regulated by CARB in the CPR[7]. The CARB CPR is a statewide regulation applicable to any person who uses, sells, supplies, offers for sale, or manufactures consumer products for us in the state of California and implemented by CARB. A regulated product under Rule 1168 is an adhesive, adhesive primer, sealant, or sealant primer. The majority of emissions come from small volume users (area sources) including manufacturing, commercial, and consumer uses.

Initial development of the current revision to PAR 1168 began in 2013 and continued into 2014. During that timeframe, staff conducted eight working group meetings, drafted six versions of proposed amended rule language, released a preliminary draft staff report, and developed a voluntary survey of regulated product sales in the SCAQMD's jurisdiction. The survey was intended to improve the emissions inventory and assess product market share. At the time of initial development of PAR 1168, a key component in the proposal included dimethyl carbonate (DMC) and tertiary-butyl acetate (tBAc) in the list of compounds that would be exempt from the definition of a VOC. However, due to toxicity concerns and the uncertainty of the on-site exposure modeling methodologies, the rule amendment process was put on hold and SCAQMD staff was directed to research the issues associated with DMC and tBAc and to follow up with a report to the Governing Board. SCAQMD staff subsequently prepared the "tBAc Assessment White Paper"[8] and the Governing Board decided to use a precautionary approach with regard to tBAc and DMC, such that a VOC exemption for DMC and tBAc would not be allowed for inclusion in future rule amendments unless they are found to have known toxic profile factor by the Office of Environmental Health Hazard Assessment (OEHHA). In May 2017, SCAQMD staff resumed work on developing PAR 1168, but without including a proposal to include tBAc and DMC as VOC-exempt compounds.

PROJECT DESCRIPTION

The purpose of PAR 1168 is to further reduce emissions of VOCs, toxic air contaminants, and stratospheric ozone-depleting compounds from regulated products by limiting the VOC content. The proposed limits are based on market trends and market share of low-VOC products and feedback from manufacturers. In the 2016 AQMP, the total VOC emissions inventory from regulated products was estimated to be 4.1 tons per day (tpd). It is important to note that this inventory does not include consumer products subject to the CARB CPR. Also, this inventory does not include emissions from small sources ~~with permits, facilities~~ that do not report as part of the Annual Emissions Reporting (AER) Program~~; and 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. Based on the 2015 AER data, facilities emitted 0.1 tons per day of VOC under Rule 1168, which represents less than one percent of the overall inventory. In addition, survey data was provided by adhesive and sealant manufacturers and suppliers in 2013. Staff scaled the survey data to estimate the contribution by category since only a fraction of the products sold was provided. A growth factor was applied to estimate increased usage (population growth was used as a surrogate for increased usage). It has been determined that the inventory is

[7] CARB, Consumer Products Regulation, March 5, 2015. https://www.arb.ca.gov/consprod/regs/2015/article_2_final_1-22-15.pdf

[8] SCAQMD, tBAc Assessment White Paper, April 2017. http://www.aqmd.gov/docs/default-source/planning/tbac/tbac-draft paper.pdf

approximately ~~actually closer to~~ 10.5 tpd and~~.~~ PAR 1168 is anticipated to reduce VOC emissions by 1.43 tpd by 2023.

It is expected products not currently meeting the VOC content limits will be reformulated. In addition, PAR 1168 will: 1) clarify applicability; 2) revise, delete, and add definitions; 3) lower VOC limits for certain product categories and allow for a three-year sell-through and use-through; 4) add new product categories with corresponding VOC content limits; 5) require products marketed for use under varying categories to be subject to the lowest VOC limit; 6) prohibit the storage of non-compliant products, unless for shipment outside of the SCAQMD; 7) add test methods for analyzing VOC content; 8) add labeling requirements; 9) include reporting requirements for manufacturers, private labelers, Big Box retailers, distribution centers, and facilities that use a 55 gallon per year exemption; 10) prohibit the use of Rule 102 Group II exempt solvents, except volatile methyl siloxanes; 11) include a technology assessment for certain product categories; 12) remove, modify~~restrict~~, or add exemptions; 13) retain ~~include~~ streamlined recordkeeping options for products with a VOC content of less than 20 grams per liter; and 14) allow products with a viscosity of 200 centipoise or greater to retain an ~~be~~ exemption~~ed~~ from transfer efficiency requirements. The following is a detailed summary of the key elements contained in PAR 1168. A draft of PAR 1168 can be found in Appendix A.

Purpose and Applicability – subdivision (a)

Subdivision (a) will clarify that the rule applies to any person who uses, sells, stores, supplies, offers for sale or manufactures for sale any ~~consumer product~~ adhesives, adhesive primers, sealants, and sealant primers, unless otherwise exempted by the rule. ~~not regulated by CARB and to products not used by household and institutional consumers or by manufacturing facilities for repair or maintenance.~~ All categories, excluding aerosol adhesives and aerosol adhesive primers, greater than one pound and consist of greater than 16 fluid ounces are subject to Rule 1168. Products that are one pound ~~(16 fluid ounces)~~ or less, or consist of 16 fluid ounces or less, and have a~~n applicable~~ VOC limit in the CARB CPR would not be regulated by PAR 1168, unless they are incorporated into or used exclusively for manufacturing goods or commodities for sale. ~~Any regulated product that is used exclusively for a business activity or to manufacture goods or commodities for sale would be subject to PAR 1168.~~In addition, products used in pollution-generating activities that take place at stationary sources (including area sources), excluding maintenance and repair, are subject to PAR 1168. Figure 1-2 summarizes and differentiates the regulated products that would be subject to either PAR 1168 or the CARB CPR.

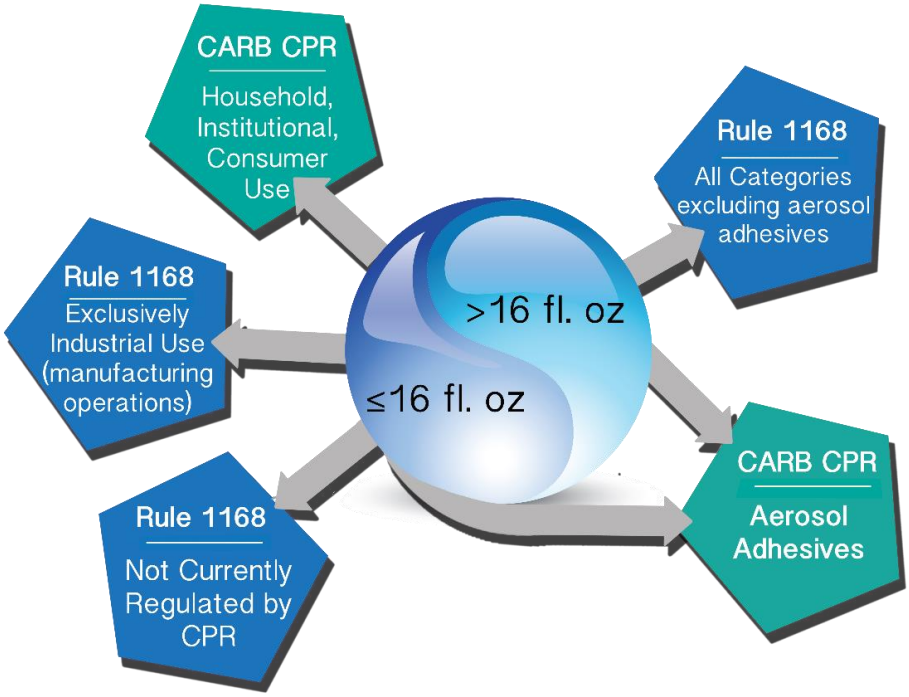

Figure 1-2
Comparison of SCAQMD Rule 1168 Applicability to CARB CPR

Definitions (b)

The following definitions are proposed to be added: ABS to PVC Transition Cement, ABS Welding Cement; Adhesive Tape; Aerosol Product~~Ambient Reactive Cure Adhesive~~; Architectural Appurtenance; Big Box Retailer, Building Envelope; Building Envelope Membrane Adhesives; Clear, Paintable, and Immediately Water-Resistant Sealant, Consumer Products Regulation ~~(CPR)~~; CPVC Welding Cement; Dip Coat, Distribution Center; Edge Glue; Electrostatic Application; Energy Curable Adhesives and Sealants~~; Establishments~~; Flow Coat; Foam Insulation; Foam Sealant, Grout; ~~Institutional Use; Insulating Foam;~~ Maintenance; Manufacturing; Marine Appurtenances; Non-Staining Plumbing Putty; Ozone-Depleting Compound; Plastic Adhesive Primer; Potable Water Architectural Sealant; Pressure Sensitive Adhesive; Private Labeler; Pump Spray; PVC Welding Cement; Quantity and Emissions Report (QER); Regulated Product; Reinforced Plastic Composite; Repair; Rubber; Rubber Vulcanization Adhesive; Toll Manufacturer; Toxic Air Contaminant (TAC); Vehicle Glass Adhesive Primer; Waterproof Resorcinol Glue.

Changes are proposed to the definitions to clarify the meaning of terms used throughout the rule and to provide more consistency between Rule 1168 and the Ozone Transport (OTC) Commission's Model Rule[9] for Adhesives and Sealants. The OTC is a multi-state organization created under the Clean Air Act and is responsible for advising the U.S. EPA on transport issues and for developing regional solutions to the ground-level ozone problem. The OTC Model Rule for consumer products is applicable to the Northeast and Mid-Atlantic regions as part of a regional effort to attain and maintain the eight-hour ozone standard, and reduce eight-hour ozone levels.

[9] OTC Model Rule for Consumer Products, May 10, 2012. http://www.otcair.org/upload/Documents/Model%20Rules/OTC%20CP%20Model%20Rule%202012%20CLEAN_vs2010.2012%2005%2010.pdf

The following definitions are proposed to be revised including: Adhesive; Adhesive Primer; Aerosol Adhesive; Architectural Application; Ceramic, Glass, Porcelain, and Stone Tile Adhesive; Contact Adhesive; Cove Base; Cyanoacrylate Adhesive; Grams of VOC Per Liter of Regulated Product, Less Water and Less Exempt Compounds; Grams of VOC Per Liter of Material; Hand Application Methods; High-Volume, Low-Pressure (HVLP) Spray; Indoor Floor Covering Adhesive; Low-Solids; Marine Deck Sealant; Marine Deck Sealant Primer; Modified Bituminous Materials; Outdoor Floor Covering Adhesive; Person; Plastics; Polyethylene Terephthalate (PET, PETE); Polyethylene Terephthalate Glycol (PETG); Polyvinyl Chloride (PVC); Reactive Products; Roll Coater; Sealant; Sealant Primer; Single Ply Roof Membrane Sealant; Tire Tread Adhesive; Traffic Marking Tape; Traffic Marking Tape Adhesive Primer; Transfer Efficiency; Vinyl Compositions Tile.

The default category "Other" is proposed to be included in Table 1 instead of paragraph (c)(1) of the current rule language for clarification. The limit, however, nor the applicability will change from the existing rule.

Additionally, following definitions are proposed to be deleted either because they are obsolete or are redundant in that they restate a dictionary definition without providing additional insight: 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; Light Curable Adhesives and Sealants; Low-Solids Adhesive Primer; Nonmembrane Roof Adhesive; Nonmembrane Roof Sealant; Orthotics and Prosthetics; Polyurethane Foams; Primer; Propellant; Rubber Foam; Sheet Applied Rubber Lining Operation; Space Vehicle; Viscosity; Wood Parquet Flooring; Wood Plank Flooring.

Requirements – subdivision (c)

VOC Limits: Paragraph (c)(1) lists the VOC limits for multiple categories of adhesives, adhesive primers, sealants and sealant primers. Table 1-1 summarizes the proposed changes to various VOC limits for regulated products that would be subject to PAR 1168. While some ~~most~~ of the proposed new or revised VOC limits in PAR 1168 would go into effect upon the date of the rule adoption and ~~on or~~ before January 1, 2019~~21~~, there are several categories that have VOC limits that would go into effect on January 1, 2023 so as to allow additional time for product reformulation and testing. The following categories were also included to meet the United States Environmental Protection Agency's (U.S. EPA) reasonably available control measures (RACM) and best available control measures (BACM) requirements: ~~cellulosic plastic welding, SAN welding adhesive,~~ reinforced plastic composite adhesives, and waterproof resorcinol glue. The VOC limit for All Other Plastic Welding Cements is proposed to be reduced to 100 g/L to address RACM/BACM requirements for cellulosic plastic welding and styrene acrylonitrile welding. In addition, PAR 1168 is proposing technology assessments to be conducted for the following categories: Foam Insulation; Foam Sealant~~s~~; Plastic Welding Cement ~~Welding~~, including ABS to PVC Transition Cement ~~Welding~~, CPVC Welding Cement ~~Welding~~, and PVC Welding Cement ~~Welding~~; Roofing products, including All Other Roof Adhesives, Single Ply Roof Membrane Adhesives, All Other Roof Sealants, and Single Ply Roof Membrane Sealants, and Top and Trim Adhesives. The proposed VOC limits for these products are subject to the results of the technology assessments.

Table 1-1
Regulated Product Categories and VOC Limits

Category	VOC Content Limit (g/L)[1]				
	Current	**Upon Rule Adoption**	**1/1/2019**	**~~1/1/2021~~**	**1/1/2023**
Adhesives					
Architectural Applications					
All Other Outdoor Floor Covering Adhesives	150		50		
Plastic Welding					
ABS to PVC Transition Cement	510				425~~325~~[2]~~*~~
CPVC Welding Cement	490				400[2] ~~325*~~
PVC Welding Cement	510				425[2] ~~325*~~
All Other Plastic Welding Cements ~~Cement Welding~~	250		100		
Roofing					
All Other Roof Adhesives	250			~~200~~	200[2]
Single Ply Roof Membrane Adhesive	250			~~200~~	200[2]
Wood Flooring Adhesive	100			~~20~~	20
Rubber Vulcanization Adhesive	250	850		~~250~~	250
Top and Trim Adhesive	250	540			250[2]
Waterproof Resorcinol Glue			170		
Substrate Specific Adhesive					
Reinforced Plastic Composite	250		200		
Sealants					
Architectural Applications					
Clear, Paintable, Immediately Water Resistant	250	380		~~250~~	250
Foam Insulation	250				50[3]
Foam Sealant	250	~~200~~			50[3]~~*~~
Grout	250	65			
Non-Staining Plumbing Putty	250	150			50
Potable Water Sealant	250	100			
Roofing					
All Other Roof Sealants	300			~~250~~	250[2]
Single Ply Roof Membrane Sealant	450			~~250~~	250[2]
All Other Architectural Sealants	250		50		
All Other Sealants	420			~~250~~	250
Adhesive Primers					
Pressure Sensitive	250	785			
Vehicle Glass	250	700			

1. ~~*~~VOC limits are expressed as grams of VOC per liter of regulated product, less water and less exempt compounds, as defined, except for low-solid regulated products where the VOC limit is expressed in grams per liter of material.

2. ~~Subject to technology assessment.~~ Technology assessment will be conducted in~~by January 1,~~ 2022 and the Executive Officer shall report on the results of the technology assessment to the Stationary Source Committee prior to the ~~January 1, 2023~~ implementation date.
3. Technology assessment will be conducted in 2020 and the Executive Officer shall report on the results of the technology assessment to the Stationary Source Committee prior to the implementation date.

PAR 1168 proposes to reduce the VOC emissions by lowering the VOC content limits for most of the architectural adhesive and sealant categories. Compliance is expected through the reformulation of regulated products. Also, PAR 1168 proposes to temporarily reinstate the 540 grams per Liter (g/L) VOC limit for Top and Trim Adhesives and to exclude this category from a 55 gallon per year exemption to allow manufacturers time to reformulate to a 250 g/L VOC limit by 2023.

Regulated Product Categorization: Paragraph (c)(2) proposes to require products marketed for use under varying categories to be subject to the most restrictive~~lowest~~ VOC limit of the varying categories. In particular, if anywhere on the regulated product container such as on any sticker or label affixed thereto, or in any sales or advertising literature, any representation is made that the regulated product may be used as, or is suitable for use as, a regulated product for which a lower VOC standard is specified in Table 1 or any other source specific rule application, for which there is a lower VOC standard, then the lowest VOC standard shall apply. However, this requirement would not apply to Substrate Specific Adhesives ~~Applications~~. For example, if a Substrate Specific Adhesive is used to bond dissimilar substrates together, the higher VOC content limit would apply.

Sell-Through Provision: Paragraph (c)(3) proposes to allow manufacturers and suppliers to deplete regulated products in the warehouse or on the shelf and allows users to use up any remaining product rather than disposing of them. The sell-through and use-through effective dates should accommodate the typical three year shelf life of these regulated products.

Disposal of Regulated Products and VOC-Laden Cloth: Paragraph (c)(4) proposes to require disposal provisions to apply to all regulated products and VOC-laden cloth or paper, instead of only products used for stripping cured adhesives or sealants.

Solvent Cleaning Operations: Paragraph (c)(5) proposes to specify that all cleaning operations are subject to Rule 1171 – Solvent Cleaning Operations.

Transfer Efficiency: Paragraph (c)(6) proposes minor clarifications for consistency with terms and definitions used throughout PAR 1168. Also, the exclusion for high viscosity regulated products is proposed to be moved to paragraph (i)(6~~14~~).

Control Devices: Paragraph (c)(7) proposes the following revisions to be consistent with other VOC rules: 1) to allow the use of an air pollution control device if it reduces VOC emissions by at least 95 percent by weight or the output of the device is not more than 50 ppm VOC by volume, calculated as carbon with no dilution; and 2) the owner or operator demonstrates that the emission collection system collects at least 90 percent by weight of the VOC emissions generated.

Storage and Mixing: A new storage prohibition is proposed to be added to paragraph (c)(10) to prohibit the storage of non-compliant regulated products on site unless the regulated products are being stored on site for the purpose of shipment outside of the District. Paragraph (c)(11) is also proposed to be added to require that containers for storage or mixing remain closed except while in use.

Methods of VOC Analysis – subdivision (e)

Three additional VOC content test methods are proposed to be added to subdivision (e), as follows:

- SCAQMD Method 313 – Determination of Volatile Organic Compounds (VOC) by Gas Chromatography-Mass Spectrometry
- ASTM Test Method 6886 (Standard Test Method for Determination of the Weight Percent Individual Volatile Organic Compounds in Water-borne Air-Dry Coatings by Gas Chromatography)
- Appendix A to Subpart PPPP of 40 CFR Part 63 – Determination of Weight Volatile Matter Content and Weight Solids Content of Reactive Adhesives

~~For compliance purposes, when more than one applicable test method or set of test methods are specified for any testing, a violation of any requirement of this rule established by any one of the specified test methods or set of test methods constitutes a violation of the rule.~~

Paragraph (e)(1) clarifies that a test method will not be used if the test method specifically states it is not appropriate for a product type or product chemistry. When a test method specifies it is inapplicable to a product category, it shall not be used for that inapplicable category. The Executive Officer will develop a guidance document to determine which test method will be used when two or more applicable test methods can be used to demonstrate compliance with the rule. The selected test method will be used based on product type, chemistry, and VOC content.

Further, SCAQMD Method 302 is proposed to be removed. Instead, to allow for flexibility for new innovative test methodologies for emerging technologies, paragraph (e)(5) is proposed to be added to include other test methods to be used provided that they have been reviewed to be equivalent by the Executive Officer, CARB, and the U.S. EPA. In addition, paragraph~~subdivision~~ (e)(6) proposes to clarify that all test methods referenced will be the most recently approved by the appropriate governmental entities.

Administrative Requirements – subdivision (f)

Labeling: Paragraph (f)(1) proposes new requirements for labels on regulated products to include VOC content and the date of manufacture, effective January 1, 2019. It is acceptable for the label to identify the VOC content as the maximum VOC allowed for the regulated product category or the maximum anticipated for a product instead of the specific VOC to account for batch-to-batch variations. Products stored in containers with a capacity of one fluid ounce or less and products solely subject to the CARB CPR are exempted from these labeling requirements. For those products subject to both the provisions of this rule and the CARB CPR, the manufacturer may include the VOC content in g/L on supplemental documentation for the product instead.

Additional labeling requirements are proposed for categories with higher VOC limits. The labeling requirement would require the specification of that type of product category's usage only (i.e., "For Top and Trim Uses Only"). This would prevent these products from being used under other product categories or usages. These categories will include:

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

Reporting Requirements: Paragraph (f)(2) proposes to add requirements to report data of regulated products sold into or within the SCAQMD. The reporting requirements will go into effect on September 1, 2019, and manufacturers and private labelers of regulated products will be required to submit a Quantity and Emission Report (QER) to the SCAQMD every three years, from years 2019 to 2025, and every five years, thereafter, until and including 2040, of the previous two ~~three~~ years sales data. The reporting requirement will sunset in 2040. The QERs will also need to include the product manufacturer name, product name and code, applicable Rule 1168 product category, the grams of VOC per liter of regulated product (less water and exempt solvents)~~regulatory VOC content~~, the grams of VOC per liter of material~~ VOC content~~, utilization of sell-through provision (if applicable), designation as to whether or not the product is Low Solids, whether the product ~~type (~~is water-borne or ~~/~~solvent-based~~)~~, ~~and~~ the total annual volume sold into or within the SCAQMD, including products sold through distribution centers located within or outside the SCAQMD (in gallons ~~of~~ for all container sizes), and whether the product was sold under a specific provision; low-solids product; exemption under subdivision (i); compliance with paragraph (c)(7) – Control Device; and/or compliance with paragraph(c)(8) – Alternative Emission Control.

Big Box r~~R~~etailers and distribution centers will also be required to report to the manufacturer or private labeler. Manufacturers and private labelers, who sell aerosol adhesives and aerosol adhesive primers into or within the SCAQMD, must also submit a report (QER) to the SCAQMD that includes the total weight sold and the percent VOC by weight~~content~~. ~~However, the VOC content may be given in weight percent, which is consistent with the aerosol units within CARB's VOC limit requirements.~~

Facilities that use regulated products under a 55 gallon per year exemption, as cited in subparagraph (i)(5~~7~~)(C), will be required to report the volume of products purchased and the name and address of the company where the products were purchased.

~~Lastly,~~ Paragraph (f)(3) includes a proposal that would require manufacturers or suppliers of regulated products to maintain records of VOC content determination. The VOC content determination may be calculated based on product formulation or by using a laboratory analysis. The records must be retained for three years and available upon request. Records for any product with a VOC content of 20 g/L or less may be identified as "20 g/L or less;" otherwise the records should reflect the calculated or analyzed VOC content.

Paragraph (f)(4) allows information submitted for reporting requirements to be designated as confidential.

Prohibition of Sales and Use – subdivision (g)

Rule 1168 currently prohibits the sale and use of products containing chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene. Paragraph (g)(2~~3~~) proposes to also prohibit Rule 102 Group II exempt solvents except VMS in a regulated product for use, supply, sale or offered for sale.

~~In addition, the following clarifications to paragraph (g)(4) are proposed to the prohibition of sales: 1) the prohibition would 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 SCAQMD; and 2) notification letters will need to be maintained for three years and made available to the Executive Officer upon request.~~

Exemptions – subdivision (i)

The majority of exemptions in subdivision (i) remain the same in PAR 1168; however, subsequent to the release of the Draft EA, the paragraphs have been renumbered or organized into subparagraphs to streamline the section and provide more clarity. In addition, several new paragraphs and/or subparagraphs have been added to provide clarity to the purpose and applicability of the rule.

New paragraph (i)(1) includes existing exemptions that have been renumbered into various subparagraphs. Subparagraph (i)(1)(A) contains proposed revisions to an existing exemption which would ~~Revisions are proposed to an existing exemption in paragraph (i)(2) which would~~ replace the term "aerospace components" with adhesives, adhesive primers, sealants, or sealant primers and associated application processes that would be subject to SCAQMD Rule 1124 – Aerospace Assembly and Component Manufacturing Operations. New subparagraph (i)(1~~5~~)(B) ~~is~~ proposes~~d~~ to exempt adhesive tape. Subparagraph (i)(1)(C) clarifies that regulated products shipped, supplied, or sold to persons for use outside the District are exempt. New subparagraph (i)(1~~7~~)(D) ~~is proposed to~~ clarifies~~y~~ that distribution centers that do not ship regulated products, aerosol adhesives, or aerosol adhesive primers into the District are exempt.

Revisions are proposed to an existing exemption in renumbered paragraph (i)(2~~10~~) to clarify that aerosol adhesives and aerosol adhesive primers dispensed from non-refillable aerosol spray system~~cans~~ are subject to reporting requirements in subparagraph (f)(2)(C~~c~~).

New paragraph (i)(3) exempts certain regulated products from paragraphs (g)(1~~2~~) and (g)(2~~3~~). New subparagraph (i)(3~~4~~)(A) is proposed to exempt products stored in containers with a capacity of one fluid ounce or less. Revisions are proposed to an existing exemption in renumbered subparagraph (i)(3~~8~~)(B) to clarify that the prohibition of sale for products containing Rule 102 Group II exempt compounds described in paragraph (g)(2~~3~~) would apply to the exemption for adhesives uses for gluing flowers to parade floats. Revisions are proposed to existing exemptions renumbered in subparagraphs (i)(3~~12~~)(C) and (i)(~~1~~3)(D) to clarify that the prohibition of sale of products containing Rule 102 Group II exempt compounds ~~described in paragraph (g)(3)~~ would apply to the exemptions for adhesives used to fabricate orthotics and prosthetics under a medical doctor's prescription and shoe repair, luggage, and handbag adhesives, respectively.

Revisions are proposed to an existing exemption in renumbered subparagraph (i)(4~~6~~)(A) to clarify that records shall be kept in accordance with the requirements in subdivision (c~~d~~). The existing exemption for solvent welding operations used in the manufacturing of medical devices has been renumbered to subparagraph (i)(4)(B).

The existing exemptions for adhesives used in tire repair or adhesives and or adhesive application processes in compliance with Rules 1104, 1106, 1128, 1130, and 1130.1 have been renumbered to subparagraphs (i)(5)(A) and (i)(5)(B), respectively. Revisions are proposed to an existing exemption in renumbered subparagraph (i)(5~~7~~)(C) to clarify that a 55 gallon per year exemption will cover a calendar year and will not be available to users of Rubber Vulcanization Adhesives or Top and Trim Adhesives, effective January 1, 2019~~8~~. New subparagraph (i)(~~1~~5)(D) is proposed to exempt products used in field installation and repair or potable water linings and covers at water treatment, storage or water distribution facilities from requirements in paragraph (c)(1).

New paragraph (i)(6~~14~~) is proposed to exempt products with a viscosity of 200 centipoise or greater from paragraph (c)(6).

New paragraph (i)(7~~16~~) is proposed to exempt products offered for sale as a dry mix, containing no polymer, which are ready for use or only mixed with water prior to use, including, but not limited to grouts, cements, and mortars and to thermoplastic hot melt adhesives from requirements in subdivision (f).

New paragraph (i)(8~~3~~) is proposed to exempt products with a VOC content of no more than 20 grams per liter, less water and less exempt compounds, or no more than 20 grams per liter material for low-solids products. However, the products will still be subject to subdivisions (f) and (g).

New paragraph (i)(9) proposes to exempt solvent welding formulations containing methylene chloride used to bond hard acrylic, polycarbonate, and polyethylene terephthalate glycol plastic fabrications from requirements in paragraphs (g)(1~~2~~) and (g)(2~~3~~) until January 1, 2021. Solvent welding formulations will be exempt provided: 1) the concentration of methylene chloride does not exceed 60 percent by weight; and 2) the purchase of all solvent welding product does not exceed 20 gallons per calendar year at a single facility, as demonstrated with purchase records and invoices. These records will need to be made available to the Executive Officer upon request.

Paragraph (i)(10) is an existing exemption that has been revised to clarify regulated products, weighing one pound or less, or consisting of 16 fluid ounces or less and have VOC limits in the CARB CPR, are not subject to the rule unless these regulated products are incorporated into or used exclusively in the manufacture or construction of the goods or commodities, or used in pollution-generating activities that take place at stationary sources (including areas sources) and excluding maintenance and repair of the stationary source.

New paragraph (i)(11) exempts manufacturers or supplies from regulated products from the requirements in subdivision (g), as long as the products are sold to an independent distributor and informed that the products are not to be used in the SCAQMD. Records would be need to be maintained for three years and available to the Executive Officer.

CHAPTER 2

ENVIRONMENTAL CHECKLIST

Introduction

General Information

Environmental Factors Potentially Affected

Determination

Environmental Checklist and Discussion

INTRODUCTION

The environmental checklist provides a standard evaluation tool to identify a project's potential adverse environmental impacts. This checklist identifies and evaluates potential adverse environmental impacts that may be created by the proposed project.

GENERAL INFORMATION

Project Title:	~~Draft Environmental Assessment for~~ Proposed Amended (PAR) Rule 1168 – Adhesive and Sealant Applications
Lead Agency Name:	South Coast Air Quality Management District
Lead Agency Address:	21865 Copley Drive Diamond Bar, CA 91765
CEQA Contact Person:	Ms. Diana Thai, (909) 396-3443
PAR 1168 Contact Person	Ms. Nicole Silva, (909) 396-3384
Project Sponsor's Name:	South Coast Air Quality Management District
Project Sponsor's Address:	21865 Copley Drive Diamond Bar, CA 91765
General Plan Designation:	Not applicable
Zoning:	Not applicable
Description of Project:	PAR 1168 would further reduce emissions of VOCs, toxic air contaminants, and stratospheric ozone-depleting compounds from adhesives, adhesive primers, sealants and sealant primers. PAR 1168 will clarify applicability; revise, delete, and add definitions; lower VOC limits for certain categories and allow for a three-year sell-through and use-through; add new product categories with corresponding VOC content limits; require products marketed for use under varying categories to be subject to the lowest VOC limit; prohibit the storage of non-compliant products, unless for shipment outside of the SCAQMD; add test methods for analyzing VOC content; add labeling requirements; include reporting requirements for manufacturers, private labelers, Big Box retailers, distribution centers, and facilities that use a 55 gallon per year exemption; prohibit the use of Rule 102 Group II exempt solvents, except volatile methyl siloxanes; include a technology assessment for certain product categories; remove, restrict, or add exemptions; include streamlined recordkeeping options for products with a VOC content of less than 20 grams per liter; and allow products with a viscosity of 200 centipoise or greater to be exempted from transfer efficiency requirements. Some sites affected by PAR 1168 may be identified on lists compiled by the California Department of Toxic Substances Control per Government Code Section 65962.5. The analysis of PAR 1168 in the ~~Draft~~ Final EA did not result in the identification of any environmental topic areas that would be significantly adversely affected.

Surrounding Land Uses and Setting:	Various
Other Public Agencies Whose Approval is Required:	Not applicable

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The following environmental impact areas have been assessed to determine their potential to be affected by the proposed project. As indicated by the checklist on the following pages, environmental topics marked with an "✓"involve at least one impact that is a "Potentially Significant Impact". An explanation relative to the determination of impacts can be found following the checklist for each area.

☐	Aesthetics	☐	Geology and Soils	☐	Population and Housing
☐	Agriculture and Forestry Resources	☐	Hazards and Hazardous Materials	☐	Public Services
☐	Air Quality and Greenhouse Gas Emissions	☐	Hydrology and Water Quality	☐	Recreation
☐	Biological Resources	☐	Land Use and Planning	☐	Solid and Hazardous Waste
☐	Cultural Resources	☐	Mineral Resources	☐	Transportation and Traffic
☐	Energy	☐	Noise	☐	Mandatory Findings of Significance

DETERMINATION

On the basis of this initial evaluation:

☑ I find the proposed project, in accordance with those findings made pursuant to CEQA Guidelines Section 15252, COULD NOT have a significant effect on the environment, and that an ENVIRONMENTAL ASSESSMENT with no significant impacts has been prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will NOT be significant effects in this case because revisions in the project have been made by or agreed to by the project proponent. An ENVIRONMENTAL ASSESSMENT with no significant impacts will be prepared.

☐ I find that the proposed project MAY have a significant effect(s) on the environment, and an ENVIRONMENTAL ASSESSMENT will be prepared.

☐ I find that the proposed project MAY have a "potentially significant impact" on the environment, but at least one effect: 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards; and, 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL ASSESSMENT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects: 1) have been analyzed adequately in an earlier ENVIRONMENTAL ASSESSMENT pursuant to applicable standards; and, 2) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL ASSESSMENT, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Date: August 11, 2017 **Signature:** Barbara Radlein

Barbara Radlein
Program Supervisor, CEQA Special Projects
Planning, Rules, and Area Sources

ENVIRONMENTAL CHECKLIST AND DISCUSSION

Rule 1168 applies to any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers, unless otherwise specifically exempted by the rule. Rule 1168 also applies to regulated products that are consumer products not regulated by CARB in the CPR; incorporated into or used exclusively in the manufacture or construction of the goods or commodities; used in pollution-generating activities that take place at stationary sources, excluding maintenance and repair~~, 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 CARB CPR~~. As discussed in Chapter 1, the main focus of PAR 1168 is to reduce emissions of VOCs, toxic air contaminants, and stratospheric ozone-depleting compounds from these products. To accomplish this goal, PAR 1168 proposes to lower the VOC content limits of several categories of regulated products, add new product categories with corresponding VOC content limits, and prohibit the use of Rule 102 Group II exempt solvents (except VMS) from regulated product formulations. In order to comply with PAR 1168, manufacturers are expected to reformulate their regulated products with chemicals that contain less VOCs, less or no toxics, and no stratospheric ozone-depleting compounds. However, while product reformulation may create an environmental benefit, it also is a physical change that may also create secondary adverse environmental impacts.

Also, PAR 1168 proposes to temporarily reinstate the 540 g/L VOC limit for Top and Trim Adhesives and to exclude this category from a 55 gallon per year exemption to allow manufacturers time to reformulate to a 250 g/L VOC limit by 2023. It is important to note that a forgone emissions decrease of 0.21 tpd in the Top and Trim Adhesives category would be expected to occur due to the temporary, proposed reinstatement of 540 g/L VOC limit which is also considered a secondary adverse environmental impact. However, it should be noted that current Top and Trim Adhesives are formulated and complying with a 540 g/L VOC content limit.

While there are other requirements in PAR 1168 that are necessary to support compliance with the rule, the following components of PAR 1168 are administrative or procedural in nature and as such, would not be expected to cause any physical changes: revising, adding, or deleting definitions; clarifying rule language; clarifying applicability, labeling, and recordkeeping requirements; prohibiting the storage of non-compliant products; adding test methods for analyzing VOC content; adding reporting requirements; and including technology assessments. As such, these components of PAR 1168 would not be expected to create any secondary adverse environmental impacts.

For these reasons, the analysis in this EA focuses on the potential secondary adverse environmental impacts associated with product reformulation and temporarily reinstatement of the 540 g/L VOC limit for Top and Trim Adhesives. The effects of implementing these two key rule components in PAR 1168 has been evaluated relative to the environmental topics identified in the following environmental checklist (e.g., aesthetics, agriculture and forestry resources, biological resources, etc.).

Subsequent to the release of the Draft EA for public review and comment, minor modifications were made to PAR 1168 that are described in the Project Description section in Chapter 1. These modifications are indicated in the strikeout/underlined text. Staff has reviewed these modifications and concluded that overall, no new impacts are anticipated to result from these modifications. Further, the impacts previously evaluated in the Draft EA would not be made substantially worse

and the conclusions reached in the Draft EA remain unchanged in the Final EA with respect to the current version of PAR 1168. Thus, staff has concluded that none of the modifications constitute significant new information of substantial importance relative to the Draft EA. In addition, revisions to PAR 1168 in response to verbal or written comments received during the rule development process would not create new, avoidable significant effects. As a result, these revisions do not require recirculation of the document pursuant to CEQA Guidelines Sections 15073.5 and 15088.5.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
I.	**AESTHETICS.** Would the project:				
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☑
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☑
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☑
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☑

Significance Criteria

The proposed project impacts on aesthetics will be considered significant if:

- The project will block views from a scenic highway or corridor.
- The project will adversely affect the visual continuity of the surrounding area.
- The impacts on light and glare will be considered significant if the project adds lighting which would add glare to residential areas or sensitive receptors.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

I. a), b) c) & d) No Impact. Compliance with PAR 1168 is expected to be met with manufacturers reformulating regulated products by substituting certain chemicals with other chemicals that contain less VOCs, less or no toxics, and no stratospheric ozone-depleting compounds. Physical modifications to or new installations of manufacturing equipment would not be expected to be needed in order to reformulate products. Similarly, since the reformulated products will need to comply with the lower VOC limits and as such, would contribute less to air pollution, modifications to existing or installation of new air pollution control equipment would also not be expected to be necessary in order for manufacturers to reformulate their products in order to comply with the revised VOC limits in PAR 1168. Therefore, implementation of PAR 1168 would not be expected to require any construction to install new or modify existing buildings or other structures that would obstruct scenic resources or degrade the existing visual character of a site, including, but not limited to, trees, rock outcroppings, or historic buildings. Similarly, additional light or glare would not be created which would adversely affect day or nighttime views in the area because no light generating equipment would be required to comply with PAR 1168. Further, the manufacturing of PAR 1168-compliant regulated products would not appreciably change the visual profile of the building(s) where regulated products are manufactured, because any changes to the manufacturing process would occur inside the facility's buildings and not affect the exterior of the structure in any way.

Conclusion

Based upon these considerations, significant adverse aesthetics impacts are not expected from implementing PAR 1168. Since no significant aesthetics impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
II.	**AGRICULTURE AND FORESTRY RESOURCES.** Would the project:				
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland mapping and Monitoring Program of the California Resources Agency, to non- agricultural use?	☐	☐	☐	☑
b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☑
c)	Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	☑
d)	Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☑

Significance Criteria

Project-related impacts on agriculture and forestry resources will be considered significant if any of the following conditions are met:

- The proposed project conflicts with existing zoning or agricultural use or Williamson Act contracts.
- The proposed project will convert prime farmland, unique farmland or farmland of statewide importance as shown on the maps prepared pursuant to the farmland mapping and monitoring program of the California Resources Agency, to non-agricultural use.
- The proposed project conflicts with existing zoning for, or causes rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined in Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)).
- The proposed project would involve changes in the existing environment, which due to their location or nature, could result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

II. a), b), c), & d) No Impact. Compliance with PAR 1168 is expected to be met with manufacturers reformulating regulated products by substituting certain chemicals with other chemicals that contain less VOCs, less or no toxics, and no stratospheric ozone-depleting compounds. Physical modifications to or new installations of manufacturing equipment would not be expected to be needed in order to reformulate products. Similarly, since the reformulated products will need to comply with the lower VOC limits and as such, would contribute less to air pollution, modifications to existing or installation of new air pollution control equipment would also not be expected to be necessary in order for manufacturers to reformulate their products in order to comply with the revised VOC limits in PAR 1168. For these reasons, implementation of PAR 1168 would not convert farmland to non-agricultural use or conflict with zoning for agriculture use or a Williamson Act contract. Further, the manufacture of compliant regulated products is expected to occur within the confines of existing industrial facilities and would not require converting farmland to non-agricultural uses. Any changes to the manufacturing process (e.g., the substitution of chemicals) would occur inside each affected manufacturer's building(s). Similarly, it is expected PAR 1168 would not result in the loss of forest land or conversion of forest land to non-forest use. Consequently, the proposed project would not create any significant adverse agriculture or forestry impacts.

Conclusion

Based upon these considerations, significant adverse agriculture and forestry resources impacts are not expected from implementing PAR 1168. Since no significant agriculture and forestry resources impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
III. AIR QUALITY AND GREENHOUSE GAS EMISSIONS. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☑	☐
b) Violate any air quality standard or contribute to an existing or projected air quality violation?	☐	☐	☑	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☐	☑	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☑	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☑	☐
f) Diminish an existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s)?	☐	☐	☑	☐
g) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☐	☑
h) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☑

Significance Criteria

To determine whether or not air quality and greenhouse gas impacts from implementing PAR 1168 are significant, impacts will be evaluated and compared to the criteria in Table 2-1. PAR 1168 will be considered to have significant adverse impacts if any one of the thresholds in Table 2-1 are equaled or exceeded.

Table 2-1
SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds [a]		
Pollutant	**Construction [b]**	**Operation [c]**
NO_x	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM_{10}	150 lbs/day	150 lbs/day
$PM_{2.5}$	55 lbs/day	55 lbs/day
SO_x	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day

Toxic Air Contaminants (TACs), Odor, and GHG Thresholds	
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index ≥ 1.0 (project increment)
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402
GHG	10,000 MT/yr CO_2eq for industrial facilities

Ambient Air Quality Standards for Criteria Pollutants [d]	
NO_2 1-hour average annual arithmetic mean	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 ppm (federal)
PM_{10} 24-hour average annual average	10.4 μg/m^3 (construction)[e] & 2.5 μg/m^3 (operation) 1.0 μg/m^3
$PM_{2.5}$ 24-hour average	10.4 μg/m^3 (construction)[e] & 2.5 μg/m^3 (operation)
SO_2 1-hour average 24-hour average	0.25 ppm (state) & 0.075 ppm (federal – 99th percentile) 0.04 ppm (state)
Sulfate 24-hour average	25 μg/m^3 (state)
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)
Lead 30-day Average Rolling 3-month average	1.5 μg/m^3 (state) 0.15 μg/m^3 (federal)

[a] Source: SCAQMD CEQA Handbook (SCAQMD, 1993)
[b] Construction thresholds apply to both the South Coast Air Basin and Coachella Valley (Salton Sea and Mojave Desert Air Basins).
[c] For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.
[d] Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
[e] Ambient air quality threshold based on SCAQMD Rule 403.

KEY: lbs/day = pounds per day ppm = parts per million μg/m^3 = microgram per cubic meter ≥ = greater than or equal to
MT/yr CO_2eq = metric tons per year of CO_2 equivalents > = greater than

Revision: March 2015

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

III. a) Less Than Significant Impact. The SCAQMD is required by law to prepare a comprehensive district-wide Air Quality Management Plan (AQMP) which includes strategies (e.g., control measures) to reduce emission levels to achieve and maintain state and federal ambient air quality standards, and to ensure that new sources of emissions are planned and operated to be consistent with the SCAQMD's air quality goals. The AQMP's air pollution reduction strategies include control measures which target stationary, area, mobile and indirect sources. These control measures are based on feasible methods of attaining ambient air quality standards. Pursuant to the provisions of both the state and federal Clean Air Acts, the SCAQMD is also required to attain the state and federal ambient air quality standards for all criteria pollutants.

The most recent regional blueprint for how the SCAQMD will achieve air quality standards and healthful air is outlined in the 2016 AQMP[10] which contains multiple goals of promoting reductions of criteria air pollutants, greenhouse gases, and toxics. In particular, the 2016 AQMP contains control measure CTS-01: Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants, which identifies Rule 1168 as a VOC rule that has the potential to achieve additional VOC emission reductions. In addition, the 2016 AQMP includes control measure MCS-01: Application of All Feasible Measures Assessment, which seeks to achieve emission reductions from all pollutants.

Compliance with PAR 1168 is expected to occur through the reformulation of regulated products. Manufacturers are expected to reformulate using chemicals that contain less VOCs, less or no toxic compounds, and no stratospheric ozone-depleting compounds to make regulated products that comply with the reduced VOC content requirements and the prohibition of Group II exempt solvents (except VMS) in PAR 1168. Upon full implementation, PAR 1168 is estimated to achieve approximately 1.43 tons per day tpd of VOC emission reductions.

[10] SCAQMD, Final 2016 Air Quality Management Plan, March, 2017. http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf

For one product category, 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. Staff found emissions increased from the use of these products compared to the estimated reductions proposed in previous versions of the rule, through the use of the volume usage exemption of 55 gallons per year. The emissions were shown to increase by 0.04 tpd. Since 2003, the 250 g/L was delayed twice to allow manufacturers additional time to reformulate, because manufacturers were unable to make Top and Trim Adhesives that could achieve this VOC limit. Delaying compliance with the 250 g/L VOC limit meant that the 540 g/L VOC limit was still in effect. However, the 2003 and 2005 versions of Rule 1168 at that time did not explicitly identify the VOC limit as 540 g/L for Top and Trim Adhesives. It is important to note that a foregone emission decrease of 0.21 tpd in the Top and Trim Adhesives category would be expected to occur due to the temporary, proposed reinstatement of the 540 g/L VOC limit. However, by 2023, the VOC content limit the Top and Trim Adhesives category is proposed to be lowered to 250 g/L, allowing the SCAQMD to maintain the VOC emission reductions previously claimed in the 2003 and 2005 versions of the rule (see Section III. b) and f) for further details). In addition to reinstating the 540 g/L limit, PAR 1168 is also proposing to exclude Top and Trim Adhesives from a 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 amendments to the rule.

In addition, PAR 1168 contains a restriction for products marketed for use under varying categories to be subject to the lower VOC limit of the varying categories. This restriction is expected to assure that the lowest VOC containing products are marketed.

For these reasons, PAR 1168 is not expected to obstruct or conflict with the implementation of the 2016 AQMP because the emission reductions from implementing PAR 1168 are in accordance with the emission reduction goals in the 2016 AQMP. PAR 1168 would reduce VOC and toxic emissions and therefore, be consistent with the goals of the 2016 AQMP. Therefore, implementing PAR 1168 to reduce VOC and toxic emissions from regulated products would not conflict with or obstruct implementation of the applicable air quality plans. Attainment of the state and federal ambient air quality standards will protect sensitive receptors and the public in general from the adverse effects of criteria pollutants, including VOCs, which are known to have adverse human health effects. Since no significant impacts were identified for this issue, no mitigation measures are necessary or required.

III. b) and f) Less Than Significant Impact. For a discussion of these items, refer to the following analysis.

Construction Impacts

Compliance with PAR 1168 is expected to be met by manufacturers reformulating regulated products. The manufacture of regulated products is expected to use the same or similar equipment currently utilized to manufacturer compliant regulated products. Therefore, the manufacture of regulated products is not expected to require physical changes or modifications that would involve construction activities. As a result, there would be no construction air quality impacts resulting from PAR 1168.

Operational Impacts

The emission reductions are estimated using the scaled sales volume and reported VOC content emission inventory data collected from the survey. The emission reductions are calculated by assuming the material VOC content of products currently above the proposed limit will be reformulated to meet the proposed VOC limits as indicated in Table 1-1. The estimated emissions reductions are presented in Table 2-2.

Table 2-2
Estimated Emission Reductions from PAR 1168

Category	Emission Reductions (tpd)				
	Upon Adoption	**2019**	**~~2021~~**	**2023**	**Total Reduction (tpd)**
All Other Architectural Sealants		0.37~~8~~			0.37~~8~~
Clear, Paintable, and Immediately Water Resistant Sealant			~~0.02~~	0.02	0.02
CPVC Welding Cement				0.01	0.01
Foam Sealant				0.23~~2~~	0.23~~2~~
All Other Roof Adhesives			~~0.04~~	0.04	0.04
All Other Roof Sealants			~~0.15~~	0.14	0.14~~5~~
All Other Sealants			~~0.06~~	0.06	0.06
PVC Welding Cement				0.18~~22~~	0.18~~22~~
Rubber Vulcanization Adhesive				0.06	0.06
Single Ply Roof Adhesive			~~0.06~~	0.05	0.05~~6~~
Single Ply Roof Membrane Sealant			~~0.005~~	0.003	0.003~~5~~
Top and Trim Adhesive	-0.21			0.21	
Wood Flooring Adhesive			~~0.26~~	0.24	0.24~~6~~
Totals:	**-0.21**	**0.37~~8~~**	**~~0.59~~**	**1.16~~0.66~~**	**1.38~~43~~**

Compliance with PAR 1168 is expected to be met with manufacturers reformulating regulated products by substituting certain chemicals with other chemicals that contain less VOCs, less or no toxics, and no stratospheric ozone-depleting compounds. Regulated products are expected to be used in a similar fashion to currently compliant regulated products. Physical modifications to or new installations of manufacturing equipment would not be expected to be needed in order to reformulate products. Similarly, since the reformulated products will need to comply with the lower VOC limits and as such, would contribute less to air pollution, modifications to existing or installation of new air pollution control equipment would also not be expected to be necessary in order for manufacturers to reformulate their products in order to comply with the revised VOC limits in PAR 1168. It is important to note that a foregone emission decrease of 0.21 tpd in the Top and Trim Adhesives category would be expected to occur due to the temporary, proposed reinstatement of the 540 g/L VOC limit. By 2023, the VOC content limit will be lowered to 250 g/L, allowing the SCAQMD to maintain the emissions reductions already claimed in the 2003 and 2005 versions of the rule. PAR 1168 is expected to result in an overall VOC emission reduction

of 1.4~~3~~ tpd and does not exceed any one of the thresholds in Table 2-1. Products are expected to be reformulated with water-borne technology or VOC exempt solvents. In addition, manufacturers are expected to reformulate with less toxic compounds, since Group II exempt solvents (except VMS) will be prohibited. The reduction in VOC content is expected to only affect VOC emissions, i.e., no other criteria pollutant emissions. Therefore, it is not considered to have a significant air quality impact.

III. c) Less Than Significant Impact.

Cumulatively Considerable Impacts

Based on the foregoing analysis, since criteria pollutant project-specific air quality impacts from implementing PAR 1168 would not be expected to exceed the air quality significance thresholds in Table 2-1, cumulative air quality impacts are also expected to be less than significant. SCAQMD cumulative significance thresholds are the same as project-specific significance thresholds. Therefore, potential adverse impacts from implementing PAR 1168 would not be "cumulatively considerable" as defined by CEQA Guidelines Section 15064(h)(1) for air quality impacts. Per CEQA Guidelines Section 15064(h)(4), the mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable.

The SCAQMD guidance on addressing cumulative impacts for air quality is as follows: "As Lead Agency, the SCAQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR." "Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant."[11]

This approach was upheld by the Court in *Citizens for Responsible Equitable Environmental Development v. City of Chula Vista* (2011) 197 Cal. App. 4th 327, 334. The Court determined that where it can be found that a project did not exceed the South Coast Air Quality Management District's established air quality significance thresholds, the City of Chula Vista properly concluded that the project would not cause a significant environmental effect, nor result in a cumulatively considerable increase in these pollutants. The court found this determination to be consistent with CEQA Guidelines Section 15064.7, stating, "The lead agency may rely on a threshold of significance standard to determine whether a project will cause a significant environmental effect." The court found that, "Although the project will contribute additional air pollutants to an existing nonattainment area, these increases are below the significance criteria…" "Thus, we conclude that no fair argument exists that the Project will cause a significant unavoidable cumulative contribution to an air quality impact." As in *Chula Vista*, here the SCAQMD has demonstrated, when using accurate and appropriate data and assumptions, that the project will not exceed the established SCAQMD significance thresholds. See also, *Rialto Citizens for Responsible Growth v. City of Rialto* (2012) 208 Cal. App. 4th 899. Here again the court upheld the SCAQMD's approach to utilizing the established air quality significance thresholds to

[11] SCAQMD Cumulative Impacts Working Group White Paper on Potential Control Strategies to Address Cumulative Impacts From Air Pollution, August 2003, Appendix D, Cumulative Impact Analysis Requirements Pursuant to CEQA, at D-3. http://www.aqmd.gov/docs/default-source/Agendas/Environmental-Justice/cumulative-impacts-working-group/cumulative-impacts-white-paper-appendix.pdf.

determine whether the impacts of a project would be cumulatively considerable. Thus, it may be concluded that the proposed project will not contribute to a significant unavoidable cumulative air quality impact.

III. d) Less Than Significant Impact. Compliance with PAR 1168 is expected to be met with the reformulation of regulated products. Reformulated regulated products are expected to be used in a similar fashion to compliant regulated products. Products are expected to be reformulated with water-borne technology or VOC exempt solvents. In addition, manufacturers are expected to reformulate with less toxic compounds and non-ozone-depleting compounds, since Group II exempt solvents (except VMS) will be prohibited. PAR 1168 is expected to result in an overall VOC emission reduction of 1.4~~3~~ tpd. The reduction in VOC content is expected to only affect VOC emissions, i.e., no other criteria pollutant emissions. Sensitive receptors are not expected to be exposed to substantial pollutant concentrations from the implementation of PAR 1168 for the following reasons: 1) as analyzed in Section III. b) and f), there are no operational increases of VOC emissions associated with PAR 1168; 2) implementing PAR 1168 is expected to reduce VOC emissions in the SCAQMD by approximately 1.4~~3~~ tpd by 2023; 3) products are expected to be formulated with replacement chemicals that contain less VOCs, less or no toxics, and no stratospheric ozone-depleting compounds than what are currently used in products regulated by PAR 1168; and 4) the use of future compliant materials must comply with all applicable SCAQMD rules and regulations. By achieving these VOC emission reductions, VOC concentrations are expected to be lessened as a result of implementing PAR 1168. As such, any future exposures to sensitive receptors from implementing PAR 1168 is expected to be lessened (a benefit) when compared to the existing setting. Further, as previously explained in Section III. a), attainment of the state and federal ambient air quality standards will protect sensitive receptors and the public in general from the adverse effects of criteria pollutants, including VOCs, which are known to have adverse human health effects. For these reasons, implementation of PAR 1168 is not expected to expose sensitive receptors to substantial pollutant concentrations. Therefore, no significant adverse air quality impacts to sensitive receptors are expected from implementing PAR 1168.

III. e) Less Than Significant Impact.

Odor Impacts

Odor problems depend on individual circumstances. For example, individuals can differ quite markedly from the populated average in their sensitivity to odor due to any variety of innate, chronic or acute physiological conditions. This includes olfactory adaptation or smell fatigue (i.e., continuing exposure to an odor usually results in a gradual diminution or even disappearance of the smell sensation).

During the manufacturing process, manufacturers may utilize some replacement solvents (e.g., parachlorobenzotrifluoride (PCBTF)) that may individually have a distinct aromatic odor. Currently, PCBTF is allowed to be used in formulations and odor has not been an issue for these products. Replacing other chemicals with solvents, such as PCBTF, would not necessarily cause more of an issue with odor, because once a replacement chemical is blended with other components, the end product may have an entirely different odor profile that could lessen the distinct odor. Thus, if other chemicals with distinct odors are used for reformulation under PAR 1168, odor issues would not be expected to be a problem. Further, if water is used to replace other VOC-containing chemicals as part of reformulation, water does not have an appreciable odor. Thus, products that are reformulated with water would be expected to have a less distinct overall

odor than products made with VOC-containing chemicals. For these reasons, reformulated products made to have lesser amounts of VOC-containing materials would not be expected to have appreciably increased or different odor impacts than the currently used materials. Furthermore, local governments typically have ordinances that are intended to protect the public from adverse odors. SCAQMD Rule 402 – Nuisance, also protects the public from adverse odor impacts. During construction, manufacturers would have ventilation systems vented to air pollution control equipment and require employees to wear personal protective equipment to protect from odors. However, no construction is expected since reformulation of products will take place within existing manufacturer's building(s). For these reasons, odor impacts from the reformulation of products is not expected to create significant adverse objectionable odors during construction or operation. Since no significant impacts were identified for this issue, no mitigation measures for odors are necessary or required.

III. g) and h) No Impact.

Greenhouse Gas (GHG) Impacts

Significant changes in global climate patterns have recently been associated with global warming, an average increase in the temperature of the atmosphere near the Earth's surface, attributed to accumulation of GHG emissions in the atmosphere. GHGs trap heat in the atmosphere, which in turn heats the surface of the Earth. Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. The emission of GHGs through the combustion of fossil fuels (i.e., fuels containing carbon) in conjunction with other human activities, appears to be closely associated with global warming. State law defines GHG to include the following: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6) (Health and Safety Code Section 38505(g)). The most common GHG that results from human activity is CO2, followed by CH4 and N2O.

Traditionally, GHGs and other global warming pollutants are perceived as solely global in their impacts and that increasing emissions anywhere in the world contributes to climate change anywhere in the world. A study conducted on the health impacts of CO2 "domes" that form over urban areas cause increases in local temperatures and local criteria pollutants, which have adverse health effects[12].

The analysis of GHGs is a different analysis than the analysis of criteria pollutants for the following reasons. For criteria pollutants, the significance thresholds are based on daily emissions because attainment or non-attainment is primarily based on daily exceedances of applicable ambient air quality standards. Further, several ambient air quality standards are based on relatively short-term exposure effects on human health (e.g., one-hour and eight-hour standards). Since the half-life of CO2 is approximately 100 years, for example, the effects of GHGs occur over a longer term which means they affect the global climate over a relatively long time frame. As a result, the SCAQMD's current position is to evaluate the effects of GHGs over a longer timeframe than a single day (i.e., annual emissions). GHG emissions are typically considered to be cumulative impacts because they contribute to global climate effects.

[12] Jacobsen, Mark Z. "Enhancement of Local Air Pollution by Urban CO2 Domes," Environmental Science and Technology, as describe in Stanford University press release on March 16, 2010 available at: http://news.stanford.edu/news/2010/march/urban-carbon-domes-031610.html.

Compliance with PAR 1168 is expected through manufacturers reformulating regulated products. As explained in Section III. b) and f), implementation of PAR 1168 is not expected to involve or require construction activities that would utilize GHG emitting combustion equipment. Further, the types of chemicals that are used for reformulating products in order to reduce the content of VOCs, toxics, and stratospheric ozone-depleting substances do not contain any GHG compounds (e.g., CO2, CH4, N2O, HFCs, PFCs, and SF6). Therefore, PAR 1168 is not expected to generate GHG emissions either directly or indirectly, that may have a significant impact on the environment. Further, as noted in Section III. a), implementation of PAR 1168 would not be expected to conflict with an applicable plan, policy or regulation adopted for the purpose of reducing criteria pollutants and the same is true for GHG emissions since GHG emissions would not be impacted in any way by PAR 1168. Therefore, GHG impacts are not considered significant.

Conclusion

Based upon these considerations, significant air quality and GHG emissions impacts are not expected from implementing PAR 1168. Since no significant air quality and GHG emissions impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
IV.	**BIOLOGICAL RESOURCES.** Would the project:				
a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☑
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☑
c)	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☑
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☑
e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☑
f)	Conflict with the provisions of an adopted Habitat Conservation plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☑

Significance Criteria

Impacts on biological resources will be considered significant if any of the following criteria apply:

- The project results in a loss of plant communities or animal habitat considered to be rare, threatened or endangered by federal, state or local agencies.
- The project interferes substantially with the movement of any resident or migratory wildlife species.
- The project adversely affects aquatic communities through construction or operation of the project.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

IV. a), b), c), & d) No Impact. The proposed project does not require the acquisition of land to comply with the provisions of PAR 1168. Further, compliance with PAR 1168 would be expected to be met with manufacturers reformulating regulated products within their existing structures and facilities. The manufacture of regulated products is expected to use the same or similar equipment currently utilized to manufacturer compliant regulated products. Therefore, the manufacture of regulated products is not expected to require physical changes or modifications that would involve construction activities to install new or modify existing manufacturing equipment or air pollution control equipment. Thus, PAR 1168 is not expected to adversely affect in any way habitats that support riparian habitat, federally protected wetlands, or migratory corridors. Similarly, since implementing PAR 1168 would not require the construction of any structures, special status plants, animals, or natural communities identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service are not expected to be adversely affected. The reformulation of regulated products to comply with PAR 1168 are similar to the formulation in existing compliant regulated products except the reformulated regulated products are expected to be formulated with water, low-solvent, VOC exempt solvents, or less toxic solvents to meet the lower VOC content limits and comply with existing toxic rules

(e.g., SCAQMD Rules 1401 and 1402). In addition, PAR 1168 prohibits the use of Group II exempt solvents (except VMS), which would lower the toxic emissions from regulated products. Therefore, PAR 1168 would have no direct or indirect impacts that could adversely affect plant or animal species or the habitats on which they rely in the SCAQMD.

IV. e) & f) No Impact. The proposed project is not expected to conflict with local policies or ordinances protecting biological resources or local, regional, or state conservation plans because PAR 1168 does not require the construction of any new or modified structures or new development in undeveloped areas. Additionally, PAR 1168 would not conflict with any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or any other relevant habitat conservation plan, and would not create divisions in any existing communities because compliance with PAR 1168 would involve reformulation of regulated products in previously disturbed areas which are not typically subject to Habitat or Natural Community Conservation Plans.

Conclusion

Based upon these considerations, significant biological resource impacts are not expected from implementing PAR 1168. Since no significant biological resource impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
V.	**CULTURAL RESOURCES.** Would the project:				
a)	Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☐	☐	☑
b)	Cause a substantial adverse change in the significance of an archaeological resource as defined in Section 15064.5?	☐	☐	☐	☑
c)	Directly or indirectly destroy a unique paleontological resource, site, or feature?	☐	☐	☐	☑
d)	Disturb any human remains, including those interred outside formal cemeteries?	☐	☐	☐	☑
e)	Cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code Section 21074?	☐	☐	☐	☑

Significance Criteria

Impacts to cultural resources will be considered significant if:

- The project results in the disturbance of a significant prehistoric or historic archaeological site or a property of historic or cultural significance, or tribal cultural significance to a community or ethnic or social group or a California Native American tribe.
- Unique paleontological resources or objects with cultural value to a California Native American tribe are present that could be disturbed by construction of the proposed project.
- The project would disturb human remains.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufacturers for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent

manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

V. a), b), c), d) & e) No Impact. No construction-related activities to existing manufacturing facilities would be associated with the implementation of PAR 1168; therefore, no impacts to historical or cultural resources are anticipated to occur. Further, PAR 1168 is not expected to require physical changes to the environment, such as construction, which may disturb paleontological or archaeological resources or disturb human remains interred outside of formal cemeteries. PAR 1168 is not expected to require physical changes to a site, feature, place, cultural landscape, sacred place or object with cultural value to a California Native American Tribe. Furthermore, PAR 1168 is not expected to result in a physical change to a resource determined to be eligible for inclusion or listed in the California Register of Historical Resources or included in a local register of historical resources. For these reasons, PAR 1168 is not expected to cause any substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code Section 21074.

As part of releasing this CEQA document for public review and comment, the SCAQMD also provided a formal notice of the proposed project to all California Native American Tribes (Tribes) that requested to be on the Native American Heritage Commission's (NAHC) notification list per Public Resources Code Section 21080.3.1(b)(1). The NAHC notification list provides a 30-day period during which a Tribe may respond to the formal notice, in writing, requesting consultation on the proposed project.

In the event that a Tribe submits a written request for consultation during this 30-day period, the SCAQMD will initiate a consultation with the Tribe within 30 days of receiving the request in accordance with Public Resources Code Section 21080.3.1(b). Consultation ends when either: 1) both parties agree to measures to avoid or mitigate a significant effect on a Tribal Cultural Resource and agreed upon mitigation measures shall be recommended for inclusion in the environmental document [see Public Resources Code Section 21082.3(a)]; or, 2) either party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached [see Public Resources Code Section 21080.3.2(b)(1)-(2) and Section 21080.3.1(b)(1)].

Conclusion

Based upon these considerations, significant adverse cultural resources impacts are not expected from implementing PAR 1168. Since no significant cultural resources impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
VI.	**ENERGY.** Would the project:				
a)	Conflict with adopted energy conservation plans?	☐	☐	☐	☑
b)	Result in the need for new or substantially altered power or natural gas utility systems?	☐	☐	☐	☑
c)	Create any significant effects on local or regional energy supplies and on requirements for additional energy?	☐	☐	☐	☑
d)	Create any significant effects on peak and base period demands for electricity and other forms of energy?	☐	☐	☐	☑
e)	Comply with existing energy standards?	☐	☐	☐	☑

Significance Criteria

Impacts to energy resources will be considered significant if any of the following criteria are met:

- The project conflicts with adopted energy conservation plans or standards.
- The project results in substantial depletion of existing energy resource supplies.
- An increase in demand for utilities impacts the current capacities of the electric and natural gas utilities.
- The project uses non-renewable resources in a wasteful and/or inefficient manner.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new

or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

VI. a), b), c), d) & e) No Impact. The manufacturing of reformulated regulated products is expected to utilize similar equipment currently used to manufacture compliant regulated products. Regulated products that are reformulated are expected to be used and applied in a similar fashion to compliant regulated products. PAR 1168 is not expected to require physical changes or modifications that involve construction activities. Those who manufacture or use compliant regulated products are expected to comply with any relevant existing energy conservation plans and standards, and implementation of PAR 1168 would not require changes to existing energy conservation plans and standards. As a result, PAR 1168 would not conflict with adopted energy conservation plans, create a need for new for new or substantially altered power or natural gas utility systems, or create any significant adverse effects on peak and base period demands for electricity, natural gas, or other forms of energy, or adversely affect energy producers or energy distribution infrastructure. PAR 1168 would also not create any significant effects on peak and base period demands for electricity or other forms of energy.

Conclusion

Based upon these considerations, significant adverse energy impacts are not expected from implementing PAR 1168. Since no significant energy impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
VII. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☐	☑
• Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☐	☐	☐	☑
• Strong seismic ground shaking?	☐	☐	☐	☑
• Seismic–related ground failure, including liquefaction?	☐	☐	☐	☑
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☑
c) Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☑
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☑
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☑

Significance Criteria

Impacts on the geological environment will be considered significant if any of the following criteria apply:

- Topographic alterations would result in significant changes, disruptions, displacement, excavation, compaction, or over covering of large amounts of soil.
- Unique geological resources (paleontological resources or unique outcrops) are present that could be disturbed by the construction of the proposed project.

- Exposure of people or structures to major geologic hazards such as earthquake surface rupture, ground shaking, liquefaction or landslides.
- Secondary seismic effects could occur which could damage facility structures, e.g., liquefaction.
- Other geological hazards exist which could adversely affect the facility, e.g., landslides, mudslides.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

VII. a) No Impact. PAR 1168 would not result in any construction activities. The manufacture or use of regulated products would be expected to take place at existing settings that are not expected to substantially change as a result of the proposed rule. Thus, PAR 1168 would not alter the exposure of people or property to geological hazards such as earthquakes, landslides, mudslides, ground failure, or other natural hazards. As a result, substantial exposure of people or structures to the risk of loss, injury, or death involving the rupture of an earthquake fault, seismic ground shaking, ground failure or landslides is not anticipated.

VII. b) No impact. PAR 1168 would not require the installation of new or the modification of existing manufacturing equipment, air pollution control equipment or any structures. Since PAR 1168 does not involve construction activities whatsoever, no soil disruption from excavation, grading, or filling activities; changes in topography or surface relief features; erosion of beach sand; or changes in existing siltation rates are anticipated from the implementation of this proposed project.

VII. c) No Impact. Since PAR 1168 would not require any construction activities, no excavation, grading, or filling activities would be expected to occur in order to comply with the proposed project. For these reasons, subsidence is not anticipated to be a problem. Further, the proposed project would not require the drilling or removal of underground products (e.g., water, crude, oil, etc.) that could produce subsidence effects. Since no groundwork or earth moving activities would

be required as part of PAR 1168, no new landslide effects or changes to unique geologic features would occur.

VII. d) & e) No Impact. Since PAR 1168 would not require the installation of new or the modification of existing manufacturing equipment, air pollution control equipment or any structures, no earth-moving activities would be expected to occur. Therefore, no persons or property will be exposed to new impacts related to expansive soils or soils incapable of supporting water disposal. Further, PAR 1168 would not require the installation of septic tanks or other alternative wastewater disposal systems. The main effect of the proposed project would be to lower the VOC content limits. Thus, implementation of PAR 1168 will not adversely affect soils associated with a installing a new septic system or alternative wastewater disposal system or modifying an existing sewer.

Conclusion

Based upon these considerations, significant adverse geology and soils impacts are not expected from the implementation of PAR 1168. Since no significant geology and soils impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
VIII.	**HAZARDS AND HAZARDOUS MATERIALS.** Would the project:				
a)	Create a significant hazard to the public or the environment through the routine transport, use, and disposal of hazardous materials?	☐	☐	☑	☐
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset conditions involving the release of hazardous materials into the environment?	☐	☐	☑	☐
c)	Emit hazardous emissions, or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☑	☐
d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment?	☐	☐	☐	☑
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public use airport or a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
f)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☑
g)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☑
h)	Significantly increased fire hazard in areas with flammable materials?	☐	☐	☑	☐

Significance Criteria

Impacts associated with hazards will be considered significant if any of the following occur:

- Non-compliance with any applicable design code or regulation.
- Non-conformance to National Fire Protection Association standards.
- Non-conformance to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection.
- Exposure to hazardous chemicals in concentrations equal to or greater than the Emergency Response Planning Guideline (ERPG) 2 levels.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

VIII. a), b), & c) Less than Significant Impact. PAR 1168 does not include any provisions that would directly or indirectly dictate the use of any specific regulated product formulations with the exception of prohibiting Group II exempt solvents (except VMS), which are, or are potentially toxic or contain stratospheric ozone-depleting compounds. Manufacturers will have the flexibility to choose the product formulation that best suits their needs.

A number of physical or chemical properties may cause a substance to be a fire hazard. With respect to determining whether any conventional or replacement solvent is a fire hazard, Product Data Sheets (PDS) lists the National Fire Protection Association (NFPA) 704 flammability hazard ratings. NFPA 704 is a "standard (that) provides a readily recognized, easily understood system for identifying flammability hazards and their severity using spatial, visual, and numerical methods to describe in simple terms the relative flammability hazards of a material[13]. However, there are limitations to the NFPA 704 rating system, because a substance can have the same NFPA 704 flammability rating code. Other factors can make a substance's fire hazard different from each

[13] National Fire Protection Association, FAQ for Standard 704. http://www.nfpa.org/assets/files/aboutthecodes/704/704_faqs.pdf

other, depending on its chemical characteristics. Flashpoint is a particularly important measure of the fire hazard of a substance. The Consumer Products Safety Commission (CPSC) promulgated Labeling and Banning Requirements for Chemicals and Other Hazardous Substances in U.S.C. Section 1261 and 16 CFR Part 1500 is based on flammability and flash point.

Current regulated products are water-borne (minimal VOC) or use the following VOC-containing solvents in their formulations: acetone, methyl ethyl ketone (MEK), tetrahydrofuran (THF), PCBTF, xylene, cyclohexane, hexane, heptane, and toluene. If these regulated products are reformulated, some more will likely become water-borne (minimal VOC) or use low-VOC solvents. Others could use solvents currently used in other formulations. Thus, manufacturers are already handling and working with solvents that have potential hazard impacts. Procedures to mitigate those hazards are already in place. Besides water, potential solvents used in reformulations of regulated products may include, but are not limited to the following chemicals:

Acetone

Acetone is a colorless, highly volatile liquid that has a fragrant, mint-like odor. It is a manufactured chemical that is also found naturally in the environment. It occurs naturally in plants, trees, volcanic gases, forest fires, and as a product of the breakdown of body fat. It is present in vehicle exhaust, tobacco smoke, and landfill sites. Acetone is used to make plastic, fibers, drugs, and other chemicals. It is also used to dissolve other substances. Industrial processes contribute more acetone to the environment than natural processes. Common uses for acetone are nail polish removers and for thinning paint. It has a high solvent strength greater than the other types of solvents, except for xylene, which has a similar solvent strength. Acetone is widely available at retail stores that sell solvents.

1. As a VOC: Acetone is currently listed as a Group I exempt VOC pursuant to SCAQMD Rule 102 – Definition of Terms, because it does not contribute appreciably to ozone formation. Acetone was originally "delisted" as a VOC by the U.S. EPA in 1995.

2. Flammability: Acetone has the lowest flash point, -4 degrees Fahrenheit (°F) (below freezing,) and is the most flammable of all the solvents considered in PAR 1168. Acetone, along with the majority of other solvents except for PCBTF, is rated "three" for flammability by the National Fire Protection Association (NFPA) which means that it is considered to be highly flammable. However, because of the ultra-low flash point, labeling requirements pursuant to the CPSC classifies acetone as "extremely flammable."

PCBTF

PCBTF is a colorless liquid with a distinct aromatic odor. It is commonly used as an ink solvent in the printing industry and is sold under the brand name Oxsol 100. PCBTF had originally been used as an intermediate in the production of other compounds, but more recently has been marketed as a cleaning solvent and paint thinner. Because it is only manufactured in a limited number of countries overseas (e.g., China), it is considered to be expensive due to high shipping costs relative to other possible solvent replacements.

1. As a VOC: Exempt pursuant to U.S. EPA and listed as exempt in Rule 102, Group I.

2. Flammability: PCBTF, like mineral spirits, has a relatively high flash point at 109 °F (well above typical ambient temperatures) when compared to acetone, and as such, is one of the least flammable of all the solvents considered in PAR 1168. PCBTF, is the only solvent

that is rated "one" for flammability by the NFPA which means that it is considered to be slightly flammable or combustible if heated. Because of its high flash point range, labeling requirements pursuant to the CPSC classifies PCBTF as "combustible."

The flammability and the associated hazards of each reformulated product is directly dependent upon which substitute solvents are used and which existing solvents are replaced. There are solvents that can be used to reformulate products that would comply with the lower VOC content limits contained in PAR 1168 but that may also be flammable, such as acetone or PCBTF, which is less flammable than acetone. Water, which is not flammable, could also be used to reformulate products. It is important to note that acetone, PCBTF and water are all currently used for manufacturing products that comply with the current version of Rule 1168. In any case, SCAQMD staff is unable to predict or forecast which chemicals would be selected by manufacturers as replacements solvents and how much of these chemicals would be used. Moreover, SCAQMD staff is also unable to predict or forecast the flammability of future reformulations. Therefore, in accordance with CEQA Guidelines Section 15145, an evaluation of the flammability of each future reformulated product is concluded to be speculative and will not be evaluated further in this analysis. PAR 1168 will also prohibit the use of Group II exempt compounds (except VMS), thus limiting and reducing the potential for products to be reformulated with toxic or stratospheric ozone-depleting chemicals.

It is anticipated that the current extensive and comprehensive regulatory requirements regarding flammable and otherwise hazardous materials will not need to be amended as a result of the proposed project since, in part, acetone is already widely distributed, sold and used. Based on the preceding information, it is also expected that implementing PAR 1168 is not expected to increase or create any new hazardous emissions which would adversely affect existing or proposed schools. In fact, to the extent that manufacturers, schools and other users replace the regulated products formulated with conventional VOC-containing solvents with reformulated products made with water, acetone, PCBTF or other minimal VOC chemicals, any existing hazardous emissions, including those near one-quarter mile of any schools, would be expected to remain unchanged or would be reduced with regard to hazardous characteristics.

Therefore, PAR 1168 is not expected to create a significant hazard to the public or environment through the routine transport, use, and disposal of hazardous materials; create a new significant hazard to the public or the environment through reasonably foreseeable upset conditions involving the release of hazardous materials into the environment; emit new hazardous emissions, or handle hazardous or acutely hazardous materials, substances or waste within one quarter mile of an existing or proposed school; or significantly increase fire hazard in areas with flammable materials.

VIII. d) No Impact. Government Code Section 65962.5 refers to hazardous waste handling practices at facilities subject to the Resources Conservation and Recovery Act (RCRA). Current regulated products are water-borne (minimal VOC) or use the following VOC-containing solvents in their formulations: acetone, methyl ethyl ketone (MEK), tetrahydrofuran (THF), PCBTF, xylene, cyclohexane, hexane, heptane, and toluene. While there are manufacturing facilities that are identified on lists of California Department of Toxics Substances Control hazardous waste facilities per Government Code Section 65962.5, PAR 1168 would not change how these facilities comply with their current hazardous waste handling practices. In fact, any facility that is subject to the requirements in Government Code Section 65962.5 would still be required need to comply with any regulations relating to that code section irrespective of whether PAR 1168 is

implemented. For this reason, PAR 1168 is not expected to have direct impacts on any facilities subject to the requirements in Government Code Section 65962.5
In general, the purpose of PAR 1168 is to achieve VOC emission reductions through reformulation of regulated products, which will ultimately improve air quality and reduce adverse human health impact related to poor air quality. Further, since products are to be reformulated with less hazardous components (e.g., chemicals that contain less VOCs, toxics and stratospheric ozone-depleters) than what is currently available, PAR 1168 may have the added beneficial effect of reducing the amount of unused regulated products that are disposed of as hazardous waste. Nonetheless, the use of PAR 1168 compliant regulated products is not expected to interfere with existing hazardous waste management programs since facilities handling hazardous waste would be expected to continue to manage any and all hazardous materials and hazardous waste, in accordance with applicable federal, state, and local rules and regulations. Therefore, compliance with PAR 1168 would not create a new significant hazard to the public or environment.

VIII. e) No Impact. It is expected compliance with PAR 1168 will result in the reformulation of regulated products. No construction activities are expected from the implementation of PAR 1168. Therefore, it is not expected to increase or create any new safety hazards to peoples working or residing in the vicinity of public/private airports.

VIII. f) No Impact. Health and Safety Code Section 25506 specifically requires all businesses handling hazardous materials to submit a business emergency response plan to assist local administering agencies in the emergency release or threatened release of a hazardous material. Business emergency response plans generally require the following:

- Identification of individuals who are responsible for various actions, including reporting, assisting emergency response personnel and establishing an emergency response team;
- Procedures to notify the administering agency, the appropriate local emergency rescue personnel, and the California Office of Emergency Services;
- Procedures to mitigate a release or threatened release to minimize any potential harm or damage to persons, property or the environment;
- Procedures to notify the necessary persons who can respond to an emergency within the facility;
- Details of evacuation plans and procedures;
- Descriptions of the emergency equipment available in the facility;
- Identification of local emergency medical assistance; and,
- Training (initial and refresher) programs for employees in:
    1. The safe handling of hazardous materials used by the business;
    2. Methods of working with the local public emergency response agencies;
    3. The use of emergency response resources under control of the handler;
    4. Other procedures and resources that will increase public safety and prevent or mitigate a release of hazardous materials.

In general, every county or city and all facilities using a minimum amount of hazardous materials are required to formulate detailed contingency plans to eliminate, or at least minimize, the possibility and effect of fires, explosion, or spills. In conjunction with the California Office of Emergency Services, local jurisdictions have enacted ordinances that set standards for area and business emergency response plans. These requirements include immediate notification, mitigation of an actual or threatened release of a hazardous material, and evacuation of the emergency area.

Compliance with PAR 1168 is expected through the reformulation of regulated products. Manufacturing practices and the usage of reformulated regulated products in accordance with PAR 1168 are not expected to change from existing manufacturing practices and usage of current compliant products. Further, PAR 1168 contains no requirements that would pertain to or alter any adopted emergency response plans or emergency evacuation plans that may be in place at facilities that manufacture or use the regulated products. Therefore, PAR 1168 is not expected to impair the implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

VIII. g) No Impact. Compliance with PAR 1168 is expected through the reformulation of regulated products. The facilities affected by PAR 1168 are typically located in existing industrial, commercial or mixed land use areas and are not located near wildlands; therefore, PAR 1168 is not expected to be significant for exposing people or structures to risk of loss, injury or death involving wildland fires.

VIII. h) Less Than Significant Impact. The Uniform Fire Code and Uniform Building Code set standards intended to minimize risks from flammable or otherwise hazardous materials. Local jurisdictions are required to adopt the uniform codes or comparable regulations. Local fire agencies require permits for the use or storage of hazardous materials and permit modifications for proposed increases in their use. Permit conditions depend on the type and quantity of the hazardous materials at the facility. Permit conditions may include, but are not limited to, specifications for sprinkler systems, electrical systems, ventilation, and containment. The fire departments make annual business inspections to ensure compliance with permit conditions and other appropriate regulations. Further, businesses are required to report increases in the storage or use of flammable and otherwise hazardous materials to local fire departments. Local fire departments ensure that adequate permit conditions are in place to protect against the potential risk of upset. PAR 1168 would not change the existing requirements and permit conditions for the proper handling of flammable materials. Further, PAR 1168 does not contain any requirements that would prompt facility owners/operators to begin using new flammable materials. In addition, the National Fire Protection Association has special designations for deflagrations (e.g., explosion prevention) when using materials that may be explosive. Therefore, for liability reasons, it is unlikely that manufacturers would elect to reformulate products that may have explosive properties without first ensuring that there are explosion control systems and employee safety procedures and protections in place. Additional information pertaining to these types of protective measures is available in Chapter 8 of the *Industrial Ventilation, A Manual for Recommended Practice for Design*, 28th Edition, published by the American Conference of Governmental Industrial Hygienists, ©2013.

Conclusion

Based upon these considerations, significant adverse hazards and hazardous materials impacts are not expected from implementing PAR 1168. Since no significant hazards and hazardous materials impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
IX.	**HYDROLOGY AND WATER QUALITY.** Would the project:				
a)	Violate any water quality standards, waste discharge requirements, exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board, or otherwise substantially degrade water quality?	☐	☐	☑	☐
b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☑	☐
c)	Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in substantial erosion or siltation on- or off-site or flooding on- or off-site?	☐	☐	☐	☑
d)	Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☑
e)	Place housing or other structures within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, which would impede or redirect flood flows?	☐	☐	☐	☑

f) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam, or inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☑
g) Require or result in the construction of new water or wastewater treatment facilities or new storm water drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑
h) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☑	☐
i) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☑	☐

Significance Criteria

Potential impacts on water resources will be considered significant if any of the following criteria apply:

<u>Water Demand:</u>

- The existing water supply does not have the capacity to meet the increased demands of the project, or the project would use more than 262,820 gallons per day of potable water.
- The project increases demand for total water by more than five million gallons per day.

<u>Water Quality:</u>

- The project will cause degradation or depletion of ground water resources substantially affecting current or future uses.
- The project will cause the degradation of surface water substantially affecting current or future uses.
- The project will result in a violation of National Pollutant Discharge Elimination System (NPDES) permit requirements.
- The capacities of existing or proposed wastewater treatment facilities and the sanitary sewer system are not sufficient to meet the needs of the project.

- The project results in substantial increases in the area of impervious surfaces, such that interference with groundwater recharge efforts occurs.
- The project results in alterations to the course or flow of floodwaters.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

IX. a) & i) Less than Significant Impact. Lowering the VOC content limit of coatings will not be expected to have any direct or indirect impact on water quality because the reformulation of regulated products is not expected to change the current regulated product practices or alter the regulated product formulations to be more detrimental to water quality. Although compliance of PAR 1168 is expected to be through the reformulation of regulated products, PAR 1168 does not specify or dictate the type of solvent that need to be used or that water-borne technology must be used for reformulation. For any regulated products that are reformulated with water, water will also be needed for clean-up purposes, in lieu of solvent-based clean up materials. Similarly, wastewater from cleaning up water-borne reformulations could be disposed of into the public sewer system, in lieu of disposal as hazardous waste. It is important to note that PAR 1168 also contains a sell-through and use-through provision such that PAR 1168 will not create a new need to dispose of unused materials that do not comply with PAR 1168 upon adoption. Of course, when there is unused material under the current version of Rule 1168, contractors and businesses using regulated products either dispose of waste material according to the specifications in the manufacturer's product data sheets or recycle the waste material, such that unused materials are not disposed of via wastewater. Under PAR 1168, these practices would not be expected to change. In addition, SCAQMD rules that regulate VOC emissions, including Rule 1113 – Architectural Coatings[14], Rule 1107 – Coating of Metal Parts and Products[15], and Rule 1151 –

[14] Final Environmental Assessment for Proposed Amended Rule 1113 – Architectural Coatings, February 2016. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2016/par-1113-final-ea2.pdf

[15] Final Environmental Assessment for Proposed Amended Rule 1107 – Coating of Metal Parts and Products, October 2005. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2005/final-ea-for-proposed-amended-rule-1107.pdf

Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations[16], were previously amended to lower VOC content limits via reformulation of solvent-based coatings to lower VOC coatings or water-borne coatings was anticipated and occurred; these amendments and the corresponding CEQA documents analyzing the effects on water quality did not result in significant adverse impacts to water quality. In practice, the coatings subject to these rules were successfully reformulated with water-borne technology and no adverse effects to water quality, wastewater treatment, or wastewater treatment capacity occurred during implementation. For these reasons, reformulation of regulated products as a result of implementing PAR 1168 would not be expected to violate any water quality standards, waste discharge requirements, exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board, or otherwise substantially degrade water quality. Further, implementation of PAR 1168 would also not be expected to result in a determination by the wastewater treatment provider which serves or may serve the manufacturers and users of the reformulated regulated products that there is not adequate existing capacity to serve any additional wastewater that may be generated from using water for cleaning up.

IX. b) Less than Significant Impact. SCAQMD staff is unable to predict or forecast whether any manufacturers will have access to groundwater and whether the groundwater will be of a sufficient quality or supply to be used for reformulation of regulated products. Nonetheless, although very unlikely, if a manufacturer has a well on its property, groundwater may be used for reformulating regulated products provided that the property owner has groundwater pumping rights, a sufficient supply, and the groundwater is of a suitable quality for manufacturing. In general, the quality of groundwater is typically not suitable for usage in the manufacturing of regulated products, unless it has been treated to meet the quality assurance and quality control of strict manufacturing standards. Manufacturers of regulated products typically use potable water water-borne formulations of regulated products. In addition, as explained in Section IX. a), for past rule amendments that have relied on similar reformulation technology, the water demand to reformulate regulated products has not resulted in a significant adverse impact on groundwater supplies. Thus, PAR 1168 is not expected to substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.

IX. c) & d) No Impact. The manufacturing and application of regulated products that are reformulated pursuant to PAR 1168 is expected to take place at existing locations and settings. As with currently regulated products under existing Rule 1168, the manufacturing of reformulated regulated products in accordance with PAR 1168 will continue to occur at existing facilities whose process lines operate within enclosed buildings. Similarly, the application and use of reformulated products are expected to be used in the same manner as the currently regulated products under existing Rule 1168 (e.g., inside existing buildings). Further, as explained in Section IX. a), contractors and businesses using regulated products either dispose of waste material according to the specifications in the manufacturer's product data sheets or recycle the waste material, such that unused materials are not improperly disposed of.

For these reasons, implementation of PAR 1168 would not be expected to: 1) substantially alter the existing drainage pattern of the site or area where reformulated regulated products are

[16] Final Environmental Assessment for: Proposed Amended Rule 1151 – Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations, November 2005. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2005/final-ea-par1151.doc

manufactured or used, including through alteration of the course of a stream or river, or 2) substantially increase the rate or amount of surface runoff in a manner that would result in substantial erosion or siltation on- or off-site or flooding on- or off-site. In addition, PAR 1168 would also not be expected to create new or contribute to existing runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.

IX. e) & f) No Impact. As explained in Section IV. e) and f), PAR 1168 would not require the construction of any new or modified structures or new development in undeveloped areas. Compliance with PAR 1168 is expected to be through the reformulation of regulated products to meet VOC content limits. As with currently regulated products under existing Rule 1168, the manufacturing of reformulated regulated products in accordance with PAR 1168 will continue to occur at existing facilities whose process lines operate within enclosed buildings. Similarly, the application and use of reformulated products are expected to be used in the same manner as the currently regulated products under existing Rule 1168 (e.g., inside existing buildings). Therefore, PAR 1168 would not be expected to cause placing housing or structures to be placed within 100-year flood hazard areas as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, which would impede or redirect flood flows. Similarly, PAR 1168 would also not be expected to expose people or structures to a significant risk of loss, injury or death involving flooding as a result of the failure of a levee or dam, or inundation by seiche, tsunami, or mudflow because any flood event of this nature would be part of the existing setting or topography that is present for reasons unrelated to PAR 1168.

IX. g) No Impact. As explained previously, since compliance with PAR 1168 is expected to be through the reformulation of regulated products to meet VOC content limits, PAR 1168 would not require the construction of any new or modified structures or new development. Thus, PAR 1168 would also not require or result in the construction of new water or wastewater treatment facilities or new storm water drainage facilities, or the expansion of existing facilities.

IX. h) Less Than Significant Impact. While compliance with PAR 1168 is expected to be through the reformulation of regulated products to meet VOC content limits, it is unknown at this time how many types of regulated products manufacturers will elect to reformulate with water and how much water will be needed to do so. However, as explained in Section IX. a) and i), CEQA evaluations were conducted for previous amendments to other VOC-based rules (e.g., Rules 1107, 1113, and 1151) which also proposed to lower VOC content limits via reformulation similar to what is expected to occur with PAR 1168. The water demand analyses in these CEQA documents concluded that the existing water supplies were sufficiently available for the reformulation of regulated products without the need for new or expanded entitlements. For this reason, the reformulation of regulated products with water as part of implementing PAR 1168 would also be expected to have sufficient water supplies available from existing entitlements and resources with requiring any new or expanded entitlements.

Conclusion

Based upon these considerations, significant adverse hydrology and water quality impacts are not expected from implementing PAR 1168. Since no significant hydrology and water quality impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
X. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☑
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☑

Significance Criteria

Land use and planning impacts will be considered significant if the project conflicts with the land use and zoning designations established by local jurisdictions.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

X. a)& b) No Impact. Since compliance with PAR 1168 is expected to be through the reformulation of regulated products to meet VOC content limits, PAR 1168 would not require the construction of any new or modified structures or new development in undeveloped areas. Therefore, implementation of PAR 1168 would not be expected to result in physically dividing an established community.

Further, land use and other planning considerations are determined by local governments and there is no land use agency that would have jurisdiction over PAR 1168. For this reason, PAR 1168 would not require alterations to or conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.

Conclusion

Based upon these considerations, significant adverse land use and planning impacts are not expected from implementing PAR 1168. Since no significant land use and planning impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XI. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☑
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☑

Significance Criteria

Project-related impacts on mineral resources will be considered significant if any of the following conditions are met:

- The project would result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.
- The proposed project results in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

XI. a) & b) No Impact. There are no provisions in PAR 1168 that would result in the loss of availability of a known mineral resource of value to the region and the residents of the state, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plant or other land use plant. Some examples of mineral resources are gravel, asphalt, bauxite, and gypsum, which are commonly used for construction activities or industrial processes. Since the proposed project is likely only to result in the reformulation of regulated products and not require new construction, PAR 1168 would have no effects on the use of important minerals, such as those described above. Therefore, no new demand on mineral resources is expected to occur and significant adverse mineral resources impacts from implementing PAR 1168 are not anticipated.

Conclusion

Based upon these considerations, significant adverse mineral resource impacts are not expected from implementing PAR 1168. Since no significant mineral resource impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XII. NOISE. Would the project result in:				
a) Exposure of persons to or generation of permanent noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☑
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☑
c) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☑
d) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public use airport or private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑

Significance Criteria

Noise impact will be considered significant if:

- Construction noise levels exceed the local noise ordinances or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three decibels (dBA) at the site boundary. Construction noise levels will be considered significant if they exceed federal Occupational Safety and Health Administration (OSHA) noise standards for workers.
- The proposed project operational noise levels exceed any of the local noise ordinances at the site boundary or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three dBA at the site boundary.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC

content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

XII. a) No Impact. PAR 1168 is not expected to alter the manufacturing, distribution, or application of regulated products in any substantial way that would alter existing noise profile at the manufacturing facilities. The manufacture of PAR 1168 compliant regulated products is not expected to require physical modifications that would require additional noise-causing equipment at existing facilities, because it is anticipated that the same equipment used to manufacturer and apply currently available regulated products would continue to be used and applied. Further, the use of regulated products at the consumer and institutional level is typically not a noise intensive activity. Therefore, the existing noise levels are unlikely to change and raise ambient noise levels in the vicinities of the existing facilities or other sites where these products are distributed, sold, or used to above a level of significant in response to implementing PAR 1168. Further, Occupational Safety and Health Administration (OSHA) and California-OSHA have established noise standards to protect worker health at distribution and retail locations.

XII. b) No Impact. PAR 1168 is not anticipated to expose persons to or generate excessive groundborne vibration or groundborne noise levels since no construction activities are expected to occur from the expected reformulation of regulated products as a result of lowering the VOC content limits in PAR 1168.

XII. c) No Impact. No increase in periodic or temporary ambient noise levels in the vicinity of affected facilities above levels existing prior to PAR 1168 is anticipated because the proposed project would not require construction-related activities nor would it change the existing activities currently performed by persons who utilize regulated products. See also the response to Section XII. a).

XII. d) No Impact. Implementation of PAR 1168 would not affect existing practices by persons who use and apply PAR 1168 regulated products. Even if affected sites where PAR 1168 compliant regulated products are used are located within two miles of a public airport or private airstrip, no new noise impacts would be expected since the application of regulated products is not typically a noise intensive activity. Thus, PAR 1168 is not expected to expose persons residing or working within two miles of a public airport or private airstrip to excessive noise levels.

Conclusion

Based upon these considerations, significant adverse noise impacts are not expected from the implementing PAR 1168. Since no significant noise impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XIII. POPULATION AND HOUSING. Would the project:				
a) Induce substantial growth in an area either directly (for example, by proposing new homes and businesses) or indirectly (e.g. through extension of roads or other infrastructure)?	☐	☐	☐	☑
b) Displace substantial numbers of people or existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑

Significance Criteria

Impacts of the proposed project on population and housing will be considered significant if the following criteria are exceeded:

- The demand for temporary or permanent housing exceeds the existing supply.
- The proposed project produces additional population, housing or employment inconsistent with adopted plans either in terms of overall amount or location.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

XIII. a) No Impact. PAR 1168 is not anticipated to generate any significant effects, either direct or indirect, on the population or population distribution within SCAQMD's jurisdiction as no additional workers are anticipated to be required to comply with PAR 1168. No additional workers

would be required to manufacture PAR 1168-compliant regulated products because the same equipment that is currently used to manufacture regulated products under the current version of Rule 1168 would continue to be used to manufacture reformulated products under PAR 1168. In addition, even though regulated products are expected to be reformulated, the usage amount of the reformulated regulated products would not be expected to substantially change. Thus, no additional workers are expected to be needed to apply the reformulated regulated products. Human population within the jurisdiction of the SCAQMD is expected to grow regardless of implementing PAR 1168. As such, PAR 1168 would not result in changes in population densities or induce significant growth in population.

XIII. b) No Impact. PAR 1168 would likely only result in reformulation of regulated products. Aside from altering the chemical components of the regulated products, PAR 1168 is not expected to substantially alter existing operations where the reformulated regulated products may be manufactured or used. Consequently, PAR 1168 is not expected to result in the creation of any industry that would affect population growth, directly or indirectly induce the construction of single- or multiple-family units, or require the displacement of persons or housing elsewhere in the District.

Conclusion

Based upon these considerations, significant adverse population and housing impacts are not expected from implementing PAR 1168. Since no significant population and housing impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XIV. PUBLIC SERVICES. Would the proposal result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:				
a) Fire protection?	☐	☐	☑	☐
b) Police protection?	☐	☐	☑	☐
c) Schools?	☐	☐	☐	☑
d) Other public facilities?	☐	☐	☐	☑

Significance Criteria

Impacts on public services will be considered significant if the project results in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response time or other performance objectives.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new

or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

XIV. a) Less Than Significant Impact. A potential adverse impacts to fire departments could occur if there is an increase the potential for an accidental release of a hazardous or flammable material that is used in reformulating compliant regulated products. Under this circumstance, fire departments would have to respond more frequently to accidental release incidences. Another potential adverse impact to fire departments could occur if there is an increase in the amount of hazardous materials or flammable materials stored at affected facilities, fire departments may have to conduct additional safety inspections. However, in order to comply with PAR 1168, manufacturers are expected to reformulate their regulated products with chemicals that contain less VOCs, less or no toxics, and no stratospheric ozone-depleting compounds. PAR 1168 does not include any provisions that would directly or indirectly dictate the use of any specific regulated product formulations with the exception of prohibiting Group II exempt solvents (except VMS), which are, or are potentially toxic or ozone-depleting compounds. Manufacturers will have the flexibility to choose the product formulation that best suits their needs.

Current regulated products are water-borne (minimal VOC) or use the following VOC-containing solvents, which are flammable, in their formulations: acetone, methyl ethyl ketone (MEK), tetrahydrofuran (THF), PCBTF, xylene, cyclohexane, hexane, heptane, and toluene. If these regulated products are reformulated, some more will likely become water-borne (minimal VOC) or use low-VOC solvents and the existing fire hazard for the manufacturers as well as the end users would be expected to eventually decrease as reformulated products become available.

In 2013, SCAQMD staff contacted the California Fire Marshall's Office and county fire departments to inquire about fire statistics and it turns out that incidences of fires are not indexed with enough detail to determine which fires were caused by coatings, adhesives, sealants, or solvents. Therefore, it could not be determined if the number fire incidents have increased because of the reformulations to lower VOC-containing products for other existing SCAQMD VOC rules (e.g., Rules 1107, 1113 and 1151). As stated by a San Bernardino Country Fire employee[17], only two fires between 2000 and 2013 were determined to be caused by architectural coating operations. In both cases, the fires were from the combustion of cleaning rags (which are subject to Rule 1171 – Solvent Cleaning Operations, and not architectural coating operations (which are subject to Rule 1113). Therefore, based on this sampling of data, fires that can be attributed to regulated products that are reformulated pursuant to the lower VOC content requirements in PAR 1168 would be rare. Thus, fire departments would not be expected to have to respond more frequently to accidental releases of chemicals used by manufacturers in the reformulation process or accidental releases of the reformulated regulated products that are used by consumers.

Therefore, PAR 1168 is not expected to increase the amount of hazardous materials or flammable materials stored at affected facilities, which would require significant additional safety inspections. PAR 1168 is not expected to generate significant adverse impacts to fire departments.

XIV. b) Less Than Significant Impact. Local police departments are also first responders to emergency situations such as fires, for example, to cordon off the area and provide crowd control. However, as explained in Section XIV. a), implementing PAR 1168 would not be expected to increase the number of fires compared to the existing setting. As a result, no significant adverse

[17] Telephone conversation with San Bernardino County Fire Department Public Information Unit on December 6, 2013.

impacts to local police departments would also be expected because no substantial increases in fire emergencies are anticipated.

XIV. c) & d) No Impact. As explained in Section XIII. a), PAR 1168 is not anticipated to generate any significant effects, either direct or indirect, on the population or population distribution within SCAQMD's jurisdiction as no additional workers are anticipated to be required to comply with PAR 1168. No additional workers would be required to manufacture PAR 1168-compliant regulated products because the same equipment that is currently used to manufacture regulated products under the current version of Rule 1168 would continue to be used to manufacture reformulated products under PAR 1168. In addition, even though regulated products are expected to be reformulated, the usage amount of the reformulated regulated products would not be expected to substantially change. As such, no additional workers are expected to be needed to apply the reformulated regulated products. Because PAR 1168 is not expected to induce population growth in any way, and because the local labor pool (e.g., workforce) using regulated products would remain the same since PAR 1168 would not trigger changes to current usage practices, no additional schools would need to be constructed as a result of implementing PAR 1168. Therefore, since no increase in local population would be anticipated as a result of implementing PAR 1168, there would be no corresponding impacts to local schools and there would be no corresponding need for new or physically altered public facilities in order to maintain acceptable service ratios, response times, or other performance objectives. Therefore, no impacts would be expected to schools or other public facilities.

Conclusion

Based upon these considerations, significant adverse public services impacts are not expected from implementing PAR 1168. Since no significant public services impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XV. RECREATION.				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☑
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment or recreational services?	☐	☐	☐	☑

Significance Criteria

Impacts to recreation will be considered significant if:

- The project results in an increased demand for neighborhood or regional parks or other recreational facilities.
- The project adversely affects existing recreational opportunities.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

XV. a) & b) No Impact. As discussed in Section X - Land Use and Planning, there are no provisions in PAR 1168 that would affect land use plans, policies, or regulations. Land use and

other planning considerations are determined by local governments. No land use or planning requirements would be altered by the adoption of PAR 1168, which only affects the VOC content of regulated products. Further, PAR 1168 would not affect population growth or distribution within the SCAQMD's jurisdiction (see Section XIII – Population and Housing), in ways that could increase the demand for or use of existing neighborhood and regional parks or other recreational facilities or require the construction of new or expansion of existing recreational facilities that might have an adverse physical effect on the environment because it would not directly or indirectly increase or redistribute population.

Conclusion

Based upon these considerations, significant adverse recreation impacts are not expected from implementing PAR 1168. Since no significant recreation impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XVI. SOLID AND HAZARDOUS WASTE. Would the project:				
a) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☑
b) Comply with federal, state, and local statutes and regulations related to solid and hazardous waste?	☐	☐	☐	☑

Significance Criteria

The proposed project impacts on solid and hazardous waste will be considered significant if the following occurs:

- The generation and disposal of hazardous and non-hazardous waste exceeds the capacity of designated landfills.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

XVI. a) & b) No Impact. In general, the purpose of PAR 1168 is to achieve VOC emission reductions through reformulation of regulated products, which will ultimately improve air quality and reduce adverse human health impacts related to poor air quality. Further, since products are to be reformulated with less hazardous components (e.g., chemicals that contain less VOCs, toxics and stratospheric ozone-depleters) than what is currently available, PAR 1168 may have the added beneficial effect of reducing the amount of unused regulated products that are disposed of as hazardous waste. It is important to note that PAR 1168 also contains a three-year sell-through to allow manufacturers and suppliers to deplete regulated products in the warehouse or on the shelf

and allows users to use up any remaining product rather than disposing of them. The sell-through and use-through effective dates should accommodate the typical three year shelf life of these regulated products. Of course, when there is unused material under the current version of Rule 1168, contractors and businesses using regulated products either dispose of waste material according to the specifications in the manufacturer's product data sheets or recycle the waste material. Under PAR 1168, these disposal practices and the total amount of materials (hazardous and non-hazardous) disposed of would not be expected to change. For these reasons, implementation of PAR 1168 would not be expected to create a new need to dispose of unused materials that do not comply with PAR 1168 upon adoption.

Based upon these considerations, PAR 1168 is not expected to increase the volume of solid or hazardous wastes that cannot be handled by existing municipal or hazardous waste disposal facilities, or require additional waste disposal capacity. Further, implementing PAR 1168 is not expected to interfere with any affected distributors' or retailers' ability to comply with applicable local, state, or federal waste disposal regulations.

Conclusion

Based upon these considerations, significant adverse solid and hazardous waste impacts are not expected from implementing PAR 1168. Since no significant solid and hazardous waste impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XVII. TRANSPORTATION AND TRAFFIC. Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☑
b) Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☑
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☑
d) Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☐	☐	☐	☑
e) Result in inadequate emergency access?	☐	☐	☐	☑
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☑

Significance Criteria

Impacts on transportation and traffic will be considered significant if any of the following criteria apply:

- Peak period levels on major arterials are disrupted to a point where level of service (LOS) is reduced to D, E or F for more than one month.
- An intersection's volume to capacity ratio increase by 0.02 (two percent) or more when the LOS is already D, E or F.
- A major roadway is closed to all through traffic, and no alternate route is available.
- The project conflicts with applicable policies, plans or programs establishing measures of effectiveness, thereby decreasing the performance or safety of any mode of transportation.
- There is an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system.
- The demand for parking facilities is substantially increased.
- Water borne, rail car or air traffic is substantially altered.
- Traffic hazards to motor vehicles, bicyclists or pedestrians are substantially increased.
- The need for more than 350 employees.
- An increase in heavy-duty transport truck traffic to and/or from the facility by more than 350 truck round trips per day.
- Increase customer traffic by more than 700 visits per day.

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

XVII. a) & b) No Impact. In order to comply with PAR 1168, manufacturers are expected to reformulate their regulated products with chemicals that contain less VOCs, less or no toxics, and

no stratospheric ozone-depleting compounds. In order to accomplish this task, the supply of non-compliant chemicals used to make current regulated products will be replaced with PAR 1168 compliant chemicals. Further, the volumes of reformulated regulated products that are produced by manufacturers to comply with PAR 1168 will eventually replace the existing supply of regulated products currently available on the market. Thus, the increased amounts of replacement chemicals needed to reformulate products will be offset by a decrease in the amounts of non-compliant chemicals needed such that no increase is expected in the overall volumes of materials to be used in manufacturing or the amount of reformulated products to be made. There are currently manufactured regulated products that are compliant within SCAQMD's jurisdiction that are shipped and transported throughout the country and other compliant products that are manufactured outside the SCAQMD's jurisdiction are trucked in. It would not be expected that the reformulation of regulated products would alter any future deliveries or change in the circulation of regulated products. Thus, the current level of transportation demands related to transporting substitute chemicals or new formulations of materials is also not expected to increase. PAR 1168 is not expected to affect existing uses and applications of regulated products that would change or cause additional worker trips to distribution or retail facilities or increase transportation demands or services. Therefore, with no substantial increase in operational-related trips anticipated, implementing PAR 1168 would not be expected to significantly adversely affect circulation patterns on local roadways or the level of service at intersections near affected facilities or other sites that use these products.

XVII. c) No Impact. PAR 1168 will result in the reformulation of regulated products by manufacturers substituting VOC-containing chemicals with other replacements that contain less VOCs, toxics and stratospheric ozone-depleters. Since product reformulation would not require the installation of new or the modification of existing manufacturing equipment, air pollution control equipment or any structures at a height that would interfere with an airport, no changes in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks, would be expected to occur as a result of complying with PAR 1168. In addition, PAR 1168 would not affect in any way air traffic in the region, because regulated products are typically shipped via ground transportation and not by air. Therefore, implementation of PAR 1168 is not expected to adversely affect traffic patterns.

XVII. d) & e) No Impact. As explained in Section XVII c) above, regulated products are typically shipped via ground transportation (e.g., via roadways) and the shipping of reformulated regulated products made in response to PAR 1168 would also be shipped via ground transportation. As explained in Section XVII a) and b) above, the current level of transportation demands related to transporting substitute chemicals necessary to manufacturer reformulations or the final reformulations themselves is also not expected to increase. Therefore, the existing roadways should be sufficient to handle the transportation needs associated with implementing PAR 1168. Thus, the manufacture and use of compliant regulated products would not require the construction of new or modified structures or roadways. Consequently, implementing the proposed project will not create roadway hazards or incompatible roadway uses or alter the existing long-term circulation patterns. Thus, no long-term impacts on the traffic circulation system are expected to occur during implementation of PAR 1168.

Further, impacts to existing emergency access at the manufacturing facilities would also not be affected because PAR 1168 does not contain any requirements specific to emergency access points and each manufacturer would be expected to continue to maintain their existing emergency access. As a result, PAR 1168 is not expected to adversely impact emergency access.

XVII. f) No Impact. No changes to the parking capacity at or in the vicinity of the manufacturing facilities are expected with adopting PAR 1168. Adoption of PAR 1168 would not change existing operations, so no new workers at the manufacturing facilities would be expected. Since implementation of PAR 1168 is not expected to require additional workers, no traffic impacts are expected to occur and consequently, additional parking capacity will not be required. Therefore, PAR 1168 is not expected to adversely impact on- or off-site parking capacity. PAR 1168 has no provisions that would conflict with alternative transportation, such as bus turnouts, bicycle racks, etcetera.

Conclusion

Based upon these considerations, significant adverse transportation and traffic impacts are not expected from implementing PAR 1168. Since no significant transportation and traffic impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☑
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)	☐	☐	☑	☐
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☑	☐

Discussion

PAR 1168 will reduce VOC, toxic air contaminant emissions, and stratospheric ozone-depleting compounds from regulated products by lowering VOC content limits of certain categories of adhesives and sealants. PAR 1168 affects any person who uses, sells, stores, supplies, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers but includes certain exceptions. For some products, compliance is expected to occur through the reformulation of the regulated product, which may potentially create secondary adverse environmental impacts. Currently, many products are solvent-based. Based on past coatings rules requiring reformulation, manufacturers will likely reformulate their products with water-borne technology or replace conventional solvents with VOC exempt solvents to meet the lower VOC content limits. During reformulation, manufacturers will need to ensure products do not contain any SCAQMD Rule 102 Group II exempt compounds as replacements for any solvent greater than 0.1 percent by weight. Thus manufacturers will replace conventional solvents with less or non-toxic solvents. Further, PAR 1168 will also contain a requirement that would prevent

manufacturers from reformulating regulated products with stratospheric ozone-depleting compounds. Any changes to the manufacturing process would occur inside each affected existing manufacturer's building(s). Since, VOC emissions will be reduced through reformulation, no new or additional construction of air pollution control equipment is expected based on the implementation of PAR 1168.

XVIII. a) No Impact. As explained in Section IV - Biological Resources, PAR 1168 is not expected to significantly adversely affect plant or animal species or the habitat on which they rely because the proposed project would not require any new construction and/or operational activities that differ from existing settings. The regulated products can be used at existing settings and have been already greatly disturbed and as such, would not typically support any species of concern or the habitat on which they rely. For these reasons, PAR 1168 is not expected to reduce or eliminate any plant or animal species or destroy prehistoric records of the past.

XVIII. b) Less Than Significant Impact. Based on the foregoing analyses, PAR 1168 would not result in significant adverse project-specific environmental impacts. Potential adverse impacts from implementing PAR 1168 would not be "cumulatively considerable" as defined by CEQA Guidelines Section 15064(h)(1) for any environmental topic because there are no, or only minor incremental project-specific impacts that were concluded to be less than significant. Per CEQA Guidelines Section 15064(h)(4), the mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulative considerable. SCAQMD cumulative significant thresholds are the same as project-specific significance thresholds.

Therefore, there is no potential for significant adverse cumulative or cumulatively considerable impacts to be generated by PAR 1168 for any environmental topic.

XVIII. c) Less Than Significant Impact. Based on the foregoing analyses, PAR 1168 is not expected to cause adverse effects on human beings for any environmental topic, either directly or indirectly because: 1) the air quality and GHG impacts were determined to be less than the significance thresholds as analyzed in Section III – Air Quality and Greenhouse Gases; 2) the hazards and hazardous materials impacts were determined to be less than significant as analyzed in Section VIII – Hazards and Hazardous Materials; 3) the increased water usage and wastewater was determined to be less than significant as analyzed in Section IX – Hydrology and Water Quality; 4) public services such as fire protection and police protection were determined to be less than the significance thresholds as analyzed in Section XIV – Public Services. In addition, the analysis concluded that there would be no significant environmental impacts for the remaining environmental impact topic areas: aesthetics, agriculture and forestry resources, biological resources, cultural resources, energy, geology and soils, land use and planning, mineral resources, noise, population and housing, recreation, solid and hazardous waste, and transportation and traffic.

Conclusion

As previously discussed in environmental topics I through XVIII, the proposed project has no potential to cause significant adverse environmental effects. Since no mitigation measures are necessary or required.

APPENDICES

Appendix A: Proposed Rule 1168 – Adhesive and Sealant Applications

Appendix B: Comment Letters Received on the Draft EA and Responses to Comments

APPENDIX A

PROPOSED AMENDED RULE 1168 – ADHESIVE AND SEALANT APPLICATIONS

In order to save space and avoid repetition, please refer to the latest version of Proposed Amended Rule 1168 located elsewhere in the Governing Board Package. The version of Proposed Amended Rule 1168 that was circulated with the Draft EA and released on July 21, 2017 for a 30-day public review and comment period ending on September 15, 2017 was identified as "Proposed Amended Rule 1168 (Version 8) - July 21, 2017".

Original hard copies of the Draft EA, which include the draft version of the proposed amended rule listed above, can be obtained through the SCAQMD Public Information Center at the Diamond Bar headquarters or by contacting Fabian Wesson, Public Advisor at the SCAQMD's Public Information Center by phone at (909) 396-2039 or by email at PICrequests@aqmd.gov.

APPENDIX B

Comment Letters Received on the Draft EA and Responses to Comments

Comment Letter #1: Rita M. Loof / RadTech International

Comment Letter #2: Severin Martinez for Dianna Watson / California Department of Transportation (Caltrans)

Comment Letter #1

RADTECH
THE ASSOCIATION FOR UV&EB TECHNOLOGY

August 31, 2017

Mr. Michael Krause
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Re: Public comments to Proposed Amended Rule 1168—Adhesives

Dear Mike:

RadTech International hereby reiterates the comments we have made in writing and during the public consultation process on proposed amended rule (PAR) 1168. We were thankful that staff expressed a willingness to make changes to the proposal presented at the most recent public consultation meeting. However, we are disheartened that staff's position regarding our two main issues (1) Inclusion of test method for enforcement purposes and (2) Exemption from the overly prescriptive recordkeeping requirements; remains unchanged.

Inclusion of Test Methods for UV/EB/LED

RadTech commends the district for including a definition for energy curable materials in Section (b)(28) of the proposed rule and providing clarification regarding test methodology. However, we cannot support the concept of creating two different mechanisms (one for "information-only" and one for enforcement) to test materials. RadTech urges the inclusion of ASTM D7767-11 in both the Definition and the Test Method section of the rule. ASTM D7767-11 is the best tool available today to measure VOC emissions from UV/EB thin film materials. We had previously reached consensus with the district regarding the inapplicability of Method 24 and SCAQMD Method 313 to UV/EB materials. Thus, we would suggest that an additional sub-section (K) be added to Section (e)(1) to read as follows:

(K) The VOC content of Energy Curable Adhesives and Sealants shall be determined by ASTM Test Method D7767-11- Standard Test Method to Measure Volatiles from Radiation Curable Acrylate Monomers, Oligomers, and Blends and Thin Coatings Made from Them.

Additionally, the rule includes a method for "thick film" adhesives which is not applicable to UV/EB/LED materials. The following language would ensure clarity:

(L) The VOC content of Non-Thin Film Energy Curable Adhesives and Sealants shall be determined by ASTM Test Method D5403-93- Standard Test Methods for Volatile Content of Radiation Curable Materials.

Comment Letter #1 (cont.)

Staff has stated that the ASTM method is not a "direct" method but, the GCMS alternative is also an indirect method. It does not allow VOC's from a cured coating to be measured at the end use location and using the end use cure conditions (which includes backing, geometry, source, line speed, environment (air or nitrogen), etc.). The GCMS method has a level of uncertainty in the correlation to real emissions in use. As per a request from district staff in 2013, we have provided you with a procedure to calculate VOC's from a fully formulated product using ASTM D7767-11.

Exemption from Reporting & Recordkeeping

We urge the district to provide incentives to companies who reduce their emissions by exempting UV/EB/LED materials that exceed the rule requirements. We are supportive of the concept of reducing recordkeeping burdens for those materials and believe those operations should not be subjected to the same labeling and recordkeeping requirements as their higher emitting counterparts. We request that UV/EB/LED materials containing 50 grams per liter of VOC or less, be exempted from the Administrative Requirements in Section (f)(1) and the Reporting Requirements in Section (f)(2) of PAR 1168. In 2021, the lowest limit in the rule will be 20 grams per liter and as such, we would be open to lowering the limit to 20 grams per liter in 2021 to ensure consistency. We are especially concerned with the consequences of this proposal on the medical device industry as it may hamper the manufacture of life saving medical products. 1-1

We have seen how overly prescriptive regulations have had the unintended consequences of driving business out of the basin. As a result, emissions from goods movement have increased as products are manufactured elsewhere and either shipped in or trucked into the basin. Thus, there is a correlation between the exodus of manufacturing from the Basin and emissions associated with goods movement. We ask that you analyze the emissions impact of goods movement as part of the CEQA process in the rule.

Guidance Document

We were recently informed that staff intends to provide additional clarifications on rule language interpretation, after rule adoption via a "Guidance Document". Although well intentioned, we are not supportive of this concept because there is no assurance that the Board will be involved. For lack of a better term, this would amount to "underground" rulemaking. If a rule needs a guidance document to interpret it after the board has adopted it, the rule itself is not sufficiently clear and thus does not meet the requirements for Clarity in the Health and Safety Code.

We appreciate your attention to these issues and look forward to a productive rulemaking effort.

Sincerely

Rita M. Loof
Director, Environmental Affairs

Cc: Wayne Nastri, Nicole Silva, Heather Farr, Barbara Radlein

Response to Comment Letter #1: - RadTech International

Comment Letter #1 primarily consists of comments pertaining to the proposed rule language in PAR 1168, except for the bracketed language as shown above relating to CEQA. Responses to the remainder of the comment letter directly related to proposed rule language in PAR 1168 can be found in the staff report under the section Comments and Responses, Comment Letter No. 7.

Response 1-1

Manufacturers of products subject to Rule 1168 exist within SCAQMD's jurisdiction, outside of SCAQMD's jurisdiction but within California, and outside of California, and there are no provisions in PAR 1168 that would require these manufacturers to relocate. While manufacturers outside of SCAQMD's jurisdiction are not subject to SCAQMD's Rules and Regulations per se, the products they manufacture and ship into SCAQMD's jurisdiction for distribution and sale, are subject to the requirements, including recordkeeping and reporting, in current Rule 1168 and these products will continue to be subject to PAR 1168. For these reasons, the reporting and recordkeeping requirements affect manufacturers of regulated products nationwide and not just within the SCAQMD's jurisdiction. Manufacturers that are subject to the current version of Rule 1168 already keep records that contain purchasing and sales data, for example, and submit periodic reports to SCAQMD. Further, the additional recordkeeping and reporting requirements contained in PAR 1168 would not change how the goods are currently moved into the Basin, for those products that are already manufactured outside of the Basin. Goods manufactured elsewhere, including those manufactured in other countries, would continue to be required to report sales data if they manufacture regulated products that are delivered and distributed or sold within the SCAQMD's jurisdiction. While PAR 1168 proposes to change the VOC limits of certain products which will cause products to be reformulated, the shipment of the reformulated products will replace the previous products that are currently shipped. Thus, no changes to shipping methods and routes would be expected to change as a result of product reformulation.

Finally, SCAQMD staff has not received any comments from affected manufacturers located within SCAQMD's jurisdiction indicating that they would relocate in response to the recordkeeping and reporting requirements contained in PAR 1168. Conversely, SCAQMD staff has also not received any comments from affected manufacturers located outside SCAQMD's jurisdiction that PAR 1168 would cause them to relocate their facilities to within SCAQMD's jurisdiction.

For these reasons, the emissions from goods movement of products reformulated in accordance with PAR 1168 would not be expected to change from the existing setting and no further analysis is warranted under CEQA.

Comment Letter #2

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 7-OFFICE OF REGIONAL PLANNING
100 S. MAIN STREET, MS 16
LOS ANGELES, CA 90012
PHONE (213) 897-0067
FAX (213) 897-1337
www.dot.ca.gov

Making Conservation a California Way of Life.

September 12, 2017

Ms. Barbara Radlein
South Coast AQMD
21865 Copley Drive
Diamond Bar, CA 91765

RE: Proposed Amended Rule 1168 – Adhesive and Sealant Application
Vic: Various PM: Various
GTS# 07-ALL-2017-00033
SCH# 2017081031

Dear Ms. Radlein,

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above referenced project. The proposed project would further reduce emissions of volatile organic compounds (VOCs), toxic air contaminants, and stratospheric ozone-depleting compounds from adhesives, adhesive primers, sealants and sealant primers.

Upon reviewing the Draft Environmental Assessment, Caltrans has the following comments:

We do not expect project approval to result in direct adverse impacts to existing State transportation facilities.

If you have any questions or concerns regarding these comments, please contact project coordinator, Severin Martinez at (213) 897-0067 or severin.martinez@dot.ca.gov and refer to GTS# 07-ALL-2017-00033.

Sincerely,

DIANNA WATSON for
IGR/CEQA Branch Chief

cc: Scott Morgan, State Clearinghouse

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

Response to Comment Letter #2: - Department of Transportation (Caltrans)

Thank you for your comment. No further response is required under CEQA.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

SCIENCE & TECHNOLOGY ADVANCEMENT

MONITORING & ANALYSIS

LABORATORY SERVICES & SOURCE TEST ENGINEERING

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Method 313 Determination of Volatile Organic Compounds (VOC) by Gas Chromatography/ Mass Spectrometry/ Flame Ionization Detection (GC/MS/FID)

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
preparations, reviews and approvals page

VOC ANALYSIS BY GC MS FID

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Quality Assurance Approved by	**NA**

Revision history page

VOC ANALYSIS BY GC MS FID

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List of abbreviations:

SCAQMD	South Coast Air Quality Management District
VOC	Volatile Organic Compound
CACC	Clean Air Choices Certification
CAS	Clean Air Solvent
SIP	State Implementation Plan
EPA M24	Environmental Protection Agency Method 24
ASTM 5095	American Society of Testing and Materials Method 5095 "Determination of the Nonvolatile Content in Silanes, Siloxanes and Silane-Siloxane Blends used in Masonry Water-Repellent Treatments"
UV/EB	Ultraviolet/Electron Beam
VOHAP	Volatile Organic Hazardous Air Pollutant
MeOH	Methanol
THF	Tetrahydrofuran
GC	Gas Chromatograph
MS	Mass Spectrometer
FID	Flame Ionization Detector
RRF	Relative Response Factor
HC	Hydrocarbon
nC6 – nC15	Hexane - Pentadecane
MIR	Minimum Incremental Reactivity
GWC	Global Warming Compound
ODC	Ozone Depleting Compound
RB	Reagent Blank
SOP	Standard Operating Procedure
PPE	Personal Protective Equipment
BFB	4-Bromoflurobenzene
TRIG	Triglyme
IPA	Isopropyl Alcohol
EGDE	Ethylene Glycol Diethyl Ether
DIIBA	Diisobutyl Adipate
MeP	Methyl Palmitate
EG	Ethylene Glycol
PG	Propylene Glycol
p-tSAM	p-Toluenesulfonic Acid Monohydrate
%D	% Difference
RPD	Relative Percent Difference
PBM	Probability Base Matching
NIST	National Institute of Standards and Technology
AMDIS	Automated Mass spectral Deconvolution and Identification System
PFTBA	Perfluorotributylamine

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1.0 Scope and Application

This method is for Volatile Organic Compound (VOC) analysis of materials regulated under South Coast Air Quality Management District (SCAQMD) State Implementation Plan (SIP) Rules and SCAQMD voluntary certification programs, such as Clean Air Solvents (CAS) and Clean Air Choices Cleaners (CACC). SCAQMD Rules or Protocols may also require this method. M313 may be used to develop speciation information for SCAQMD Program or Rule Development or special studies.

Method 313 applies to materials such as paints, coatings, solvents, and other liquid/dispersed-solid materials containing less than 150 g/L VOC material as measured by SCAQMD Method 304-91 or Environmental Protection Agency Reference Method 24 (EPA M24). Method 313 may be used for samples requiring ASTM D5095 "Determination of the Nonvolatile Content in Silanes, Siloxanes and Silane-Siloxane Blends used in Masonry Water-Repellent Treatments" and for materials which do not reach a stable weight by EPA M24 with a demonstrated additional weight loss of greater than 0.2% absolute or 3% relative difference (whichever is greater) after one additional hour of oven heating even if over 150 g/L VOC material. This method is not to be used for 2-component coatings, Ultraviolet/Electron Beam (UV/EB)-cured coatings, or other coatings which require specialized curing conditions. Samples requiring Volatile Organic Hazardous Air Pollutant (VOHAP) analysis cannot be diluted in methanol since methanol is a common VOHAP, unless methanol is demonstrated not to be in the sample.

This method has been developed to achieve a reportable limit of 5 g/L; however, method sensitivity and analytical certainty depend on the number of individual VOCs in the analyzed sample. A large number of small analyte peaks in a sample can decrease the sensitivity of the method, and a large number of unidentified analyte peaks in a sample will result in lower certainty.

The method must be performed by staff which is fully-trained and well-experienced in gas chromatographic analysis and mass spectrometric interpretation.

2.0 Summary of Method

Samples are spiked with surrogate standards and diluted with internal standard in either methanol (MeOH) or tetrahydrofuran (THF) solvent, then injected into a Gas Chromatograph (GC) equipped with a Mass Spectrometer (MS) and Flame Ionization Detector (FID). Eluted samples are split post-column to the MS and FID. Individual peaks are identified by MS, and their respective concentrations are estimated using their FID area counts and the Relative Response Factor (RRF) of triglyme (TRIG) calculated from the FID.

The estimated concentration of each peak is then used to determine whether each compound must be quantified using a matching standard RRF, or may be estimated from the RRF of a similar compound or from the default TRIG RRF. VOC Material and VOC Coating values are

then calculated from the summed concentrations of all peaks that elute prior to Methyl Palmitate (MeP).

Petroleum distillate-based samples may demonstrate a complex hydrocarbon profile with few or no fully resolved peaks; these samples must be quantified using the summed area counts of FID time slices and the RRF of appropriate hydrocarbon (HC) standards.

Identified compounds are screened against VOHAP compounds, Maximum Incremental Reactivity (MIR) compounds, Global Warming Compounds (GWC), Ozone Depleting Compounds (ODC) or other specified lists when required by CAS, CACC, or other District Rules, Protocols, or purposes.

A list of commonly analyzed compounds and their corresponding RRFs are presented in Appendix 2.

3.0 Definitions of Method

See Appendix 1 for the definition of method-specific terms.

4.0 Interferences

Analysts must remain alert to the presence of novel compounds, unpredictable solvent interactions, and the following interferences:

4.1 Co-elution

Surrogate spike compounds are added to samples in order to examine the extraction efficiency of the dilution solvent. These compounds and the solvent selected for dilution may co-elute with compounds found in the sample chromatogram. Following instructions provided in Section 10, optimize the instrument in such a way as to reduce potential co-elution between spikes, solvent, and compounds commonly seen during analysis.

Not all sample peaks may separate chromatographically. Identify the overlapping constituents and determine which area counts belong to which compound and assign the appropriate calibration factors to each component. Attempt analysis with a different solvent if the interference makes or identification or area count apportionment too difficult.

4.2 Contamination

Contaminants in the samples that originate from the dilution solvent and extraction markers should not be quantified as VOC during sample processing. Use the RB and CSV injections nearest to the sample in the sequence to determine which peaks in the sample injection are contaminants derived from the solvent and/or the surrogate spikes.

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4.3 Inlet breakdown and contamination

Compounds which are determined to elute prior to MeP only due to inlet fragmentation may be excluded from quantitation. Reducing inlet temperature for specific samples may alleviate this problem.

Materials labeled as “sanitizers” or “disinfectants” may contain benzalkonium chloride (quaternary ammonium compounds, commercially labeled as “quat”) which fractures in the injection port. In addition to product labeling, the presence of these compounds is indicated by multiple peaks of chloro-, benzene-, and amine-derived fragments.

Concrete sealers labeled as “non-VOC” may contain siliconates. These samples typically do not accept any extraction marker spikes, and may leave a residue in the injection port. Ensuing DIIBA-containing injections often fail to meet quality control requirements after these sample types, and these samples should be analyzed at the end of a sequence when possible.

Cleaners with very high or very low pH may leave a residue in the injection port. This contamination should be suspected when subsequent CSV or sample injections containing DIIBA result in analyses that fail to meet QC requirements and these samples should be analyzed at the end of a sequence when possible.

Some samples contain a compound which reacts with DIIBA in methanol to form a residue which has been tentatively identified as hydrazine sulfate. Some samples also have been seen to convert DIIBA to dimethyl adipate when the sample is dissolved in methanol.

4.4 Hygroscopicity

Some compounds may be hygroscopic and must be protected from excessive water absorption as this will dilute the compound and reduce its response. Examples of hygroscopic compounds include TRIG, glycerol, and N-methylpyrrolidone.

4.5 Poor mixing/non-homogeneity

All samples must be thoroughly mixed and must remain homogenous throughout subsampling and preparation. Non-homogenous samples or preparations may produce non-representative results. See Section 11 for the sample preparation procedure.

4.6 Carryover

Analysis of samples containing highly retained compounds can lead to carryover between injections. Inject reagent blanks between sample injections as described in Section 11.6 to limit carryover. Evaluate the Relative Percent Difference (RPD) of total VOC in replicate injections to identify carryover, and re-inject the affected samples once the carryover in the system has been eliminated.

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5.0 Safety

This method does not purport to address all safety concerns. This method requires the use of compressed gases and hazardous solvents such as THF, which may require specific Standard Operating Procedures (SOPs). Solvent handling must be conducted in a fume hood using appropriate Personal Protective Equipment (PPE). In all cases, follow required safety procedures.

6.0 Equipment and Supplies

Mention of a manufacturer does not constitute endorsement or recommendation for use. Equivalent equipment from any manufacturer is suitable for use.

Agilent 6890Plus to 7890A GC with split-vent injection port
Agilent 5973 to 5775C Mass spectrometer
Agilent 6890 Enhanced to 7693 Autosampler
Inlet liner, split/splitless FocusLiner with taper; Supelco Product Number 2879925-U
Column DB-624®, 30m X 0.32 mm, 1.8 um film
Chromatographic post-column splitter with zero dead volume unions
Capillary tubing, 0.32 mm id (from post-column splitter to FID) 80 cm in length
Capillary tubing, 0.10 mm id (from post-column splitter to MS) 50 cm in length
Agilent Gas Clean Filter System or equivalent
Chemstation processing and instrument operation software, or equivalent
Clean 10, 25, 50 mL Class A Volumetric Flasks
1 mL Class A Volumetric pipets
Analytical balance (0.1 mg sensitivity)
Vials, 1.8 mL, screw cap with Teflon® faced septa
Gas-tight syringe, 10 µL with needle
Gas-tight syringe, 50 µL with needle
Gas-tight syringe, 250 µl with needle
Gas-tight syringe, 500 µl with needle
Gas-tight syringe, 5 mL with needle
Vials, 60 mL, screw cap with Teflon face
Acrodisc Syringe filters (25 mm diameter, 1 µm glass fiber membrane)
Glass mixing beads

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6.1 Compressed Gases

Gas	CAS #
Helium carrier gas	7440-59-7
Hydrogen FID fuel gas	1333-74-0
Air FID oxidant gas	132259-10-0
Nitrogen FID make-up gas	7727-37-9

7.0 Pure Compounds and Laboratory Solutions

The compounds listed in Section 7.1 are required for instrument optimization and initial calibration. This method requires reagents for every compound detected above 3 g/L "as triglyme". Prepare all standards gravimetrically on a calibrated balance via sequential addition. The final concentration of each prepared standard should factor in the stated purities of each compound. Use the purity value from a Certificate of Analyses if it has been provided by the vendor.

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7.1 Required Pure Compounds

Compound, abbreviation	CAS #
4-bromofluorobenzene, BFB	460-00-4
Methanol, MeOH	67-56-1
Tetrahydrofuran, THF	109-99-9
Triethylene glycol dimethyl ether, TRIG	112-49-2
Isopropyl alcohol, IPA	67-63-0
Ethylene glycol diethyl ether, EGDE	629-14-1
Diisobutyl adipate, DIIBA	141-04-8
Methyl palmitate (Methyl hexadecanoate), MeP	112-39-0
Ethylene glycol, EG	107-21-1
p-Toluenesulfonic acid monohydrate, pTSAM	104-14-4
Hexane, nC6	110-54-3
Heptane, nC7	142-82-8
Octane, nC8	111-65-9
Nonane, nC9	1118-84-2
Decane, nC10	124-18-5
Undecane, nC11	1120-21-4
Dodecane, nC12	112-40-3
Pentadecane, nC15	629-62-9
Other organic compounds as needed for specific calibrations	NA

Note: All chemicals must be ACS grade or equivalent.

The following are descriptions only. For quality control requirements, please see Section 9.0. For preparation instructions, please see Section 10.5.

7.2 Reagent Blank (RB)
This mix is used to demonstrate system cleanliness.

Compound	CAS #	Concentration (g/L)
Solvent (THF or MeOH)	NA	NA
Ethylene glycol diethyl ether, EGDE	629-14-1	5

7.3 Continuing Spike Verification (CSV)
This mix of compounds is used to establish that the calibrations of the extraction marker compounds have not drifted.

Compound	CAS #	Concentration (g/L)
Solvent (THF or MeOH)	NA	NA
Ethylene glycol diethyl ether, EGDE	629-14-1	5
Isopropyl alcohol, IPA	67-63-0	1
Diisobutyl adipate, DIIBA	141-04-8	1
Triethylene glycol dimethyl ether, TRIG	112-49-2	1
Heptane, nC7	142-82-8	1

7.4 Instrument Optimization Mix (IOM)
This mix of compounds is used to test and optimize injection representativeness, peak resolution, instrument sensitivity, mass spectrometer tuning, and endpoint.

Compound(s)	CAS #	Concentration (g/L)
Solvent (THF or MeOH)	NA	NA
n-Hydrocarbons (nC6-nC15)	NA	3 (each)
Ethylene glycol diethyl ether, EGDE	629-14-1	5
Triethylene glycol dimethyl ether, TRIG	112-49-2	0.1
Ethylene glycol, EG	107-21-1	3
Propylene glycol, PG	57-55-6	3
p-Bromofluorobenzene, BFB	460-00-4	0.1
Methyl palmitate, MeP	112-39-0	3

7.5 Continuing Calibration Verification (CCV) Mix
This mix is a compilation of the highest concentration compounds in exceedance of 1 g/L “as triglyme” identified across an analytical sequence. Starting with the highest concentration compound from each sample in the sequence and the five subsequent lower concentration compounds seen across the sequence. A list of compounds required for the CCV may be

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generated from knowledge of sample formulation, previous analysis, or by sample screening the sample prior to quantitation and should not exceed a total of 8 compounds.

Compound	CAS #	Concentration (g/L)
Solvent (THF or MeOH)	NA	NA
Ethylene glycol diethyl ether, EGDE	629-14-1	5
Compounds > 1 g/L "as triglyme" seen in samples	NA	1

7.6 Calibration Standards

A list of compounds required for instrument calibration may be generated from knowledge of sample formulation, previous analysis, or by sample pre-screening to determine which compounds are seen above 3 g/L "as triglyme".

Compound	CAS #	Concentration (g/L)
Solvent (THF or MeOH)	NA	NA
Ethylene glycol diethyl ether, EGDE	629-14-1	5
Compounds > 1 g/L "as triglyme" seen in samples	NA	15, 10, 5, 1, or 0.1

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8.0 Sample Collection, Preservation and Storage

Samples submitted for compliance determination must be accompanied by approved versions of Analysis Request/Chain of Custody form and should be stored in a secure, temperature controlled location. Samples will be stored at room temperature in tightly closed containers unless stated otherwise in accompanying analysis requests.

Dilute samples within 30 minutes of spiking each sample. Spiking may cause matrix disruptions and change sample consistency, making sample handling difficult or impossible.

Seal diluted samples using a stopper and parafilm wax immediately following preparation if they are to be stored overnight. Do not use diluted samples after 24 hours after due to potential solvent loss. Dilutions should only be used within 24 hours if there is less than a 1% change in total sample mass. Store the other lab solutions under the same conditions as the samples to demonstrate that no bias has been introduced during sample storage.

9.0 Quality Control

The minimum requirements of this program consist of an initial demonstration of laboratory capability, and the periodic analysis of the following laboratory solutions as a continuing check on performance. Laboratories performing this analysis are required to maintain performance records which detail the quality of the generated data.

The following describe the limits for quality control injections which are required as part of calibration and analytical sequences. A summary of allowable QC recoveries is provided in Appendix 4.

9.1 Internal Standard Limits

EGDE is the internal standard added to reagent blanks, calibration solutions, CCVs, CSVs, and samples. EGDE recoveries are acceptable if they fall within 85-115% of the prepared concentration for all laboratory solutions, and within 50-150% for samples, provided surrogate standards or CSV recoveries are acceptable and the instrument is able to meet sensitivity requirements. The source of any unacceptable internal standard recovery must be investigated and corrected before proceeding with the analysis. One common acceptable reason for changed EGDE is the purchase of a syringes from a different manufacturer.

High or low internal standard recoveries for low viscosity solutions may indicate faulty syringe mechanics, such as plugged syringes or faulty sample split mechanics such as a plugged flow controller filter. Low internal standard recoveries may indicate partial injection for thick solutions.

High sample internal standard recoveries may be due to the filtration of solids prior to GC injection for high-solids solutions or the co-elution of 2-amino-2-methyl-1-propanol CAS 124-68-5) with EGDE.

Analysts should be aware that internal standard recoveries near the 50% recovery limit can imply meaningful changes to the instrument sensitivity, rendering the current LOD less than required for analysis. Analysts may re-prepare dilutions with the minimum allowable weight of sample (2.5 g) if high viscosity is limiting syringe performance.

9.2 Reagent Blank Limits

See Section 7.2 for a description of the reagent blank standard and Section 10.5 for its preparation. Reagent blanks must be injected prior to every sample injection and following the final sample injection in a sequence to demonstrate system cleanliness. Follow the sequence in Section 11.6 for an example of how RB interlacing should be performed. Special attention should be paid to any contaminants which may co-elute with compounds in the CSV. The area counts for any contaminant peak should not exceed 5% of the area counts of any CSV standard with which it co-elutes. Reagent blank contamination and carryover should be investigated in the case of reagent blank QC failure.

9.3 CSV Limits

See Section 7.3 for a description of the CSV standard and Section 10.5 for its preparation. Bracket every calibration and analysis sequence with replicate CSV injections. The CSV standard should be prepared at the same time as the samples. Recoveries are acceptable if they

fall within 90-110% of the prepared concentration. Failing CSVs indicate a general instrument drift, and analysis should be stopped until corrective action can be taken to restore the instrument to expected performance. CSV failures are most often the result of leaky fittings at the detectors or contamination in the inlet liner from prior sample injections. Section 11.6 provides an example sequence demonstrating how to bracket with CSVs.

9.4 IOM Limits

See Section 7.4 for a description of the IOM, Section 10.5 for its preparation steps, and Section 10.1 for more detailed information regarding instrument tuning and optimization. Inject the IOM at the beginning and end of every calibration and analysis sequence as described in Section 11.6.

9.4.1 Representativeness

Test the representativeness of the system by looking for excessive discrimination against any molecular weight in the nC6 through nC15 region

The %D between nC10 normalized area counts and each individual nHC normalized area count must be within ± 15%. (See appendix for calculation.)

9.4.2 MS Tuning

The IOM must pass EPA TO-15 ionization criteria for BFB as listed in Section 10.2.

9.4.3 Resolution

Chromatographic resolution must be 90% or better for the EG, EGDE, and PG peaks.

9.4.4 Endpoint

Note and record the methyl palmitate retention time for each IOM injection. Methyl palmitate is the first peak that is not integrated during sample analysis. The retention time drift between IOM injections should not exceed 0.1 minutes.

9.4.5 Sensitivity

Recoveries of the 0.1 g/L TRIG peak in the IOM should be within 0.02 g/L

9.5 CCV Standard

See Section 7.5 for a description of the CCV standard and Section 11.4 for its preparation.
A CCV standard contains compounds above 1 g/L which are found in the samples of an analysis sequence. The highest concentration compound in each sample must be selected for the CCV, followed by compounds in decreasing concentration, to a maximum of eight compounds per CCV. Bracket every analysis sequence with CCV injections as shown in Section 11.6. Recoveries for each compound in the standard must fall within 85-115%. Failing CCV QC indicates calibration drift for the compounds in the mixture. QC failures are most often the result of leaky fittings at the detectors or contamination in the inlet liner from prior sample injections.

9.6 Surrogate Standard Limits

Surrogate standards are added to each sample prior to dilution to evaluate the extraction efficiency of the solvent used for dilution. See Section 11.4 for a description of the sample spiking process. Recoveries are acceptable if they fall within 85-115% of the prepared concentration.

Recoveries exceeding 115% often fail due to co-elution with compounds in the sample. When this occurs, re-spike the sample and do not include the co-eluting surrogate standard. Compare the area counts in the retention time of interest between the sample injections and calculate the corrected spike recovery amount. Recoveries below 85% indicate incomplete VOC extraction, in which case the sample should be diluted in an alternative solvent.

Some sample matrixes do not accept certain spikes. Samples with greater than 80% water will not accept the nC7 spike, in which case the nC7 spike may be eliminated. nC7 and DIIBA may form an oily layer on the top of some samples, in which case both spikes should be eliminated for cause. Some spikes may cause some samples to gel, making mixing and subsequent injection impossible. Record observations when spikes interfere with the sample matrix and eliminate them in subsequent preparations.

Certain samples react with DIIBA in the presence of either THF or methanol, especially when using p-toluenesulfonic acid for samples requiring ASTM D5095. These reactions can activate the inlet liner for several injections and may be identified by the sudden and continued suppression of DIIBA in the sample, along with the ensuing CSV and sample recoveries. When this occurs, change the injection port liner and inject the other samples separately with their own bracketing CSVs, then inject the suspect sample separately with its own bracketing CSV.

Other quality control

9.7 Total Unidentified Components

All sample peaks are first calculated “as triglyme” to determine the appropriate quantitation technique for each peak. The default treatment for sample peaks below 1 g/L as triglyme is to classify those peaks as “unidentified” and continue calculating them “as triglyme”; however, the total concentration of unidentified peaks should constitute no more than 5 g/L material or 10% of the final VOC Material result, whichever is larger.

If the total concentration of unidentified components produces an unacceptably large value, continue to identify and quantify smaller peaks until the total “as triglyme” value becomes acceptable. If the “as triglyme” values cannot be brought to acceptable levels- for example, the sample contains many unidentifiable peaks- flag the result.

9.8 Percent Water Comparisons

Comparisons can be made between the water % weight values determined experimentally from EPA M24 and water values calculated from M313 determinations with the following formula:

$$W_{\%wt} = 100 - NV_{\%wt} - Exempts_{\%wt} - VOC_{\%wt}$$

A difference of greater than 3% between calculated and derived values can signal sample misidentification, co-elution of VOC peaks with the main solvent peak, a fault in the Karl Fischer analysis, the presence of exempt compounds which have not been subtracted correctly, a misidentified peak, an erroneous RRF, or the presence of semi-volatile compounds. While agreement between M24/ M304-91 and M313 is not mandatory, a difference of more than 3% should initiate a review of the discrepancy, including re-analysis of water content and screening for co-eluting VOC peaks using an alternate solvent.

9.9 QC Requirement Summary
See Appendix 4.

10.0 Calibration and Standardization

If the instrument has not been previously configured for M313 analysis, begin with Section 10.1; otherwise, skip to Section 10.2 to evaluate the quality of the MS tune.

10.1 Instrument Parameters and Setup
Set up the GC/MS/FID in liquid analysis mode with a 10 µL autosampler syringe and the appropriate wash solvent (see section 11.2 for guidance). A wide variety of instrument parameters have been used successfully, but the following parameters should be used as a starting point for instrument configuration.

Injector Parameters:

Injector Type	Split/Splitless using Splitless Mode
Injector Temp	255 ºC or lower
Injector Pressure	8-14 psi
Total Flow Rate	60-75 mL/min
Purge Flow Rate to Split Vent	>35 mL/min @ 0.1 – 0.5 min
Gas Saver On	20 mL/min after 2 min
Injection volume	1 µL

Column Parameters:

Flow Mode	Constant Flow
Column Flow Rate	1.5 - 4 mL/min
Total Run Time	35 - 50 min

GC Oven Temperature Ramp:

Initial Temp	35 ^{o}C or higher
Init. Hold Time	2 - 5 min
1st Ramp Rate	4 - 8 degrees per minute
1st Ramp Temp	75 ^{o}C
1st Hold Time	0 - 4 min
2nd Ramp Rate	10.0 degrees per minute
2nd Ramp Temp	225 ^{o}C
2nd Hold Time	6.0 min
3rd Ramp Rate	25.0 degrees per minute
3rd Ramp Temp	255 ^{o}C
3rd Hold Time	4 – 10 min
Total Run Time	35 - 50 min

FID Detector Parameters:

Detector Heater	240-255 ^{o}C
Hydrogen Flow Rate	40 mL/min
Air Flow Rate	450 mL/min
Makeup Flow Rate	45 mL/min

MSD Parameters:

MS Transfer Line	280 ^{o}C
MS Source	230 ^{o}C
MS Quad	150 ^{o}C
MS Scan Start Time	0.0 min
MS Scan Range	5-505 amu

This method is configured for a post-column split to the MS and FID. Install a capillary column splitter and use a length of fused-silica tubing to connect the splitter to each detector. Use 0.32 mm ID tubing to the FID and 0.1 mm tubing to the MS.

Turn the MS “off” whenever the solvent (MeOH or THF) peak emerges, and turn it back on just before the peak reaches baseline.

Prepare an IOM standard (Sections 7.4, 9.4) to test the suitability of the instrument for analysis. The IOM results must meet the following minimum criteria for the instrument to be considered fit for use:

(1) EG at 3 g/L, EGDE at 5g/L, and PG at 3 g/L must be at least 90% resolved from each other
(2) The %D of mass-normalized area counts for each hydrocarbon must be within ±15% to the mass-normalized area counts for nC10 (see Section 9.4)

(3) Triglyme requires a method detection limit (MDL) at 99% confidence limit of 0.02 g/L or lower. This is verified in the IOM by a 0.1 g/L triglyme recovery between 80-120%
(4) BFB must pass the EPA TO-15 tuning criteria for a 0.1 g/L prep (Section 10.2)

It may be the case that the initial instrument parameters meet all IOM QC requirements. In the event that the instrument parameters require modification, it is recommended that analyte resolution be optimized first, followed by analyte discrimination, and lastly the analyte sensitivity.

10.2 Mass spectrometer Tuning
Ensure that the instrument is free of leaks by evaluating the amount of air present during an air and water check or a PFTBA tuning attempt. Air peak ions should meet the following criteria:

m/z	Ion Type	Ion Abundance Requirement
18	ion of water	< 1% of 69 amu of PFTBA
28	ion of nitrogen	< 1% of 69 amu of PFTBA
32	ion of oxygen	< 1% of 69 amu of PFTBA

If a leak is present in the system, tighten any loose fittings and perform air and water checks until air peak ion criteria is met, then tune the instrument using perfluorotributylamine (PFTBA) following the manufacturer's instruction. Once tuned, the instrument should meet the following criteria:

m/z	Ion Abundance	Reference Ion
69	Base Peak (100%)	NA
219	30 - 60%	of 69 amu
502	1 - 10%	of 69 amu

If the mass spectrometer cannot be tuned using PFTBA, troubleshoot the instrument following the manufacturer's recommended steps. The source should be removed and cleaned according to the manufacturer's instructions if the instrument tune still fails to meet the requirements.

Following a successful PFTBA tune, the instrument must demonstrate appropriate ionization of 4-bromofluorobenzene (BFB). Check the BFB ionization by injecting an IOM made up in the solvent to be used for analysis.

The BFB ionization should be evaluated in the IOM at the beginning and end of every sequence (calibration or analysis), every week when not used daily, after cleaning the source, and after re-tuning PFTBA. Stop any instrument sequence that is running and go through the complete PFTBA and BFB re-tuning procedure if the instrument fails to meet the following BFB requirements:

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m/z	Ion Abundance	Reference Ion
50	8 - 40%	of 95 amu
75	30 - 66%	of 95 amu
95	Base peak	NA
96	5 - 9%	of 95 amu
173	< 2%	of 174 amu
174	50 – 120%	of 95 amu
175	4 - 9%	of 174 amu
176	93 - 101%	of 174 amu
177	5 - 9%	of 176 amu

10.3 Calibration List

A list of compounds required for instrument calibration may be generated from knowledge of sample formulation or prior analysis. The instrument must be calibrated for compounds identified in a sample which have a concentration greater than 1 g/L. When screening samples, calculate individual peak concentrations using a TRIG default standard to establish which compounds require calibration. Compounds greater than 3 g/L "as triglyme" require an exact compound match, except in the case of hydrocarbon mixtures (see Section 10.4). Compounds with a concentration between 1 and 3 g/L "as triglyme" may be calibrated with the identified compound or a substitute standard, provided that the functional groups are identical and the number of carbons is ± 1. Peaks less than 1 g/L are quantified “as triglyme” unless their calibration is required in order to meet the limit for total unidentified compounds (see Section 9.8). Peaks less than 0.1 g/L are not quantified.

It is recommended that no more than 8 compounds be calibrated at once due to time and co-elution concerns.

10.4 Calibrations for Petroleum Distillate-Based Samples

Samples of this type may demonstrate a complex hydrocarbon profile with few or no fully resolved peaks; these samples must be quantified using the FID area summation slices regardless of the concentration of each peak; thus, analysis of these sample types requires that the appropriate substitute compounds be calibrated. Adhere to the following rules to ensure that appropriate compounds are calibrated for these sample types:

(1) Substituted alkanes and cycloalkanes should be quantified using the RRF of the n-alkane which elutes closest to and following the compound of interest. For instance, 2-methyl decane elutes prior to undecane and would be quantified using undecane’s RRF.
(2) Substituted aromatics should be quantified using the RRF of a substituted aromatic compound that matches the number of carbon substitutions for the compound of

interest. For example, mesitylene and propyl benzene share the same number of carbons and same degree of saturation; as such, each compound can be used as a substitute for the other this example.

10.5 Calibration Levels

The concentration of individual components in a sample rarely exceeds 15 g/L when samples are diluted according to the method; thus, the maximum required calibration is usually no more than 15 g/L. The SCAQMD laboratory has found that with the exception of amines such as N,N-dimethylethylenediamine and monoethanolamine, compounds calibrated on an FID are linear up to at least 15 g/L when forced through zero.

Single point calibrations can be used for most compounds once system linearity has been demonstrated by successfully calibrating the 4 surrogate standard spike compounds used in the CSV (Section 7.2) with a multi-level calibration and replicate injections at each level. The RRF of the 4 surrogate standards are considered linear when they all demonstrate correlation coefficients of at least 0.999 and once residual concentrations are calculated for each level and determined to be within 0.02 g/L or 10%; whichever is larger, at each level.

Single point calibrations require the preparation of 1 standard mix (15 g/L) injected in replicate. Linearity of single point calibrations is verified with replicate injections of a 0.1 g/L check standard containing the calibrated compounds. Linearity is verified with a percent recovery between 80 – 120% for each compound in the 0.1 g/L check mix.

The table below summarizes a single level calibration preparation forced through zero. It is acceptable that standard levels at and below 1 g/L be prepared via serial dilutions.

Calibration Level (g/L)	**Compound (g)**	**EGDE (g)**	**Quantity Sufficient (QS) to volume (ml)**
15	0.375	0.13	25
0.1	0.01	0.52	100
0	0	.13	25

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The table below summarizes the multi-level calibration preparation forced through zero.

Calibration Level (g/L)	**Compound (g)**	**EGDE (g)**	**Quantity Sufficient (QS) to volume (ml)**
15	0.375	0.13	25
10	0.25	0.13	25
1	0.025	0.13	25
0.1	0.01	0.52	100
0	0	0.13	25

10.5 Laboratory Solution Preparation For Calibrations

The required laboratory solutions for calibration are:
Reagent Blank
IOM
CSV (if TRIG, IPA, DIIBA and nC7 are already calibrated)

NOTE: Some compounds, especially glycol ethers and polyols, are hygroscopic and may become diluted with absorbed water from frequent opening. Do not use compounds if they are past their expiry.

Prepare laboratory solutions in the following way:

Prepare QC and calibration standards in separate Class A volumetric flasks. Place each flask on a balance and add approximately 10 mL of the solvent used for sample analysis. Record the exact weight to the nearest 0.1 mg. Rinse a clean gas-tight syringe with the solvent used for analysis 3 times, then rinse it 3 additional times with the compound to be added. Use Section 7 as a guide for the preparation of each QC standard and Section 10.4 as a guide for each calibration level. Add the volume of compound necessary to create the required concentration for each standard or level. Record the weight of the added compound to the nearest 0.1 mg. Do this for each compound to be added to the mixture. Do not mix the flask until the solution has been brought to volume. QS the solution once the last compound has been added to the volumetric flask, mix, then weigh to the nearest 0.1 mg. Calculate the concentrations of each compound in the mixture, taking care to correct the concentrations for each compound's stated purity.

CSV standards should be included in sequences following the calibration of the 4 compounds in the CSV. IOM solutions prepared in methanol will require extended mixing; alternatively, analysts may reduce the concentration of each hydrocarbon to 2 g/L. IOMs may be prepared ahead of time and stored for up to 2 months in a freezer in a capped, glass vial. All other standards must be prepared immediately before or immediately after the calibration is prepared.

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10.6 Calibration Sequence

Replace the inlet liner prior to every analysis or calibration sequence to eliminate the potential for contamination from a previous set of injections.

Use the following sequence as a template for calibrations:

RB
IOM
CSV (if previously calibrated)
RB
CSV (replicate, if previously calibrated)
RB
0.1 g/L Calibration Standard
RB
0.1 g/L Calibration Standard (replicate)
RB
1 g/L Calibration Standard*
RB*
1 g/L Calibration Standard (replicate)*
RB*
10 g/L Calibration Standard*
RB*
10 g/L Calibration Standard (replicate)*
RB*
15 g/L Calibration Standard
RB
15 g/L Calibration Standard (replicate)
RB
CSV (if previously calibrated)
RB
CSV (replicate, if previously calibrated)
RB
IOM
RB

*Not required for single point calibrations

10.8 Calculating RRFs

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Determine each compound's RRF using the following equations:

$$X_i = \frac{Conc.\ of\ STD\ (g/L)}{Conc.\ of\ internal\ STD\ (g/L)} \qquad Y_i = \frac{Area\ counts\ STD}{Area\ counts\ internal\ STD}$$

$$X_{ave} = \frac{\sum X_i}{n} \qquad Y_{ave} = \frac{\sum Y_i}{n}$$

$n =$ number of calibration injections

$$RRF = \frac{\sum(X_i - X_{ave})(Y_i - Y_{ave})}{\sum(X_i - X_{ave})^2} \qquad r^2 = \frac{\sum[(X_i - X_{ave})(Y_i - Y_{ave})]^2}{\sum(X_i - X_{ave})^2\,(Y_i - Y_{ave})^2}$$

$RRF =$ Relative Response Factor $\quad r^2 =$ correlation coefficient

Calculate the error of each point on the calibration curve by applying the area counts of each point to the determined RRF as in the calculations above to calculate "residual" concentrations. The allowable error for each residual is 10% of the prepared value or 0.02 g/L; whichever is larger.

In the event of a non-linear curve, reduce the applicable calibration range to the portion of the curve which meets requirements.

Note that some compounds such as 2,2,4-trimethylpentane-1,3-diol monoisobutyrate (Texanol™) and dipropylene glycol dimethyl ether exist as more than one isomer. When calibrating these compounds, sum the area of all isomer peaks before further calculation.

Collect RRF, retention-time, and mass spectral libraries of prohibited and quantified compounds as they are calibrated. If a compound's RRF has been determined in a previous calibration or on a different instrument, it is prudent to compare current and historical RRFs. A difference of more than 15% from the average of previously obtained RRFs requires review of sample preparation and instrument conditions.

10.10 Instrument Sensitivity (MDL)
Compounds which exhibit a lower RRF than TRIG must have their MDL determined at the time of their calibration. Refer to EPA Pt. 136, App B to determine the MDL of each compound.

10.11 Calibration Frequency
Update calibrations after any repairs or method modifications which result in a demonstrated change in instrument sensitivity. The instrument does not require recalibration after changes to the liner or minor changes to the column. It is important to ensure that the instrument is still under control after any changes by analyzing an IOM and CSV mix and verifying their quality.

11.0 Analysis Procedure

11.1 Sample Analysis
Begin sample analysis only if all compounds in the sample in exceedance of 3 g/L are calibrated, and all compounds between 1 and 3 g/L are calibrated with an exact or appropriate substitute compound. A list of compounds requiring calibration can be generated from formulation data, previous analysis, or sample pre-screening.

11.2 Solvent Choice for Sample Dilutions
Both THF and methanol have been used successfully to dissolve samples for sample analysis and sample screening. Methanol is less toxic and has fewer contaminant peaks, but should not be used for paint samples which are labeled as "acrylic" (they often contain methanol), CAS, CACC samples (methanol is a VOHAP analyte), samples which require pTSAM, and samples which are known to contain a high number of molecular-weight hydrocarbons (C12 or greater).

Some samples may only be successfully dissolved or extracted in one solvent. When samples are diluted for analysis, pay close attention to resulting homogeneity. Large clumps, gels, layering, etc. may inhibit VOC extraction and require a different solvent. This method has been extensively tested only with THF and methanol as the solvents; do not use water or acetone as solvents. The solvent used for compound calibration and sample analysis must be consistent, and TRIG must be calibrated in any solvent that is used for sample screening.

11.3 Sample Analysis Laboratory Solutions Preparations
Prepare reagent blank, CSV, and IOM, and CCV standards in the same manner as described in Section 10.5. See section 7.5 for details on how to determine which compounds to include in the CCV standard.

11.4 Sample Surrogate Spiking
Prior to sample spiking, ensure that the sample has been analyzed for density, water content and nonvolatile content using SCAQMD Method 304-91 or EPA Method 24.

Vigorously shake the sample container either by hand or mechanical shaker for several minutes. The sample should be homogeneous before proceeding. Drag a stirring tool across the bottom of the container to ensure that no solids have settled in the sample.

Dissolution and VOC extraction is verified by spiking samples with surrogate standards (TRIG, nC7, IPA and DIIBA) prior to dilution. Begin surrogate spiking by weighing a 40-mL vial to the nearest 0.1 mg. Add approximately 30 grams of sample to the vial, and reweigh. If a sample will not remain homogenous during this step, allow the sample to separate, measure the volume of each layer, and prepare each layer separately. Add approximately 317 uL of DIIBA, and reweigh the vial to the nearest 0.1 mg. Add approximately 317 uL of TRIG, and reweigh the vial

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to the nearest 0.1 mg. Add approximately 443 uL of nC7, and reweigh the vial to the nearest 0.1 mg. Add approximately 382 uL of IPA, then reweigh the vial to the nearest 0.1 mg and add four to six glass mixing beads to the sample mixture. Cap and vigorously shake by hand until the spiked sample is completely mixed.

Inspect the sample. Some resins swell and solidify with the addition of nC7 and/or DIIBA; if this occurs, re-spike a fresh sample aliquot, but exclude nC7. If the re-spiked sample also demonstrates a matrix incompatibility, re-spike again but exclude both nC7 and DIIBA. Sample layering can occur in high water (> 80%) samples. In these cases, the sample must be freshly re-spiked and nC7 and DIIBA should again be excluded. The minimum required surrogate standard spike for any sample is TRIG.

11.5 Sample Analysis Dilution

Determine the appropriate dilution solvent using Section 11.2 as a guide. Fill a clean 25 mL volumetric flask approximately one-third full with the solvent of choice. Weigh the volumetric flask to the nearest 0.1 mg. Add between 2.5 grams to 3.5 grams of surrogate-spiked sample and re-weigh the flask. Add 150 uL EGDE internal standard and re-weigh. If ASTM D5095 has been requested, add approximately 20 mg of p-toluenesulfonic acid monohydrate (pTSAM) to the flask. Fill to the mark, cap, and mix well. The sample should be sonicated for 5 minutes to ensure appropriate mixing, but should be sonicated for 30 minutes if the sample contains glycerol. Samples should never be heated during sonication, and attention should be paid that the volume in the volumetric flask does not change during sonication. Cloudy samples sometimes clear if allowed to stand overnight. Allow the sample to react for at least one hour prior to analysis for samples requiring ASTM D5095.

Observe the diluted sample for uniformity. Samples which gel, form large clumps or develop two liquid layers must be re-prepared using whichever dilution solvent was not used in the original preparation. Allow solids to settle, then transfer the liquid portion of the dilution to an autosampler vial, minimizing headspace. Samples with a high concentration of solids may be filtered through an Acrodisc filter to extend the lifetime of the GC's capillary column.

11.6 Analysis Sequence

A new inlet liner should be installed prior to each analysis due to the potential for contamination from previous analyses. Fill autosampler vials with each sample or standard to be analyzed, cap them, and place in autosampler tray. Inject each QC standard or sample using the following sequence as a guide:

RB
IOM
CSV
CSV
CCV

RB
CCV
RB
Sample 1
RB
Sample 1 (replicate)
RB
Sample 2
RB
Sample 2 (replicate)
RB
Sample 3
RB
Sample 3 (replicate)
RB
CCV
RB
CCV
RB
CSV
CSV
IOM
RB

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RBs in between and immediately following CCV injections can be removed if there is no chance of carryover between their injections. Samples should always be injected in replicate with a RB in between injections, as reagent blanks reduce the potential for carryover into the second injection of the sample. The syringe wash solvent must be the same solvent that was used in the dilution of the sample. It is recommended that no more than three sample analyses be included in each analytical sequence due to the potential for solvent loss and settling of solids.

CSV and CCV recoveries which do not fall within the allowable QC range of 85-115%, BFB evaluations that do not meet passing criteria, and failing discrimination % differences indicate instrument drift and/or malfunction. Do not continue with sample analysis until the instrument is brought back under control. Internal standards and surrogate standard spikes which are high or low may indicate sample partitioning, poor extraction, or the presence of co-eluting compounds.

12.0 Data Analysis and Calculations

12.1 Peak Identifications

Samples may be very complex and contain hundreds of peaks. Analysts must use mass spectrometry to examine peaks. Analyte identification should only be performed by experienced

GC-MS operators. If components are present which cannot be positively identified by matching to known spectra, the analysts should utilize spectrum background subtraction capabilities made available in the system's chromatography software to improve spectrum signal and increase confidence in identifications. When no identifications can be made using the default library matching algorithm, usually Probability Base Matching (PBM), the analyst may use the National Institute of Standards and Technology (NIST) library matching algorithm, or the analyst may use deconvolution tools such as the Automated Mass spectral Deconvolution and Identification System (AMDIS) combined with PBM algorithm and/or the NIST library matching algorithm.

12.2 Sample Data Analysis

Examine all peaks for proper integration. Examine the sample chromatogram to determine whether the sample exhibits a petroleum-distillate profile.

Use the FID area counts and retention times from the RB and CSV which immediately precede the sample as a guide for which peaks to ignore; do not quantify any peaks that are attributable to column bleed, carryover, the dilution solvent, the internal standard, surrogate spikes, or their associated contaminants. Ethylene glycol, commonly found in paints and coatings, is of particular interest due to its potential to co-elute with the internal standard. Many co-eluting compounds may be separated by adjusting the carrier gas flow rate or modifying the oven temperature ramp profile. Follow the instrument optimization guide in Section 10.1 for further details. Samples may be screened in a solvent that is not to be used for analysis in order to examine potential co-elution with the solvent peak. If a sample peak and an RB or CSV peak elute at the same retention time, classify the peak as sample if the area counts of the sample peak are larger than the RB or CSV area counts by a factor of at least 2x.

Report FID data in a format which shows the area counts and retention time for each peak. Calculate the concentration of each peak "as triglyme" using FID area counts. If any peaks are observed over the quantification threshold of 0.1 % or 1 g/L, identify those peaks with the MS list their identities alongside the area counts and retention time. The final concentration of identified peaks will be calculated using each calibrated peak's RRF, or a valid substitute RRF if the concentration as TRIG is greater than 1 g/L and less than 3 g/L.

Peaks may be generically characterized (e.g. C9 hydrocarbon isomer) when an exact match cannot be determined. If the analyst cannot come up a reasonable analyte identification or generic characterization using all the tools available, the analyte should be flagged as "UNKNOWN" and the concentration should be calculated and reported "as triglyme".

Calculate sample VOC concentrations as follows:

$$VOC_{g/L} = \frac{area\ counts\ compound}{area\ counts\ internal\ std} \times \frac{\text{g/L internal std}}{RRF} \times \frac{volume\ (ml)}{sample\ weight\ (g)} \times D$$

$$RRF = \frac{area\ counts\ std}{area\ counts\ internal\ std} \times \frac{g/L\ internal\ std}{g/L\ std}$$

$$volume\ (ml) = volume\ of\ dilution\ volumetric\ flask\ (mL)$$
$$D = density\ of\ sample\ (g/mL)$$

Calculate the final concentration of each compound in the sample by using the compound-specific RRF or an appropriate substitute RRF. Ignore peaks calculated to be less than 0.1 g/L as TRIG and any exempt compounds. Peaks that elute at the same retention time as methyl palmitate are the first peaks to be ignored for VOC quantitation. Ignore any peaks that elute at or after MeP's retention time. Sum the VOC concentrations of all sample compounds and report the sum as g/L (material), but do not include the surrogate spikes and internal standard in the total. For paints and coatings, calculate the Solids lb/gal and VOC g/L (coating) using weight percent nonvolatiles (NV) and density in grams per milliliter (D) measured by Method 304-91 as follows:

$$VOC_{\%wt} = \frac{VOC_{g/L} material}{(D * 10)} \qquad W_{\%wt} = 100 - NV_{\%wt} - VOC_{\%wt}$$

$$VOC_{g/L}(coating) = \frac{VOC_{\%wt} \times 1000}{\left(\frac{100}{D} - \frac{W_{\%wt}}{0.997}\right)}$$

$$Solids_{lb/gal} = \frac{NV_{\%wt}}{100} \times \frac{D}{454} \times 3785$$

The precision of this method has been estimated at 5 g/L material. It may be used to estimate the error in the final VOC g/L (coating) value first by adding the estimated error to the final VOC g/L (material) and calculating the VOC g/L (coating), then subtracting the estimated error and performing the same calculations. See the following equations:

To estimate the minimum VOC coating value for an analysis, $VOC_{g/L}(coating)_{min}$:

$$VOC_{g/L}(coating)_{min} = \frac{\left(VOC_{\%wt} - \left[\frac{5}{D * 10}\right]\right) \times 1000}{\left(\frac{100}{D} - \frac{W_{\%wt}}{0.997}\right)}$$

To estimate the maximum VOC coating value for an analysis, $VOC_{g/L}(coating)_{max}$:

$$VOC_{g/L}(coating)_{max} = \frac{\left(VOC_{\%wt} + \left[\frac{5}{D * 10}\right]\right) \times 1000}{\left(\frac{100}{D} - \frac{W_{\%wt}}{0.997}\right)}$$

Samples submitted for CAS or CACC analysis which contain prohibited compounds in excess of the quantitation threshold (1 g/L) are rejected before further calculation.

Peak concentrations must be examined to determine whether they fall within linear instrument range. Peaks found to exceed the instrument's calibrated range for that compound can be re-prepared and re-analyzed using a smaller sample size if a large aliquot was originally used; otherwise, the instrument's calibrated range must be expanded. All peaks should also be examined for proper integration and analysts should be aware that GC software occasionally combines two peaks into one, erroneously exceeding the 1 g/L threshold for identification used in this method.

Peaks which have been quantified "as triglyme" should constitute no more than 5 g/L material or 10% of the final VOC result, whichever is larger. If the above procedure produces an unacceptably large number of peaks quantified "as triglyme", continue to identify and apply appropriate RRFs to each successively smaller peak until the total "as triglyme" value becomes acceptable. If the "as triglyme" values cannot be brought to acceptable levels- for example, the sample contains many unidentifiable peaks- flag the result.

12.4 Petroleum Distillate Based Samples

In this profile, assume that peaks are hydrocarbons unless otherwise demonstrated. However, samples containing petroleum-distillates often contain co-solvents or surfactants such as dipropylene glycol ethers which elute within the retention time range of hydrocarbon peaks. Therefore it is important to examine the chromatogram for surfactants because hydrocarbon and glycol ether RRFs are very different, and misidentifying these peaks may under-report VOC content significantly

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12.5 Sample Analysis Reporting
On the summary page, report the sample
VOC in g/L (material)
VOC g/L (coating)
Solids lb/gallon

On the detailed page, report
CCV and CSV recoveries
Surrogate standard recoveries
Weight percent solids (from SCAQMD Method 304-91/ EPA Method 24)
Sample density in g/mL (from SCAQMD Method 304-91/ EPA Method 24)
Weight percent water, measured (EPA Method 24)
Weight percent water, calculated (SCAQMD Method 313)
Total g/L (material) of compounds reported "as triglyme"
Annotations about the sample analysis

13.0 Method Performance

This section is currently reserved

14.0 Pollution Prevention

No specific pollution prevention steps have been identified.

15.0 Waste Management

Follow the laboratory guidelines for handling and disposal of waste generated from using this method.

16.0 References

17.0 Tables, Diagrams, Flowcharts and Validation Data

This section is currently reserved

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Appendix 1: Glossary

CAS # - Chemical Abstracts Service registry number assigned as a unique numerical identifier to every chemical described in open scientific literature.

Clean Air Solvents (CAS) - An SCAQMD voluntary certification program.

Co-elute - When a compound elutes at the same retention time as that of another compound.

Continuing Spike Verification (CSV) standard - A mix of four compounds prepared at 1 g/L each: isopropanol (IPA), heptane (nC7), TRIG, and diisobutyl adipate (DIIBA). This standard is prepared in either methanol or tetrahydrofuran. This solution is analyzed before and after a sample set to assess the quality of the instrument control during an analysis or calibration sequence. This solution is also used to discount from samples any contaminants that are introduced into a sample when the same four compounds are used as surrogate standards in the sample preparation.

Coalescing solvent (co-solvent) - A VOC compound which remains after water evaporates whose function is to soften paint particles and cause them to fuse into a continuous film.

Critical analytes - Analytes that elute close to one another. They may co-elute in a GC analysis depending on their concentrations in a sample. EG and PG are typical VOCs found in coatings in relatively large amounts and are common critical analytes due to their potential co-elution with EGDE.

Detected peak (as injected) – A peak seen on the chromatogram from the final diluted solution that is injected into the GC. The concentrations determined by quantifying these peaks would still need to be corrected for any dilution made throughout the sample preparation process in order to get the original value in the neat sample.

EPA M24 - An analysis for VOC using gravimetric measurement of sample nonvolatiles and density, a titrimetric or gravimetric measurement of water, and a gas chromatographic measurement of exempt compounds. VOC is assumed to be the remainder, once nonvolatiles, water, and exempt compounds are subtracted.

Injection - The emplacement of a small sample aliquot into a GC injection port for subsequent analysis.

Method detection limit (MDL) - A method-defined limit of detection set at 0.1 g/L material VOC in the neat sample. The method must at least be able to quantify individual VOCs at and

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above 0.1 g/L material with the RRF of TRIG. An MDL of 0.01 g/L or better, "as injected", is confirmed by using seven replicate injections of a 0.1 g/L TRIG standard, calculating the standard deviation (SD) of the area counts, multiplying the SD by the student's t value for 99% confidence level (3.14), and calculating that value as g/L.

Novel compounds - Compounds seen in the chromatogram which are not typically part of a coating formulation. The analyst needs to flag these compounds as something that may "require further investigation" as to its origin. These may be decomposition products, contamination, "dirty" liner reaction products, extraction solvent-sample reaction products, etc.

Percent difference (%D) - The difference of one value *(V)* to a reference value *(Vr)* expressed as a percentage of the reference value *(Vr)*: $\%D = ((V-Vr)/Vr)*100$

QS to volume - "Quantity sufficient to volume" means "add enough solvent to bring the total volume to..." For example, "QS to 25 ml" means "add the volume necessary to make the total volume 25 ml."

Reagent blank (RB) - A solution consisting of the sample extraction solvent of choice and EGDE internal standard. This solution is analyzed prior to diluted samples to identify and subtract contaminants inherent in the extraction solvent and in the internal standard from the VOCs found in the diluted, spiked sample aliquots.

Relative percent difference (RPD) - A measure of precision, calculated by:
$RPD = [X_1 - X_2]/X_{ave} \times 100\%$
where, e.g:
X_1 = VOC content determined in first injection
X_2 = VOC content determined in duplicate injection
X_{ave} = average VOC amount determined = $((X_1 + X_2) / 2)$

Relative Response Factor (RRF) - The normalized peak area response (to its amount, g/L) of a VOC standard relative to the normalized value of the internal standard (EGDE)

"as triglyme" - Quantitation of detected VOC peaks using the default calibration standard RRF of TRIG .

Sample discrimination - During sample injection, the analytes in a sample may split unevenly at the inlet. This uneven split must be avoided to ensure that a representative weight of each sample analyte is delivered onto the column. When all lab instruments have similar discrimination profiles, this ensures comparable RRFs from instrument to instrument. This is important in assessing instrument stability, standard resolution, and/or standard purity.

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Minimizing discrimination also ensures that a default RRF can be universally applied to unidentified VOCs across an entire chromatogram.

Sample pre-screening - Refers to the analysis of a neat sample only diluted in the solvent of choice with the internal standard. This is done to determine if there are any VOCs in the sample that may co-elute with the spikes and its contaminants that are introduced into the neat sample in a regular analysis. This process may also be used to determine if any compounds in the sample must be calibrated for quantitation.

Substitute standard - A compound considered as an acceptable replacement standard used to calibrate and quantify an otherwise known compound. It must have the same functional groups and must differ from the target compound by only 1 carbon atom.

Surrogate standards - Four compounds (IPA, TRIG, DIIBA, nC7) spiked neat and mixed uniformly into a sample. These are used to monitor the extraction efficiency of the solvent (methanol of THF) on the spiked sample. The surrogate standards should have a concentration of nominally 1 g/L in the final sample dilution.

Syringe/Injector mechanics - Mechanical aspects of the syringe and injector function parameters like plunger draw speed, injection speed, plunger dispense speed, and dwell time. Optimum recommended settings to improve precision include a slow syringe plunger draw speed, a fast syringe inject speed, and a fast syringe plunger dispense speed. There should also be enough syringe post-injection dwell time for the plunger to completely dispense the sample into the inlet before the syringe is drawn out and back to home position by the autosampler turret. Syringe injection mechanics affect analyte discrimination, and any adjustment in these settings may necessitate a re-optimization of the other parameters.

Multi-component coatings - See SCAQMD Rule 1113 for a definition of multi-component coatings.

Unpredictable solvent interactions - Phenomenon where the extraction solvent of choice reacts with the sample matrix resulting in sample clumping, sample hardening, or the creation of an inefficient extraction environment for VOC analytes.

VOC Coating - The VOC of coating is the same as the term “regulatory VOC”, which is equivalent to the term "VOC, less water and exempts". It is the amount of VOC in a sample volume, from which the volume of water and exempt volumes have been mathematically subtracted from the fully formulated sample.

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VOC Material - The VOC of material is the same as the term "actual VOC ", which is equivalent to the term "VOC, including water and exempts". It is the amount of VOC in a volume of fully formulated sample.

Volatile Organic Compounds (VOC) - See SCAQMD Rule 102 for the definition of VOC.

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Appendix 2: Commonly seen compounds and Relative Response Factors (RRF)

Compound	CAS #	RRF
2,2,4-trimethylpentane-1,3-diol monoisobutyrate, Texanol™, TX, a mixture of two isomers	25265-77-4 (mixture)	1.4
Texanol™ A, propanoic acid 2-methyl- 1- (2-hydroxy- 1-methylethyl)-2,2-dimethylpropyl ester	74367-33-2	
Texanol™ B, propanoic acid 2-methyl-, 3-hydroxy- 2,4,4-trimethyl-pentyl ester	74367-34-3	
Ethylene glycol, EG	107-21-1	0.5
Propylene glycol, PG	57-55-6	0.7
Ethylene glycol butyl ether, EGBE	111-76-2	1.1
Diethyleneglycol butyl ether, DEGBE	112-34-5	1.0
Dipropylene glycol monomethyl ether, DPGME, occurs as four identifiable isomers	34590-94-8 (mixture) 13429-07-7 20324-32-7 13588-28-8 55956-21-3	1.2
Dipropylene glycol, DPG occurs as three identifiable isomers	25265-71-8 (mixture)	1.3
2,2'-Oxybis-1-propanol	110-98-5	
2,2’-Oxybis-2-propanol	108-61-2	
2-(2-Hydroxypropoxy)-1-propanol	106-62-7	
2,4,7,9-tetramethyl-5-decyn-4,7-diol, TMDD	126-86-3	1.6
n-Methylpyrrolidinone, NMP	872-50-4	1.0
2,2,4-Trimethyl-1,3-pentanediol, TMPD	144-19-4	1.4
1-(2-Butoxyethoxy)-ethanol,DEGBE	54446-78-5	0.9
1-Butanol	71-36-3	1.3
p-Xylene	106-42-3	2.1
3-Iodo-2-propynyl n-butyl carbamate	55406-53-6	0.6
2-Methyl-1-propanol	78-83-1	1.4
Butyl acrylate	141-32-2	0.9
1-Phenoxypropan-2-ol	770-35-4	1.3
2,3-Dimethylpyrazine	5910-89-4	1.3
Tetraethylene glycol	112-60-7	0.5
Pentaethylene glycol	4792-15-8	0.5
Cyclohexanone	108-94-1	1.2
Methyl acetate	79-20-9	0.6
Decane	124-18-5	2.0
1,2,3-Trimethylbenzene	526-73-8	2.1
Tripropylene glycol mono methyl ether, TPGME	25498-49-1	0.9
TPGME is a mixture of isomers	and 20324-33-8	

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Compound	CAS #	RRF
Ethyl benzene	100-41-4	2.1
Nonane	111-84-2	2.0
Undecane	1120-21-4	2.1
Dodecane	112-40-3	2.1
Triethylamine	121-44-8	1.6
Propylene glycol butyl ether	5131-66-8	1.2
Methyl methacrylate	80-62-6	1.0
Toluene	108-88-3	2.6
1-Dodecanol	112-53-8	1.8
Diethylene glycol ethyl ether	111-90-0	0.8

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Appendix 3: QC Summary

Standard	Hold Time	Run	Requirement
Reagent Blank	two days	before and after each sample injection	Area count at surrogate standard retention times < 1% of total area of surrogate standard spikes
CSV Standard	two days	before and after each batch of samples	Surrogate standard recoveries within 85 - 115% EGDE recovery within 85 - 115%
CCV Standard	two days	before and after each batch of samples	Calibration check recoveries within 85 - 115% EGDE recovery within 85 - 115%
IOM Standard	1 month	at the start of each sequence	Acceptable BFB recovery as per EPA TO-15 %D ± 15% for nC6-nC15 (compare to nC10) TRIG recovery within ± 0.02 g/L.
Spiked surrogate standards	two days	in each sample	Recoveries within 85 - 115% EGDE recovery within 50 -150%

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Appendix 4: IOM % Difference Calculation Example

IOM Compound	Retention Time (min)	Mass (g)	% Purity	Purity Adjusted Mass (g)	Area Counts	Area/P.A. Mass	%D from C10
Hexane	8.83	0.0966	99.0	0.0956	2492674954	26064735910	105.5
Heptane	12.18	0.0985	99.0	0.0975	2454428253	25169750838	101.9
Octane	16.51	0.0993	99.0	0.0983	2465421237	25078796393	101.5
Nonane	19.19	0.1092	99.3	0.1084	2634660258	24297004471	98.4
Decane	21.41	0.1078	99.0	0.1067	2636157632	24701164071	100.0
Undecane	23.26	0.1111	99.0	0.1100	2666157609	24240220468	98.1
Dodecane	24.89	0.1127	99.0	0.1116	2729565353	24464389709	99.0
Tridecane	26.37	0.1135	99.0	0.1124	2739759287	24382675095	98.7
Tetradecane	27.75	0.1164	99.0	0.1152	2830475046	24562420129	99.4
Pentadecane	29.03	0.1162	99.0	0.1150	2822626975	24536474687	99.3

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Designation: D6886 – 12

Standard Test Method for Determination of the Individual Volatile Organic Compounds (VOCs) in Air-Dry Coatings by Gas Chromatography[1]

This standard is issued under the fixed designation D6886; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method is for the determination of the weight percent of individual volatile organic compounds in air-dry coatings.

1.2 The method can be used to determine the weight fraction VOC content of waterborne coatings in which the material VOC content is below 5 weight percent. The method has been used successfully with higher VOC content waterborne coatings and with solvent-borne coatings (Note 1).

1.3 The method may also be used to measure the exempt volatile organic compound content (acetone, methyl acetate, t-butyl acetate and p-chlorobezotrifluoride) of waterborne and solvent-borne coatings. The methodology is virtually identical to that used in Test Method D6133 which, as written, is specific for only exempt volatile compounds.

1.4 Volatile compounds that are present at the 0.005 weight percent level or greater can be determined.

NOTE 1—This test method may be used for the VOC analysis of coatings containing silanes, siloxanes, and silane-siloxane blends. The test method is not suitable for the analysis of coatings that cure by chemical reaction (this includes two-component coatings and coatings which cure when heated) because dilution with a solvent would impede the chemical reaction required for these types of coatings. This test method measures the VOC weight fraction of air-dry coatings directly as opposed to the methods of Practice D3960 which measure the VOC weight fraction of air-dry waterborne coatings indirectly. A direct measurement of VOC weight fraction, particularly in low VOC content waterborne coatings, generally gives better precision. California Polytechnic State University carried out an extensive study for the California Air Resources Board comparing the precision of the direct method with the indirect method (CARB Standard Agreement No. 04.329).[2] This study may be used to decide if the present method or the methods of Practice D3960 are preferred as an analysis method for obtaining the best possible precision for measuring the mass-based VOC content of a specific coating.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[3]

D2369 Test Method for Volatile Content of Coatings

D3792 Test Method for Water Content of Coatings by Direct Injection Into a Gas Chromatograph

D3960 Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings

D4017 Test Method for Water in Paints and Paint Materials by Karl Fischer Method

D6133 Test Method for Acetone, *p*-Chlorobenzotrifluoride, Methyl Acetate or *t*-Butyl Acetate Content of Solventborne and Waterborne Paints, Coatings, Resins, and Raw Materials by Direct Injection Into a Gas Chromatograph

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Terminology

3.1 *Abbreviations:*

3.1.1 *EGDE*—ethylene glycol diethyl ether

3.1.2 *DB*—2-(2-butoxyethoxy)ethanol; Butyl Carbitol;[4] diethylene glycol monobutyl ether

3.1.3 *EB*—2-butoxyethanol; Butyl Cellosolve;[5] ethylene glycol monobutyl ether

3.1.4 *EG*—ethylene glycol

3.1.5 *FID*—flame ionization detector

3.1.6 *F-VOC*—formulation data calculated volatile organic compound in g/(L-water)

3.1.7 *GC*—gas chromatograph

3.1.8 *PG*—propylene glycol

[1] This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.21 on Chemical Analysis of Paints and Paint Materials.

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[2] Detailed results of this study may be found at http://www.arb.ca.gov/coatings/arch/Final_Report_6_11_09.pdf.

[3] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[4] Butyl Carbitol is a registered trademark of The Dow Chemical Company.

[5] Butyl Cellosolve is a registered trademark of The Dow Chemical Company.

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3.1.9 *% RSD*—percent relative standard deviation

3.1.10 *SPME*—solid phase microextraction

3.1.11 *SPDE*—solid phase dynamic extraction

3.1.12 *Std Dev*—standard deviation

3.1.13 *TX*—2,2,4-trimethypentane-1,3-diol, monoisobutyrate

3.1.14 *VOC*—volatile organic compound

3.1.15 *X-VOC*—experimental volatile organic compound in g/(L-water)

4. Summary of Test Method

4.1 A known weight of coating is dispersed in methanol or tetrahydrofuran (THF) internally standardized, and analyzed by capillary gas chromatography to give a speciated composition of the volatile organic compounds and exempt organic compounds, if any, present in the coating. Summation of the individual volatile organic compound weight fractions gives the total VOC content of the coating measured in weight percent (Note 2).

NOTE 2—Methanol should be used as a solvent for all waterborne coatings. THF should be used for solventborne coatings. Acetone may also be used for solventborne coatings but should not be used for waterborne coatings because it may react with ammonia and amines which are frequently found in waterborne coatings. Using the provisions of Practice D3960, the VOC content of coatings measured in g/L minus water, or other units, may be determined. Since the determination of weight percent VOC in the present method is by direct measurement, either the water fraction (Test Method D3792 or Test Method D4017) or the nonvolatile fraction (Test Method D2369) may be determined indirectly in the application of Practice D3960. Since precision is better for the determination of the nonvolatile content, this is the preferred method for the indirect calculation of water content in this test method. The equations for calculating coating VOC content when no exempt volatile compounds are present are:

$$VOC = \frac{f_{VOC}(D_P)}{1 - [(1 - f_{NV} - f_{VOC})(D_P/D_W)]} \quad (1)$$

or

$$VOC = \frac{f_{VOC}(D_P)}{1 - [f_W(D_P/D_W)]} \quad (2)$$

where:

D_P, f_{NV}, f_{VOC}, and f_W = coating density, nonvolatile fraction, VOC fraction, and water fraction, respectively.

4.2 Direct GC/FID, GC/MS and solid phase microextraction / gas chromatography (SPME/GC) of the coating may be used to facilitate identification of the volatile compounds present in a coating. Table X1.1 lists the GC retention times for the volatile compounds which may be found in low VOC content air-dry coatings and several possible internal standards, ordinarily not present in coatings, which may be used (Note 3).

NOTE 3—The analyst should consult MSDS and product data sheets for possible information regarding solvents which may be present in a particular coating. Retention times given in X1.1 must be verified for each individual instrument.

5. Significance and Use

5.1 In using Practice D3960 to measure the VOC content of waterborne coatings, precision tends to be poor for low VOC content air-dry coatings when the VOC weight fraction is determined indirectly. The present method first identifies and then quantifies the weight fraction of individual VOCs directly in air-dry coatings. The total VOC weight fraction can be obtained by adding the individual weight fraction values (Note 4).

NOTE 4—The present method may be used to speciate solvent-borne air-dry coatings. However, since these normally contain high, and often complex, quantities of solvent, precision tends to be better using the methods contained in Practice D3960, where the VOC fraction is determined by a direct weight loss determination.

5.2 SPME/GC makes it possible to identify very low levels of volatile compounds in a coating and could serve to make it possible to identify the presence of hazardous air pollutants (HAPs).

6. Apparatus

6.1 *Gas Chromatograph, FID Detection or Mass Spectrometry Detection with Electronic Data Acquisition System*—Any capillary gas chromatograph equipped with a flame ionization detector or mass spectrometer and temperature programming capability may be used. Electronic flow control, which gives a constant carrier gas flow, is highly recommended.

6.2 *Standard GC/FID and GC/MS Instrument Conditions*:

6.2.1 See Table 1.

7. Reagents and Materials

7.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, all reagents shall conform to the available specifications of the Committee on Analytical Reagents of the American Chemical Society. Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

7.2 *Carrier Gas*, helium of 99.995 % or higher purity.

7.3 *Tetrahydrofuran (THF)*, HPLC grade.

7.4 *Methanol*, HPLC grade.

7.5 Possible internal standards: *1-Propanol, p-fluorotoluene, cyclohexanol, p-chlorotoluene, ethylene glycol diethylether (EGDE).*

7.6 *Fluorocarbon-faced Septum Vials*, 20 mL and 40 mL capacity.

7.7 *Ceramic Beads*, 0.5–1.0 mm diameter.

8. Column Conditioning

8.1 The capillary columns should be conditioned according to the manufacturer's recommendation. The columns may then be used indefinitely without further conditioning.

9. Preparation of Standards

9.1 Prepare a stock mixture of ethylene glycol (EG), propylene glycol (PG), ethylene glycol monobutyl ether (EB), ethylene glycol diethyl ether (EGDE) [or other suitable internal standard], diethylene glycol monobutyl ether (DB), and 2,2,4-trimethylepntane-1,3-diol monoisobutyrate (TX) by weighing one or two grams of each into an appropriate vial. The weight of each component should be approximately the same and determined to 0.1 mg. Mix the contents.

TABLE 1 Standard FID Instrument Conditions

Instrument Conditions	FID	GC/MS
Detector	Flame ionization	70 eV electron impact mass spectrometer
Columns	Primary column: 30 by 0.25 mm 5 % phenyl/95 % methyl siloxane (PMPS),[A] 1.0 µm film thickness Confirmatory Columns: 30 by 0.25 mm polydimethylsiloxane (PDMS), 0.25 µm film thickness; 30 by 0.25 mm Carbowax (CW), 0.25 µm film thickness.	Primary column: 30 by 0.25 mm % phenyl/95 % methyl siloxane (PMPS),[A] 1.0 µm film thickness Confirmatory Columns: 30 by 0.25 mm polydimethylsiloxane (PDMS), 0.25 µm film thickness; 30 by 0.25 mm Carbowax (CW), 0.25 µm film thickness.
Carrier Gas	Helium	Helium
Flow Rate	1.0 mL per min, constant flow (24.9 cm/s at 40°)	1.0 mL per min, constant flow (24.9 cm/s at 40°)
Split Ratio	50 to 1	50 to 1
Temperatures, °C, Primary Column		
Inlet	260°	260°
Detector	270°	270°
Initial	50° for 4 min	50° for 4 min
Rate	20° per min to 250°, hold 6 min (total run time = 20 min)	20° per min to 250°, hold 6 min (total run time = 20 min)
Temperatures, °C, Confirmatory Columns		
Inlet	260°	260°
Detector	270°	270°
Initial	40° for 4 min	40° for 4 min
Rate	10° per min to 250°, hold 25min	10° per min to 250°, hold 25min
Source		230°
Quadrupole		230°
Transfer Line		260°
Scanning Parameters		Mass 29–400 amu

[A] Some coatings may contain high-boiling components which elute from the GC capillary column after the specified run time of 20 minutes. It is advisable, therefore, to bake out the column in these cases. The column designated as PMPS is commercially available from several vendors by the following designations: DB-5, SPB-5, HP-5, AT-5, CP Sil 8CB, RTx-5, BP-5. The column designated as PDMS is available by th designations DB-1, SPB-1, HP-1, AT-1, CP Sil 5 CB, Rtx-1. The column designated as Carbowax is available by the designations Supelcowax 10, DB-Wax, HP-Wax, AT-Wax, CP-Wax 52 CB, Rtx-Wax, BP-20.

9.2 Transfer approximately 100 µL of the stock mixture to a septum-capped vial containing 10 mL of THF or methanol and mix the contents (Note 5). This solution will contain each of the known analytes at a concentration of approximately 2 mg/mL.

NOTE 5—The solvents EG, PG, EB, DB TX are widely used in the manufacture of waterborne air-dry coatings and may be expected as highly probable components of these coatings.

9.3 Chromatograph the solution in 9.2 by injecting 1 µL into the PMPS column using the chromatographic conditions given in 6.2. Calculate the relative response factors for each of the analytes relative to the EGDE or other suitable internal standard using the relationship:

$$RF = \frac{AA * MI}{AI * MA} \quad (3)$$

where:

RF = relative response factor,
AA = area of analyte,
MI = weight of internal standard (from 9.1),
AI = area of internal standard, and
MA = weight of analyte (from 9.1).

10. Paint Analysis

10.1 *Analysis of Air-dry Solvent-borne and Waterborne Coatings by GC/FID or GC/MS*:

10.1.1 Prepare duplicate samples by pipetting 10 mL of methanol (waterborne coatings) or THF (solventborne coatings) into a vial containing 3 to 5 g of ceramic beads and close with a fluorcarbon-faced septum cap. Using a dedicated glass syringe (25 or 50 microliter capacity), add 10 µL of EGDE or other internal standard and weigh to at least 0.1 mg. This

solution must be analyzed by GC to determine if there are peaks that result from it rather than from the paint sample that is prepared in 10.1.2.

10.1.2 Pipette 10 mL of methanol or THF into a 20 or 40 mL vial containing 3 to 5 g ceramic beads and close with a fluorocarbon-faced septum cap. Using a disposable 1 mL syringe, add approximately 0.6 to 0.8 g of the well-mixed paint through the septum cap and weigh to 0.1 mg (Note 6). Using the dedicated syringe, add 10 microliters of pure EGDE (or other internal standard) through the septum and weigh the amount added to at least 0.1 mg. Mix the contents vigorously by shaking for 1 min. Let the vial stand to permit pigments, if any, to settle.

NOTE 6—The paint should be drawn into the syringe without an attached syringe needle. Excess paint is wiped from the syringe and the needle is then attached for paint transfer. The mass of the paint may be determined by either the difference in the weight of the filled and empty syringe or by the difference in the weight of the vial before and after adding paint.

10.1.3 Chromatograph the solution in 10.1.2 by injecting 1 µL into the PMPS capillary column using the standard conditions described in 6.2. Adjust the split ratio to give well-defined chromatographic peaks. Identify the volatile compounds which elute over a 20 minute run time. An internal marker, methyl palmitate (BP = 338°C) should elute at approximately 18.4 minutes. Calculate the weight fraction of each peak using the relationship:

$$\%X = \frac{(AA)(MI)(100)}{(AI)(RF)(MC)} \quad (4)$$

where:

X = one of several possible volatile compounds in the coating,
RF = relative response factor of compound X,
AA = peak area of compound X,
MI = weight of internal standard,
AI = peak area of internal standard, and
MC = weight of coating.

NOTE 7—If volatile compounds other than those in the standard (9.1) are present in the coating, the identity should be confirmed by FID retention time comparison with authentic material or by GC/MS and the relative response factor should be determined as outlined in 9.1-9.3. Commercial 2,2,4-trimethylpentane-1,3-diol monoisobutyrate (TX) may contain small amounts of 2,2,4-trimethylpentane-1,3-diol which elutes approximately 0.5 minutes before butyl carbitol and 2,2,4-trimethylpentane-1,3-diol diisobutyrate (TXIB) which elutes approximately 1.5 minutes after 2,2,4-trimethylpentane-1,3-diol monoisobutyrate (TX). Acetone and isopropyl alcohol have nearly the same retention time on a PMPS column and if either is found, their identities should be confirmed and quantitated on a Carbowax[6] column or by using GC/MS. Isobutyl alcohol coelutes with the solvent (THF) and must be determined on a different column (Carbowax) or using a different solvent (methanol). SPME, SPDE and static headspace analysis are especially useful techniques for confirming that decomposition products are not being observed. Small quantities (up to 0.5 %) of acetic acid are sometimes found in coatings containing vinyl acetate resins. The acetic acid is formed as a decomposition product in the GC inlet and should not be counted as a VOC. Some coatings contain additives (for example, carbamate ester biocides) that may give decomposition products in the hot inlet of the gas chromatograph. If decomposition products are suspected, a convenient procedure for determining this is to analyze the coating by static headspace gas chromatograhpy. In using static headspace, a large sample of the coating (15 to 20 g) is internally standardized with 10 mg/g of EGDE, approximately 5 mL of ceramic beads are added, and manually mixed by shaking until the paint/internal standard mixture is homogeneous. The static headspace procedure is carried out on 40 to 60 mg of the internally standardized coating using a 20 mL crimp-cap headspace vial. Static headspace conditions are: Oven, 20 to 30 minutes at 130°C; Loop, 150°C; Transfer Line, 150°C. Chromatographic Conditions: as described in 6.2. Alternatively, if static headspace, SPME, or SPDE capability are not available, the analysis can be done using a lower inlet temperature as long as the selected temperature is high enough to fully volatilize the suspect compounds. Cool on-column injection can also be sued to determine if a compound is being generated vial thermal decomposition in the hot GC inlet.

10.2 *Overlapping Chromatographic Peaks*:

10.2.1 A number of VOCs in solvent-borne paints containing commercial xylene tend to overlap. These include propylene glycol monomethyl ether acetate/ethylbenzene and butoxyethanol/o-xylene. Resolution can generally be obtained by simply changing the chromatographic heating rate.

10.3 *Coatings Containing Silanes, Siloxanes and Silane-Siloxane Blends*:

10.3.1 If the coating contains silanes, siloxanes, and silane-siloxane blends, approximately 50 mg of solid p-toluenesulfonic acid should be added to the solution in 10.1.2 thirty minutes prior to gas chromatography. The p-toluenesulfonic acid catalyzes the hydrolysis of alkoxy silanes to free alcohol (usually ethanol).

11. Reporting Results

11.1 Prepare a table (as indicated below) which contains information on each of the VOC species found. Do not include any exempt volatile organic compounds in this table.

VOC Found	GC Retention Time	Weight % Found

Total weight percent of all speciated VOCs =

11.2 List VOCs that are not identified as unknown (UK) and use the relative response factor of 2,2,4-trimethylpentane-1,3-diol monoisobutyrate to calculate the weight % for unknown VOCs. List any exempt compounds that may be present separately from those listed in the VOC table.

12. Alternate Identification Methods

12.1 The use of GC/MS for volatile compound identification is highly desirable even when quantitation is carried out by GC/FID. A convenient procedure is to sample the headspace of the coating using an SPME or SPDE followed by thermal desorption onto any standard capillary column and subsequent mass spectral identification. This technique is especially valuable for identifying oxygenates, aromatics and other volatile organic compounds.

13. Precision and Bias

13.1 An interlaboratory study of total weight percent VOC was conducted in accordance with Practice E691 in seven

[6] Carbowax is a registered trademark of The Dow Chemical Company.

TABLE 2 Precision Statistics for Low VOC Content Waterborne Air-Dry Coatings Analyzed by Gas Chromatography

Material	Total VOC in Weight Percent, Average	Repeatability Standard Deviation	Reproducibility Standard Deviation	Repeatability Limit	Reproducibility Limit
A	0.25	0.009	0.020	0.03	0.06
B	2.85	0.058	0.125	0.16	0.35
C	4.04	0.087	0.187	0.24	0.52
D	4.49	0.145	0.314	0.41	0.88
E	4.50	0.100	0.215	0.28	0.60

laboratories with five materials, with each laboratory obtaining three test results for each material. Five commercial waterborne coatings, a primer, a flat, a satin, a semi-gloss and a gloss, ranging in weight percent VOC content from 0.25 to 4.50, were analyzed. Each of the laboratories analyzed the coatings three times according to protocols specified in Practice E691(see Note 8).

13.2 Precision statistics were calculated for the total weight percent VOC found in each of the five coatings and are presented in Table 2. The terms repeatability limit and reproducibility limit are used as specified in Practice E177.

13.3 *95 % Repeatability Limit (within laboratory)*—The within-laboratory coefficient of variation is 2.7 % relative. The 95 % confidence limit for the difference between two such averages is 7.5 % of the test result.

13.4 *95 % Reproducibility Limit (between laboratories)*—The between-laboratory coefficient of variation is 5.8 % relative. The 95 % confidence limit for the difference between two such averages is 16.2 % of the test result.

13.5 *Bias*—Bias has not been determined.

NOTE 8—The precision statistics determined for this test method are applicable only to gas chromatography using flame ionization detection. Statistics using mass spectral detection have not been determined.

14. Keywords

14.1 exempt organic compounds; gas chromatography; speciation; VOC (volatile organic compound); waterborne coatings

APPENDIX

(Nonmandatory Information)

X1. RELATIVE RESPONSE FACTORS AND RETENTION TIMES – PRECISION STATISTICS

X1.1 Precision statistics were calculated for each of the individual VOCs found in the five coatings analyzed in the interlaboratory study and are presented in Table X1.2. The experimental VOC content (X-VOC) is compared with the theoretical VOC (F-VOC) obtained from formulation data.

TABLE X1.1 Retention Times (in Minutes) and FID Relative Response Factors (RRF) of Possible Volatile Organic Compounds and Exempt Compounds in Waterborne Air-Dry Coatings Using Chromatographic FID Conditions Described in 6.2

Compound	RRF	PMPS	Carbowax	PDMS
methanol	0.66	2.35	5.16	1.97
ethanol	1.00	2.75	5.85	2.08
acetone	1.02	3.12	3.93	2.21
2-propanol	1.02	3.13	5.71	2.19
t-butyl alcohol		3.42		
methyl acetate	0.60	3.59	4.1	2.31
1-propanol		3.82	7.91	2.44
vinyl acetate		4.40		
methyl ethyl ketone	1.25	4.74	5.24	2.7
2-butanol	1.18	4.78	7.63	2.72
ethyl acetate	0.83	5.05		
tetrahydrofuran (THF)		5.31	4.65	3.05
isobutyl alcohol	1.62	5.31	8.94	2.97
1-butanol	1.59	5.97	9.92	3.39
propylene glycol monomethyl ether	0.79	6.18	9.66	3.62
ethylene glycol	0.55	6.42	16.94	3.91
ethyl acrylate		6.48		
t-butyl acetate	1.22	6.65	5.31	4.18
methyl methacrylate		6.74		
2-ethoxyethanol	0.70	6.83		
methyl pivalate		7.00		
propylene glycol	0.73	7.18	16.48	4.8
AMP-95	0.84	7.46		
toluene	2.07	7.82	8.02	5.44
p-fluorotoluene		8.03		
ethylene glycol diethyl ether (EGDE)	1.00	8.12		
2-propoxyethanol (EP)	1.00	8.27	12.58	6.41
butyl acetate	1.16	8.33		
propylene glycol monopropyl ether (PnP)	1.01	8.72	11.65	7.32
diacetone alcohol		8.73		
furfuryl alcohol	0.93	8.88		
ethylbenzene	2.04	8.92	10.87	7.75
parachlorobenzotrifluoride	1.02	8.93		
propylene glycol, mono t-butyl ether	1.16	8.96	12.58	7.67
propylene glycol, methyl ether acetate	0.86	8.99		
p-xylene	2.17	9.19	9.72	7.6
m-xylene	2.17	9.19	9.87	7.81
butyl ether		9.20	9.99	7.81
2-heptanone	1.46	9.32		
cyclohexanol		9.32		
butyl acrylate		9.32		
butyl propionate		9.45		
o-xylene	2.17	9.47		
2-butoxyethanol (EB)	1.11	9.51	10.78	8.28
hexylene glycol		9.62	14.05	8.6
diethylene glycol monomethyl ether	0.70	9.81	16.89	
propylene glycol monobutyl ether (PnB)	1.09	9.87	16.52	
diethylene glycol diethyl ether	0.68	9.88		
PnB (minor component)		10.05	13.15	9.41
glycerin	0.65	10.12		
diethylene glycol	0.57	10.14		
p-chlorotoluene		10.17	13.97	9.66
butyl methacrylate		10.20		
dipropylene glycol monomethyl ether (DPM)	0.80	10.46, 10.51, 10.71		
diethylene glycol monoethyl ether	0.69	10.49		
p-cymene	2.13	10.84	15.62	10.67
benzyl alcohol	1.65	10.89		
N-methylpyrrolidinone	0.72	10.96	12.18	10.94
ethylene glycol butyl ether acetate		11.25	17.73	
diethylene glycol monopropyl ether (DP)		11.34	14.8	11.85
diethylene glycol monopropyl ether (DPnP)	0.76	11.79, 11.82		

TABLE X1.1 *Continued*

Compound	RRF	PMPS	Carbowax	PDMS
2,2,4-trimethylpentane-1,3-diol				
diethylene glycol monobutyl ether (DB)	0.93	12.12		
naphthalene	2.03	12.43		
2-(2-ethylhexyl)ethanol		12.51		
triethylene glycol	0.58	12.53		
dipropylene glycol monobutyl ether (DPnB)	1.04	12.53, 12.58	18.86	13.41
propylene glycol monophenyl ether	1.14	12.67		
2,2,4-trimethylpentane-1,3-diol monoisobutyrate (TX)	1.27	13.62, 1374		
tetraethylent glycol	0.59	14.54		
2,2,4-trimethylpentane-1,3-diol, diisobutyrate (TXIB)	1.17	15.15		
2-ethylhexyl benzoate	1.39	16.05		
methyl palmitate		18.40		
dibutyl phthalate	1.16	18.50		
Mineral Spirits	2.23	9 to 11		
Aromatic100	2.10	9.2 to 10.6		

TABLE X1.2 Precision Statistics for Individual VOCs Found in the Round Robin of Coatings A-E

Paint		EG %	PG %	EB %	DB %	TX %	Total VOC, %	X-VOC[A]	F-VOC[A]
A	Average					0.25	0.25	10	11
	Std Dev					0.03	0.03	1.2	
	% RSD					11.93	11.93	11.8	
B	Average		1.53		0.14	1.19	2.85	92	92
	Std Dev		0.14		0.01	0.10	0.11	3.1	
	% RSD		9.18		9.13	8.13	3.76	3.4	
C	Average		2.49			1.55	4.04	145	147
	Std Dev		0.11			0.14	0.16	5.0	
	% RSD		4.61			8.76	4.00	3.4	
D	Average	2.31		1.04	0.09	1.05	4.49	113	121
	Std Dev	0.32		0.07	0.01	0.11	0.23	5.2	
	% RSD	13.65		6.73	8.51	10.17	5.09	4.6	
E	Average		2.40		0.64	1.45	4.50	142	138
	Std Dev		0.11		0.05	0.15	0.15	4.0	
	% RSD		4.66		8.23	9.99	3.29	2.8	

[A] Measured in grams per litre minus water.

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Designation: C1520 – 02 (Reapproved 2015)$^{\varepsilon 1}$

Standard Guide for Paintability of Latex Sealants[1]

This standard is issued under the fixed designation C1520; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

ε^1 NOTE—Duplicate wording was deleted in 18.1 in July 2015.

1. Scope

1.1 This guide describes the practical considerations that may be used to determine the compatibility of a paint or coating to be applied over a latex sealant or caulk. It evaluates the appearance and not the performance characteristics of the coated or painted joint.

1.2 The committee with jurisdiction over this standard is not aware of any comparable standards published by other organizations.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C717 Terminology of Building Seals and Sealants

D1729 Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials

D2244 Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

E284 Terminology of Appearance

3. Terminology

3.1 *Definitions*—Refer to Terminology C717 for definitions of the following term(s) used in this guide: compatibility, cure, joint, latex sealant. Refer to Terminology E284 for definitions of the following term(s) used in this guide: gloss.

3.2 *color change*—a change in either the observed (see Practice D1729) or measured color (see Test Method D2244) of a substance.

3.3 *cracking*—a failure resulting in a discontinuous film (of paint) or bead (of sealant).

4. Summary of Practice

4.1 This guide reviews many of the issues concerning the compatibility of latex sealants with paint. While the focus of this guide is on latex sealants, the paint or coating may be of any composition.

5. Significance and Use

5.1 The intent of this guide is to provide the reader with information concerning possible reasons for paint failures where the paint is used over a latex sealant.

CONSIDERATIONS

6. Temperature

6.1 Since standard testing is usually performed at "room temperature," about 22°C, this would be considered the ideal temperature for application and curing. As the temperature deviates from this ideal, the "science" of drying changes in as much as lower temperature results in slower drying and faster drying occurs at elevated temperatures.

7. Percent Relative Humidity

7.1 In waterborne sealants, the humidity directly affects the ability of the system to lose water. Standard testing is typically done at 50 % RH, which allows for an acceptable evaporation rate. Temperature and humidity variations in climatic regions and fluctuations through the application and cure will have significant impacts.

8. Type of Paint

8.1 The type of paint applied to the sealant has an effect on how well it may handle dimensional changes, adhere to the sealant or dry during the curing of the sealant. Paints made from more flexible resins (low Tg) with low pigment volume

[1] This guide is under the jurisdiction of ASTM Committee C24 on Building Seals and Sealants and is the direct responsibility of Subcommittee C24.10 on Specifications, Guides and Practices.

Current edition approved June 1, 2015. Published July 2015. Originally approved in 2002. Last previous edition approved in 2010 as C1520-02(2010). DOI: 10.1520/C1520-02R15E01.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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content (PVC) (PVC << CPVC) will withstand the most change while a hard resin (high Tg) at high PVC will be the least forgiving. Broadly speaking, high gloss, interior paints represent the former while interior flat paints represent the latter.

9. Type of Sealant

9.1 The sealant will have an effect on adhesion of the paint film, the degree of change in geometry of the paint film and changes in color and gloss. However, generally speaking, these changes are difficult to quantify by the type and quality of sealant.

10. Cure Time

10.1 The degree of sealant cure may affect the time to paint, the compatibility of the applied paint with the sealant, and the dry time of the applied paint. An uncured sealant may react with the paint ingredients. Cracking of the paint film may occur when the sealant is painted before curing of the sealant bead is complete due to subsequent shrinkage of the underlying sealant. Additionally, migration of sealant components to the bead surface may affect adhesion.

11. Sealant Geometry/Tooling

11.1 Use of a backing material usually helps to decrease sealant cracking and thereby also usually decrease paint failure.

12. Method of Paint Application

12.1 The manner in which the paint is applied, that is, roller, brush or sprayer, may affect the thickness of the paint that is initially applied. Some rollers and brushes, especially low cost applicators, may lose bristles or leave brush strokes or surface irregularities in the paint film, which may promote premature failures.

13. Substrate Effects

13.1 The porosity, composition and cleanliness of the substrate affect the cure of both sealant and paint. A more porous substrate will wick away water or solvent and shorten the paint curing period. A difficult to adhere to substrate, or one that consists of material containing low molecular weight oils, plasticizers, etc., will affect film formation and wetting, and may induce gloss and color change.

14. Type of Construction

14.1 This affects the substrates and amount of movement that a paint/sealant system may be subjected to.

15. Lot to Lot Variation

15.1 A number of factors contribute to lot to lot variation in both sealants and paints. Whenever changing either, it may be prudent to test compatibility.

OBSERVATIONS

16. Cracking

16.1 This may be simple cracking of the paint film or may manifest itself as a crack in the sealant. The degree and amount of cracking between the sealant and the paint will affect the acceptability of this condition. Severe cracking of the sealant may overwhelm the crack bridging ability of the paint film.

17. Color Change

17.1 This may be caused by the leaching of material from either the sealant or substrate into the paint and changing its appearance. This may also be caused by the paint being more susceptible to dirt pick-up, especially in areas where airborne dirt is prevalent.

18. Gloss

18.1 Plasticizer migration may cause the paint to develop a higher gloss over time.

19. Keywords

19.1 cracking; latex sealant; paint

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Designation: D1209 – 05 (Reapproved 2011)

Standard Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)[1]

This standard is issued under the fixed designation D1209; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This test method describes a procedure for the visual measurement of the color of essentially light colored liquids (Note 1). It is applicable only to materials in which the color-producing bodies present have light absorption characteristics nearly identical with those of the platinum-cobalt color standards used.

NOTE 1—A procedure for estimating color of darker liquids, described for soluble nitrocellulose base solutions, is given in Guide D365.

1.2 For purposes of determining conformance of an observed or a calculated value using this test method to relevant specifications, test result(s) shall be rounded off "to the nearest unit" in the last right-hand digit used in expressing the specification limit, in accordance with the rounding-off method of Practice E29.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 For specific hazard information, see the Material Safety Data Sheet.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific hazard statements see Section 6.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D156 Test Method for Saybolt Color of Petroleum Products (Saybolt Chromometer Method)

D365 Guide for Soluble Nitrocellulose Base Solutions

D1193 Specification for Reagent Water

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E202 Test Methods for Analysis of Ethylene Glycols and Propylene Glycols

E346 Test Methods for Analysis of Methanol

3. Significance and Use

3.1 The property of color of a solvent varies in importance with the application for which it is intended, the amount of color that can be tolerated being dependent on the color characteristics of the material in which it is used. The paint, varnish, and lacquer solvents, or diluents commercially available on today's market normally have little or no color. The presence or absence of color in such material is an indication of the degree of refinement to which the solvent has been subjected or of the cleanliness of the shipping or storage container in which it is handled, or both.

3.2 For a number of years the term "water-white" was considered sufficient as a measurement of solvent color. Several expressions for defining "water-white" gradually appeared and it became evident that a more precise color standard was needed. This was accomplished in 1952 with the adoption of Test Method D1209 using the platinum-cobalt scale. This test method is similar to the description given in *Standard Methods for the Examination of Water and Waste Water*[3] and is referred to by many as "APHA Color." The preparation of these platinum-cobalt color standards was originally described by A. Hazen in the *American Chemical Journal*[4] in which he assigned the number 5 (parts per ten thousand) to his platinum-cobalt stock solution. Subsequently, in their first edition (1905) of Standard Methods for the Examination of Water, the American Public Health Association, using exactly the same concentration of reagents, assigned the color designation 500 (parts per million) which is the same ratio. The parts per million nomenclature is not used since color is not referred

[1] This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.35 on Solvents, Plasticizers, and Chemical Intermediates.

Current edition approved Feb. 1, 2011. Published February 2011. Originally approved in 1952. Last previous edition approved in 2005 as D1209 – 05$^{\varepsilon 1}$. DOI: 10.1520/D1209-05R11.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] *Standard Methods for the Examination of Water and Waste Water*, M. Franson, Ed., American Public Health Assoc., 14th ed., 1975, p. 65 .

[4] Hazen, A., "New Color Standard for Natural Waters," *American Chemical Journal*, Vol XIV, 1892, p. 300–310.

*A Summary of Changes section appears at the end of this standard

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TABLE 1 Absorbance Tolerance Limits For No. 500 Platinum-Cobalt Stock Solution

Wavelength, nm	Absorbance
430	0.110 to 0.120
455	0.130 to 0.145
480	0.105 to 0.120
510	0.055 to 0.065

TABLE 2 Platinum-Cobalt Color Standards

Color Standard Number	Stock Solution, mL	Color Standard Number	Stock Solution, mL
5	1	70	14
10	2	100	20
15	3	150	30
20	4	200	40
25	5	250	50
30	6	300	60
35	7	350	70
40	8	400	80
50	10	450	90
60	12	500	100[A]

[A] This is platinum-cobalt color No. 10 in Guide D365.

TABLE 3 Platinum-Cobalt Color Standards for Very Light Colors

Color Standard Number	Stock Solution, mL	Color Standard Number	Stock Solution, mL
1	0.20	9	1.80
2	0.40	10	2.00
3	0.60	11	2.20
4	0.80	12	2.40
5	1.00	13	2.60
6	1.20	14	2.80
7	1.40	15	3.00
8	1.60		

directly to a weight relationship. It is therefore recommended that the incorrect term "Hazen Color" should not be used. Also, because it refers primarily to water, the term "APHA Color" is undesirable. The recommended nomenclature for referring to the color of organic liquids is "Platinum-Cobalt Color, Test Method D1209."

3.3 The petroleum industry uses the Saybolt colorimeter Test Method D156 for measuring and defining the color of hydrocarbon solvents; however, this system of color measurement is not commonly employed outside of the petroleum industry. It has been reported by various sources that a Saybolt color of +25 is equivalent to 25 in the platinum-cobalt system or to colors produced by masses of potassium dichromate ranging between 4.8 and 5.6 mg dissolved in 1 L of distilled water. Because of the differences in the spectral characteristics of the several color systems being compared and the subjective manner in which the measurements are made, exact equivalencies are difficult to obtain.

4. Apparatus

4.1 *Spectrophotometer,* equipped for liquid samples and for measurements in the visible region.

NOTE 2—The spectrophotometer used must be clean and in first-class operating condition. The instrument should be calibrated in accordance with the instructions given in the Standards for Checking the Calibration of Spectrophotometers (200 to 1000 nm).[5]

4.2 *Spectrophotometer Cells,* matched having a 10-mm light path.

4.3 *Color Comparison Tubes*—Matched 100-mL, tall-form Nessler tubes, provided with ground-on, optically clear, glass caps. Tubes should be selected so that the height of the 100-mL graduation mark is 275 to 295 mm above the bottom of the tube.

4.4 *Color Comparator*—A color comparator constructed to permit visual comparison of light transmitted through tall-form, 100-mL Nessler tubes in the direction of their longitudinal axes. The comparator should be constructed so that white light is passed through or reflected off a white glass plate and directed with equal intensity through the tubes, and should be shielded so that no light enters the tubes from the side.[6]

5. Reagents

5.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.[7] Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

5.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water conforming to Type IV of Specification D1193.

5.3 *Cobalt Chloride* ($CoCl_2 \cdot 6H_2O$).

5.4 *Hydrochloric Acid* (sp gr 1.19)—Concentrated hydrochloric acid (HCl).

5.5 *Potassium Chloroplatinate* (K_2PtCl_6).

6. Platinum-Cobalt Reference Standards

6.1 *Platinum-Cobalt Stock Solution*— Dissolve 1.245 g of potassium chloroplatinate (K_2PtCl_6) and 1.00 g of cobalt chloride ($CoCl_2 \cdot 6H_2O$) in water. Carefully add 100 mL of hydrochloric acid (HCl, sp gr 1.19) and dilute to 1 L with water. The absorbance of the 500 platinum-cobalt stock solution in a cell having a 10-mm light path, with reagent water in a matched cell as the reference solution,[8] must fall within the limits given in Table 1.

[5] See NIST Letter Circular LC-1017.

[6] The sole source of supply of the unit known to the committee at this time is Scientific Glass and Instruments, Inc., P.O. Box 6, Houston, TX 77001. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[7] *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals,* BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary,* U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.

[8] See the manufacturer's instruction manual for complete details for operating the spectrophotometer.

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TABLE 4 Precision Values for Greater than 25 Pt-Co Color

Color (Pt-Co units)	Repeatability, *r*	Reproducibility, *R*
25	3	10
75	5	15
165	7	22
265	10	31
385	13	41
475	16	49

NOTE 3—This stock solution is commercially available from reputable chemical suppliers.

6.2 *Platinum-Cobalt Standards*—From the stock solution, prepare color standards in accordance with Table 2 by diluting the required volumes to 100 mL with water in the Nessler tubes. Cap the tubes and seal the caps with shellac or a waterproof cement. When properly sealed and stored, these standards are stable for at least 1 year and do not degrade markedly for 2 years.[9]

6.2.1 For a more precise measurement of light colors below 15 platinum-cobalt, prepare color standards from the stock solution in accordance with Table 3 by diluting the required volumes to 100 mL with water in the Nessler tubes. Use a semi-microburet for measuring the required amount of stock solution.

7. Procedure

7.1 Introduce 100 mL of specimen into a Nessler tube, passing the specimen through a filter if it has any visible turbidity. Cap the tube, place in the comparator, and compare with the standards.

8. Report

8.1 Report as the color the number of the standard that most nearly matches the specimen. In the event that the color lies midway between two standards, report the darker of the two.

8.2 If, owing to differences in hue between the specimen and the standards, a definite match cannot be obtained, report the range over which an apparent match is obtained, and report the material as "off-hue."

9. Precision

9.1 *Color Samples with Pt-Co Color Greater than 25*[10]*:*

9.1.1 These precision statements are based upon an interlaboratory study in which six platinum-cobalt standards having values of 25, 75, 170, 265, 385, and 475 were prepared in accordance with the instructions given in Section 6 of this test method and were given coded labels. These solutions were tested by one analyst in each of ten different laboratories making a single observation on one day and then repeating the observation on a second day. The analysts were requested to estimate the color to the nearest one unit for solutions below 40 platinum-cobalt, to the nearest five units for solutions between 40 and 100 platinum-cobalt and to the nearest ten units for solutions above 100 platinum-cobalt. Based on the results of this interlaboratory study, the following criteria, calculated according to RR-D02-1007, should be used for judging the acceptability of results at the 95 % confidence level when the results are obtained under optimum conditions where the hue of the sample matches exactly the hue of the standards. Poor precision will be obtained in varying degrees as the hue of the sample departs from that of the standards.

9.1.1.1 *Repeatability*—Two results, obtained by the same analyst should be considered suspect if they differ by more than:

$$r = 0.027\ (X + 92) \text{ platinum-cobalt units}$$

where X is the average of the two results.

9.1.1.2 *Reproducibility*—Two results, obtained by analysts in different laboratories, should be considered suspect if they differ by more than: $R = 0.087\ (X + 92)$ platinum-cobalt units where X is the average of the two results.

9.1.1.3 Table 4 shows precision values for samples with Pt-Co Color of greater than 25.

9.2 *Color Samples with Pt-Co Color Less than 25*[11]*:*

9.2.1 The results of two interlaboratory studies were pooled to give precision values calculated according to RR-D02-1007. One study of glycols included 4 samples and 7 laboratories; the other study included 5 samples and 6 laboratories. Based on the pooled repeatability and reproducibility standard deviations, the following criteria should be used for judging, at the 95 % confidence level, the acceptability of results obtained on samples with less than 25 Pt-Co Color.

9.2.1.1 *Reapeatability*—Two results, each the mean of duplicates, obtained by the same operator on different days should be considered suspect if they differ by more than two platinum-colbalt units.

9.2.1.2 *Reproducibility*—Two results, each the mean of duplicates, obtained by operators in different laboratories, should be considered suspect of they differ by more than seven platinum-cobalt units.

9.3 *Bias*—The test procedure has no bias because the value of the test result is defined only in terms of the test method.

10. Keywords

10.1 clear liquids; color; platinum-cobalt color scale

[9] Scharf, W. W., Ferber, K. H., and White, R. G., "Stability of Platinum-Cobalt Color Standards," *Materials Research and Standards*, Vol 6, No. 6, June 1966, pp. 302 –304.

[10] Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Reports RR:D01-1024 and RR:D02-1007.

[11] These precision statements are based on interlaboratory studies conducted by Committee E15 on Industrial Chemicals on samples of ethylene glycol and methanol as reported in Test Methods E202, E346, and Research Reports RR:E15-0028 and RR:D01-1108. Research reports are available from ASTM International.

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SUMMARY OF CHANGES

Committee D01.35 has identified the location of selected changes to this standard since the last issue (D1209 – 00) that may impact the use of this standard.

(1) Added reference to Practice E29 in 1.2 of the Scope section.
(2) Added Practice E29 to list of Referenced Documents.
(3) Removed self-reference in Section 2.

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Designation: D1544 – 04 (Reapproved 2010)

Standard Test Method for Color of Transparent Liquids (Gardner Color Scale)[1]

This standard is issued under the fixed designation D1544; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the measurement of the color of transparent liquids by means of comparison with arbitrarily numbered glass standards.

1.2 Users of this method should have normal color vision.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1545 Test Method for Viscosity of Transparent Liquids by Bubble Time Method

D6166 Test Method for Color of Naval Stores and Related Products (Instrumental Determination of Gardner Color)

E308 Practice for Computing the Colors of Objects by Using the CIE System

3. Significance and Use

3.1 This test method applies to drying oils, varnishes, fatty acids, polymerized fatty acids, and resin solutions. Its application to other materials has not been tested.

4. Apparatus

4.1 *Glass Standards,* 18, numbered separately, and having the color characteristics given in Table 1. The color shall be produced by the glass components only. Some glass standards in use today do not conform to the values reported in Table 1. The calibration of glass standards should be verified prior to use; a suitable procedure for their calibration is contained in Appendix X1.

4.2 *Glass Tubes,* clear, 10.65 mm in inside diameter and about 114 mm in outside length. (Viscosity tubes, as described in Test Method D1545, are satisfactory.)

4.3 Suitable apparatus for comparing sample and standard. The apparatus may be of any design, but should have the following characteristics:

4.3.1 *Illumination*—CIE Illuminant C.

4.3.2 *Surrounding Field*—The field should be black.

4.3.3 *Field of View*—The specimen and one or more standards should subtend a visual angle of about 2° and be in the field of view simultaneously.

4.3.4 *Separation of Standard and Specimen*—There should be a perceptible separation between specimen and standard, but this should be as small as is mechanically possible.

5. Procedure

5.1 Fill a glass tube with the material under test. If the material is perceptibly cloudy, first filter it.

5.2 Compare with glass standards, determining which standard most closely matches the specimen in brightness and saturation. Ignore hue differences.

6. Report

6.1 Report the color as the number of the standard most closely matching the specimen. If more precise measurements are needed, report as either matching a standard or lighter or darker. Thus, between colors 5 and 6, the steps will be 5, 5+, 6–, and 6.

6.2 Report any significant difference in hue between the sample and the nearest-match standard.

7. Precision and Bias

7.1 On the basis of a study in which one observer at each of 80 laboratories made duplicate determinations on four samples, the "between" and "within" standard deviations were found to be 0.5 and 0.1 color number, respectively. Based on these

[1] This test method is under the jurisdiction of Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.26 on Optical Properties.

Current edition approved June 1, 2010. Published June 2010. Originally approved in 1958. Last previous edition approved in 2004 as D1544 – 04. DOI: 10.1520/D1544-04R10.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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TABLE 1 Color Specifications of Reference Standards

Gardner Color Standard Number	Chromaticity Coordinates[A]		Luminous Transmittance *Y*, %	Transmittance Tolerance, ±
	x	*y*		
1	0.3177	0.3303	80	7
2	0.3233	0.3352	79	7
3	0.3329	0.3452	76	6
4	0.3437	0.3644	75	5
5	0.3558	0.3840	74	4
6	0.3767	0.4061	71	4
7	0.4044	0.4352	67	4
8	0.4207	0.4498	64	4
9	0.4343	0.4640	61	4
10	0.4503	0.4760	57	4
11	0.4842	0.4818	45	4
12	0.5077	0.4638	36	5
13	0.5392	0.4458	30	6
14	0.5646	0.4270	22	6
15	0.5857	0.4089	16	2
16	0.6047	0.3921	11	1
17	0.6290	0.3701	6	1
18	0.6477	0.3521	4	1

[A] A duplicate standard shall have chromaticity coordinates that differ from the reference standard by no more than one third of the difference in *x* or *y* between adjacent reference standards. In any one set, no two standards shall be closer together than two thirds of the difference in *x* or *y* between corresponding reference standards.

standard deviations, the following criteria should be used for judging the acceptability of results at the 95 % confidence level.

7.2 *Repeatability*—Two results obtained by a single operator should be considered suspect if they differ by more than two thirds of a color number.

7.3 *Reproducibility*—Two results, each of the mean of duplicate measurements, made by operators in different laboratories should be considered suspect if they differ by more than four thirds of a color number.

NOTE 1—If desired, liquid standards matching the colors given in Table 1, in glass tubes similar to the sample tubes may be used. These may be filled with potassium chloroplatinate for the light colors and solutions of ferric chloride and cobalt chloride in hydrochloric acid for the darker colors. The specifications and approximate composition of these solutions are given in Test Method D1544 – 58 T.[3] Many Glass Standards in current use do not conform to the values of Table 1.

NOTE 2—The precision data were obtained using an instrument in which two standards are viewed simultaneously. There are other instruments available for color matching which would be expected to give similar results, but the statement above applies only to the instrument checked.

8. Keywords

8.1 glass filters; other measurements; transparent standards

[3] See *1961 Book of ASTM Standards*, Part 8.

APPENDIX

(Nonmandatory Information)

X1. CALIBRATION OF GLASS REFERENCE STANDARDS

X1.1 Select a dual beam spectrophotometer with a sufficiently small light beam at the sample position so that all rays will pass through the standards to be calibrated. Alternatively equip the spectrophotometer with a condensing lens to accomplish this purpose.

X1.2 Place the standards in turn in the sample position of the spectrophotometer. If the comparator is provided with a separate green filter in front of the light source, place this filter in the reference beam of the dual beam spectrophotometer during calibration of each standard.

X1.3 Obtain spectral transmittance data for each glass reference standard by following Practice E308.

X1.4 From the spectral transmittance data for each reference standard calculate the CIE tristimulus values, *X*, *Y*,*Z*, and the chromaticity coordinates, *x*,*y*, for CIE Illuminant C (see Practice E308).

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Designation: D7315 – 17

Standard Test Method for Determination of Turbidity Above 1 Turbidity Unit (TU) in Static Mode[1]

This standard is issued under the fixed designation D7315; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This test method covers the static determination of turbidity in water. Static refers to a sample that is removed from its source and tested in an isolated instrument. (See Section 4.)

1.2 This test method is applicable to the measurement of turbidities greater than 1.0 turbidity unit (TU). The upper end of the measurement range was left undefined because different technologies described in this test method can cover very different ranges. The round robin study covered the range of 0–4000 turbidity units because instrument verification in this range can typically be covered by standards that can be consistently reproduced.

1.3 Many of the turbidity units and instrument designs covered in this test method are numerically equivalent in calibration when a common calibration standard is applied across those designs listed in Table 1. Measurement of a common calibration standard of a defined value will also produce equivalent results across these technologies.

1.3.1 In this test method calibration standards are often defined in NTU values, but the other assigned turbidity units, such as those in Table 1 are equivalent. For example, a 1 NTU formazin standard is also a 1 FNU, a 1 FAU, a 1 BU, and so forth.

1.4 This test method does not purport to cover all available technologies for high-level turbidity measurement.

1.5 This test method was tested on different natural waters and wastewater, and with standards that will serve as surrogates to samples. It is the user's responsibility to ensure the validity of this test method for waters of untested matrices.

1.6 Depending on the constituents within a high-level sample, the proposed sample preparation and measurement methods may or may not be applicable. Those samples with the highest particle densities typically prove to be the most difficult to measure. In these cases, and alternative measurement method such as the process monitoring method can be considered.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Refer to the MSDSs for all chemicals used in this procedure.*

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1129 Terminology Relating to Water
D1193 Specification for Reagent Water
D2777 Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D19 on Water
D4411 Guide for Sampling Fluvial Sediment in Motion
D5847 Practice for Writing Quality Control Specifications for Standard Test Methods for Water Analysis
D6855 Test Method for Determination of Turbidity Below 5 NTU in Static Mode
E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

2.2 *Other Referenced Standards:*

U.S. EPA Method 180.1 Methods for Chemical Analysis of Water and Wastes, Turbidity[3]
ISO 7027 Water Quality—Determination of Turbidity[4]

[1] This test method is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.07 on Sediments, Geomorphology, and Open-Channel Flow.

Current edition approved July 1, 2017. Published July 2017. Originally approved in 2007. Last previous edition approved in 2012 as D7315 – 12. DOI: 10.1520/D7315-17.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from United States Environmental Protection Agency (EPA), William Jefferson Clinton Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, http://www.epa.gov.

[4] Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, http://www.iso.org.

***A Summary of Changes section appears at the end of this standard**

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TABLE 1 Summary of Known Instrument Designs, Applications, Ranges, and Reporting Units

Design and Reporting Unit	Prominent Application	Key Design Features	Typical Instrument Range	Suggested Application Ranges
Nephelometric non-ratio (NTU)	White light turbidimeters. Comply with U.S. EPA Method 180.1 for low level turbidity monitoring.	Detector centered at 90° relative to the incident light beam. Uses a white light spectral source.	0.0–40	0.0–40 Regulatory
Ratio White Light turbidimeters (NTRU)	Complies with ISWTR regulations and Standard Method 2130B. Can be used for both low and high level measurement.	Used a white light spectral source. Primary detector centered at 90°. Other detectors located at other angles. An instrument algorithm uses a combination of detector readings to generate the turbidity reading.	0–10 000	0–40 Regulatory 0–10 000 other
Nephelometric, near-IR turbidimeters, non-ratiometric (FNU)	Complies with ISO 7027. The wavelength is less susceptible to color interferences. Applicable for samples with color and good for low level monitoring.	Detector centered at 90° relative to the incident light beam. Uses a near-IR (780–900 nm) monochromatic light source.	0–1000	0–40 Regulatory (non-US) 0–1000 other
Nephelometric near-IR turbidimeters, ratio metric (FNRU)	Complies with ISO 7027. Applicable for samples with high levels of color and for monitoring to high turbidity levels.	Uses a near-IR monochromatic light source (780–900 nm). Primary detector centered at 90°. Other detectors located at other angles. An instrument algorithm uses a combination of detector readings to generate the turbidity reading.	0–10 000	0–40 Regulatory 0–10 000 other
Surface Scatter Turbidimeters (NTU)	Turbidity is determined through light scatter from or near the surface of a sample.	Detector centered at 90° relative to the incident light beam. Uses a white light spectral source.	10–10 000	10–10 000
Formazin Back Scatter (FBU)	Not applicable for regulatory purposes. Best applied to high turbidity samples. Backscatter is common with but not all only probe technology and is best applied in higher turbidity samples.	Uses a near-IR monochromatic light source in the 780–900 nm range. Detector geometry is between 90° and 180° relative to the incident light beam.	100–10 000+	100–10 000
Backscatter Unit (BU)	Not applicable for regulatory purposes. Best applied for samples with high level turbidity.	Uses a white light spectral source (400–680 nm range). Detector geometry is between 90° and 180° relative to the incident light beam.	10–10 000+	100–10 000+
Formazin attenuation unit (FAU)	May be applicable for some regulatory purposes. This is commonly applied with spectrophotometers. Best applied for samples with high level turbidity.	Detector is geometrically centered at 0° relative to incident beam (attenuation). Wavelength is 780–900 nm.	20–1000	20–1000 Regulatory
Light attenuation unit (AU)	Not applicable for some regulatory purposes. This is commonly applied with spectrophotometers.	Detector is geometrically centered at 0° relative to incident beam (attenuation). Wavelength is 400–680 nm.	20–1000	20–1000
Nephelometric Turbidity Multibeam Unit (NTMU)	Is applicable to EPA regulatory method GLI Method 2. Applicable to drinking water and wastewater monitoring applications.	Detectors are geometrically centered at 0° and 90°. An instrument algorithm uses a combination of detector readings, which may differ for turbidities varying magnitude.	0.02–4000	0–40 Regulatory 0–4000 other

USGS National Field Manual for the Collection of Water Quality Data[5]

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this standard, refer to Terminology D1129.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *attenuation, v*—the amount of incident light that is scattered and absorbed before reaching a detector, which is geometrically centered at 0° relative to the centerline of the incident light beam.

3.2.1.1 *Discussion*—Attenuation is inversely proportional to transmitted signal.

$$\text{Attenuated Turbidity} = \text{Absorbed Light} + \text{Scattered Light}$$

The application of attenuation in this test method is as a distinct means of measuring turbidity. When measuring in the FAU or AU mode, the turbidity value is a combination of scattered (attenuated) plus absorbed light. The scattered

[5] Available from United Stated Geological Survey (USGS), 12201 Sunrise Valley Drive, Reston, VA 20192, http://www.usgs.gov.

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light is affected by particle size and is a positive response. The absorption due to color is a negative. The sum of these two entities results in the turbidity value in the respective units.

3.2.2 *calibration turbidity standard, n*—a turbidity standard that is traceable and equivalent to the reference turbidity standard to within statistical errors; calibration turbidity standards include commercially prepared 4000 NTU Formazin, stabilized formazin (see 9.2.3), and styrenedivinylbenzene (SDVB) (see 9.2.4).

3.2.2.1 *Discussion*—These standards may be used to calibrate the instrument. Calibration standards may be instrument design specific. Calibration standards that exceed 10 000 turbidity units are commercially available.

3.2.3 *calibration verification standards, n*—defined standards used to verify the accuracy of a calibration in the measurement range of interest.

3.2.3.1 *Discussion*—These standards may not be used to perform calibrations, only calibration verifications. Included standards are opto-mechanical light scatter devices, gel-like standards, or any other type of stable liquid standard. Calibration verification standards may be instrument design specific.

3.2.4 *nephelometric turbidity measurement, n*—The measurement of light scatter from a sample in a direction that is at 90° with respect to the centerline of the incident light path.

3.2.4.1 *Discussion*—Units are NTU (Nephelometric Turbidity Units). When ISO 7027 technology is employed units are in FNU (Formazin Nephelometric Units).

3.2.5 *ratio turbidity measurement, n*—the measurement derived through the use of a nephelometric detector that serves as the primary detector and one or more other detectors used to compensate for variation in incident light fluctuation, stray light, instrument noise, or sample color.

3.2.6 *reference turbidity standard, n*—a standard that is synthesized reproducibly from traceable raw materials by the user.

3.2.6.1 *Discussion*—All other standards are traced back to this standard. The reference standard for turbidity is formazin (see 9.2.2).

3.2.7 *seasoning, v*—the process of conditioning labware with the standard to be diluted to a lower value.

3.2.7.1 *Discussion*—The process reduces contamination and dilution errors.

3.2.8 *stray light, n*—all light reaching the detector other than that which is scattered by the sample.

3.2.8.1 *Discussion*—For example: ambient light leakage, internal reflections and divergent light in optical systems. For this test method, stray light is likely to be negligible. The instrument design is intended to reduce or eliminate stray light.

3.2.9 *surface scatter turbidimeter, n*—an instrument that determines the turbidity through incident light scatter that occurs at or slightly below the surface of a water sample with a detection angle that is at 90° relative to the incident light beam.

3.2.9.1 *Discussion*—Interferences are not as substantial as nephelometric non-ratio measurements.

3.2.10 *turbidimeter, n*—an instrument that measures light scatter, caused by particulates within a sample and converts the measurement to a turbidity value.

3.2.10.1 *Discussion*—The detected light is quantitatively converted to a numeric value that is traced to a light-scatter standard. See Table 1 for examples of designs.

3.2.11 *turbidity, n*—an expression of the optical properties of a sample that causes light rays to be scattered and absorbed rather than transmitted in straight lines through the sample.

3.2.11.1 *Discussion*—Turbidity of water is caused by the presence of matter such as clay, silt, finely divided organic matter, plankton, other microscopic organisms, organic acids, and dyes.

4. Summary of Test Method

4.1 The optical property expressed as turbidity is measured by the scattering effect that constituents within a sample have on light; the higher the quantity of scattered or attenuated incident light, the higher the turbidity. In samples containing particulate material, light scatter and attenuation will vary *(1)* due to size, shape and composition of the particles in the water, and *(2)* the wavelength of the incident light.

4.2 This test method is based upon a comparison of the amount of light scattered or attenuated by the sample with the amount of light scattered or attenuated by a reference suspension. Lower turbidity values are typically determined by a nephelometer, which measures light scatter from a sample in a direction that is at 90° with respect to the centerline of the incident light path. High-level turbidity determination can be performed using many different technologies. It is critical when reporting the measurement, traceability to the type of technology be used. Turbidity measurements are not often consistent among differing technologies.

5. Significance and Use

5.1 Turbidity at the levels defined in the scope of this test method are often monitored to help control processes, monitor the health and biology of water environments and determine the impact of changes in response to environmental events (weather events, floods, etc.). Turbidity is often undesirable in drinking water, plant effluent waters, water for food and beverage processing, and for a large number of other water-dependent manufacturing processes. Removal is often accomplished by coagulation, sedimentation, and various levels of filtration. Measurement of turbidity provides an indicator of contamination, and is a vital measurement for monitoring the characteristics and or quality within the sample's source or process.

5.2 This test method does overlap Test Method D6855 for the range of 1–5 TU. If the predominant measurement falls below 1.0 TU with occasional spikes above this value, Test Method D6855 may be more applicable. For measurements that are consistently above 1 TU, this test method is applicable.

5.3 This test method is suitable to turbidity such as that found in all waters that measure above 1 NTU. Examples include environmental waters (streams, rivers, lakes, reservoirs, estuaries), processes associated with water pollution

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control plants (wastewater treatment plants), and various industrial processes involving water with noticeable turbidity. For measurement of cleaner waters, refer to Test Method D6855.

5.4 The appropriate measurement range for a specific technology or instrument type that should be utilized is at or below 80 % of full-scale capability for the respective instrument or technology. Measurements above this level may not be dependable.

5.4.1 Dilutions of waters are not recommended, especially in the case of samples with rapidly settling particles (that is, sediments). It is recommended that an appropriate instrument design that covers the expected range be selected to avoid the need to perform dilutions.

5.5 Technologies described in this standard may not measure all aspects (absorption and scatter) of a sample. Some of the properties of the water, the suspended material, or both may interfere with the certain measured property of the sample, such as the scattering of light that the particular instrument is measuring.

5.6 Several different technologies are available for use in the measurement of high-level turbidity. Some technologies may be better suited for specific types of samples, depending on the application and measurement criteria. Please refer to Table 1 and Appendix X1 which is a flow chart to help assist in selecting the best technology for the specific application.

5.6.1 When measuring high levels of turbidity the samples will often contain significant interferences such as that from absorbing particles, absorbance in the matrix, and rapidly settling particles. These may have a significant impact on how one measurement technology responds to changes in turbidity. Often times it will be prudent to run a series of linear dilutions to determine if the measured response was expected relative to the dilution. In cases where the response to dilution ratio is linear, the technology may be adequately accounting for the interferences. If the response is not expected, another technology should be considered to determine if a more accurate measurement could be obtained.

5.7 When reporting the measured result, appropriate units should also be attached. The units are reflective of the technology used to generate the measurements. The intention is to provide traceability for the technology used to generate the measured result, and if necessary, provide more adequate comparison to historical data. Section 7 describes technology that each type of traceable reporting units is based.

5.7.1 Table 1 contains the list of technologies and respective reporting units that will be traceable to that technology.

5.7.1.1 The methods in Table 1 can be broken down into two distinct groups of designs which are based on the type of incident light source used. These are broad-band white light source or light sources that provide a spectral output in the 400–680 nm range. These include polychromatic light sources, such as those that are necessary to comply with regulatory method U.S. EPA Method 180.1, but also can include monochromatic light sources if the respective wavelength falls within the specified range. The second group of instruments uses a near IR monochromatic light source that is in the range of 780 to 900 nm. These designs are distinguishable in the reporting units and will always begin with the letter F.

5.7.1.2 For a specific design that falls outside of these reporting ranges, the turbidity should be reported in turbidity units (TU) with a subscripted wavelength value to characterize the light source that was used. See 7.4.3.

5.7.1.3 Those designs listed in Table 1 cover those that were currently identified by the ASTM subcommittee. Future designs that are not covered in this document may be incorporated into a future revision after review by the method subcommittee.

5.7.1.4 See Section 7 for more details regarding instrument designs.

5.7.1.5 Section 16 contains precision and bias data that incorporates the different classifications of technologies. The precision and bias section includes the overall data set of all laboratories and smaller segments of this data set to provide comparisons across distinguishing technological features that are exhibited by those technologies that are represented in this test method.

5.8 This test method covers the measurement of samples collected from waters and analyzed using typical laboratory based or portable-based instruments.

6. Interferences

6.1 Bubbles, although they cause turbidity, may result in interferences in measured turbidity as determined by this test method. Bubbles cause a positive interference and color typically causes a negative interference. Dissolved material that imparts a color to the water may cause errors in pure nephelometric readings, unless the instrument has special compensating features to reduce these interferences. Certain turbulent motions also create unstable reading conditions of nephelometers.

6.2 Color is characterized by absorption of specific wavelengths of light. If the wavelengths of incident light are significantly absorbed, a negative interference will result unless the instrument has special compensating features. Depending on the application color may or may not be considered as an interference. Some instrument designs are intended to remove the effect that color imparts on a turbidity measurement. Other designs do not remove the effects of color.

6.2.1 Those designs where color effects can be reduced or eliminated include nephelometric-based designs with incident light sources in the 780–900 nm range. Those designs that have additional detectors, such as ratioing instruments also help to reduce the effects of color regardless of the light source. Single detector systems with light sources below 780 nm will be more impacted by the effects of color in the sample, that is, color visible to the naked eye. Color can have a significant impact on attenuation-based instruments if it has absorption spectrum that overlaps the spectral output of the incident light source.

6.3 Scratches, finger marks, or dirt on the walls of the sample cell may give erroneous readings, especially at lower turbidity levels. Sample cells should be kept scrupulously clean both inside and outside and discarded when they become

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etched or scratched. The sample cells must not be handled where the light strikes them when positioned in the instrument well.

6.4 Sample cell caps and liners must also be scrupulously clean to prevent contamination of the sample. Seasoning of the sample cells should be performed each time a new sample is measured.

6.5 The optical quality and geometry of the sample cells can also impact results. At all turbidity levels, sample cells that are not optically consistent can result in error. Errors greater than 10 % relative to the turbidity value can be reduced through indexing or replacement of the cells. See Section 16 for additional information.

6.5.1 Sample cells should be optically matched or a single cell should be used to perform calibrations and measurements.

6.6 Particle size and distribution will also impact turbidity and is sensitive to the different types of technologies used. Typically, small particles will more effectively scatter light in the nephelometric direction (at 90° relative to the incident light beam) than larger particles. Overall, however, it is the net aggregate scatter and attenuation of the available incident light by all particles that in the sample that contribute to the measurement.

6.7 The path-length of the sample cell or equivalent will impact the sensitivity of measurements. A shorter path length will extend the range and reduce the interference proportionally. However, use of a shorter path-length will reduce the sensitivity of the measurement.

6.8 Ideally, the same indexed sample cell should be used first for standardization followed by unknown (sample) determination. If this is not possible, then sample cells must be matched. Refer to the instrument manual or the standard's manufacturer for instructions regarding the matching of sample cells.

NOTE 1—Indexing of the sample cell to the instrument well is accomplished by placing a mark on the top of the sample cell and a similar mark on the upper surface of the well so that the sample cell can be placed in the well in an exact position each time.

6.9 Condensation on optical elements or sample cells can lead to severe errors in measurement.

6.10 Rapidly settling particles are also an interference. Particles such as sand can settle rapidly and cause false high or false low turbidity readings. The user of this test method must use care to ensure particles are suspended in solution the instant that the measurement is taken.

7. Apparatus

7.1 There are several technologies that are capable of measuring turbidity that exceeds 1.0 turbidity unit. A summary of these technologies is provided in Table 1. Within this table, suggested reporting units, which are representative to the technology, are included.

7.2 Several technologies for measuring high-level turbidity are discussed in this test method. They include nephelometer-based instruments (see Figs. 1-3), backscatter based instruments (see Fig. 4), and attenuation-based instruments (see Fig. 5). These are all discussed in more detail.

7.2.1 Nephelometers include the Photoelectric Nephelometer, Ratio Photoelectric Nephelometer with single beam design, and ratio photoelectric nephelometer in the dual beam design. The correlation between detector response and increasing turbidity levels is positive.

7.2.2 Backscatter turbidimeters typically employ similar light sources used in the photoelectric photometer but utilize a detection angle that is capable of detecting backscattered light from a sample. The correlation between detector response and increasing turbidity levels is positive.

7.2.3 Attenuation-based turbidimeters employ a detection angle that is 0° relative to the incident light beam.

7.3 The resolution of the instruments should permit detection of differences of at least 1 % of the range in which it is used. See Section 14 for rounding the reporting values of turbidity.

7.3.1 Consult the manufacturer to determine that your instrument meets any of the designs that are discussed in this test method.

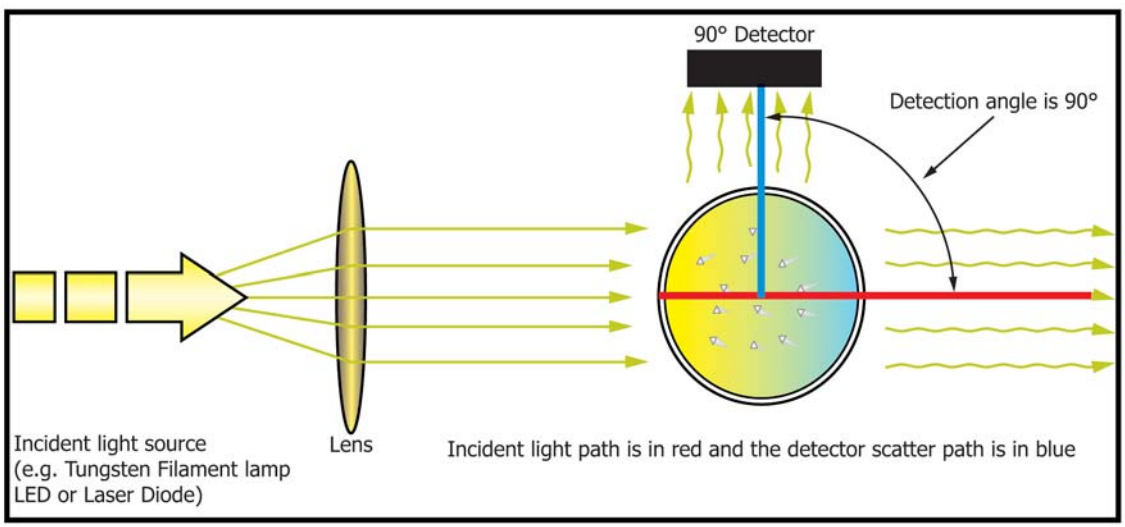

FIG. 1 Typical Nephelometer

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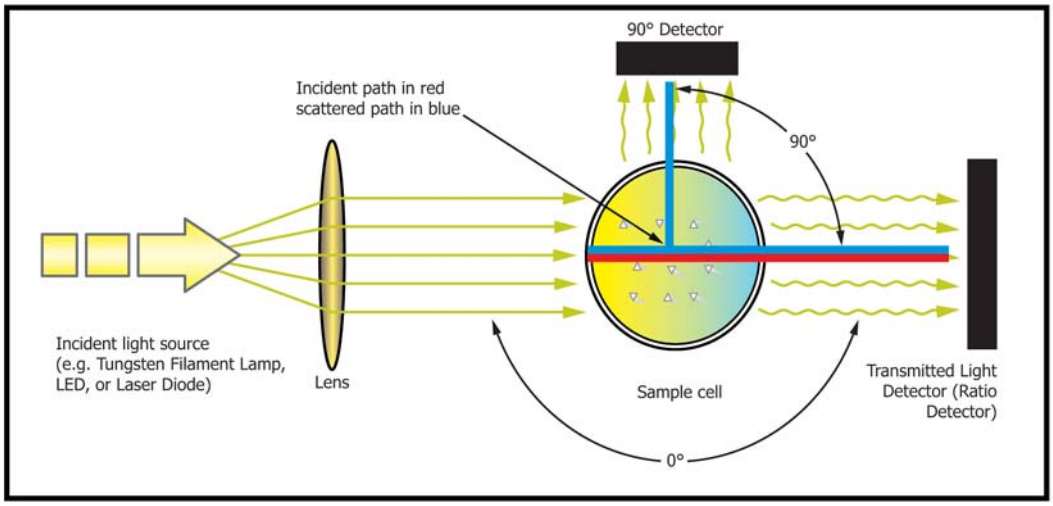
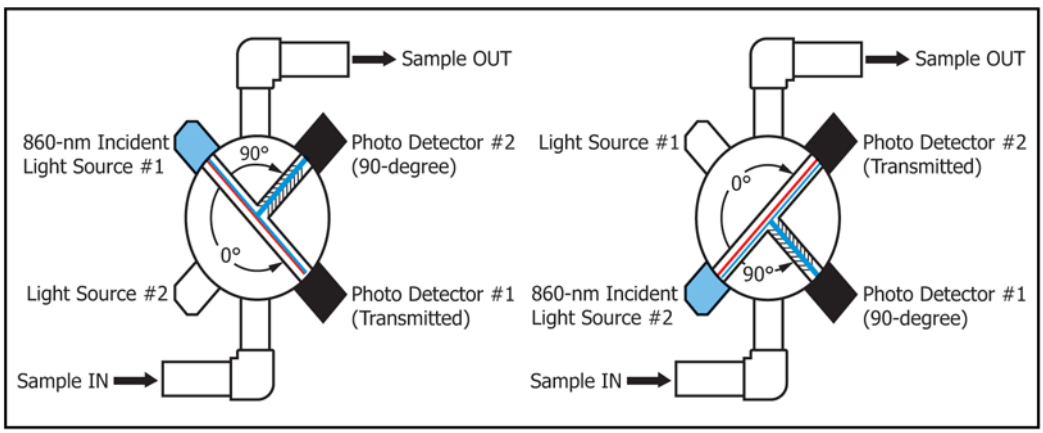


FIG. 2 Ratio Nephelometer (Single Beam Design)



NOTE 1—The blue traces show the path of the scattered light.

FIG. 3 Ratio Nephelometer (Multiple Beam Design)

7.4 *The Nephelometer:*

7.4.1 This instrument uses a light source for illuminating the sample and a single photodetector with a readout device to indicate the intensity of light scattered at right angle(s) (90°) to the centerline of the path of the incident light. The photoelectric nephelometer should be designed so that minimal stray light reaches the detector in the absence of turbidity and should be free from significant drift after a short warm-up period. The light source shall be a tungsten lamp operated at a color temperature between 2200 and 3000 K (U.S. EPA Method 180.1). Light-emitting diodes (LEDs) or laser diodes in defined wavelengths ranging from 400–680 nm and 780–900 nm may also be used if accurately characterized to be equivalent in performance to tungsten using the same type of calibration and calibration verification standards. It is important to note that new technologies may not be covered by this test method. If LEDs or laser diodes are used, then the LED or laser diode should be coupled with a monitor detection device to achieve a constant output. LEDs and laser diodes should be characterized by a wavelength of between 400 and 900 nm with a bandwidth of less than 60 nm. The total distance traversed by incident light and scattered light within the sample is not to exceed 10 cm. The angle of light acceptance to the detector shall be centered at 90° to the centerline of the incident light path and shall not exceed ±10° from the 90° scatter path centerline. The detector must have a spectral response that is sensitive to the spectral output of the incident light used.

7.4.2 Differences in physical design of nephelometers may cause differences in measured values for turbidity even though the same suspension is used for calibrations. Comparability of measurements made using instruments differing in optical and physical designs is not recommended. To minimize initial differences, the following design criteria should be observed (see Fig. 1).

7.4.3 Report in units of NTU if a white light source was used or in units of FNU if a 780–900 nm light source was used.

7.5 *Ratio Nephelometer:*

7.5.1 *Ratio Nephelometer* (see Fig. 2 for single beam design; see Fig. 3 for multiple beam design)—This instrument uses the measurement derived through the use of a nephelometric detector that serves as the primary detector and one or more other detectors used to compensate for variation in incident light fluctuation, stray light, instrument noise, or

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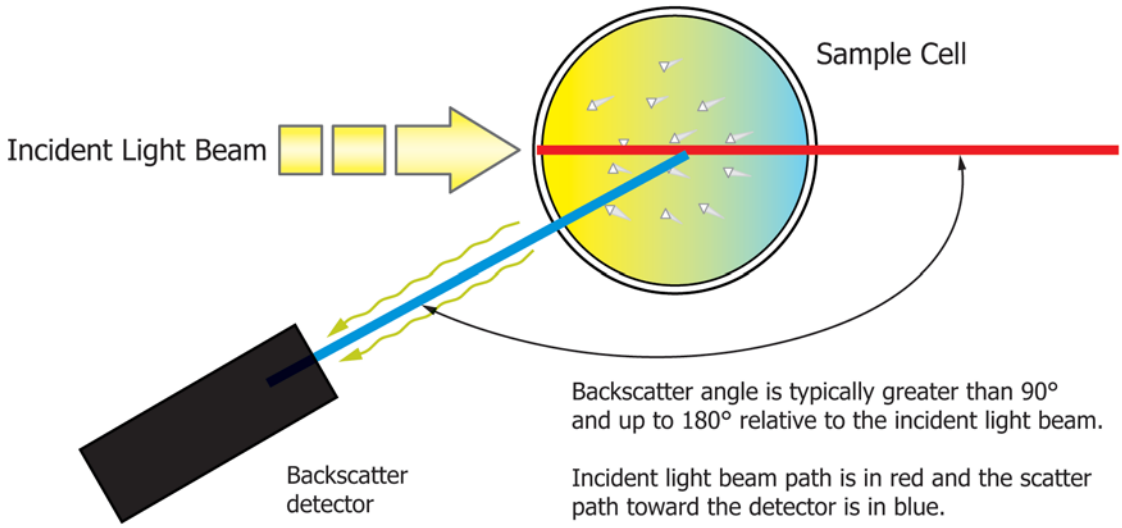
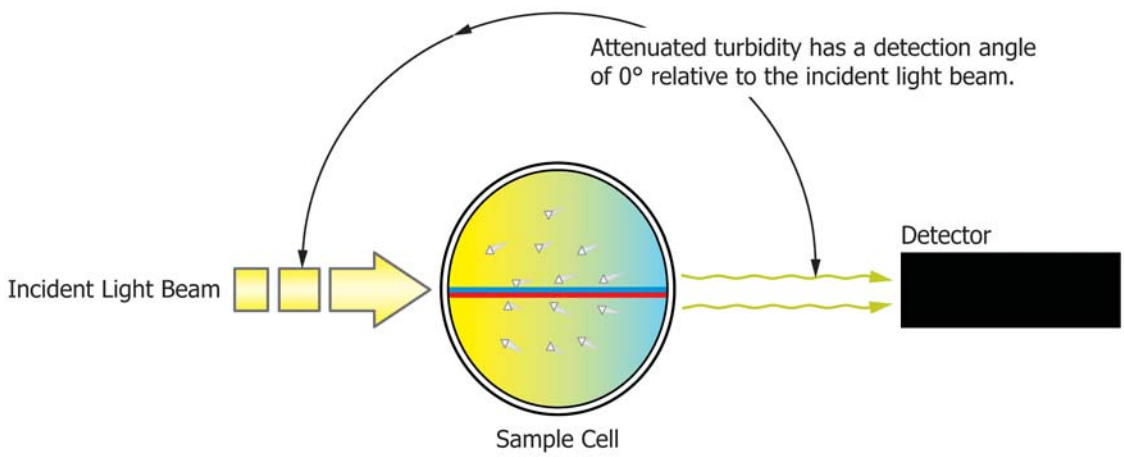


NOTE 1—In the design shown, pathlength varies, depending on the turbidity of the sample.

FIG. 4 Geometric Diagram of a Backscatter Measurement (<90°)



NOTE 1—The scatter and attenuation path is the same as the incident light path.

FIG. 5 Technology Diagram of an Attenuation Technology

sample color. As needed by the design, additional photodetectors may be used to detect the intensity of light scattered at other angles. The signals from these additional photodetectors may be used to compensate for variations in incident light fluctuation, instrument stray light, instrument noise, sample color, or combinations thereof. The ratio photoelectric nephelometer should be so designed that minimal stray light reaches the detector(s), and should be free from significant drift after a short warm-up period. The light source should be a tungsten lamp, operated at a color temperature between 2200 and 3000 K (U.S. EPA Method 180.1). LEDs and laser diodes in defined wavelengths ranging from 400 to 900 nm may also be used. If an LED or a laser diode is used in the single beam design, then the LED or laser diode should be coupled with a monitor detection device to achieve a consistent output. The distance traversed by incident light and scattered light within the sample is not to exceed 10 cm. The angle of light acceptance to the nephelometric detector(s) should be centered at 90° to the centerline of the incident light path and should not exceed ±10° from the scatter path centerline. The detector must have a spectral response that is sensitive to the spectral output of the incident light used. The instrument calibration (algorithm) must be designed such that the scaleable reading is from the nephelometric detector(s), and other detectors are used to compensate for instrument variation described in 7.4.1.

7.5.2 Differences in physical design of ratio photoelectric nephelometers may cause differences in measured values for turbidity even when the same suspension is used for calibrations. Comparability of measurements made using instruments differing in optical and physical design is not recommended. To minimize initial differences, the following design criteria should be observed (see Figs. 2 and 3).

7.5.3 Report in the appropriate units using Table 1 as guidance.

7.5.3.1 FNRU, and FNMU signify the use of an incident light wavelength between 780–900 nm. NTRU and NTMU signify the use of an incident light in the wavelength range of 400–680 nm for a ratio technology.

7.6 *Backscatter Turbidimeters:*

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7.6.1 The instrumentation contains a light source that meets or exceeds the criteria specified in 7.4.1 for illumination of the sample.

7.6.2 The response curve of the detector should be such that it overlaps the output of the light source.

7.6.3 The detection angle for backscatter is between 90° and 180° relative to the centerline of the incident light beam. See Fig. 4.

7.6.4 When reporting turbidity, report in units that best fit the light source and detector in Table 2. Report in BU (white light source) or FBU (if a 780–900 nm light source was used).

7.7 *Attenuation-Based Turbidimeters:*

7.7.1 The instrument contains a light source that meets or exceeds the criteria specified in 7.4.1 for illumination of the sample. Examples include monochromatic light such as those generated in spectrophotometers.

7.7.2 The detector response curve should overlap the incident light source.

7.7.3 The detection angle for attenuation is to be set at 0° relative to the centerline of the incident light beam. See Fig. 5.

7.7.4 When reporting turbidity, report in units that best fit the light source and detector in Table 1. Report in AU (white light source) or FAU (if a 780–900 nm light source was used).

7.8 *Sample Cells* (if used with typical benchtop or portable instruments):

7.8.1 The sample cells used in calibration and sample measurement must be the following:

7.8.1.1 Clear, colorless glass or optically clear plastic, be kept scrupulously clean, both inside and out, and discarded when it becomes etched or scratched (see non-mandatory Appendix X3 for sample cell cleaning procedure).

7.8.1.2 Index marked so that repeated exact placements into the instrument sample cell compartment for measurement can be made. The location of the index mark should be such that the window of movement is less than 10° of rotation where the measurement is consistent. See 11.4.2.1.

7.8.1.3 Cells should be handled where the light path does not pass during measurement. Provision should be made in design to give the sample cell a proper place in which to handle the cell during calibration or sample measurement procedure.

7.8.1.4 The outside surface of a glass sample cell may be oiled, using silicone oil and a soft cloth, or a lint free laboratory tissue to minimize imperfections that could cause light to scatter off the surface of this sample cell, or wiped with alcohol. See the manufacturer's recommendations for sample cell preparation.

TABLE 2 Reporting of Results for High Level Static Turbidity Measurements

NOTE 1—New developments in technologies may allow instruments to extend beyond range.

Measured Value In Appropriate Units	Report to Nearest
1.0* < 9.9	0.1
10 < 99	1
100–999	5
1000<	50

7.8.1.5 Preferably matched sample cells that provide consistent readings to within 10 % on filtered DI water should be used.

7.9 *Sample Chambers:*

7.9.1 For those instruments not using sample cells, the sample is placed directly into the sample chamber. For those units, the sample chamber must be the following:

7.9.1.1 Sample chambers should be kept scrupulously clean. Scratches, fingerprints and dirt on the walls of the sample chamber may give erroneous results. See the manufacturer's recommendations for sample chamber maintenance.

7.9.1.2 Sample chambers should be designed in such a way as to negate any influence from external light sources, and to minimize stray light interference with readings.

8. Purity of Reagents

8.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. All reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.[6]

8.1.1 ACS grade chemicals of high purity (99+%) shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available. Other grades may be used providing it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

NOTE 2—Refer to product MSDS for possible health exposure concerns.

8.2 Reverse osmosis (RO) water is acceptable and preferred in this test method. Standard dilution waters and rinse waters should be prepared by filtration through a 0.22 µm or smaller membrane filter or any other suitable filter within 1 h of use to reduce background turbidity. Type III water is also acceptable (see Specification D1193). These types of water should be used in preparation of turbidity standards for calibration or verification.

9. Reagents

9.1 *Dilution and Final Rinsing Water,* see 8.2.

9.2 *Turbidity Standards:*

NOTE 3—A standard with a turbidity of 1.0 NTU is the lowest formazin turbidity standard that should be produced on the bench. Skilled laboratory personnel with experience in quantitative analysis shall perform preparation of formazin standards. Close adherence to the instructions within this section is required in order to accurately prepare low-level turbidity standards.

NOTE 4—Equivalent, commercially available, calibration standards may be used. These standards, such as stabilized formazin (StablCal[7]) and styrenedivinylbenzene (SDVB), have a specified turbidity value and

[6] *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For Suggestions on the testing of reagents not listed by the American Chemical Society, see *Annual Standards for Laboratory Chemicals,* BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary,* U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.

[7] StableCal is a trademark of Hach Company, Loveland, CO, 80538.

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accuracy. Such standards must be referenced (traceable) to bench-synthesized formazin (see 9.2.2). Follow specific manufacturer's calibration procedures.

9.2.1 All volumetric glassware must be scrupulously clean. The necessary level of cleanliness can be achieved by performing all of the following steps: washing glassware with laboratory detergent followed by 3 tap water rinses; then rinse with portions of 1:4 HCl followed by at least 3 tap water rinses; finally, rinse with rinse water as defined in 8.2.

9.2.2 *Reference Formazin Reference Turbidity Standard, 4000 NTU*—This standard is synthesized in the lab.

9.2.2.1 Quantitatively transfer 5.000 g of reagent grade hydrazine sulfate (99.5%+ purity) ($N_2H_4 \cdot H_2SO_4$) into approximately 400 mL of dilution water (see 8.2) contained in a 1-L Class A volumetric flask; stopper and completely dissolve by swirling.

NOTE 5—To quantitatively transfer this powdered reagent, transfer the hydrazine sulfate into the flask containing the dilution water. Rinse the weighing bowl with dilution water, adding the rinsings to the flask. Repeat the rinsing again adding the second rinsings to the flask.

9.2.2.2 Quantitatively transfer 50.000 g of reagent grade hexamethylenetetramine (99%+ purity) in approximately 400 mL of dilution water (see 8.2) contained in a clean flask; stopper and completely dissolve by swirling. Filter this solution through a 0.2 µm filter into a clean flask.

9.2.2.3 Quantitatively transfer the filtered hexamethylenetetramine into the flask containing the hydrazine sulfate. Dilute this mixture to 1 L using dilution water (see 8.2). Stopper and mix for at least 5 min, and no more than 10 min.

NOTE 6—To quantitatively transfer this liquid mixture, transfer the hexamethylenetetramine into the flask containing the hydrazine sulfate. Rinse this flask two times using 50 mL aliquots of dilution water, adding each rinsing to the flask containing the hydrazine sulfate.

9.2.2.4 Allow the solution to stand for at least 24 h at 25 ± 1°C. The 4000 NTU Formazin suspension develops during this time.

NOTE 7—This suspension, if stored at 20–25°C in amber polyethylene bottles, is stable for 1 year; it is stable for 1 month if stored in glass at 20–25°C.

9.2.3 Stabilized formazin turbidity standards (StablCal) are prepared stable suspensions of the formazin polymer. Preparation is limited to inverting the container to re-suspend the formazin polymer. These standards require no dilution and are used as received from the manufacturer.

9.2.4 SDVB standards are prepared stable suspensions of copolymer microspheres which are used as received from the manufacturer or distributor. These standards exhibit calibration performance characteristics that are specific to instrument design.

NOTE 8—Sealed or solid samples should not be used to standardize turbidimeters for the turbidity measurement of water or waste; they may only be used for calibration verification. These two methods (sealed or solid examples) neglect the zeroing out of the sample cell prior to making water measurement in the cell.

9.2.5 *Formazin Turbidity Suspension, Standard (40 NTU)*—This is an example on how to prepare a calibration standard of a specific turbidity value. All labware shall be seasoned (see Appendix X3). Invert 4000 NTU stock suspension 25 times to mix (1 s inversion cycle); immediately pipette, using a Class A pipette, 10.00 mL of mixed 4000 NTU stock into a 1000-mL Class A volumetric flask and dilute with water to mark. The turbidity of this suspension is defined as 40 NTU. This 40-NTU suspension must be prepared weekly.

9.2.6 *Other Formazin Calibration Standards*—Using a similar procedure as in 9.2.5, prepare the appropriate standards as required to calibrate the instrument as instructed by the instrument calibration protocol.

9.2.7 *Dilute Formazin Turbidity Suspension Standard (1.0 NTU)*—Prepare this standard daily by inverting the 40 NTU (9.2.5) stock suspension 25 times to mix (1 s inversion cycle) and immediately pipet a volume of 40 NTU standard. All glassware shall be seasoned (see Appendix X3).

NOTE 9—The instructions below result in the preparation of 200 mL of a formazin standard. Users of this test method will need different volumes of the standard to meet their instrument's individual needs; glassware and reagent volumes shall be adjusted accordingly.

9.2.7.1 Within one day of use, rinse both a glass Class A 5.00 mL pipette and a glass Class A200 mL volumetric flask with laboratory glassware detergent or 1:1 hydrochloric acid solution. Follow with at least ten rinses with rinse water. Cap and store in a clean environment until use.

9.2.7.2 Using the cleaned glassware, pipet 5.00 mL of well-mixed 40.0 NTU formazin suspension (9.2.5) into the 200 mL flask and dilute to volume with the dilution rinse water. Stopper and invert (1 s inversion cycle) 25 times to mix. The turbidity of this standard is 1.0 NTU.

9.2.8 *Miscellaneous Dilute Formazin Turbidity Suspension Standard*—Prepare all turbidity standards with values below 40 NTU daily. Standards ≥ 40 NTU have a useful life of one week. All labware shall be seasoned (See Appendix X3). Use Class A glassware that has been cleaned in accordance with the instructions in 9.2.1 and prepare each dilution by pipetting the volume of 40 NTU (9.2.5) into a 100-mL volumetric flask and diluting to mark with dilution water (8.2). For example, prepare the solution so that 50.0 mL of 40 NTU diluted to 100 mL is 20.0 NTU and 10.0 mL of 40 NTU diluted to 100 mL is 4.00 NTU.

9.2.8.1 Prepare standards at the turbidity concentrations that are required to meet the specific calibration requirements for the instrument that is to undergo calibration.

9.2.9 Stable turbidity standards are commercially available. These standards, such as stabilized formazin and styrenedivinylbenzene (SDVB), have a specific turbidity value and accuracy. Such standards must be traceable to the reference turbidity standard.

10. Safety

10.1 Wear appropriate personal protection equipment at all times.

10.2 Follow all relevant safety guidelines.

10.3 Refer to instrument manuals for safety guidelines when installing, calibrating, measuring or performing maintenance with any of the respective instrumentation.

10.4 Refer to all Material Safety Data Sheets (MSDSs) prior to preparing or using standards and before calibrating or performing instrument maintenance.

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11. Sampling and Sample Preservation

11.1 *Collection of Sample*—Collect the sample in accordance with the applicable standard, specification and practices. See Guide D4411 for the collection of samples in moving waters.

11.2 *Storage of Sample*—Analyze the sample immediately. Do not store the sample.

11.3 *Sample Handling*—Samples should be measured expeditiously after collection to prevent changes in particle characteristics due to temperature changes and settling. Temperature can effect particles either by changing their behavior or creating new particles, if precipitates are created. Dilution water may dissolve particles or change their characteristics. Operators should draw samples only when turbidimeters are ready for operation. Do not draw a sample and allow it to sit while the turbidimeter is being readied.

11.4 *Other Important Sampling Techniques:*

11.4.1 Minimize agitation of samples as particles can be altered or air may be entrained into the sample. Gentle agitation or swirling is recommended to reduce particle settling. Swirling may not be appropriate for rapidly settling particles.

11.4.2 Sample cells should only be used with the instrumentation for which they were intended.

11.4.2.1 Prior to each measurement inspect the filled sample cell and ensure that there are no bubbles in the sample, and that the cell is free of scratches.

NOTE 10—If degassing is necessary, a non-intrusive procedure for removing bubbles can be used. Examples include the application of a vacuum or the use of an ultra-sonic bath. Caution must be exercised not to alter the composition of the samples.

11.4.2.2 Sample cells should be evaluated with a low turbidity water (after cleaning) to determine if cells remain matched. If the evaluation determines that a cell is corrupted, discard the cell. This check should be performed on a weekly basis.

11.4.2.3 If a sample cell's condition is questionable, discard the cell and replace with a new sample cell.

11.5 *Sample Preparation for Measurement:*

11.5.1 Rinse the clean sample cell or chamber twice with the sample that is to be measured, and discard the rinsings.

11.5.2 Fill the sample cell or chamber to a level at which the top air/liquid interface will not interfere with the subsequent reading. Follow manufacturer recommendations as to sample cell or chamber filling.

11.5.3 After the sample cell is filled, use a lint-free tissue to remove all traces of dirt or fingerprints. Tissue alone does not clean dirty sample cells and one of the common nonabrasive glass cleaners may be necessary.

11.5.4 The cleaned sample cell is handled by its very top and placed in an indexed manner in the instrument.

12. Calibration and Calibration Verification

12.1 Determine if the instrument requires any maintenance such as cleaning the sample cell or sample chamber, etc. Follow the manufacturer's instructions for any required instrument maintenance prior to calibration.

12.2 *Calibration:*

12.2.1 Follow the manufacturer's instructions for calibration and operation. Calibrate the instrument to assure proper operation for the range of interest with appropriate standards. See standard or instrument manufacturers for the preparation and use of calibration or verification standards.

12.2.2 Formazin-based calibration standards should be re-suspended through inversion (1 s inversion cycle) 25 times followed by a 2 to 10 min wait to allow for bubble removal. Standards of 40 NTU or below will remain suspended for up to 30 min; standards greater than 40 NTU may require more frequent re-suspension.

NOTE 11—A Calibration Turbidity Standard is a turbidity standard that is traceable and equivalent to the reference turbidity standard to within statistical errors, including commercially prepared 4000 NTU Formazin, stabilized formazin, and styrenedivinylbenzene (SDVB). These standards may be used to calibrate the instrument.

12.2.3 Verify instrument calibration accuracy in the expected measurement area using a calibration verification standard. The calibration verification standard used should have a defined value with known accuracy. The calibration verification standard should allow the instrument to perform to within its defined performance specifications. Verification should be conducted at timely intervals between calibrations. (Consult instrument manufacturer's recommendations, standard's manufacturers recommendations, or both for guidance associated with verification methods and devices.)

NOTE 12—Some regulatory agencies may have specific requirements or guidelines regarding the calibration of turbidimeters. Consult those authorities if reporting to specific regulatory agencies.

12.2.4 In case of verification failure clean the instrument to reduce stray light levels or contamination. Follow with a recalibration (instrument adjustment) according to manufacturer's calibration instructions, using a calibration standard (see 3.2.2), or at a minimum on a quarterly basis.

12.2.5 Close adherence to the calibration procedure and to the rinsing/seasoning techniques is very important to ensure data quality.

12.2.6 Proper sample handling and preparation procedures must be followed to assure data quality (see Section 11).

12.2.7 Proper care and maintenance of sample cells and sample chambers must be performed in a timely manner (see 7.7).

13. Procedure for the Measurement of High-Level Static Turbidity

13.1 Identify the technology to be used and determine the most appropriate turbidity unit. See Table 1 and Appendix X2 for guidance and application of the technologies offered in this test method.

13.2 *Turbidity Greater than 1.0 NTU*—Gently invert the sample several times (1 s inversion cycle) to thoroughly suspend any solids. Rinse a clean sample cell several times with sample. Fill the sample cell with sample and cap the cell. Clean outside surfaces of the sample cell (see non-mandatory Appendix X3). Invert again and immediately place the sample cell into the instrument at the index mark and measure at a consistent distinct time interval, not to exceed 15 s, after

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inserting the vial. Repeat a minimum of 2 more times with new sample. Average the values to generate the reported result.

NOTE 13—Care must be taken to ensure the sample does not settle when transferring from the sample container to a sample vial. See 13.5.1.

NOTE 14—If the instrument has a long measurement-averaging interval, the interval should be as short as possible to minimize error due to particle settling. Even with extremely short intervals (for example, <1 s) rapidly settling particles may still lead to erroneous results. Under such conditions, a different measurement practice, such as an in-situ measurement my produce better data quality.

NOTE 15—If the measurement is to be performed with an in-situ probe, follow the instructions for maintenance of the measurement chamber. Place the probe into the sample chamber immediately after mixing and perform measurements using the same timelines that are suggested in this section.

13.2.1 If the measured sample exceeds the highest calibration point, dilute the sample using quantitative techniques until a measured value is below the highest calibration point. For real-world samples, if the measurement is above 80 % of the maximum range, the operator should use dilution to ensure the measurement is valid.

13.3 *Sample Verification*—It is prudent to carefully dilute samples that contain significant color or turbidity. Ensure that there is not active settling of particles within the sample when performing dilutions. For such samples, perform at least three dilutions at approximately 80, 50, and 20 % of the original concentration. Determine the turbidity of each dilution and determine if they are linear and correlate positively with the dilutions (that is, a 50 % dilution should read ½ the turbidity value of the concentrated sample). If a dilution was used to generate the result, it should be reported that it was performed.

13.3.1 Dilutions of samples on a routine basis are not recommended, especially in the case of samples with fast settling particles (those with high densities). It is recommended that an appropriate instrument design that covers the expected measurement range be selected to avoid dilutions.

13.3.1.1 Aliquots for the dilution should be withdrawn from the original sample in such a way as to ensure that an aliquot contains the original concentration and particle size distribution of all suspended material (see Section 5.1.1 in USGS National Field Manual for the Collection of Water Quality Data).

13.3.2 Dilution of samples with colorless and filtered water should be performed if the desired application treats color as part of turbidity. However, if the desired application does not consider color as part of the turbidity measurement, then the sample dilution should be made using water that is less than 1 TU as read by the instrument being used.

13.4 *Stability*—To better assure stability in reading, do not shake the samples, but place the sample in the meter as rapidly as possible after inverting the sample vial several times (approximately 1 inversion per s) to ensure all suspended material is in suspension. If after the placement of the sample vial in the measurement chamber for measurement, the reading does not become stable and decreases more than 10 % over a short period of time (for example, 20 s) it is likely due to rapid settling. In this case, re-invert the sample gently, immediately insert into the instrument and record the highest measurement. Repeat at least two more times to collect a minimum of three measurements. Average the values together to generate the recorded result as greater than the average of the three reading.

13.5 Measurement variability that is unsatisfactory due to settling may warrant the use of other technologies such as in-situ turbidimeters.

13.5.1 If the response for the dilution curve is non-linear, it is typically due to the impacts of color absorbance in the sample matrix or particle absorbance. Typically, as dilutions become more significant, the impacts of matrix absorbance will eventually be reduced to project a linear portion of the response curve at lower turbidity levels (1–40 TU range). Multiply the turbidity value by the dilution factor to generate the reported result.

13.5.2 If interferences are severe (see 13.5), an alternative technology that may better compensate for the interference should be considered.

14. Report

14.1 Report results as presented in Table 2.

15. Quality Control (QC)/Quality Assurance (QA)

15.1 In order to be certain that analytical values obtained using this test method are valid and accurate within the confidence limits of the test, the following QC procedures must be followed when running the test.

15.2 *Calibration and Calibration Verification:*

15.2.1 Determine if the instrument requires any maintenance such as replacing the lamp, cleaning the sample cells, sample chamber, or optics etc. Follow the manufacturer's instructions for any required instrument maintenance prior to calibration.

15.2.2 Follow the manufacturer's instruction for calibration and operation of instrumentation. Refer to the standard's manufacturer for the preparation and use of calibration or verification standards. Calibrate the instrument to assure proper operation for the range of interest with the appropriate standards.

15.2.2.1 Verify instrument calibration by analyzing calibration or calibration verification standards that is within the range of interest. These standards must be run prior to and after any sample determinations. The recommended frequency for determining calibration verification is more than or equal to every 10 samples or upon the arrival of a new measurement site.

NOTE 16—Consult instrument or standards manufacturers for recommended and available sources for verification standards.

15.2.3 The round robin study resulted in the generation of a precision and bias section. The values obtained upon analysis of calibration or calibration verification standards will fall within the acceptance limits presented in Tables 3-7, as determined from single operator standard deviation (S_O), as determined by Practice E691.

15.3 Alternative to 15.2.3:

15.3.1 The values obtained upon analysis of calibration or calibration verification standards must fall within the acceptance criteria generated after sufficient data is generated for each of the standards, typically 20 to 30 results. Control charts must be developed from the mean recovery (x) and the standard

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TABLE 3 ASTM Practice E691 Data Analysis: Comparison Across All Technologies

Reporting: ASTM High Level Turbidity Measurement in the Static Mode—Round Robin Study—October 2005
All Laboratories Reporting: NTU, NTRU, AU, FNU, FNRU, FAU, and FBU

	Material	All Laboratories Average TU	Within Laboratory Repeatability TU	Between Laboratories Reproducibility TU	Single Operator S_o* Repeatability TU	Expected TU	Overall Bias TU	Test Sequence	Number of Labs Reporting
Surrogates	SDVB #2 2 NTU	2.4294	0.2938	0.6326	0.1049	2.000	0.4294	6	17
	Formazin A	81.2500	2.4466	5.7671	0.8738	83.800	–2.5500	1	18
	StablCal B286	278.5141	4.5804	194.0931	1.6359	286.000	–7.4859	4	17
	Formazin B	487.4812	7.6308	72.5012	2.7253	507.100	–19.6188	2	17
	SDVB #2 800 NTU	687.0938	3.4369	833.7638	1.2275	800.000	–112.9062	7	15
	Formazin C	1383.3800	8.6869	508.4925	3.1025	1433.000	–49.6200	3	10
Real World Samples	Acid Mine 1	105.7830	10.8195	64.7087	3.8641			8	18
	Acid Mine Dup	107.0219	19.5133	80.2707	6.9690			9	18
	Alk Glac Flr 100 %	1373.3424	112.2216	2381.2417	40.0791			10	11
	Alk Glac Flr 100 % Dup	1165.6667	842.0044	980.2578	300.7158			11	10
	Alk Glac Flr 50 %	753.0642	59.9148	711.1709	21.3981			12	12
	Alk Glac Flr 25 %	372.2931	78.1192	291.3120	27.8997			13	17
	Kansas 100 %	1573.1733	59.5038	1828.6915	21.2514			14	10
	Kansas 100 % Dup	1641.3037	151.4506	1853.3339	54.0895			15	9
	Kansas 50 %	873.7083	42.2894	716.8163	15.1034			16	14
	Kansas 50 % Dup	873.7083	31.0279	755.4455	11.0814			17	12
	Kansas 25 %	408.6984	63.4992	338.3758	22.6783			18	17
	Kansas 4.2 %	62.3828	3.9393	53.9633	1.4069			19	19
	Reston Pond No Filt	34.1472	7.7058	25.1033	2.7521			20	19
USGS QC	USGS QC #1	12.6296	2.6517	7.9051	0.9470			21	19
	USGS QC #2	40.1219	6.2935	35.0466	2.2477			22	18
	USGS QC #3	161.8663	18.7592	115.5199	6.6997			23	17
	USGS QC #4	142.1513	20.8887	106.4929	7.4603			24	18
	USGS QC #5	349.6522	37.8965	263.1686	13.5345			25	17

TABLE 4 ASTM Practice E691 Data Analysis: Comparison Across Ratio Technologies

Reporting: ASTM High Level Turbidity Measurement in the Static Mode—Round Robin Study—October 2005
Finalized for All Laboratories Using Ratio Technologies: NTRU and FNRU

	Material	All Laboratories Average TU	Within Laboratory Repeatability TU	Between Laboratories Reproducibility TU	Single Operator S_o* Repeatability TU	Expected TU	Overall Bias TU	Test Sequence	Number of Labs Reporting
Surrogates	SDVB #2 2 NIL	2.4560	0.4527	0.6064	0.1617	2.000	0.4560	6	
	Formazin A	81.2400	0.4025	5.3856	0.1438	83.800	–2.5600	1	5
	StablCal B286	280.9200	2.6097	29.2805	0.9320	286.000	–5.0800	4	5
	Formazin B	490.8000	5.3126	34.5131	1.8974	507.100	–16.3000	2	5
	SDVB #2 800 NTU	646.8000	2.2862	693.8744	0.8165	800.000	–153.2000	7	5
	Formazin C	1489.5000	12.1244	165.5437	4.3301	1433.000	56.5000	3	4
Real World Samples	Acid Mine 1	110.4933	13.5129	43.0844	4.8260			8	5
	Acid Mine Dup	111.4200	10.3837	49.7262	3.7085			9	5
	Alk Glac Flr 100 %	2290.2222	164.8040	545.8287	58.8586			10	3
	Alk Glac Flr 100 % Dup	1165.6667	842.0044	980.2578	300.7158			11	3
	Alk Glac Flr 50 %	903.6667	50.3222	478.0769	17.9722			12	4
	Alk Glac Flr 25 %	406.7733	25.3835	204.8961	9.0655			13	5
	Kansas 100 %	2111.1111	64.9120	808.5700	23.1828			14	3
	Kansas 100 % Dup	2127.6667	250.0201	815.8910	89.2929			15	3
	Kansas 50 %	963.1667	36.2110	633.9762	12.9325			16	4
	Kansas 50 % Dup	963.1667	16.6437	664.1603	5.9442			17	4
	Kansas 25 %	449.6667	13.8121	294.2140	4.9329			18	5
	Kansas 4.2 %	61.7800	3.5777	19.3406	1.2778			19	5
	Reston Pond No Filt	30.5867	3.0885	28.6735	1.1030			20	5
USGS QC	USGS QC #1	12.8733	2.3202	5.9592	0.8287			21	5
	USGS QC #2	39.1667	6.6154	20.0112	2.3626			22	5
	USGS QC #3	157.1733	17.2458	105.9137	6.1592			23	5
	USGS QC #4	138.7600	22.5074	93.6608	8.0384			24	5
	USGS QC #5	372.4200	30.3104	269.2088	10.8252			25	5

deviation (S) of the percent recovery for the standards. These data are used to establish upper and lower control limits as follows:

$$\text{Upper control limit} = x + 3S$$
$$\text{Lower control limit} = x - 3S$$

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TABLE 5 ASTM Practice E691 Data Analysis: Comparison Across Single Detector Technologies

Reporting: ASTM High Level Turbidity Measurement in the Static Mode—Round Robin Study—October 2005
Finalized for All 1-Detector Labs: NTU, AU, FNU, FAU, FBU

	Material	All Laboratories Average TU	Within Laboratory Repeatability TU	Between Laboratories Reproducibility TU	Single Operator S_o* Repeatability TU	Expected TU	Overall Bias TU	Test Sequence	Number of Labs Reporting
Surrogates	SDVB #2 2 NTU	2.4183	0.1920	0.6599	0.0686	2.000	0.4183	6	12
	Formazin A	81.2538	2.8680	6.1086	1.0243	83.800	–2.5462	1	13
	StablCal B286	277.5117	5.1850	229.5469	1.8518	286.000	–8.4883	4	12
	Formazin B	486.0983	8.4102	84.5842	3.0036	507.100	–21.0017	2	12
	SDVB #2 800 NTU	707.2407	3.8865	925.6199	1.3880	800.000	–92.7593	7	10
	Formazin C	1312.6333	5.2698	575.5349	1.8821	1433.000	–120.3667	3	6
Real World Samples	Acid Mine 1	103.9713	9.5841	72.1389	3.4229			8	13
	Acid Mine Dup	105.3303	22.0397	90.5792	7.8713			9	13
	Alk Glac Flr 100 %	1029.5125	84.4463	2032.0846	30.1594			10	8
	Alk Glac Flr 100 % Dup	1165.6667	842.0044	980.2578	300.7158			11	7
	Alk Glac Flr 50 %	677.7629	64.1756	737.6383	22.9199			12	8
	Alk Glac Flr 25 %	357.9264	91.5253	319.3609	32.6876			13	12
	Kansas 100 %	1342.6286	57.0293	1782.4962	20.3676			14	7
	Kansas 100 % Dup	1398.1222	56.1330	1885.3905	20.0475			15	6
	Kansas 50 %	828.9792	44.4888	752.7435	15.8889			16	10
	Kansas 50 % Dup	828.9792	36.1330	808.6572	12.9046			17	8
	Kansas 25 %	391.6283	75.0514	355.6457	26.8041			18	12
	Kansas 4.2 %	62.5981	4.0607	62.5680	1.4502			19	14
	Reston Pond No Filt	35.4188	8.7852	23.7970	3.1376			20	14
USGS QC	USGS QC #1	12.5426	2.7604	8.6631	0.9859			21	14
	USGS QC #2	40.4892	6.1652	40.0012	2.2019			22	13
	USGS QC #3	163.8217	19.3549	123.2921	6.9125			23	12
	USGS QC #4	143.4556	20.2317	114.2947	7.2256			24	13
	USGS QC #5	340.1656	40.6415	267.7663	14.5148			25	12

TABLE 6 ASTM Practice E691 Data Analysis: Comparison Across IR Light Source Based Technologies

Reporting: ASTM High Level Turbidity Measurement in the Static Mode—Round Robin Study—October 2005
Finalized for All Laboratories That Utilize IR light Sources Between 780–900 nm: FNU, FNRU, FAU, and FBU

	Material	All Laboratories Average TU	Within Laboratory Repeatability TU	Between Laboratories Reproducibility TU	Single Operator S_o* Repeatability TU	Expected TU	Overall Bias TU	Test Sequence	Number of Labs Reporting
Surrogates	SDVB #2 2 NTI	12.3452	0.3635	0.6000	0.1298	2.000	0.3452	6	11
	Formazin A	81.1590	2.7862	5.5747	0.9951	83.800	–2.64101	1	13
	StablCal B286	276.3672	5.3713	49.8787	1.9183	286.000	–9.63284	4	12
	Formazin B	483.9317	4.7082	79.8551	1.6815	507.100	–23.1683	2	12
	SDVB #2 800 NTU	759.7642	3.9538	826.6066	1.4121	800.000	–40.2358	7	11
	Formazin C	1366.2571	9.5591	614.8087	3.4140	1433.000	–66.7429	3	7
Real World Samples	Acid Mine 1	115.4354	12.5496	46.0717	4.4820			8	13
	Acid Mine Dup	118.3123	22.6772	64.9024	8.0990			9	13
	Alk Glac Flr 100 %	1257.0481	113.6384	2511.1350	40.5851			10	9
	Alk Glac Flr 100 % Dup	1165.6667	842.0044	980.2578	300.7158			11	8
	Alk Glac Flr 50 %	745.3448	67.6794	820.6508	24.1712			12	9
	Alk Glac Flr 25 %	384.6931	87.0719	306.5319	31.0971			13	12
	Kansas 100 %	1512.7583	64.9420	2016.6404	23.1936			14	8
	Kansas 100 % Dup	1589.3429	169.9017	2095.3183	60.6792			15	7
	Kansas 50 %	867.9815	44.7673	788.7334	15.9883			16	11
	Kansas 50 % Dup	867.9815	32.1095	855.9333	11.4677			17	9
	Kansas 25 %	413.4617	73.7887	345.2275	26.3531			18	12
	Kansas 4.2 %	66.4082	3.9546	52.1435	1.4123			19	13
	Reston Pond No Filt	36.9844	8.9659	24.7738	3.2021			20	13
USGS QC	USGS QC #1	13.6815	2.8589	6.2732	1.0210			21	13
	USGS QC #2	43.9431	6.8357	33.0671	2.4413			22	13
	USGS QC #3	171.7133	19.3790	114.0778	6.9211			23	12
	USGS QC #4	148.3633	22.4063	113.6330	8.0022			24	13
	USGS QC #5	362.5628	44.1518	263.0593	15.7685			25	12

15.3.2 After each five to ten new recovery measurements, new control limits must be calculated using the most recent 20 to 30 data points. If these calculated control limits exceed those established in the method, corrective action must be taken. If calibration cannot be verified because standards are determined to be outside acceptance limits, recalibrate the instrument.

15.4 *Duplicate:*

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TABLE 7 ASTM Practice E691 Data Analysis: Comparison Across Laboratories Reporting with Broad-Band Light Sources from 400–700 nm

Reporting: ASTM High Level Turbidity Measurement in the Static Mode—Round Robin Study—October 2005
Finalized for All EPA (400–600 nm Light Source) Labs Analysis: NTU, NTRU, and AU

	Material	All Laboratories Average TU	Within Laboratory Repeatability TU	Between Laboratories Reproducibility TU	Single Operator S_o* Repeatability TU	Expected TU	Overall Bias TU	Test Sequence	Number of Labs Reporting
Surrogates	SDVB #2 2 NTU	2.5839	0.0476	0.4532	0.0170	2.000	0.5839	6	6
	Formazin A	81.4867	1.1680	6.7434	0.4171	83.800	–2.3133	1	5
	StablCal B286	283.6667	1.4459	29.1836	0.5164	286.000	–2.3333	4	5
	Formazin B	496.0000	12.0324	48.1558	4.2973	507.100	–11.1000	2	5
	SDVB #2 800 NTU	487.2500	1.1431	630.2388	0.4082	800.000	–312.7500	7	4
	Formazin C	1423.3333	6.1910	49.6191	2.2111	1433.000	–9.6667	3	3
Real World Samples	Acid Mine 1	80.6867	3.4551	53.4877	1.2340			8	5
	Acid Mine Dup	77.6667	5.8049	54.7076	2.0732			9	5
	Alk Glac Flr 100 %	1896.6667	105.6111	994.6820	37.7183			10	2
	Alk Glac Flr 100 % Dup	1165.6667	842.0044	980.2578	300.7158			11	2
	Alk Glac Flr 50 %	776.2222	24.8519	279.7650	8.8757			12	3
	Alk Glac Flr 25 %	342.5333	50.5295	255.9977	18.0462			13	5
	Kansas 100 %	1814.8333	28.8731	694.7446	10.3118			14	2
	Kansas 100 % Dup	1823.1667	46.7413	679.8899	16.6933			15	2
	Kansas 50 %	890.8889	31.5820	473.9575	11.2793			16	3
	Kansas 50 % Dup	890.8889	27.5294	450.2106	9.8319			17	3
	Kansas 25 %	397.2667	25.3345	356.9925	9.0480			18	5
	Kansas 4.2 %	53.6611	3.9061	53.8016	1.3950			19	6
	Reston Pond No Filt	28.0000	3.7234	16.0483	1.3298			20	6
USGS QC	USGS QC #1	10.3506	2.1348	7.3748	0.7624			21	6
	USGS QC #2	30.1867	4.5935	23.9715	1.6405			22	5
	USGS QC #3	138.2333	17.1807	97.4127	6.1360			23	5
	USGS QC #4	126.0000	16.2946	74.8351	5.8195			24	5
	USGS QC #5	318.6667	14.2955	270.3274	5.1056			25	5

15.4.1 To check the precision of sample analyses, analyze a sample in duplicate with each batch of samples. The recommended frequency for determining precision is more than or equal to 5 % of all samples determined for each batch of samples.

15.4.2 Calculate the standard deviation of the duplicate values and compare it to the single operator precision data found in Table 3 of this procedure by using a one-sided F test at the $\alpha = 0.01$ significance level.

15.4.2.1 Appendix X4 is the Table X2.1 from Practice D5847 for the critical values of F at the 1 % significance (99 % confidence) level (one-sided). Also, reference Practice D5847 if necessary to see an example of how the calculation utilizes both the single operator standard deviation (S_O) and the standard deviation of the duplicate sample analysis values (SA).

15.4.2.2 The result from $(S_A)^2/(S_O)^2$ = (standard deviation of sample reps)^2/(single operator standard deviation)^2 = calculated value versus (> or <) critical value from table. The result will determine if the duplicate values are acceptable.

15.4.3 If the result exceeds the precision limit as derived from the F test, the batch must be reanalyzed or the results must be qualified with an indication that they do not fall within the performance criteria of the test procedure.

15.5 *Independent Reference Material (IRM):*

15.5.1 In order to verify the quantitative value produced by the test procedure, analyze an IRM submitted as a regular sample to the laboratory at least once per quarter. The value of the IRM should be in the range of the determinations that the lab normally determines during the analyses of samples. The value obtained must fall within the control limits specified by the provider of the IRM.

16. Precision and Bias[8]

16.1 This test method was tested on 21 different laboratories that were assembled at a common site. Each laboratory consisted of an operator and an instrument (turbidimeter) that operated using a specific technology and traceable reporting unit that was listed in Table 1. Testing was conducted over a two-day period. Fig. 6 is a breakdown of the different laboratories.

16.1.1 *Samples*—24 samples were analyzed in this round robin. These were broken down into surrogates, real world environmental samples, and USGS Quality Control Samples (USGS QC).

16.1.1.1 Surrogate samples were samples of a defined turbidity value and prepared from turbidity standard materials. Specifically, these were formazin, stabilized formazin, and styrene divinylbenzene (SDVB) materials. Surrogate samples were prepared at defined values, but were run as unknowns during the round robin study. A total of six surrogate samples were run.

16.1.1.2 Real world environmental samples were samples that were collected in the field and shipped to the round robin test site. No preservation action was taken with these samples.

[8] Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D19-1179. Contact ASTM Customer Service at service@astm.org.

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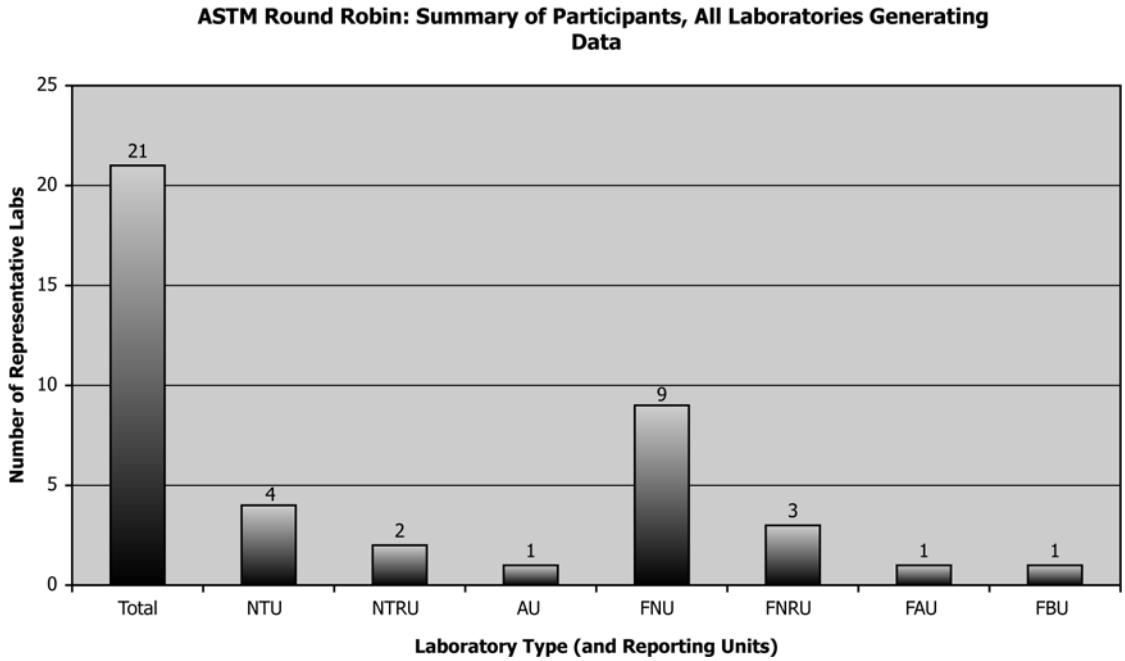

FIG. 6 Breakdown of Technologies Represented for this Test Method's Round Robin

Samples were prepared immediately before and during dispensation to each of the laboratories. Real world samples included samples from streams and ponds. A total of 13 real world environmental samples were analyzed.

16.1.1.3 USGS QC samples were samples that were prepared by the USGS branch of quality systems immediately prior to analysis. These samples had defined quantities of sands and fines. A total of five different samples were run through this round robin.

16.2 *Sample Preparation and Measurement*—Each bulk sample was mixed using a churn splitter, which is designed to maintain particulate suspensions and homogeneity throughout the bulk sample. Samples were dispensed to each laboratory at the same time and were mixed throughout the dispensation process. Once the samples were dispensed, they were prepared for measurement as prescribed in Section 13 of this test method. A total of three measurements were made of each sample. A measurement included a new dispensation, preparation, and measurement in the respective measurement. These triplicate measurements were then recorded and used in the Practice E691 data analysis methods.

16.3 *Results*—Results from this study were expressed in Tables 3-7. One of the objectives of this round robin was to demonstrate that different technologies can deliver different results on the same sample. Thus, results have been grouped to show several different comparisons among technologies. Within each table, a generic unit of "TU" is displayed, which is to infer that depending on the technology used, a specific reporting unit would be displayed.

16.3.1 *All Laboratories*—Table 3 shows the Practice E691 comparison across all laboratories. Laboratories include: ratio and non-ratio technologies, different light sources (white light, IR, defined wavelengths), and different detection angles (attenuated, nephelometric, backscatter). For certain samples, the turbidity value may have been outside the measurement range for that specific laboratory. For example, some laboratories are only capable of measuring samples at or below 40 turbidity units and for these laboratories, any sample that has a value above 40 turbidity units will be above the measurement range of the respective technology for that laboratory (that is, the instrument). Thus, depending on the sample, the number of the laboratories participating will vary. The same condition is also true for Tables 4-7.

16.3.2 The analysis of data that was generated by ratio technologies is represented in Table 4. A ratio laboratory has a nephelometric detector plus one or more detectors at other angles. All detectors work together to determine the turbidity value of the sample. The reporting units represented in this table are NTRU, and FNRU.

16.3.3 Table 5 represents the analysis of data that was generated using only 1-detector technologies. These include nephelometric, backscatter, and attenuated measurement technologies. The reporting units would be NTU, FNU, FAU, FBU, and AU.

16.3.4 Table 6 represents the analysis of data that was generated from technologies that use an IR light source as the incident light. These laboratories utilized light sources that were in the 780 to 900-nm range. This includes all FNU, FNRU, FAU, and FBU reporting units.

16.3.5 Table 7 represents the analysis of data that was generated from technologies that use a "white light" incident light source. More specifically, these light sources emit light that is in the wavelength range of 400 to 700-nm. These are represented by the units: NTU, NTRU, and AU.

16.4 The samples that were analyzed in this collaborative study may not be typical of results for matrices other than those studied. A broad range of samples was collected and this data should help guide the user of this test method to the type of

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technology(ies) that would be applicable for the analysis of their respective sample.

16.5 Precision and bias were determined in accordance to Practice E691 statistical methods. Only surrogate samples were used for the determination of bias. All other samples could be used for determining precision, as long as the minimum number of laboratories was represented for the calculation. This number of laboratories is seven. Thus, in Tables 3-7, if the number of reporting laboratories is below 7, then that precision values between laboratories should be discarded.

16.6 Because Youden Pair samples were not feasible in this study, So was calculated in accordance with the repeatability measure of Practice E691. This is the exact equivalent of single operator precision as defined in Practice D2777 when Youden pairs are not utilized.

16.6.1 Only a statement of single operator precision is required. The modification of this study was allowed according to Section 1.3.2 in Practice D2777.

16.6.2 *Discussion of Results*—Due to the length of the round robin results, a brief discussion has been provided in Appendix X1. This discussion was presented at the 2006 National Water Quality Monitoring Conference[9] and represents the analysis of data that was performed by some of the round robin participants. The summary is non-mandatory information.

17. Keywords

17.1 calibration; calibration turbidity standard; calibration verification; measurement; nephelometric turbidity; ratio turbidity; turbidimeter; turbidity; turbidity standards

[9] National Water Quality Monitoring Conference, *Working Together for Clean Water*, 5th National Monitoring Conference, San Jose, CA, May 2006, https://acwi.gov/monitoring/conference/2006.

APPENDIXES

(Nonmandatory Information)

X1. DISCUSSION OF ROUND ROBIN RESULTS

X1.1 Introduction

X1.1.1 Due to the length of the round robin results section, a brief discussion has been provided in this appendix. The discussion includes conclusions from this study. This appendix also provides suggestions to improve data quality when measuring environmental samples.

X1.1.2 This information was presented at the 2006 National Water Quality Monitoring Conference[9] and represents the analysis of data that was performed by some of the round robin participants. The summary is non-mandatory information.

X1.2 Study Conclusions

X1.2.1 Formazin and stabilized formazin standards compared well across most technologies.

X1.2.1.1 SDVB (styrene divinylbenzene) standards are designed for individual models of turbidity meters and need to be matched with the correct instrument type, or errors will develop.

X1.2.2 Different technologies can produce significantly different results from identical environmental samples.

X1.2.3 Within a given technology, results varied less than between technologies.

X1.2.4 Duplicate samples agree quite well within technologies (that is, results are repeatable if using the same technology.

X1.2.5 *Dilutions*—Although the average of all technologies resulted in a reasonable error range, individual technologies, with the exception of FAU and FBU, had at least double-digit differences when compared to original sample readings.

X1.3 Suggestions to Improve Data Quality in Turbidity Measurement of Environmental Samples

X1.3.1 Understand the expected range of measurements prior to technology selection.

X1.3.1.1 Technologies with ratio techniques have greater ranges and better consistency across sample types.

X1.3.2 Traceable reporting units are necessary.

X1.3.3 Diluting samples should be avoided if possible.

X1.3.4 Practice consistency in sub-sample dispensation, preparation, and measurement.

X1.3.5 The static mode of measuring turbidity should be avoided if the sample has a significant amount of rapidly settling material.

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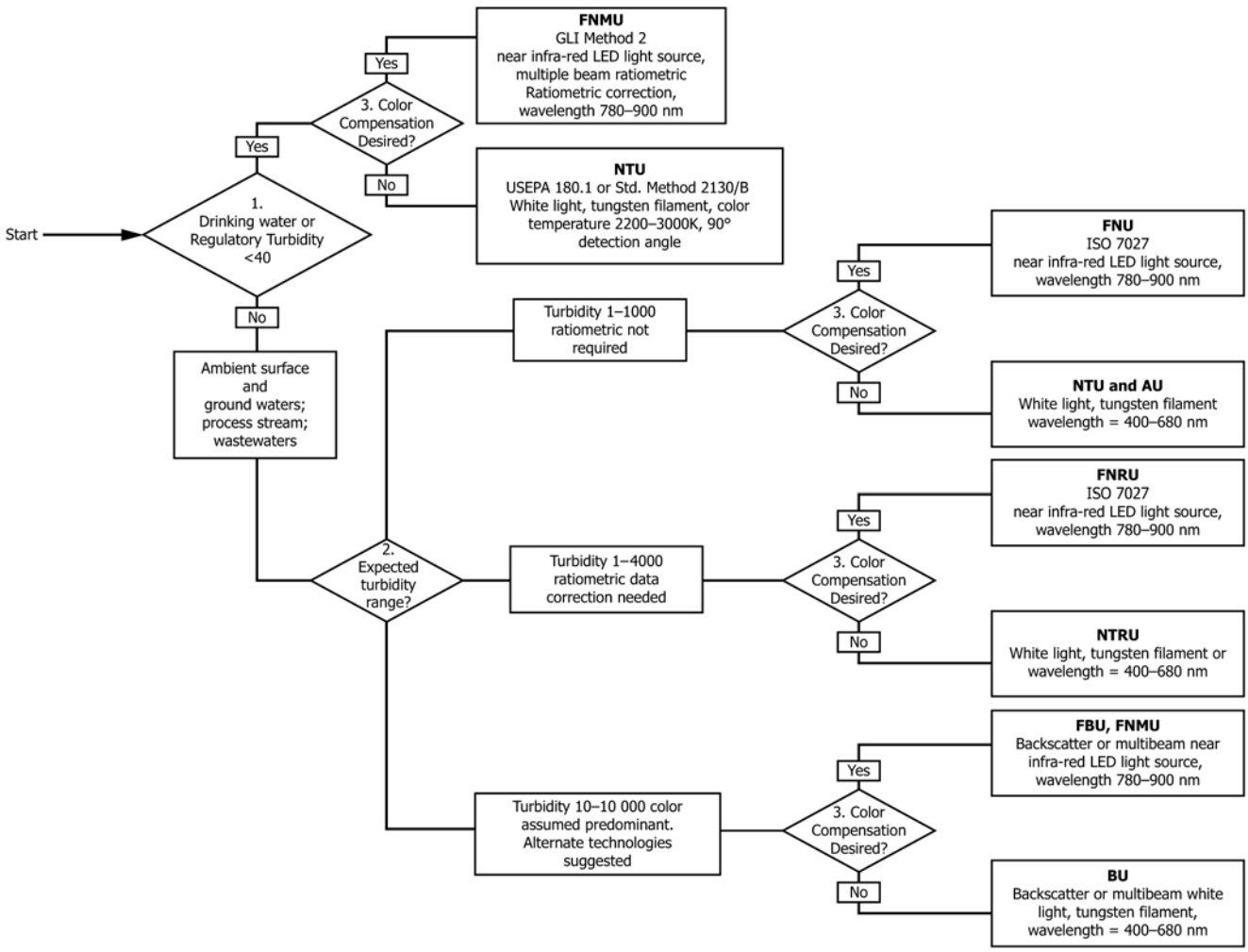
X2. SELECTION CRITERIA FLOWCHART FOR HIGH-LEVEL TURBIDITY MEASUREMENT

X2.1 Selection Criteria Flowchart for High-Level Turbidity Measurement

X2.1.1 This criteria was developed as a cooperative effort between the ASTM sub-committee on high-level turbidity measurement and the USGS. (See USGS National Field Manual for the Collection of Water Quality Data.)



NOTE 1—The technologies listed in this flowchart are those that are best applied for static turbidity measurements. Other technologies may be available but may not be suitable for static turbidity measurement applications. Change IR light sources to 780–900 nm.

FIG. X2.1 Selection Criteria Flowchart for High-Level Turbidity Measurement

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X3. CLEANING, AND MAINTENANCE OF TURBIDITY SAMPLE CELLS AND CAPS

X3.1 Introduction

X3.1.1 Sample cells and caps must be kept scrupulously clean both inside and outside. This level of cleanliness must be established prior to cell matching process and maintained throughout the cell's working lifetime.

X3.2 Cleaning

X3.2.1 Sample cells and caps must be examined prior to cleaning. All scratched, blemished, and scuffed cells should be discarded. All caps with liners that show signs of deterioration also must be discarded. Caps with TFE-fluorocarbon or polytetrafluoroethylene (PTFE) liners are recommended.

X3.2.2 Prepare a 1 % solution of a liquid detergent such as Liqui-Nox.[10] The quantity prepared should be sufficient to fill all cells twice with this solution.

X3.2.3 Fill each cell to half of its capacity with the solution, cap each cell, and shake each cell vigorously for at least 1 min. Flush each cell and cap with tap water 5 times.

X3.2.4 Refill each cell to capacity with the solution, cap each cell, and allow to stand for 2 h.

NOTE X3.1—Plastic test tube racks should be used for storage of cells.

X3.2.5 Uncap each cell, empty each, and flush each cell and cap with tap water 5 times making sure to rid each cell and cap of any residual detergent solution.

X3.2.6 Fill each cell with deionized (DI) water that has been filtered through a 0.2 µm filter, and cap. Allow to stand for 1 h.

X3.2.7 Uncap each cell and empty.

X3.2.8 Prepare a 1:4 hydrochloric acid (HCl) solution.

X3.2.9 Fill each cell to half of its capacity. Replace the cap and invert the cell 5 times (1 s inversion cycle). Uncap the cell, and pour off the HCl solution to the next cell to be rinsed.

X3.2.9.1 Repeat step X3.2.9 for up to 10 cells, after which the HCl solution is discarded. The process is repeated for every 10 cells. Each sample cell should be rinsed at least 3 times with the HCl solution.

NOTE X3.2—Caps with Teflon[11] liners are not damaged by the HCl solution. If less chemical resistant liners are present on caps, this procedure can be completed by using several caps that are dedicated for acid rinsing.

X3.2.10 After acid rinsing each cell 3 times, rinse the cells and caps 5 times with tap water and 5 times with 0.22 µm filtered DI water.

X3.2.11 Fill the cell with DI water, and place into a plastic test tube rack.

X3.2.12 Sample cells now are ready for matching, sample analyses, or both.

X3.3 Maintenance

X3.3.1 Sample cells must be evaluated frequently (weekly evaluations are recommended) to determine if they remain matched. Prior to the evaluation, all cells must be prepared as in accordance with X3.2.

X3.3.2 Fill a thoroughly clean container with sufficient 0.22 µm filtered DI water so that each cell can be filled 4 times. Acclimate the water so that it is at 20–25°C.

X3.3.3 Fill each cell with the water, degas the water by placing the cell into an ultrasonic bath for no more than 2 s. Cap the cell, and wipe the outside of the cell dry with a lint free tissue to eliminate any moisture.

X3.3.4 Place the water filled clean and dry cell in an indexed manner into the instrument and record the stable value.

X3.3.5 Repeat this process for each cell. If any cell is more than 0.010 NTU from any other cell, replace it with a cell that is.

X3.3.6 Continue with the evaluation of the cells until sufficient cells are obtained that meet the 0.010 NTU criteria and fulfill the analytical needs of the user.

X3.3.7 The cells passing the evaluation criteria now can be used for sample analysis.

X3.3.8 After sample determinations cells must be well rinsed with 0.22 µm filtered DI water and stored filled.

[10] The sole source of supply of the apparatus known to the committee at this time is SPI Supplies, P.O. Box 656, West Chester, PA 19381-0656. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[11] Teflon is a trademark of the Chemours Company FC, LLC, Wilmington, DE, 19899.

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X4. CRITICAL VALUES OF F AT 1 % SIGNIFICANCE (99 % CONFIDENCE) LEVEL (ONE-SIDED)

Degrees of Freedom for Denominator (dfS_0)	Degrees of Freedom for Numerator (dfS_1)										
	1	2	3	4	5	6	7	8	9	10	12
1	4052.	4999.	5403.	5625.	5764.	5859.	5928.	5981.	6022.	6056.	6106.
2	98.50	99.00	99.17	99.25	99.30	99.33	99.36	99.37	99.39	99.40	99.42
3	34.12	30.82	29.46	28.71	28.24	27.91	27.67	27.49	27.34	27.23	27.05
4	21.20	18.00	16.69	15.98	15.52	15.21	14.98	14.80	14.65	14.54	14.37
5	16.26	13.27	12.06	11.39	10.97	10.67	10.46	10.29	10.16	10.05	9.89
6	13.74	10.92	9.78	9.15	8.75	8.47	8.26	8.10	7.98	7.87	7.72
7	12.25	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72	6.62	6.47
8	11.26	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91	5.81	5.67
9	10.56	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35	5.26	5.11
10	10.04	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94	4.85	4.71
11	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63	4.54	4.40
12	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39	4.30	4.16
13	9.07	6.70	5.74	5.20	4.86	4.62	4.44	4.30	4.19	4.10	3.96
14	8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03	3.94	3.80
15	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89	3.80	3.67
16	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78	3.69	3.55
17	8.40	6.11	5.18	4.67	4.34	4.10	3.93	3.79	3.68	3.59	3.46
18	8.28	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60	3.51	3.37
19	8.18	5.93	5.01	4.50	4.17	3.94	3.77	3.63	3.52	3.43	3.30
20	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46	3.37	3.23
21	8.02	5.78	4.87	4.37	4.04	3.81	3.64	3.51	3.40	3.31	3.17
22	7.95	5.72	4.82	4.31	3.99	3.76	3.59	3.45	3.35	3.26	3.12
23	7.88	5.66	4.76	4.26	3.94	3.71	3.54	3.41	3.30	3.21	3.07
24	7.82	5.61	4.72	4.22	3.90	3.67	3.50	3.36	3.26	3.17	3.03
25	7.77	5.57	4.68	4.18	3.85	3.63	3.46	3.32	3.22	3.13	2.99
26	7.72	5.53	4.64	4.14	3.82	3.59	3.42	3.29	3.18	3.09	2.96
27	7.68	5.49	4.60	4.11	3.78	3.56	3.39	3.26	3.15	3.06	2.93
28	7.64	5.45	4.57	4.07	3.75	3.53	3.36	3.23	3.12	3.03	2.90
29	7.60	5.42	4.54	4.04	3.73	3.50	3.33	3.20	3.09	3.00	2.87
30	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07	2.98	2.84
40	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89	2.80	2.66
60	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72	2.63	2.50
120	6.85	4.79	3.95	3.48	3.17	2.96	2.79	2.66	2.56	2.47	2.34
∞	6.63	4.61	3.78	3.32	3.02	2.80	2.64	2.51	2.41	2.32	2.18

FIG. X4.1 Critical Values of F at 1 % Significance (99 % Confidence) Level (One-Sided)

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X5. DEFINITIONS RELATING TO THE OPTICAL DESIGN OF TURBIDIMETER INSTRUMENTATION

X5.1 Introduction

X5.1.1 This appendix is provided for the user of this test method in the case that additional information related to scientific definitions that relate to turbidity measurements. These definitions can be applied to the designs listed in this test method.

X5.2 Definitions

X5.2.1 *absorption, n*—the conversion of light or NIR to heat as it passes through water or wastewater. Unlike scattering, absorption does not alter the direction of radiation transfer. In a turbidity sample, radiation is absorbed by water, dissolved radiation-absorbing materials, the sample matrix, and by suspended particles. The absorption coefficient, a in m^{-1}, is the quantitative measure of this IOP. Turbidimeters respond to light absorption by a sample but they do not quantitatively measure the coefficient a.

X5.2.2 *attenuation, n*—the combined effects of absorption and scattering in water and wastewater that reduce (attenuate or extinguish) the intensity of light or NIR as it passes through a turbidity sample. A light beam that enters a sample with an initial intensity of 100 units and leaves the sample with an intensity of 30 units, for example, is attenuated by 70 units, or 70 %. Attenuation equals $1.0 - T$ when the quantities are expressed as ratios. The attenuation coefficient, c in m^{-1}, is the quantitative measure of this inherent optical property. Turbidimeters respond to attenuation by samples but they do not quantitatively measure c. The attenuation coefficient equals the sum of a and b ($a + b = c$).

X5.2.3 *automatic power control (APC), n*—the regulation of light or NIR power at the entrance window to a turbidity sample such that the irradiance in W m^{-2} remains constant with time and temperature. Automatic power control is achieved with the output from a light/NIR monitoring detector and an electronic feedback circuit.

X5.2.4 *broadband "white-light" sources, n*—for the purposes of this test method, a broadband, "white-light" light source is one that is visible (380–770 nm) and has a full bandwidth at half maximum intensity (FWHM) greater than 80 nm. Tungsten filament lamps and white LEDs with or without color-correction filters are used to create broadband sources in turbidimeters.

X5.2.5 *detector angle, n*—the angle between the axis of the detector acceptance cone and the axis of the source light or NIR beam. The detector angle equals $180° - \theta$.

X5.2.6 *dilution water, n*—distilled waster with a turbidity less than 0.25 NTU, measured by Test Method D6855 (low range, static mode) used for the preparation of calibration standards for this test method.

X5.2.7 *inherent optical properties (IOPs), n*—the physical properties, including absorption, scattering, and attenuation, that influence the transfer of light and NIR through water and wastewater and that are unaffected by ambient illumination or radiation. Turbidimeters respond to the IOPs of a sample but they do not quantitatively measure them.

X5.2.8 *interferences, n*—sample properties and a wide variety of factors including, but not limited to: *(1)* sample-handling artifacts, *(2)* particle settling, *(3)* bubble formation and dissolution, *(4)* chemical precipitation and dissolution, *(5)* biological production and decomposition of particles, and *(6)* changes in the transparency and reflectivity of optical components caused by chemical, biological, and sediment buildup on such components or in the sample volume. Interferences cause turbidity readings to be higher or lower than they would be in the absence of these factors. Positive interference causes turbidity measurements to increase while negative interferences lower turbidity values.

X5.2.9 *intermediate-band radiation sources, n*—for the purposes of this test method, an intermediate-band light or NIR source is one that has a full bandwidth at half maximum intensity (FWHM) of 5 to 80 nm. LEDs, IREDs, and broadband, "white-light" sources with band-pass optical filters are used to create intermediate-band sources in turbidimeters.

X5.2.10 *monitor photo/NIR detector, n*—a solid-state device used to detect the radiance from a turbidimeter light source.

X5.2.11 *narrow-band, "monochromatic" radiation sources, n*—for the purposes of this test method, a narrow-band or "monochromatic" light or NIR source is one that has a full bandwidth at half maximum intensity (FWHM) of less than 5 nm. Lasers and broadband, "white light" sources with appropriate interference filters are used to create narrow-band sources in turbidimeters.

X5.2.12 *operating spectrum, n*—the spectrum resulting from the wavelength by wavelength product of source intensities and filter and detector response. The shape of the operating spectrum represents the relative contributions of measurement wavelengths. In this test method, turbidimeters with narrow-band, "monochromatic," sources have an operating wavelength. All others have an operating spectrum.

X5.2.13 *photo/NIR detector, n*—a solid-state device used to detect the relative intensity of radiance from a turbidity sample.

X5.2.14 *particle size distribution (PSD), n*—after suspended-sediment concentration (SSC), PSDs have the largest single influence on turbidity values in surface-water measurements.

X5.2.15 *scatter (also referred to as scattering), v*—the interaction of a light or NIR beam with suspended particles and inhomogenieties of the matrix refractive index that alter the direction of radiation transport without changing the wavelength. The scattering coefficient, b in m^{-1}, is the quantitative measure of this IOP. The volume scattering function, VSF,

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expresses the angular distribution and relative intensity of light scattered from a sample. It depends, among other things, on the size of the scattering particles relative to the operating wavelength or spectrum (see definition of the size parameter). Turbidimeters respond to the intensity and direction of light scattering by samples but they not quantitatively measure the coefficient *b* or the VSF.

X5.2.16 *scattering angle (θ), n*—the angle between a source light or NIR beam and the scattered beam. Forward-scattered radiation fills the hemisphere surrounding a source beam and oriented away from the source ($0 < \theta < 90°$) and backscattered radiation fills the opposite hemisphere ($90° = \theta < 180°$).

X5.2.17 *size parameter (x), n*—the product of particle radius and $2\pi n$, where n = the refractive index of the particle-suspending medium, divided by operating wavelength. For this test method, $2\pi n$ is a constant about equal to 8.2. Other factors being equal, the shape of the volume scattering function depends on the value of x.

X5.2.18 *transmission (T), n*—the ratio, T, of light or NIR intensity at a measurement location to its initial intensity. When expressed in ratios, $T = 1.0 - A$, where A is the proportion of light or NIR intensity that is attenuated by scattering and absorption. Turbidimeters do not quantitatively measure T. (Transmittance: $T = P/ P_0$, where P_0 is the radiant power of light striking the sample on one side of the cell (or chamber) and P is the radiant power of light emerging from the other side of the sample.) This is the universal definition that is used.

X5.2.19 *turbidimeter design, n*—an arrangement of optical (lenses, windows, filters, field stops, etc.), opto-electronic (light/NIR sources and detectors, etc.), mechanical components, and electrical circuits for determining the turbidity of a water or wastewater sample in a numerical value relative to a calibration standard. This test method presents the specifications for ten turbidimeter designs.

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SUMMARY OF CHANGES

Committee D19 has identified the location of selected changes to this standard since the last issue (D7315 – 12) that may impact the use of this standard. (Approved July 1, 2017.)

(1) Revised Section 3.

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This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

Designation: D7767 – 11

Standard Test Method to Measure Volatiles from Radiation Curable Acrylate Monomers, Oligomers, and Blends and Thin Coatings Made from Them[1]

This standard is issued under the fixed designation D7767; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method describes a means to determine the percentage of processing, potential, and total volatiles from radiation curable acrylate monomers, oligomers, and blends. The results can be used to estimate the volatiles from thin radiation curable coatings that cannot otherwise be measured with the restriction that those coatings are not subjected to a pre-exposure water or solvent drying step. It also provides a means to determine the volatiles of thin radiation curable coatings in the absence of known interferences such as pigments in inks.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D5403 Test Methods for Volatile Content of Radiation Curable Materials

E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

2.2 *Other Document:*[3]

EPA Method 24 Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings

3. Terminology

3.1 *Definitions:*

3.1.1 *cure, n*—conversion of a coating from its application state to its final use state measured by tests generally related to end use performance and mutually agreeable to supplier and purchaser.

3.1.2 *electron beam (EB) curing, n*—conversion of a coating from its application state to its final use state by means of a mechanism initiated by electron impingement generated by equipment designed for that purpose.

3.1.3 *pigment, n*—an insoluble substance added to a formulation to modify the visual appearance of a coating made from the formulation.

3.1.4 *potential volatiles, n*—the percentage loss in specimen weight upon heating at 110°C for 60 min after radiation curing.

3.1.5 *processing volatiles, n*—the percentage loss in specimen weight under process conditions that are designed to simulate actual industrial cure processing conditions.

3.1.6 *retained weight, n*—the mass of specimen remaining after exposing to the UV source, heating in an oven, or both.

3.1.7 *thin, adj*—less than 15 micrometres in thickness.

3.1.8 *total volatiles, n*—the percentage loss in specimen weight under process conditions that are designed to simulate actual industrial cure processing conditions and after heating at 110°C for 60 min.

3.1.9 *ultraviolet (UV) curing, n*—conversion of a coating from its application state to its final use state by means of a mechanism initiated by ultraviolet radiation in the range from 200 to 400 nm generated by equipment designed for that purpose.

[1] This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.21 on Chemical Analysis of Paints and Paint Materials.

Current edition approved Nov. 1, 2011. Published November 2011. DOI: 10.1520/D7767-11.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, http://www.access.gpo.gov.

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3.1.10 *UVA, n*—the region of the electromagnetic spectrum comprising wavelengths falling in the range between 320 and 390 nm.

4. Summary of Test Method

4.1 A designated quantity of an acrylate-functional material (test specimen) is weighed in a container lid before and after a UV exposure step sufficient to ensure a thorough cure of the test specimen to obtain the percent solids retained. The calculated percentage weight loss is attributed to process volatiles. The test specimen and container lid are weighed again after heating for 60 min at 110 ± 5°C to obtain the percent solids retained. Any additional weight loss is attributed to potential volatiles. The total volatiles for a test specimen are the difference between the initial sample mass and the retained mass after exposing and heating divided by the initial mass.

5. Significance and Use

5.1 This test method is an extension of Test Method D5403. While Test Method D5403 specifies that a test specimen be cured by exposure to UV or EB as prescribed by the supplier of the material, most radiation curable monomers and oligomers provided as raw materials to formulators are not designed to be used alone but rather as blends of monomers and oligomers so that there are no "supplier prescribed" exposure conditions. Test Method D5403 is not appropriate for the measurement of volatiles from thin radiation-curable coatings because supplier prescribed cure conditions include both a thickness and an exposure specification which are difficult or impossible to achieve in a test lab. Furthermore, inks form a special class of thin radiation curable coatings because they are formulated with known interferences (for example, pigments). As a result, Test Method D5403 does not provide a method for measuring volatiles from monomers and oligomers used as raw materials in the formulation of radiation curable coatings nor does it provide a method for measuring volatiles from thin radiation curable coatings such as inks.

5.2 This test method provides a means to measure the volatile content of individual acrylate monomers, oligomers, and blends commonly used to formulate radiation curable coatings such as printing inks. Such coatings comprise liquid or solid reactants that cure by polymerizing, crosslinking, or a combination of both and are designed to be applied as thin coatings in the absence of water or solvent and to be cured by exposing to ultraviolet radiation. There is currently no direct method for measuring the volatiles from the individual materials used or thin coatings made from them.

5.3 This test method also provides a means to measure the volatiles from acrylate monomers, oligomers, and blends cured using ultraviolet radiation from which an estimate for the volatiles from a thin coating cured using ultraviolet radiation comprising these acrylate monomers, oligomers, and blends can be calculated. A common exposure step involving a specified amount of ultraviolet radiation in a specific spectral range using a common photoinitiator is called for.

5.4 This test method further provides a means to measure the volatiles from thin radiation-curable coatings such as inks in the absence of known interferences such as pigments. A common exposure step involving a specified amount of ultraviolet radiation in a specific spectral range using a common photoinitiator is called for.

5.5 If desired, volatile content can be determined as two separate components: processing volatiles and potential volatiles. Processing volatiles are a measure of volatile loss during the actual cure process. Potential (or residual) volatiles are a measure of volatile loss that might occur upon aging or under extreme storage conditions. These volatile content measurements may be useful to the producer of a material, a formulator using such materials, or to environmental interests for determining and reporting emissions.

5.6 The validity of this test method for non-acrylated radiation-curable chemistries such as methacrylates, thiol-ene, vinyl ethers, and epoxies cured using ultraviolet radiation has not been verified. Use of an electron beam to cure the acrylate monomers, oligomers, and blends or thin coatings made from them, including inks, has not been verified using this method and cannot be assumed.

6. Interferences

6.1 The degree to which the results of this procedure accurately measure the volatiles emitted is absolutely dependent upon proper cure during the test procedure. Although overcure will have little or no effect upon measured volatiles, undercure may lead to erroneously high values. To minimize variability in the cure conditions, an ultraviolet source providing a given irradiance in a specific spectral region and an exposure energy is specified as is a photoinitiator and concentration.

6.2 The presence of strong ultraviolet absorbing non-acrylate species such as pigments and ultraviolet blockers can interfere with the ability of this test procedure to accurately measure volatiles. These additives are designed to absorb, reflect, luminesce, or scatter visible or ultraviolet radiation. Such additives interfere with the proper cure of materials tested using this method and are to be avoided.

6.3 Photoinitiators are strong ultraviolet absorbers but their presence is required for proper curing.

7. Apparatus

7.1 *Container Lids,* metal can lids having an OD of 35 mm and a height of 14 mm with a 25 mm diameter protrusion which, when inverted, creates a 0.6 mm deep, 25 mm diameter well.[4]

7.2 *Forced Draft Oven, Type IIA or IIB* as specified in Specification E145.

7.3 *Ring Stand,* a device designed to support items using various clamps.

7.4 *Versatile Clamp,* a 3-pronged clamp with adjustable closure for holding items.

[4] Metal can lids for this method can be obtained from SKS Bottle & Packaging (Watervliet, NY).

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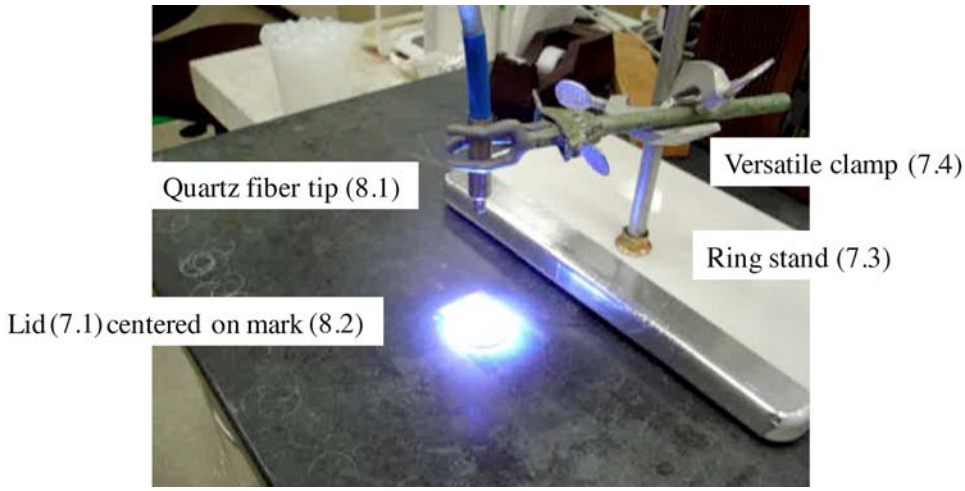

FIG. 1 Photo of Fiber Alignment Relative to Metal Lid During Exposure

7.5 *Ultraviolet Radiation Source,* the focused output from a short-arc 200W Xe/Hg bulb delivered by a quartz fiber guide.[5]

7.6 *Radiometer,* a device able to measure irradiance and energy in the UVA spectral region.[6]

7.7 *Balance,* an instrument capable of weighing a mass to the nearest 0.1 mg.

7.8 *Gloves,* personal protective wear for handling chemicals.

7.9 *Forceps or Tongs,* a means to handle a specimen without direct contact in order to minimize mass transfer.

7.10 *Spreading Tool,* a small metal or PTFE spatula or a wooden applicator stick for spreading resin.

8. Preparation of Apparatus

8.1 The tip of the quartz fiber guide shall be positioned normal to the center of a container lid (7.1) at a height of approximately 80 to 85 mm from the container lid to provide an illuminated circular area of approximately 40 to 45 mm in diameter in the plane on which the container lid (7.1) sets in order to approximate uniform irradiance of the test specimen.

8.2 Identify the approximate center of the illuminated area with a mark which will later assist in positioning of a container lid with a test specimen. A 25 mm filter paper disk taped to the work area surface works well for this. A proper setup is shown in Fig. 1.

NOTE 1—Placement of a mark is best accomplished with the shutter open. Wear appropriate eye protection before opening the shutter and placing the mark.

8.3 Center the optical window of the radiometer on the mark (8.2). Using the ultraviolet radiation source (7.5) set at 100 % power with the fiber (8.1) and radiometer optical window (7.6) properly aligned, open the shutter and measure the UVA peak irradiance at the sample plane. If necessary, adjust the fiber height to achieve a UVA peak irradiance of 115 ± 15 mW/cm^2. Once positioned, the fiber should not be moved relative to the mark (8.2).

8.4 Position the radiometer window (7.6) on the mark (8.2) and measure the UVA energy after an 80 s exposure. If necessary, adjust the exposure time to achieve a UVA target energy of 9.0 ± 0.2 joules/cm^2. This determination should be repeated daily to verify proper exposure conditions.

9. Procedure

9.1 Dissolve 2.0 % by weight of ethyl-2,4,6-trimethylbenzoyphenylphosphinate (TPO-L) photoinitiator in the material to be tested. Mix thoroughly to ensure homogeneity. Store the test specimen in a dark container.

9.2 Precondition the container lids for 30 min at 110 ± 5°C and store in a desiccator prior to use.

9.3 Weigh a preconditioned container lid (7.1) to 0.1 mg (*A*). Use gloves, forceps, or tongs to handle the container lid.

9.4 Place the container lid upside down on the balance pan and add 0.2 ± 0.02 g of the test specimen (9.1) to the recessed area. Spread the test specimen using a spreading tool to ensure uniform coverage of the recessed area. Do not allow the test specimen to contact any surface of the container lid outside of the recessed area. Weigh the container lid with test specimen to 0.1 mg (*B*).

NOTE 2—It is helpful to hold the container lid with one hand using gloves, forceps, or tongs while spreading the test specimen with the spreading tool in the other. The elapsed time between spreading and weighing should be no greater than 60 s. If the sample to be tested contains any reactive diluent with a vapor pressure at room temperature greater than 1.0 mm Hg, the elapsed time between spreading and weighing must be no greater than 30 s.

NOTE 3—Low viscosity test specimens spread easily and a uniform thickness can be obtained. High viscosity test specimens are more difficult to work with but it is important to spread as evenly as is practical. Air bubbles shall be removed, if possible.

9.5 Center the container lid with test specimen on the mark (8.2) using gloves, forceps, or tongs, being careful not to

[5] This test method was developed using an LC-8 SpotCure source from Hamamatsu Corporation (Bridgewater, NJ).

[6] Power Puck II from EIT (Sterling, VA).

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TABLE 1 Calculation of Estimated Volatiles for a Coating using Method A

Reactive Components in Composition	Weight Percentage of each Monomer, Oligomer, or Blend in the Composition	Total Percent Volatiles for each Monomer, Oligomer, or Blend in the Composition (10.2.1)	Total Percent Volatiles in Composition based on Weight Percentages
Acrylate 1	30.0	1.67	0.50
Acrylate 2	60.0	0.43	0.26
Acrylate 3	10.0	3.14	0.31
Totals	100.0	NA	1.07

TABLE 2 Determination of Volatiles from Blends and Fully Formulated Coatings using Method B

Components in Composition (I)	Weight Percentage of each Component in Fully Formulated Ink (II)	Weight Percentage of each Component in Test Specimen (III)	Total Percent Volatiles of Test Specimen (IV)
Acrylate 1	22.5	24.0	
Acrylate 2	45.0	49.0	
Acrylate 3	7.5	8.2	
Inert Filler	5.8	6.3	
Photoinitiator 1	6.0	6.5	
Amine Synergist	3.0	3.3	
Flow Aid	0.2	0.2	
Photoinitiator (Note 7)	0.0	2.0	
Pigment	10.0	0.0	
Totals	100.0	100.0	1.50

TABLE 3 R_{bake}

Expected R_{bake}	Average[A] $\bar{X}$	Repeatability Standard Deviation s_r	Reproducibility Standard Deviation S_R	Repeatability Limit r	Reproducibility Limit R
>99 %	99.6358	0.1654	0.2195	0.4631	0.6147
98 % – 99 %	98.5094	0.4852	0.5469	1.3586	1.5314
<98 %	96.0745	0.2169	0.4887	0.6075	1.3685

[A] The average of the laboratories' calculated averages.

disrupt the area of the container lid in contact with the test specimen. This is critical to ensure good repeatability.

NOTE 4—If the test specimen flows beyond the recessed area of the container lid during transport from the balance to the mark, the sample must be discarded and the procedure repeated.

9.6 Open the shutter for the exposure time determined in 8.4 to provide 9.0 ± 0.2 joules/cm ^{2} UVA energy.

NOTE 5—Acrylate polymerization is accompanied by a reaction exotherm. Some very reactive monomers such as 1,6-hexanediol diacrylate react extremely fast and generate enough heat such that the cured test specimen can shatter, sometimes resulting in expulsion of some of the cured test specimen from the container lid. If this occurs, the sample must be discarded and a fresh specimen tested.

9.7 If determination of process and potential volatiles is desired, cool the test specimen for 15 min in a desiccator then reweigh the container lid with test specimen to 0.1 mg (*C*).

9.8 Repeat steps 9.3 – 9.7 until each of three container lids with exposed specimen is deemed acceptable per Note 4 and Note 5.

9.9 Heat the container lids with test specimen in a forced draft oven (7.2) for 60 min at 110 ± 5°C.

9.10 Allow the container lid with test specimen to cool to room temperature in a desiccator for 15 min and reweigh to 0.1 mg (*D*).

10. Calculation or Interpretation of Results

10.1 Determine the retained weight percentage after UV exposure (R_{UV}) and after baking (R_{bake}) and calculate the weight percent volatiles using the following equations:

$$R_{UV} = 100\,[(C - A)/(B - A)] \quad (1)$$

$$R_{bake} = 100[(D - A)/(B - A)] \quad (2)$$

$$Processing\ Percent\ Volatiles = 100 - R_{UV} \quad (3)$$

$$Potential\ Percent\ Volatiles = R_{UV} - R_{bake} \quad (4)$$

$$Total\ Percent\ Volatiles = 100 - R_{bake} \quad (5)$$

where:

A = weight of container lid, g
B = weight of container lid plus test specimen, g
C = weight of container lid plus test specimen after UV cure, g, and
D = weight of container lid plus cured test specimen after heating, g.

10.2 Measurement of total percent volatiles for a neat monomer, oligomer or blend.

10.2.1 This test method allows the total percent volatiles of an acrylate monomer, oligomer, or blend to be determined based on the retained test specimen weights after exposing and baking. Representative materials include acrylate-functional

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raw materials that are used in formulating radiation curable coatings and inks such as tripropyleneglycol diacrylate, a polyurethane acrylate oligomer, and an epoxy acrylate oligomer diluted with trimethylolpropane triacrylate.

NOTE 6—The total percent volatiles includes a small contribution from the photoinitiator (9.1) which was measured using EPA Method 24 in which a sample of ethyl-2,4,6-trimethylbenzoylphenylphosphinate (9.1) was heated in a forced draft oven (7.2) for 60 min at 110 ± 5°C. The weight loss from the neat photoinitiator was found to be 1.11 %. Thus, the contribution from the ethyl-2,4,6-trimethylbenzoylphenylphosphinate present at the 2 % level in a test specimen contributes 0.02 % to the total percent volatiles using this test method.

10.3 Determination of total percent volatiles for a UV-curable acrylate coating.

10.3.1 *Method A — Estimating the Total Percent Volatiles for a UV-Curable Coating based on the Weighted Contribution of the Individual Components*—Table 1 illustrates how to estimate the total percent volatiles for a thin radiation curable coating using a weighted contribution of the total percent volatiles from each acrylate component present in the coating as determined using 10.2. In this example, the estimated total percent volatiles for the coating based on the individual acrylate components is 1.07 %. The same procedure can be applied to estimate a processing percent volatiles and potential percent volatiles for the coating, if desired. Note that Method A does not include contributions from other photoinitiators and non-acrylate additives including interferences that might be present in a fully formulated coating or synergistic effects of blending high and low functionality monomers, oligomers or blends and is therefore likely to provide the least accurate value of the actual total percent volatiles.

10.3.2 *Method B — Determining the Total Percent Volatiles for a UV-Curable Coating based on Testing a Blend of the Individual Components*—While 10.3.1 can be used to estimate the total percent volatiles for a UV-curable coating, a more preferred method is to measure the total percent volatiles on a fully formulated coating, less any known interferences. This method is most appropriate for UV inks or acrylate blends where synergistic effects due to functionality are expected. The blend shown in Table 2 contains all of the acrylate components listed in Table 1 in the same relative amounts in addition to a variety of non-acrylate components such as a photoinitiator package, flow aids, and amine synergists. Note that the addition of the 2.0% ethyl-2,4,6-trimethylbenzoylphenylphosphinate (9.1) is still required in the test specimen. Method B can be used to determine the total percent volatiles for a formulation that eliminates the need to measure the total percent volatiles of the individual components. The processing percent volatiles and potential percent volatiles can also be determined, if desired.

NOTE 7—If interferences are present in the fully formulated coating, the total percent volatiles value calculated for the blend less the interferences must be corrected by multiplying the total percent volatiles by one minus the percentage of interferences in the coating. Thus, if the volatiles for a fully formulated ink having the composition shown in Table 2 column II were to be determined using Method B, the composition without pigment shown in column III would be tested in which the compositional weight percentages remain the same and the required photoinitiator (9.1) is added. If the total percent volatiles were determined to be 1.50 %, then the total percent volatiles for the fully formulated composition with 10 % pigment would be 90 % of the value measured or 1.35 %. Correcting this value for the 0.02 % volatiles contribution from the required photoinitiator (Note 6), the reported value would be 1.33 %. This assumes that the total percent volatiles for the interferences is zero. If desired, a total percent volatiles contribution for these interferences can be measured using alternative methods such as EPA Method 24.

11. Precision and Bias[7]

11.1 The precision of this test method is based on an intralaboratory study of ASTM D7767, Test Method to Measure Volatiles from Radiation Curable Acrylate Monomers, Oligomers, and Blends and Thin Coatings Made from Them, conducted in 2010. Nine laboratories participated in this study, analyzing materials representing three different property types. Each "test result" reported represents an individual determination and the participating labs reported three to twelve replicate test results for each material type. Practice E691 was followed for the design and analysis of the data; the details are given in ASTM Research Report No. D01–1159.

11.1.1 *Repeatability Limit (r)*—Two test results obtained within one laboratory shall be judged not equivalent if they differ by more than the "*r*" value for that material; "*r*" is the interval representing the critical difference between two test results for the same material, obtained by the same operator using the same equipment on the same day in the same laboratory.

11.1.1.1 Repeatability limits are listed in Table 3.

11.1.2 *Reproducibility Limit (R)*—Two test results shall be judged not equivalent if they differ by more than the "*R*" value for that material; "*R*" is the interval representing the critical difference between two test results for the same material, obtained by different operators using different equipment in different laboratories.

11.1.2.1 Reproducibility limits are listed in Table 3.

11.1.3 The above terms (repeatability limit and reproducibility limit) are used as specified in Practice E177.

11.1.4 Any judgment in accordance with statements 11.1.1 and 11.1.2 would have an approximate 95 % probability of being correct.

11.2 *Bias*—At the time of the study, there was no accepted reference material suitable for determining the bias for this test method, therefore no statement on bias is being made.

11.3 The precision statement was determined through statistical examination of 189 test results, reported by nine laboratories, on three types of materials.

12. Keywords

12.1 acrylic monomers; acrylics; blends; electron beam curing; inks; oligomers; photoinitiator; pigmented coatings; radiation curable material; radiation curing; ultraviolet curing; volatile content

[7] Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D01-1159.

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Rule 1168 Emissions Reductions Calculation Demonstration

Category	Current VOC Limit (g/L)	SWA Regulated VOC (g/L)	SWA VOC of Material (g/L)	Proposed Regulatory VOC Limit (g/L)	Estimated VOC of Material (g/)	Total Sales over proposed limits (gallons)	Potential Reductions (tpd)
Foam Sealant	200	152	152	50	50	152,415	0.18
Other Outdoor Flooring Adhesives	150	1	0	50	5	PD	0.00005
Other Sealants	420	306	155	250	129	51,601	0.05
Clear, Paintable, Immediately Water Resistant Sealant	380	373	373	250	250	PD	0.013
CPVC Welding	490	495	480	400	387	10,719	0.011
PVC Welding	510	510	472	425	393	158,827	0.14
Non-Membrane Roof Adhesive	250	104	96	200	188	110,239	0.03
Non-Membrane Roof Sealant	300	172	167	250	228	516,752	0.12
Rubber Vulcanization	850	755	716	250	237	PD	0.06
Single Ply Roof Adhesive	250	69	41	200	108	1,511	0.04
Single-Ply Roof Membrane Sealant	450	71	71	250	244	3,208	0.002
Architectural Sealant	250	45	35	50	39	455,539	0.30
Wood Flooring Adhesive	100	49	28	20	13	425,522	0.19
Totals:						**1,886,333**	**1.1**
20 % for underreporting						2,263,600	1.36
2.9% for Population growth since 2013						2,328,791	1.40

SWA = Sales Weighted Average

Sample calcuation:

∑(VOC of material of product (g/L) - Estimated VOC of material limit (g/L)) * Total Sales (gallons) /119.83 (convert g/L to #/gal) / 365 days/year / 2000 #/ton

Category	Emissions	Total Sales
Adhesive - Other	0.46	282,999
Adhesive Primer - General	0.00	9,431
Adhesive Primer - Pressure Sensitive	0.02	117,312
Architectural Adhesive - Other	0.00	5,281
Architectural Adhesive - Cove Base Installation	0.01	162,473
Architectural Adhesive - Dry Wall/Panel	0.00	9,269
Architectural Adhesive - Ceramic Tile Installation	0.09	604,656
Architectural Adhesive - Flooring - Carpet Pad Adhesive	0.00	70,820
Architectural Adhesive - Flooring - Other Indoor Floor Covering	0.09	726,601
Architectural Adhesive - Flooring - Other Outdoor Floor Covering	0.00	9,321
Architectural Adhesive - Flooring - Rubber	0.00	PD
Architectural Adhesive - Flooring - Subfloor	0.05	133,376
Architectural Adhesive - Flooring - VCT and Asphalt Tile	0.04	479,502
Architectural Adhesive - Flooring - Wood	0.30	798,510
Architectural Adhesive - Multipurpose Construction	0.11	565,357
Architectural Adhesive - Roofing - Non-Membrane	0.33	243,614
Architectural Adhesive - Roofing - Single Ply Roof Material Installation	0.24	259,781
Architectural Adhesive - Structural Wood Member	0.02	41,172
Foam Sealant	0.27	154,718
Miscellaneous Adhesive - Contact Adhesive	0.14	240,926
Miscellaneous Adhesive - Marine (not in 1168 yet)	0.00	PD
Miscellaneous Adhesive - Motor Vehicle	0.00	4,451
Miscellaneous Adhesive - Motor Vehicle Top and Trim	0.28	PD
Miscellaneous Adhesive - Specialty Contact Adhesive	1.30	700,743
Miscellaneous Adhesive - Thin Metal Laminating (currently exempt)	0.00	3,971
Plastic Welding - ABS	0.19	52,912
Plastic Welding - Other	0.02	3,998

Category	Emissions	Total Sales
Plastic Welding - CPVC	0.04	7,919
Plastic Welding - Plastic Cement Welding Adhesive Primer	0.23	47,189
Plastic Welding - PVC	0.86	158,787
Sealant - Architectural	0.70	1,228,119
Sealant - Clear, Paintable, Immediately Water Resistant	0.04	PD
Sealant - Marine Deck	0.00	PD
Sealant - Non-membrane Roof	1.76	769,449
Sealant - Other	0.13	69,332
Sealant - Roadway	0.02	24,919
Sealant - Single-Ply Roof Membrane	0.01	8,294
Sealant Primer - Architectural Non Porous	0.01	1,507
Sealant Primer - Architectural Porous	0.00	402
Sealant Primer - Other	0.03	9,227
Substrate Adhesive - All Other Substrates	0.06	113,116
Substrate Adhesive - Fiberglass	0.00	628
Substrate Adhesive - Metal to Metal	0.00	196
Substrate Adhesive - Plastic Foam	0.00	12,394
Substrate Adhesive - Porous Materials	0.01	248,978
Substrate Adhesive - Reinforced Plastic Composite	0.15	PD
Substrate Adhesive - Wood	0.04	143,698
TBD	0.39	168,256
Adhesive - Cyanoacrylate	0.00	7
Potting compounds (electronics - not defined)	0.00	4,308
Sealent - Grout	0.04	77,354
	8.51	**8,887,558**
20 % for underreporting	10.2	10,665,070
2.9% for Population growth since 2013	10.5	10,972,224

PD = protected data (3 or few companies reported)

(Adopted February 4, 1977)(Amended April 1, 1977)(Amended September 2, 1977)
(Amended November 4, 1988)(Amended July 9, 1993)(Amended November 17, 1995)
(Amended June 13, 1997) (Amended March 13, 1998)(Amended June 12, 1998)
(Amended April 9, 1999)(Amended October 19, 2001)(Amended December 3, 2004)
(Amended September 11, 2009)(Amended March 1, 2013)(Amended May 2, 2014)

RULE 102. DEFINITION OF TERMS

Except as otherwise specifically provided in these rules and except where the context otherwise indicates, words used in these rules are used in exactly the same sense as the same words are used in Division 26 of the Health and Safety Code.

AGRICULTURAL BURNING means open outdoor fires used in agricultural operations in the growing of crops or raising of fowl or animals, or open outdoor fires used in forest management, range improvement, or the improvement of land for wildlife and game habitat or disease and pest prevention. Agricultural burning also includes open outdoor fires used in the operation or maintenance of a system for the delivery of water for the purposes specified above.

AGRICULTURAL OPERATIONS means any operation occurring on a ranch or farm directly related to the growing of crops, or raising of fowl or animals for the primary purpose of making a profit or for a livelihood.

AGRICULTURAL PERMIT UNIT means any article, machine, equipment or other contrivance or combination thereof operated at an agricultural source, which is an agricultural operation and may cause or control the emissions of air contaminants that is not exempt from permit. In addition, each of the following at an agricultural source shall be considered a single agricultural permit unit:

(A) All confined animal facilities, except that portion that is conveyorized feed storage and distribution.

(B) All conveyorized feed storage and distribution at confined animal facilities.

(C) All orchard wind machines powered by an internal combustion engine with a manufacturer's rating greater than 50 brake horsepower, and operated more than 30 hours in a calendar year.

AGRICULTURAL SOURCE means a source of air pollution or a group of sources used in the production of crops, or the raising of fowl or animals located on

contiguous property under common ownership or control that meets any of the following criteria:

(A) Is a confined animal facility.

(B) Is a stationary or portable internal combustion engine used in the production of crops or the raising of fowl or animals except an engine that is used to propel implements of husbandry, as that term is defined in Section 36000 of the Vehicle Code, as that section existed on January 1, 2003.

(C) Is a stationary source required by federal law to be included in an operating permit program established pursuant to Title V of the Federal Clean Air Act (42 U.S.C. Sec. 7661 to 7661f, incl.) and the federal regulation adopted pursuant to Title V, or is a source that is otherwise subject to regulation by a district pursuant to this division or the Federal Clean Air Act (42 U.S.C. Sec. 7401 et seq.)

AGRICULTURAL WASTES means unwanted or unsalable materials produced wholly from agricultural operations, other than forest or range management operations, directly related to the growing of crops or animals for the primary purpose of making a profit or for a livelihood. The term does not include wastes created by land use conversion to non-agricultural purposes unless the destruction of such waste by open outdoor fire is ordered by the County or State Agricultural Commissioner upon his determination that the waste is infested with infections transmittable or contagious plant disease which is an immediate hazard to agricultural operations conducted on adjoining or nearby property.

AIR POLLUTION CONTROL OFFICER means the Executive Officer, or designee of the South Coast Air Quality Management District.

AIR CONTAMINANT or air pollutant means any discharge, release, or other propagation into the atmosphere directly or indirectly caused by man and includes, but is not limited to, smoke, charred paper, dust, soot, grime, carbon, fumes, gases, odors, particulate matters, acids or any combination thereof.

ATMOSPHERE (This definition was adopted on November 16, 1954 for the Metropolitan Zone and on November 23, 1973 for the Southern Zone. It is currently applicable only to the Metropolitan and Southern Zones.) "Atmosphere" means the air that envelopes or surrounds the earth. Where air pollutants are emitted into a building not

designed specifically as a piece of air pollution control equipment, such emission into the building shall be considered an emission into the atmosphere.

BASIC EQUIPMENT means any article, machine, equipment or contrivance which causes the issuance of air contaminants.

BREAKDOWN means a condition caused by an accidental fire or non-preventable mechanical or electrical failure.

CLEAN AIR SOLVENT is a VOC-containing material used to perform solvent cleaning, solvent finishing, or surface preparation operations or activities which:

(A) Contains no more than twenty-five (25) grams of VOC per liter of material, as applied;

(B) Has a VOC composite partial vapor pressure less than 5 mm Hg at $20^{o}C$ ($68^{o}F$);

(C) Reacts to form ozone at a rate not exceeding that of toluene;

(D) Contains no compounds classified as Hazardous Air Pollutants (HAPs) by the Federal Clean Air Act, or Ozone Depleting Compounds (ODCs) and Global Warming Compounds (GWCs) as defined by the District; and

(E) Has been certified by the District to meet the criteria stated in (A) through (D) according to test methods and procedures approved by the District.

CLEAN AIR SOLVENT CERTIFICATE is a certificate issued by the District to a manufacturer**,** distributor, or facility for a specified product or class of products that meets the criteria for a Clean Air Solvent.

A Clean Air Solvent Certificate shall be valid for five years from the date of issuance, unless some lesser time is designated and written notification is given by the Executive Officer, and shall be renewed upon the Executive Officer's determination that the product(s) continues to meet the criteria for a Clean Air Solvent. However, the Executive Officer may revoke such Certificate if it is determined that the specific product or class of products does not meet the requirements of Clean Air Solvents as defined at the time of issuance.

COMBUSTIBLE REFUSE means any solid or liquid combustible waste material containing carbon in a free or combined state.

COMBUSTION CONTAMINANTS are particulate matter discharged into the atmosphere from the burning of any kind of material containing carbon in a free or combined state.

COMPLIANCE SCHEDULE means the date or dates by which a source or category of sources is required to comply with specific emission limitations contained in any air pollution rule, regulation, or statute and with any increment of progress toward such compliance.

CONFINED ANIMAL FACILITY (CAF) means a source or group of sources of air pollution at an agricultural source for the raising of 3,360 or more fowl or 50 or more animals, including but not limited to, any structure, building, installation, farm, corral, coop, feed storage area, milking parlor, or system for the collection, storage, or distribution of solid and liquid manure; if domesticated animals, including but not limited to, cattle, calves, horses, sheep, goats, swine, rabbits, chickens, turkeys, or ducks corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes and feeding is by means other than grazing.

CONTROL EQUIPMENT means air pollution control equipment which eliminates, reduces or controls the issuance of air contaminants.

DISTRICT means the South Coast Air Quality Management District.

DUSTS are minute solid particles released into the air by natural forces or by mechanical processes including, but not limited to, crushing, grinding, milling, drilling, demolishing, shoveling, conveying, covering, bagging, and sweeping.

EXECUTIVE OFFICER means the Executive Officer or designee of the South Coast Air Quality Management District.

EQUIPMENT means any article, machine, or other contrivance.

EXEMPT Compounds are any of the following compounds

(A) Group I

1,1,1,2,3,4,4,5,5,5-decafluoropentane (HFC-43-10mee)

1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC 225cb)

3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC 225ca)

(A) Group I (cont.)

acetone

ethane

chlorodifluoromethane (HCFC-22)

trifluoromethane (HFC-23)

2,2-dichloro-1,1,1-trifluoroethane (HCFC-123)

2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124)

pentafluoroethane (HFC-125)

1,1,2,2-tetrafluoroethane (HFC-134)

1,1,1,2-tetrafluoroethane (HFC-134a)

1,1-dichloro-1-fluoroethane (HCFC-141b)

1-chloro-1,1-difluoroethane (HCFC-142b)

1,1,1-trifluoroethane (HFC-143a)

1,1-difluoroethane (HFC-152a)

cyclic, branched, or linear, completely fluorinated alkanes

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

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

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

difluoromethane (HFC-32)

1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-butane ($C_4F_9OCH_3$)

2-(difluoromethoxymethyl)-1,1,1,2,3,3,3-heptafluoropropane [$(CF_3)_2CFCF_2OCH_3$]

1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane ($C_4F_9OC_2H_5$)

2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane [$(CF_3)_2CFCF_2OC_2H_5$]

parachlorobenzotrifluoride (PCBTF)

methyl acetate

methyl formate

propylene carbonate

1,1,1,2,3,3,3-heptafluoropropane (HFC-227ea)

trans-1,3,3,3-tetrafluoropropene (HFO-1234ze)

trans-1-chloro-3,3,3-trifluoropropene (HFO-1233zd)

(B) Group II

methylene chloride (dichloromethane)

1,1,1-trichloroethane (methyl chloroform)

trichlorofluoromethane (CFC-11)

dichlorodifluoromethane (CFC-12)

1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113)

1,2-dichloro-1,1,2,2-tetrafluoroethane (CFC-114)

chloropentafluoroethane (CFC-115)

cyclic, branched, or linear, completely methylated siloxanes (VMS)

tetrachloroethylene (perchloroethylene)

ethylfluoride (HFC-161)

1,1,1,3,3,3-hexafluoropropane (HFC-236fa)

1,1,2,2,3-pentafluoropropane (HFC-245ca)

1,1,2,3,3-pentafluoropropane (HFC-245ea)

1,1,1,2,3-pentafluoropropane (HFC-245eb)

1,1,1,3,3-pentafluoropropane (HFC-245fa)

1,1,1,2,3,3-hexafluoropropane (HFC-236ea)

1,1,1,3,3-pentafluorobutane (HFC-365mfc)

chlorofluoromethane (HCFC-31)

1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a)

1 chloro-1-fluoroethane (HCFC-151a)

The use of Group II compounds and/or carbon tetrachloride may be restricted in the future because they are either toxic, potentially toxic, upper-atmosphere ozone depleters, or cause other environmental impacts. By January 1, 1996, chlorofluorocarbons (CFC), 1,1,1-trichloroethane (methyl chloroform), and carbon tetrachloride were phased out in accordance with the Code of Federal Regulation Title 40, Part 82 (December 10, 1993).

Whenever there is a conflict between the definition of exempt compounds of VOCs in this rule and the definition of exempt compounds of VOCs in another District rule, the definition in Rule 102 shall apply.

FLEET VEHICLES means gasoline-powered motor vehicles as defined by Section 415 of the Vehicle Code and which are operated from one business address.

FUGITIVE DUST means any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of man.

GASOLINE means any petroleum distillate having a Reid vapor pressure of 200 mm Hg (3.9 pounds per square inch), or greater.

HAZARDOUS AIR POLLUTANT means any air pollutant listed as such by the United States Environmental Protection Agency in accordance with Section 112(b)(1) of the Federal Clean Air Act (42 U.S.C. Sec. 7412(b)(1)).

HEARING BOARD means the Hearing Board of the South Coast Air Quality Management District.

INCREMENTS OF PROGRESS means steps to be taken by an owner or operator to bring a source of air contaminants into compliance. (See definition of "Schedule of Increments of Progress.")

LOADING FACILITY means any aggregation or combination of organic liquid loading equipment which is both possessed by one person, and located so that all the organic liquid loading outlets, for such aggregation or combination of loading equipment can be encompassed within any circle of 90 meters (295 feet) in diameter.

MOTOR VEHICLE is a vehicle which is self-propelled.

MULTIPLE-CHAMBER INCINERATOR means any equipment, structure or part of a structure, used to dispose of combustible refuse by burning, consisting of three or more refractory lined combustion chambers, physically separated by refractory walls, interconnected by gas passage ports or ducts.

OIL-EFFLUENT WATER SEPARATOR means any tank, box, sump or other container in which any petroleum or product thereof, floating on or entrained or contained in water entering such tank, box, sump, or other container, is physically separated and removed from such water prior to outfall, drainage, or recovery of such water.

ORCHARD HEATER or citrus grove heater means any equipment burning any type of fuel or material capable of being used, for the purpose of giving protection from frost damage that is approved by the California Air Resources Board to produce no more than one gram of unconsumed solid carbonaceous material. Equipment commonly known as Wind Machines are not included.

ORCHARD WIND MACHINE means an internal combustion engine powered fan used in orchards or in citrus groves exclusively for the purpose of giving protection from frost damage.

ORGANIC MATERIAL means a chemical compound of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, metallic carbonates and ammonium carbonate.

ORGANIC SOLVENTS include diluents and thinners and are defined as organic materials which are liquids at standard conditions and which are used as dissolvers, viscosity reducers or cleaning agents, except that such material exhibiting a boiling point higher than 104°C (219°F) at 0.5 mm Hg absolute pressure or having an equivalent vapor pressure shall not be considered to be solvents unless exposed to temperatures exceeding 104°C (219°F).

OZONE-DEPLETING COMPOUNDS (ODCs) are Class I substances identified in 40 CFR, Part 82, Appendix A, Subpart A, including, but not limited to the following compounds:

1,1,1-trichloroethane (methyl chloroform)
trichlorofluoromethane (CFC-11)
dichlorodifluoromethane (CFC-12)
1,1,2-trichloro-1,2,2,-trifluoroethane (CFC-113)
1,2-dichloro-1,1,2,2-tetrafluoroethane (CFC-114)
chloropentafluoroethane (CFC-115)

PARTICULATE MATTER means any material, except uncombined water, which exists in a finely divided form as a liquid or solid at standard conditions.

PPM means parts per million by volume.

PERSON means any individual, firm, association, organization, partnership, business trust, corporation, company, contractor, supplier, installer, user or owner, or any state or local governmental agency or public district or any other officer or employee thereof. PERSON also means the United States or its agencies to the extent authorized by Federal law.

PHOTOCHEMICALLY REACTIVE SOLVENT means any solvent with an aggregate of more than 20 percent of its total volume composed of the chemical compounds classified below or which exceeds any of the following individual percentage composition limitations, referred to the total volume of solvent:

(A) A combination of hydrocarbons, alcohols, aldehydes, ethers, esters or ketones having an olefinic or cycloolefinic type of unsaturation except perchloroethylene: 5 percent;

(B) A combination of aromatic compounds with eight or more carbon atoms to the molecule except ethylbenzene, methyl benzoate and phenyl acetate: 8 percent;

(C) A combination of ethylbenzene, ketones having branched hydrocarbon structures, trichloroethylene or toluene: 20 percent.

Whenever any organic solvent or any constituent of an organic solvent may be classified from its chemical structure into more than one of the above groups of organic compounds, it shall be considered as a member of the most reactive chemical group, that is, that group having the least allowable percent of the total volume of solvents.

PM-10 means the particulate matter with an aerodynamic diameter smaller than or equal to 10 microns as measured by applicable State and Federal reference test methods.

PROCESS WEIGHT means the total weight of all materials introduced into any specific process which may discharge contaminants into the atmosphere. Solid fuels charged will be considered as part of the process weight, but liquid gaseous fuels and air will not.

PROCESS WEIGHT PER HOUR means the total process weight divided by the number of hours in one complete operation from the beginning of any given process to the completion thereof, excluding any time during which the equipment is idle.

RECEPTOR AREA means that specified geographic area in which the air contaminants emitted from a source area are present or to which they may be transported.

REDUCTION OF ANIMAL MATTER means any heated process, used for rendering, cooking, drying, dehydrating, digesting, evaporating and protein concentrating of animal matter.

REGULATION means one of the major subdivisions of the Rules of the South Coast Air Quality Management District.

RULE means a rule of the South Coast Air Quality Management District.

SCHEDULE OF INCREMENTS OF PROGRESS means a statement of dates when various steps are to be taken to bring a source of air contaminants into compliance with emission standards and shall include, to the extent feasible, the following:

(A) The dates of submittal of the final plan for the control of emissions of air contaminants from that source to the District.

(B) The date by which contracts for emission control systems or process modifications will be awarded, or the date by which orders will be issued for the purchase of component parts to accomplish emission control or process modification.

(C) The date of initiation of on-site construction or installation of emission control equipment or process change.

(D) The date by which on-site construction or installation of emission control equipment or process modification is to be completed.

(E) The date by which final compliance is to be achieved.

(F) Such other dates by which other appropriate and necessary steps shall be taken to permit close and effective supervision of progress toward timely compliance.

SMALL BUSINESS means a business which is independently owned and operated and meets the following criteria, or if affiliated with another concern, the combined activities of both concerns shall meet these criteria:

(A) the number of employees is 10 or less; and

(B) the total gross annual receipts are $500,000 or less; or

(C) not-for-profit training center.

For the purpose of qualifying for assistance offered by the District's Small Business Assistance Office only, a small business means a business with total gross

annual receipts of $5,000,000 or less, or a business with a total number of employees of 100 or less.

SOLID PARTICULATE MATTER means particulate matter which exists as a solid at standard conditions.

SOURCE AREA means that specified geographic area in which air contaminants are emitted.

STANDARD CONDITIONS are a gas temperature of 60°F and a gas pressure of 760 mm Hg (14.7 pounds per square inch) absolute.

SUBMERGED FILL PIPE means any fill pipe the discharge opening of which is completely submerged when the liquid level is 15 centimeters (6 inches) above the bottom of the container; or when applied to a container which is loaded from the side, it means any fill pipe the opening of which is entirely submerged when the liquid level is 45 centimeters (18 inches) above the bottom of the container.

VEHICLE is a device by which any person or property may be propelled, moved, or drawn upon a highway, excepting a device moved by human power or used exclusively upon stationary rails or tracks.

VOLATILE ORGANIC COMPOUND (VOC) is any volatile compound of carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, and exempt compounds.

(Adopted April 7, 1978)(Amended December 7, 1984)(Amended May 5, 1989)
(Amended March 2, 1990)(Amended December 7, 1990)(Amended March 1, 1991)
(Amended August 2, 1991)(Amended August 13, 1999)

RULE 1104. WOOD FLAT STOCK COATING OPERATIONS

(a) Applicability

This rule applies to all persons applying coatings, inks, and adhesives to wood flat stock for the purpose of manufacturing a finished wood panel intended for attachment to the inside walls of buildings, including, but not limited to, homes and office buildings, mobile homes, trailers, prefabricated buildings and similar structures, boats, and ships; or a finished exterior wood siding intended for use in construction.

(b) Definitions

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

(1) ADHESIVE is any substance that is capable of bonding surfaces together by attachment.

(2) CLEAR TOPCOAT means a coating which contains resins and binders but not opaque pigments, and which is specifically formulated to form a transparent or translucent solid protective film.

(3) COATING is a material which is applied to a surface and which forms a film in order to beautify and/or protect such surface, which includes, but is not limited to, water repellent preservatives, semitransparent stains, opaques stains, filler, and clear top coat.

(4) DIP COATER is to dip an object into a vat of coating material and drain off any excess coating.

(5) ELECTROSTATIC APPLICATION is charging of atomized paint droplets for deposition by electrostatic attraction.

(6) EXEMPT COMPOUNDS (See Rule 102 - Definition of Terms)

(7) EXTERIOR WOOD SIDING is a wood or wood-containing board having a flat surface for use in commercial or residential construction, generally as a covering for an outside wall.

(8) FILLER is a semisolid viscous material used to fill voids.

(9) FLOW COATER is to coat an object by flowing a stream of coating over an object and draining off any excess coating.

(10) GRAMS OF VOC PER LITER OF COATING, ADHESIVES, OR INKS, LESS WATER AND LESS EXEMPT COMPOUNDS is the weight of VOC per combined volume of VOC and coating solids, and can be calculated by the following equation:

Grams of VOC per Liter of Coating, Adhesives, or Inks, Less Water and Less Exempt Compounds = $$\frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where:
W_s = weight of volatile compounds in grams
W_w = weight of water in grams
W_{es} = weight of exempt compounds in grams
V_m = volume of material in liters
V_w = volume of water in liters
V_{es} = volume of exempt compounds in liters

(11) HAND APPLICATION METHODS is the application of coatings, sealants, or adhesives by manually held, non-mechanically-operated equipment. Such equipment includes paint brushes, hand rollers, caulking guns, trowels, spatulas, syringe daubers, rags, and sponges.

(12) HIGH-VOLUME, LOW-PRESSURE (HVLP) SPRAY EQUIPMENT is used to spray a coating by means of a gun that operates between 0.1 and 10 pounds per square inch gauge (psig) air pressure.

(13) INK is any fluid or viscous composition used in printing, impressing, or transferring an image onto a panel.

(14) OPAQUE STAINS are all stains not classified as semitransparent stains.

(15) PANEL is a flat piece of wood or wood-containing product~~s~~, usually rectangular, and is attached to the inside walls of homes, office buildings, mobile homes, trailers, prefabricated buildings and similar structures, boats, and ships.

(16) PERSON is any firm, business establishment, association, partnership, corporation, or individual, whether acting as principal, agent, employee, or other capacity, including any governmental entity or charitable organization.

(17) ROLL COATER is a series of mechanical rollers that forms a thin coating film on the surface of roller, which is applied to a substrate by moving the substrate underneath the roller.

(18) SEMITRANSPARENT STAINS are coatings which are formulated to change the color of a surface but not conceal the surface.

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

(20) VOLATILE ORGANIC COMPOUND (VOC) (See Rule 102 - Definition of Terms)

(21) WATER-REPELLENT PRESERVATIVE is a penetrating coating designed to protect bare wood from mildew, decay, insect attack, and water staining.

(22) WOOD FLAT STOCK is defined as interior wood panels and exterior wood siding, which include, by way of illustration and not limitation, redwood, cedar or plywood stocks, plywood panels, particle boards, composition hard boards, and any other panels or siding constructed of solid wood or a wood-containing product.

(c) Requirements

Any person applying a coating, ink, or adhesive to wood flat stock shall comply with all of the following requirements:

(1) VOC Requirements

Wood flat stock coatings, inks, and adhesives for interior wood panels and exterior wood siding, shall contain no more than 250 grams of VOCs per liter of coating, ink, or adhesive (2.1 pounds per gallon), less water and exempt compounds. Notwithstanding the above, up until January 1, 2000, wood flat stock inks and exterior wood siding coatings may contain up to 300 grams of VOCs per liter of ink (2.5 pounds per gallon) and up to 350 grams of VOCs per liter of coating (2.9 pounds per gallon), respectively, less water and less exempt compounds.

(2) Application Methods

No owner or operator shall apply coatings, adhesives, or inks unless these materials are applied with properly operating equipment, according to operating procedures specified by the equipment manufacturer or the Executive Officer or his designee, and by the use of one of the following methods:

(A) Flow Coater, Roll Coater, or Dip Coater; or

(B) Hand Application Methods; or

(C) High-Volume, Low-Pressure (HVLP) or Electrostatic Application

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

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

(4) Control Equipment Requirements

Any person owning or operating a control equipment system, in association with a wood flat stock coating operation, may comply with provisions of subparagraph (c)(1) by using approved control equipment system provided that the VOC emissions from such operations or materials, or both, are reduced in accordance with the following provisions:

(A) The control device shall reduce emissions from an emission collection system by at least 95 percent, by weight, or the output of the air pollution control device is less than 50 ppm calculated as carbon.

(B) The emission collection system shall collect at least 90 percent, by weight, of the emissions generated by the sources of emissions.

(d) Recordkeeping Requirements

Notwithstanding provisions of paragraph (g), records shall be maintained pursuant to Rule 109 - Recordkeeping for Volatile Organic Compound Emissions.

(e) Compliance Test Methods

(1) The VOC content of materials subject to the provisions of this rule shall be determined by EPA Reference Method 24 (Determination of Volatile

Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coatings, Code of Federal Regulations Title 40, Part 60, Appendix A). The exempt compounds' content shall be determined by SCAQMD Laboratory Methods of Analysis for Enforcement Samples - Section III, Method 22.

(2) The efficiency of the control device and the VOC content measured and calculated as carbon in the control device exhaust gases shall be determined by EPA Test Methods 25 and 25A, or SCAQMD Method 25.1 (March 1989) (Determination of Total Gaseous Non-Methane Organic Emissions as Carbon).

(3) The collection efficiency of the fugitive emissions will be determined pursuant to EPA's "Guidelines For Developing Capture Efficiency Protocols."

(f) Alternative Emission Control Plan

Any person may achieve compliance with requirements of paragraph (c) by means of an Alternative Emission Control Plan pursuant to Rule 108 - Alternative Emission Control Plans.

(g) Exemptions

(1) Laminating of fiberglass, metal, or plastic sheets to wood panels that is subject to the provisions of Rule 1168 - Control of Volatile Organic Compound Emissions from Adhesive Application.

(2) Coating of wood panels for furniture end use that is subject to the provisions of Rule 1136 - Wood Products Coatings.

(3) Coating of wood panels for aircraft that is subject to the provisions of Rule 1124 - Aerospace Assembly and Component Manufacturing Operations.

(Adopted November 4, 1988)(Amended May 5, 1989)(Amended June 2, 1989)
(Amended March 2, 1990)(Amended November 2, 1990)(Amended December 7, 1990)
(Amended August 2, 1991)(Amended January 13, 1995)

RULE 1106. MARINE COATING OPERATIONS

(a) Applicability

This rule applies to all coating operations of boats, ships, and their appurtenances, and to buoys and oil drilling rigs intended for the marine environment. Coating operations of vessels which are manufactured or operated primarily for recreational purposes are subject to the requirements of Rule 1106.1 - Pleasure Craft Coating Operations.

(b) Definitions

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

(1) AEROSOL COATING PRODUCT is a pressurized coating product containing pigments or resins that is dispensed by means of a propellant, and is packaged in a disposable can for hand-held application.

(2) AIR DRIED COATING is any coating that is cured at a temperature below 90°C (194°F).

(3) ANTENNA COATING is any coating applied to equipment and associated structural appurtenances which are used to receive or transmit electromagnetic signals.

(4) ANTIFOULING COATING is any coating applied to the underwater portion of a vessel to prevent or reduce the attachment of biological organisms. An antifouling coating shall be registered with the Environmental Protection Agency (EPA) as a pesticide.

(5) BAKED COATING is any coating that is cured at a temperature at or above 90°C (194°F).

(6) ELASTOMERIC ADHESIVE is any adhesive containing natural or synthetic rubber.

(7) EXEMPT COMPOUNDS are any of the following compounds:

(A) Group I (General)

trifluoromethane (HFC-23)
pentafluoroethane (HFC-125)
1,1,2,2-tetrafluoroethane (HFC-134)
tetrafluoroethane (HFC-134a)
1,1,1-trifluoroethane (HFC-143a)

1,1-difluoroethane (HFC-152a)
chlorodifluoromethane (HCFC-22)
dichlorotrifluoroethane (HCFC-123)
2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124)
dichlorofluoroethane (HCFC-141b)
chlorodifluoroethane (HCFC-142b)
cyclic, branched, or linear, completely fluorinated alkanes
cyclic, branched, or linear, completely fluorinated ethers with no unsaturations
cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations
sulfur-containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine

(B) Group II

methylene chloride
1,1,1-trichloroethane (methyl chloroform)
trichlorotrifluoroethane (CFC-113)
dichlorodifluoromethane (CFC-12)
trichlorofluoromethane (CFC-11)
dichlorotetrafluoroethane (CFC-114)
chloropentafluoroethane (CFC-115)

The use of Group II compounds and/or carbon tetrachloride may be restricted in the future because they are toxic, potentially toxic, upper-atmosphere ozone depleters, or cause other environmental impacts. By January 1, 1996, production of chlorofluorocarbons (CFC), 1,1,1,-trichloroethane (methyl chloroform), and carbon tetrachloride will be phased out in accordance with the Code of Federal Regulation Title 40, Part 82 (December 10, 1993).

(8) EXTREME HIGH GLOSS COATING is any coating which achieves at least 95 percent reflectance on a 60° meter when tested by ASTM Method D-523.

(9) GRAMS OF VOC PER LITER OF COATING, LESS WATER AND LESS EXEMPT COMPOUNDS is the weight of VOC per combined volume of VOC and coating solids and can be calculated by the following equation:

$$\text{Grams of VOC per Liter of Coating, Less Water and Less Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where: W_s = weight of volatile compounds in grams
W_w = weight of water in grams

W_{es} = weight of exempt compounds in grams
V_m = volume of material in liters
V_w = volume of water in liters
V_{es} = volume of exempt compounds in liters

(10) HEAT RESISTANT COATING is any coating which during normal use must withstand temperatures of at least 204°C (400°F).

(11) HIGH GLOSS COATING is any coating which achieves at least 85 percent reflectance on a 60° meter when tested by ASTM Method D-523.

(12) HIGH TEMPERATURE COATING is any coating which must withstand temperatures of at least 426°C (800°F).

(13) LOW ACTIVATION INTERIOR COATING is any coating used on interior surfaces aboard ships to minimize the activation of pigments on painted surfaces within a radiation environment.

(14) MARINE COATING is any coating, except unsaturated polyester resin (fiberglass) coatings, containing volatile organic materials and applied by any means to ships, boats, and their appurtenances, and to buoys and oil drilling rigs intended for the marine environment.

(15) METALLIC HEAT RESISTANT COATING is any coating which contains more than 5 grams of metal particles per liter of coating as applied and which must withstand temperatures over 80°C (175°F).

(16) NAVIGATIONAL AIDS are buoys or other Coast Guard waterway markers.

(17) PRETREATMENT WASH PRIMER is any coating which contains at least 1/2-percent acids, by weight, to provide surface etching and is applied directly to metal surfaces to provide corrosion resistance, adhesion, and ease of stripping.

(18) REPAIR AND MAINTENANCE THERMOPLASTIC COATING is any resin-bearing coating, such as vinyl, chlorinated rubber, or bituminous coatings, in which the resin becomes pliable with the application of heat, and is used to recoat portions of a previously coated substrate which has sustained damage to the coating following normal coating operations.

(19) SEALANT FOR WIRE-SPRAYED ALUMINUM is any coating of up to one mil (0.001 inch) in thickness of an epoxy material which is reduced for application with an equal part of an appropriate solvent (naphtha, or ethylene glycol monoethyl ether).

(20) SOLVENT CLEANING OPERATION is the removal of loosely held uncured adhesives, uncured inks, uncured coatings, and contaminants from

parts, products, tools, machinery, equipment, and general work areas. Contaminants include, but are not limited to, dirt, soil, and grease. In a cleaning process which consists of a series of cleaning methods, each distinct method shall constitute a separate solvent cleaning operation.

(21) SPECIAL MARKING COATING is any coating used for items such as flight decks, ships' numbers, and other safety/identification applications.

(22) TACK COAT is an epoxy coating of up to two mils (0.002 inch) thick applied to an existing epoxy coating. The existing epoxy coating must have aged beyond the time limit specified by the manufacturer for application of the next coat.

(23) TOUCH-UP COATING is any coating used to cover minor imperfections prior to shipment appearing after the main coating operation.

(24) UNDERSEA WEAPONS SYSTEM is any or all components of a weapons system that is launched or fired underwater.

(25) VOLATILE ORGANIC COMPOUND (VOC) is any volatile compound of carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, and exempt compounds.

(26) WIRE-SPRAYED ALUMINUM is any multi-aluminum coating applied to a steel substrate using oxygen fueled combustion spray methods.

(c) Requirements

(1) VOC Content of Marine Coatings

Except as otherwise provided in this rule, a person shall not apply a marine coating with a VOC content in excess of the following limits, expressed as grams of VOC per liter of coating as applied, less water and less exempt solvents:

COATING	**VOC LIMIT**	
	Baked	Air Dried
General Coating	275 g/L	340 g/L

COATING	VOC LIMIT	
	Baked	Air Dried
Specialty Coating		
Heat Resistant	360	420
Metallic Heat Resistant		530
High Temperature		500
Pre-Treatment Wash Primer	780	780
Underwater Weapons Systems	275	340
Elastomeric Adhesives with 15%, by Weight, Natural or Synthetic Rubber		730
Solvent-Based Inorganic Zinc		650
Navigational Aids		340
Sealant for Wire-Sprayed Aluminum		610
Special Marking		490
Tack Coat		610
Low Activation Interior Coating		420
Repair and Maintenance Thermoplastic		550
Extreme High-Gloss Coating	420	490
Antenna Coating		530
Antifoulant		400
High Gloss	275	340

(2) Approved Emission Control System

(A) Owners and/or operators may comply with the provisions of paragraph (c)(1) by using an emission control system, which has been approved in writing by the Executive Officer, for reducing VOC emissions. The control system must achieve a minimum capture efficiency using USEPA, ARB, and District methods specified in subparagraph (e)(4)(A) and a destruction efficiency of at least 85 percent by weight, and,

(B) The approved system shall reduce the VOC emissions, when using non-compliant coatings, to an equivalent or greater level that would be achieved by the provisions in paragraph (c)(1). The required efficiency of an emission control system at which an equivalent or greater level of VOC reduction will be achieved shall be calculated by the following equation:

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

Where:

C.E.	=	Control Efficiency, percent
VOC_{LWc}	=	VOC Limit of Rule 1106, less water and less exempt compounds, pursuant to subdivision (c).
$VOC_{LWn,Max}$	=	Maximum VOC content of non-compliant coating used in conjunction with a control device, less water and less exempt compounds.
$D_{n,Max}$	=	Density of solvent, reducer, or thinner contained in the non-compliant coating, containing the maximum VOC content of the multicomponent coating.
D_c	=	Density of corresponding solvent, reducer, or thinner used in the compliant coating system = 880g/L.

(3) Alternative Emission Control Plan

Owners and/or operators may achieve compliance with the requirements of paragraph (c)(1) by means of an Alternative Emission Control Plan pursuant to Rule 108.

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

All solvent cleaning operations and the storage and disposal of VOC-containing materials used in solvent cleaning operations shall be carried out pursuant to Rule 1171 - Solvent Cleaning Operations.

(5) Recordkeeping

Notwithstanding the provisions of subdivision (g), records shall be maintained pursuant to Rule 109.

(d) Prohibition of Specification

(1) A person shall not solicit or require any other person to use, in the district, any coating or combination of coatings to be applied to any marine vessel or marine component subject to the provisions of this rule that does not meet the limits requirements of this rule or of an Alternative Emission Control Plan approved pursuant to the provisions of paragraph (c)(3) of this rule.

(2) The requirements of paragraph (d)(1) shall apply to all written or oral agreements executed or entered into after November 4, 1988.

(e) Test Methods

(1) Determination of VOC Content

The VOC content of coatings, subject to the provisions of this rule shall be determined by the following methods:

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

(B) SCAQMD Method 304 [Determination of Volatile Organic Compounds (VOC) in Various Materials] contained in the SCAQMD "Laboratory Methods of Analysis for Enforcement Samples" manual.

(C) Exempt Perfluorocarbon Compounds

The following classes of compounds:

cyclic, branched, or linear, completely fluorinated alkanes;

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

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

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

will be analyzed as exempt compounds for compliance with subdivision (c), only when manufacturers specify which individual compounds are used in the coating formulation. In addition, the manufacturers shall identify the USEPA, California Air Resources Board, and the SCAQMD approved test methods used to quantify the amount of each exempt compound

(2) Determination of Metal Content

The metal content in metallic coatings subject to the provisions of this rule shall be determined by the SCAQMD Method 311 (Analysis of Percent Metal in Metallic Coatings by Spectrographic Method) contained in the

SCAQMD "Laboratory Methods of Analysis for Enforcement Samples" manual.

(3) Determination of Acid Content

The acid content of coating subject to the provisions of this rule shall be determined by ASTM D 1613-85 (Acidity in Volatile Solvents and Chemical Intermediates Used in Paint. Varnish, Lacquer, and Related Products) contained in the SCAQMD "Laboratory Methods of Analysis for Enforcement Samples" manual.

(4) Determination of Efficiency of Emission Control System

(A) The efficiency of the collection device of the emission control system as specified in paragraph (c)(2) shall be determined by the USEPA method cited in 55 Federal Register 26865 (June 29, 1990), or any other method approved by the USEPA, the California Air Resources Board, and the SCAQMD.

(B) The efficiency of the control device of the emission control system as specified in paragraph (c)(2) and the VOC content in the control device exhaust gases, measured and calculated as carbon, shall be determined by USEPA Test Methods 25, 25A, or SCAQMD Method 25.1 (Determination of Total Gaseous Non-Methane Organic Emissions as Carbon) as applicable. USEPA Test Method 18, or ARB Method 422 shall be used to determine emissions of exempt compounds.

(5) Multiple Test Methods

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

(6) All test methods referenced in this section shall be the most recently approved version.

(f) Rule 442 Applicability

Any marine coating operation or facility which is exempt from all or a portion of this rule shall comply with the provisions of Rule 442.

(g) Exemptions

The provisions of this rule shall not apply to:

(1) marine coatings applied to interior surfaces of potable water containers.

(2) touch-up coatings

(3) marine coatings purchased before January 1, l992, in containers of one quart or less and applied to pleasure craft.

(4) antifoulant coatings applied to aluminum hulls.

(5) aerosol coating products.

(Adopted July 6, 1979)(Amended May 7, 1982)(Amended January 6, 1984)
(Amended June 1, 1984)(Amended January 9, 1987)(Amended February 6, 1987)
(Amended April 3, 1987)(Amended May 5, 1989)(Amended March 2, 1990)
(Amended April 6, 1990)(Amended June 1, 1990)(Amended November 2, 1990)
(Amended December 7, 1990)(Amended August 2, 1991)(Amended March 6, 1992)
(Amended December 4, 1992)(Amended December 10, 1993)
(Amended January 13, 1995)(Amended Dec. 13, 1996)(Amended September 21, 2001)

RULE 1124. AEROSPACE ASSEMBLY AND COMPONENT MANUFACTURING OPERATIONS

(a) Purpose and Applicability

The purpose of Rule 1124 is to reduce volatile organic compound (VOC) emissions from aerospace assembly and component manufacturing operations. This rule applies to any operation associated with manufacturing and assembling products for aircraft and space vehicles for which an aerospace material is used. The affected industries include commercial and military aircraft, satellite, space shuttle and rocket manufacturers and their subcontractors. The rule also applies to maskant applicators, aircraft refinishers, aircraft fastener manufacturers, aircraft operators, and aircraft maintenance and service facilities

(b) Definitions

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

(1) ADHESION PROMOTER is a primer that is used to promote wetting and form a chemical bond with a subsequently applied sealant or other elastomer.

(2) ADHESIVE is any substance that is used to bond one surface to another surface by attachment

(3) ADHESIVE BONDING PRIMER is a primer that is applied to an aerospace component to increase adhesive or adhesive film bond strength. Adhesive bonding primers are of two types: those that cure at or below 250°F and those that cure above 250°F.

(4) AEROSOL COATING PRODUCT is a pressurized coating product containing pigments or resins that is dispensed by means of a propellant, and is packaged in a disposable can for hand-held application.

(5) AEROSPACE COMPONENT is the raw material, partial or completed fabricated part, assembly of parts, or completed unit of any aircraft or

space vehicle and includes integral equipment such as models, mock-ups, prototypes, molds, jigs, tooling, hardware jackets, and test coupons.

(6) AEROSPACE MATERIAL is any coating, primer, adhesive, sealant, maskant, lubricant, stripper or hand-wipe cleaning or clean-up solvent used during the manufacturing, assembly, refinishing, maintenance or service of an aerospace component. For the purposes of this rule material shall mean aerospace material.

(7) AIRCRAFT is any machine designed to travel through the air, without leaving the earth's atmosphere, whether heavier or lighter than air, including airplanes, balloons, dirigibles, helicopters, and missiles.

(8) ANTICHAFE COATING is a coating applied to areas of moving aerospace components which may rub during normal operation.

(9) ANTI-WICKING WIRE COATING is the outer coating of a wire which prevents fluid wicking into insulation of the wire.

(10) BARRIER COATING is a coating applied in a thin film to fasteners to inhibit dissimilar metal corrosion and to prevent galling.

(11) CHEMICAL MILLING is the removal of metal by chemical action of acids or alkalis.

(12) CLEAR TOPCOAT is a topcoat that contains no visible pigments and is uniformly transparent when applied.

(13) COATING APPLICATION EQUIPMENT is equipment used for applying coating to a substrate. Coating application equipment includes coating distribution lines, coating hoses, pressure-pots, spray guns, and hand-application equipment, such as hand-rollers, brushes, daubers, spatulas, and trowels.

(14) CONFORMAL COATING is a coating applied to electrical conductors and circuit boards to protect them against electrical discharge damage and/or corrosion.

(15) DRY LUBRICATIVE MATERIALS are coatings consisting of lauric acid, cetyl alcohol, waxes or other non-cross linked or resin bound materials which act as a dry lubricant or protective coat.

(16) ELECTRIC- or RADIATION-EFFECT COATINGS include electrically conductive coatings and radiation effect coatings, the uses of which may include prevention of radar detection.

(17) ELECTRONIC WIRE COATING is the outer electrical insulation coating applied to tape insulation of a wire specifically formulated to smooth and fill edges.

(18) ELECTROSTATIC DISCHARGE PROTECTION COATING is a coating applied to space vehicles, missiles, aircraft radomes, and helicopter blades to disperse static energy.

(19) EPOXY BASED FUEL-TANK COATING is a coating which contains epoxy resin that is applied to a fuel tank of an aircraft to protect it from corrosion and/or bacterial growth.

(20) EXEMPT COMPOUNDS: As defined in Rule 102.

(21) FACILITY is all the buildings, equipment and materials on one contiguous piece of property.

(22) FASTENER MANUFACTURER is a facility that coats aircraft fasteners, such as pins, collars, bolts, nuts, and rivets, with solid-film lubricants for distribution to other facilities.

(23) FIRE-RESISTANT COATING is a cabin interior coating that meets for civilian aircraft the Federal Aviation Administration-required Ohio State University Heat Release, Fire and Burn Tests; for military aircraft, Aircraft Structural Integrity Program in MIL-STD-1530A and MIL-A-87221 (Northrop's MS-445-3.3.2.1 and MS-445-3.3.2.2).

(24) FLIGHT-TEST COATING is a coating applied to an aircraft prior to flight testing to protect the aircraft from corrosion and to provide required marking during flight test evaluation.

(25) FUEL-TANK ADHESIVE is an adhesive used to bond components exposed to fuel and must be compatible with fuel-tank coatings.

(26) FUEL-TANK COATING is a coating applied to a fuel tank of an aircraft to protect it from corrosion and/or bacterial growth.

(27) GRAMS OF VOC PER LITER OF COATING, LESS WATER AND LESS EXEMPT COMPOUNDS is the weight of VOC per combined volume of VOC and coating solids and can be calculated by the following equation:

$$\text{Grams of VOC per Liter of Coating, Less Water and Less exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where: Ws = weight of volatile compounds in grams

Ww	=	weight of water in grams
Wes	=	weight of exempt compounds in grams
Vm	=	volume of material in liters
Vw	=	volume of water in liters
Ves	=	volume of exempt compounds in liters

For aerospace materials that contain reactive diluents the grams of VOC per Liter of Coating Less Water and Less Exempt Compounds shall be calculated by the following equation:

$$\text{Grams of VOC per Liter of Coating, Less Water and Less exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where:	Ws	=	weight of volatile compounds evolved during curing and analysis, in grams
	Ww	=	weight of water evolved during curing and analysis, in grams
	Wes	=	weight of exempt compounds evolved during curing and analysis, in grams
	Vm	=	volume of the material prior to reaction, in liters
	Vw	=	volume of water evolved during curing and analysis, in liters
	Ves	=	volume of exempt compounds evolved during curing and analysis, in liters

(28) GRAMS OF VOC PER LITER OF MATERIAL is the weight of VOC per volume of material and can be calculated by the following equation:

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

Where:	Ws	=	weight of volatile compounds in grams
	Ww	=	weight of water in grams
	Wes	=	weight of exempt compounds in grams
	Vm	=	volume of material in liters

(29) HAND APPLICATION METHOD is the application of materials by manually held, non-mechanically operated equipment. Such equipment includes paint brushes, hand rollers, caulking guns, trowels, spatulas, syringe daubers, rags, and sponges.

(30) HIGH-TEMPERATURE COATING is a coating that must withstand temperatures of more than 350oF.

(31) HIGH-VOLUME, LOW-PRESSURE (HVLP) SPRAY is a material application system which is operated at air pressure of between 0.1 and 10 pounds per square inch gauge (psig).

(32) IMPACT-RESISTANT COATING is a flexible coating that protects aerospace components, such as aircraft landing gear, and landing gear compartments, and other surfaces subject to impact and abrasion from runway debris.

(33) LINE-SEALER MASKANT is a maskant used to cover scribe lines in maskant in order to protect against etchant in multi-step etching processing.

(34) LONG TERM PRIMER (METAL TO STRUCTURAL CORE BONDING) is an adhesive bonding primer that has met the aircraft manufacturers' required performance characteristics following 6000 hours testing, used for metal to structural core bonding, and with an adhesive that is specified to be cured at 350oF ± 10°F.

(35) LOW-SOLIDS ADHESIVE, COATING, PRIMER OR SEALANT is an adhesive, coating, primer or sealant which has less than one pound of solids per gallon of material. Such solids are the non-volatiles remaining after a sample is heated at 110oC for one hour.

(36) LOW-SOLIDS CORROSION RESISTANT PRIMER is a corrosion resistant polyurethane compatible primer with enhanced adhesion and rain erosion resistance which contains no more than 45 percent solids, by weight, as applied.

(37) MASKANT FOR CHEMICAL MILLING is a coating applied directly to an aerospace component to protect surface areas when chemical milling the component.

(38) MASKANT FOR CHEMICAL PROCESSING is a coating applied directly to an aerospace component to protect surface areas when anodizing, aging, bonding, plating, etching, and/or performing other chemical surface operations on the component.

(39) METALLIZED EPOXY COATING is a coating that contains relatively large quantities of flake pigmentation for appearance and/or added protection.

(40) MOLD RELEASE COATING is a coating applied to the surface of a mold to prevent the molded component from sticking to the mold as it is removed.

(41) NON-STRUCTURAL ADHESIVE is an adhesive that bonds non-load-carrying aircraft components in non-critical applications and is not covered in any other specialty adhesive categories.

(42) OPTICAL ANTI-REFLECTION COATING is a coating with a low reflectance in the infrared and visible wavelength range and is used for anti-reflection on or near optical and laser hardware.

(43) PHOTOLITHOGRAPHIC MASKANT is a coating applied by photoresist operation(s) directly to printed circuit boards, and ceramic and similar substrates to protect surface areas from chemical milling or chemical processing.

(44) PHOTORESIST OPERATION is a process for the application or development of photoresist masking solution on a substrate, including preparation, soft bake, develop, hard bake, and stripping, and can be generally subdivided as follows:

(A) Negative Photoresist Operation is a process where the maskant hardens when exposed to light and the unhardened maskant is stripped, exposing the substrate surface for chemical milling or chemical processing.

(B) Positive Photoresist Operation is a process where the maskant softens when exposed to light and the softened maskant is stripped, exposing the substrate surface for chemical milling or chemical processing.

(45) PRETREATMENT PRIMER is a primer which contains no more than 12 percent solids by weight, and at least ½-percent acid by weight, to provide surface etching and is applied directly to metal surfaces to provide corrosion resistance, adhesion, and ease of stripping.

(46) PRIMER is a coating applied directly to an aerospace component for purposes of corrosion prevention, protection from the environment, functional fluid resistance and/or adhesion of subsequent coatings, adhesives, or sealants.

(47) PRIMER COMPATIBLE WITH RAIN EROSION RESISTANT COATING is a primer to which rain erosion resistant topcoat is applied.

(48) RAIN EROSION-RESISTANT COATING is a coating that protects leading edges, flaps, stabilizers, and engine inlet lips against erosion caused by rain impact during flight.

(49) REPAIR COATING is a coating used to recoat portions of a product which has sustained mechanical damage to the coating following normal painting operations.

(50) REMANUFACTURED AIRCRAFT PARTS are aerospace components that are built as spare parts or replacement parts subject to an existing commercial aircraft specification.

(51) REPAIR MASKANT is a maskant used to cover imperfections in the maskant coat.

(52) REWORK is the inspection, repair, and reconditioning of aerospace components subject to this rule.

(53) RUBBER SOLUTION FUEL-TANK COATING is a fuel-tank coating which performs as a sealant and protects the tank from corrosion and/or bacterial growth and is formulated with a butadiene acrylonitrile copolymer.

(54) SCALE INHIBITOR is a coating that is applied to the surface of a part prior to thermal processing to inhibit the formation of tenacious scale.

(55) SEALANTS are viscous semisolid materials that fill voids in order to seal out water, fuel, and other liquids and solids, and in some cases, air movement.

(56) SHORT TERM PRIMER (METAL TO STRUCTURAL CORE BONDING) is an adhesive bonding primer that has met the manufacturers' required performance characteristics following 1000 hours testing, used for metal to metal and metal to structural core bonding, and with an adhesive which is specified to be cured at a temperature of 350°F ± 10°F.

(57) SOLID-FILM LUBRICANT is a very thin coating consisting of a binder system containing as its chief pigment material one or more of the following: molybdenum disulfide, graphite, polytetrafluoroethylene (PTFE), or other solids that act as a dry lubricant between faying surfaces.

(58) SONIC AND ACOUSTIC APPLICATIONS are the use of aerospace materials on aerospace components that are subject to mechanical vibration and/or sound wave cavitation.

(59) SPACE-VEHICLE is a vehicle designed to travel beyond the earth's atmosphere.

(60) STENCIL COATING is an ink or a coating that is rolled, sprayed with an airbrush or a touch-up gun, or brushed, while using a template to add identifying letters and/or numbers to aerospace components.

(61) STRIPPER is a volatile liquid applied to remove cured aerospace materials or their residues.

(62) STRUCTURAL ADHESIVE - AUTOCLAVABLE is an adhesive used to bond load-carrying aircraft components and is cured by heat and pressure in an autoclave.

(63) STRUCTURAL ADHESIVE - NON-AUTOCLAVABLE is an adhesive cured under ambient conditions and is used to bond load-carrying aircraft components or other critical functions, such as nonstructural bonding in the proximity of engines.

(64) TEMPORARY MARKING COATING is an ink or a coating used to make identifying markings, and is removed prior to delivery of the aerospace component and/or assembly.

(65) TEMPORARY PROTECTIVE COATING is a coating applied to an aerospace component to protect it from mechanical and environmental damage during manufacturing.

(66) TOPCOAT is a coating applied over a primer for purposes such as appearance, identification, or protection.

(67) TOUCH-UP COATING is a coating used to cover minor coating imperfections appearing after the main coating operation.

(68) TOXICITY-WEIGHTED EMISSION REDUCTION EFFICIENCY is the difference between the uncontrolled and the controlled toxicity-weighted total emissions divided by the uncontrolled toxicity-weighted total emissions and multiplied by 100. Toxic organic solvent and toxic particulate matter toxicity-weighted emission reduction efficiencies are calculated separately and are represented by the following equation:

$$\eta = \frac{T_u - T_c}{T_u} \quad x \quad 100$$

Where: η = The toxicity-weighted emission reduction efficiency

T_u = The uncontrolled toxicity-weighted total emissions

T_c = The controlled toxicity-weighted total emissions

(69) TOXICITY-WEIGHTED TOTAL EMISSIONS is the sum of the product of the mass emissions and the unit risk factor for each toxic component of aerospace material used per year. There are two toxicity-weighted total emission values, one for uncontrolled emissions and the other for controlled emissions. Toxicity-weighted total emissions for toxic organic solvents and toxic particulate matter are calculated separately and are represented by the following equations:

$$T_u = \sum_{i=1}^{n} m_i U_i$$

$$T_c = \sum_{i=1}^{n} (1 - E_i)(m_i U_i) + \sum_{j=1}^{m} (1 - E_j)(m_j U_j)$$

Where:

T_u = The uncontrolled toxicity-weighted total emissions

T_c = The controlled toxicity-weighted total emissions

m_i = Baseline mass emissions of each toxic organic solvent or toxic particulate matter as established in a District approved Health Risk Assessment in pounds per year

U_i Unit risk factor for each toxic organic solvent or toxic particulate matter in inverse micrograms per cubic meter $(\mu g/m^3)^{-1}$

E_i Overall control efficiency of the add-on control equipment for which aerospace materials containing toxic organic solvent or toxic particulate matter are vented to

m_j Additional mass emissions of each toxic organic solvent or toxic particulate matter to the baseline mass emissions that established a District approved Health Risk Assessment in pounds per year

U_j Unit risk factor for each toxic organic solvent or toxic particulate matter in inverse micrograms per cubic meter $(\mu g/m^3)^{-1}$

E_j Overall control efficiency of the add-on control equipment for which additional aerospace materials containing toxic organic solvent or toxic particulate matter will be vented to

(70) TOXIC ORGANIC SOLVENT is any volatile compound that has a finalized unit risk factor assigned by the Office of Environmental Health Hazard Assessment.

(71) TOXIC PARTICULATE MATTER is any non-volatile compound that has a finalized unit risk factor assigned by the Office of Environmental Health Hazard Assessment.

(72) TRANSFER EFFICIENCY is the ratio of the weight or volume of coating solids adhering to an object to the total weight or volume, respectively, of coating solids used in the application process, expressed as a percentage.

(73) TYPE I ETCHANT is a chemical milling etchant that contains varying amounts of dissolved sulfur and does not contain amines.

(74) TYPE II ETCHANT is a chemical milling etchant that is a strong sodium hydroxide solution containing amines.

(75) UNICOAT is a coating which is applied directly to an aerospace component for purposes of corrosion protection, environmental protection, and functional fluid resistance that is not subsequently topcoated.

(76) VOC COMPOSITE PARTIAL PRESSURE is the sum of the partial pressures of the compounds defined as VOCs.

VOC Composite Partial Pressure is calculated as follows:

$$PP_c = \sum_{i=1}^{n} \frac{\frac{W_i}{MW_i} \times VP_i}{\frac{W_w}{MW_w} + \frac{W_e}{MW_e} + \sum_{i=1}^{n} \frac{W_i}{MW_i}}$$

Where:

W_i	=	Weight of the "i"th VOC compound, in grams
W_w	=	Weight of water, in grams
W_e	=	Weight of exempt compound, in grams
MW_i	=	Molecular weight of the "i"th VOC compound, in grams per gram-mole
MW_w	=	Molecular weight of water, in grams per gram-mole
MW_e	=	Molecular weight of exempt compound, in grams per gram-mole
Pp_c	=	VOC composite partial pressure at 20°C, in mm Hg
Vp_i	=	Vapor pressure of the "i"th VOC compound at 20°C, in mm Hg

(77) VOLATILE ORGANIC COMPOUND (VOC) is as defined in Rule 102.

(78) WING COATING is a corrosion-resistant coating that is resilient enough to withstand the flexing of the wings.

(79) WIRE INK is the surface identification stripe and mark on aerospace wire or cable that serves as an electrical insulator in the presence of high humidity.

(80) WIRE PREBONDING ETCHANT is a non-additive surface treatment process to provide bondability of aerospace wire coatings to the underlying insulation layer.

(c) Requirements

(1) VOC Content of Aerospace Materials

(A) A person shall not apply to aerospace components any materials, including any VOC-containing materials added to the original material supplied by the manufacturer, which contain VOC in excess of the limits specified below:

VOC Limit Grams of VOC per Liter, Less Water and Less Exempt Compounds			
Primers	**Current VOC Limit**	**VOC Limit Effective 1-1-03**	**VOC Limit Effective 1-1-05**
General Primer	350	350	350
Low-Solids Corrosion Resistant Primer	350	350	350
Pretreatment Primer	780	780	780
Rain Erosion-Resistant Coating Compatible Primer	850	850	850
Adhesion Promoter	850	850	250
Adhesive Bonding Primer			
New Commercial Aircraft	805	250	250
All Military Aircraft	805	805	805
Remanufactured Commercial Aircraft Parts	805	805	805
Sonic and Acoustic Applications	805	805	805
Adhesive Bonding Primer			
Long Term	250	250	250
Short Term	250	250	250

Coatings	**Current VOC Limit**	**VOC Limit Effective 3-01-02**
Topcoat	420	420
Clear Topcoat	520	520
Unicoat	420	420
Wing Coating	750	750
Impact Resistant Coating	420	420
High-Temperature Coating	850	850
Antichafe Coating	600	420
Rain Erosion-Resistant Coating	800	800
Conformal Coating	750	750
Optical Anti-Reflective Coating	700	700
Scale Inhibitor	880	880
Metallized Epoxy Coating	700	700

Coatings (cont'd)	**Current VOC Limit**	**VOC Limit Effective 3-01-02**
Electric or Radiation Effect Coating	800	800
Temporary Protective Coating	250	250
Fuel Tank Coatings	420	420
Mold Release Coatings	780	780
Flight Test Coatings		
Used on Missiles or Single Use Target Craft	420	420
All Other	840	840
Fire Resistant Coatings		
Commercial	650	650
Military	970	800
Wire Coatings		
Phosphate Ester Resistant Ink	925	925
Other	420	420
Space Vehicle Coatings		
Electrostatic Discharge Protection Coating	800	800
Other	1000	1000

Adhesives	**Current VOC Limit**
Non-Structural Adhesive	250
Structural Adhesive	
Autoclavable	50
Non-Autoclavable	850
Space Vehicle Adhesive	800
Fuel Tank Adhesive	620

Sealants	**Current VOC Limit**	**VOC Limit Effective 3-01-02**
Fastener Sealant	675	675
Extrudable,Rollable or Brushable Sealant	600	280
Other	600	600

Maskants	Current VOC Limit
For Chemical Processing	250
For Chemical Milling	
Type I	250
Type II	160
Photolithographic	850
Touch-up, Line Sealer Maskants	750

Lubricants	Current VOC Limit
Fastener Installation	
Solid-Film Lubricant	880
Dry Lubricative Materials	675
Fastener-Lubricative Coatings, Fastener Manufacturing	
Solid Film Lubricant	250
Dry Lubricative Materials	120
Barrier Coating	420
Non-Fastener Lubricative Coatings, Fastener Manufacturing	
Solid Film Lubricant	880
Dry Lubricative Materials	675

VOC LIMIT Grams of VOC per Liter of Material	
Cleaning Solvents and Strippers	**Current VOC Limit**
Cleaning Solvents	200 g/L or 45 mm Hg VOC Composite Partial Pressure
Strippers	300 g/L or 9.5 mm Hg VOC Composite Partial Pressure

(B) Documents shall be provided to the Executive Officer or his designee demonstrating that unicoat is being used in lieu of the application of a primer and topcoat, and the applicant must receive written approval for the use of unicoat specifying the conditions of application from the Executive Officer or his designee.

(C) For low-solids adhesives, coatings, primers or sealants, the appropriate limits in subparagraph (c)(1)(A) shall be expressed in grams of VOC per liter of material.

(2) Solvent Cleaning Operations; Storage and Disposal of VOC-Containing Materials

(A) Cleaning of material application equipment and storage of solvent laden cloth and paper shall comply with provisions of Rule 1171.

(B) A person shall not atomize any solvent into open air.

(3) Transfer Efficiency

A person or facility shall not apply aerospace materials unless they are applied with properly operating equipment or controlled, according to operating procedure specified by the equipment manufacturer or the Executive Officer or his designee, and by the use of one of the following methods:

(A) electrostatic application; or

(B) flow coater; or

(C) roll coater; or

(D) dip coater; or

(E) high-volume, low-pressure (HVLP) spray; or

(F) hand application methods; or

(G) such other alternative application methods as are demonstrated to the Executive Officer, using District-approved procedures, to be capable of achieving at least equivalent transfer efficiency to method (c)(3)(E) and for which written approval of the Executive Officer has been obtained; or

(H) Approved air pollution control equipment under paragraph (c)(4).

(4) Control Equipment

Owners and/or operators may comply with provisions of paragraphs (c)(1) and (c)(3) by using approved air pollution control equipment provided that the VOC emissions from such operations and/or materials are reduced in accordance with provisions of (A) and (B).

(A) The control device shall reduce emissions from an emission collection system by at least 95 percent, by weight, or the output of the air pollution control device is less than 50 PPM calculated as carbon with no dilution.

(B) The owner/operator demonstrates that the system collects at least 90 percent, by weight, of the emissions generated by the sources of emissions.

(d) Recordkeeping Requirements

Records shall be maintained pursuant to the requirements of Rule 109.

(e) Determination of VOC Content

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

(1) EPA Reference Method 24 (Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coatings, Code of Federal Regulations Title 40, Part 60, Appendix A). Analysis done according to EPA Method 24 shall utilize Procedure B of ASTM Method D-2369, referenced in EPA Method 24. The exempt solvent content shall be determined using SCAQMD Test Methods 302 and 303 (SCAQMD "Laboratory Methods of Analysis for Enforcement Samples" manual) or;

(2) SCAQMD Test Methods 302, 303, and 304 (SCAQMD "Laboratory Methods of Analysis for Enforcement Samples" manual).

The following classes of compounds: cyclic, branched, or linear, completely fluorinated alkanes; cyclic, branched, or linear, completely fluorinated ethers with no unsaturations; cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and sulfur-containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine, will be analyzed as exempt compounds for compliance with subdivision (c), only at such time as manufacturers specify which individual compounds are used in the coating formulations and identify the test methods, which, prior to such analysis, have been approved by the USEPA and the SCAQMD, that can be used to quantify the amounts of each exempt compound.

(f) Test Methods

(1) Efficiency of the control device shall be determined according to EPA Method 25, 25A, SCAQMD Test Method 25.1, or SCAQMD Test Method 25.3. Emissions determined to exceed any limits established by this rule through the use of either of the above-referenced test methods shall constitute a violation of this rule.

(2) The capture efficiency of the emissions collection system shall be determined by the USEPA method cited in 55 FR (Federal Register)

26865, June 29, 1990 or any other method approved by the USEPA, the California Air Resources Board, and the SCAQMD.

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

(4) The identity and quantity of components in solvents shall be determined in accordance with SCAQMD test method 308 (Quantitation of Compounds by Gas Chromatography) contained in the SCAQMD "Laboratory Methods of Analysis for Enforcement Samples" manual. The VOC composite partial pressure is calculated using the equation in paragraph (b)(72).

(5) Multiple Test Methods

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

(6) All test methods shall be those referenced in this section or any other applicable method approved by the USEPA, the California Air Resources Board, and the SCAQMD.

(g) Rule 442 Applicability

Any material, operation, or facility which is exempt from all or a portion of this rule, shall comply with the provisions of Rule 442.

(h) Prohibition of Solicitation of Violations

(1) A person shall not solicit or require any other person to use, in the District, any material or combination of materials to be applied to any aircraft component subject to the provisions of this rule that does not meet the limits and requirements of this rule, or of an Alternative Emission Control Plan (AECP) approved pursuant to the provisions of subdivision (i).

(2) The requirements of this paragraph shall apply to all written or oral agreements executed or entered into after April 3, 1987.

(i) Alternative Emission Control Plans

An owner/operator may comply with the provisions of paragraph (c)(1) by means of an Alternative Emission Control Plan pursuant to Rule 108.

(j) Reporting Requirements

Persons who perform qualification acceptance testing on materials with a future compliance date for use in the District shall, beginning July 1, 1994 and at 6-month intervals thereafter, submit a status report describing the progress toward the development of materials which satisfy future compliance dates. These reports shall contain, at a minimum:

(1) Manufacturer, product number, VOC content, and applicable material category for each of the test candidates;

(2) Test expenditures for the period;

(3) Progress on candidates tested during this period.

(4) Approvals received for materials which comply with future compliance dates.

(5) Volume of materials used in each material category for which there is a future compliance date.

Facilities testing materials in the same material category may submit joint status reports. Once compliance with future compliance dates is achieved and a status report is submitted documenting such, no further status reports need be submitted.

(k) Air Toxics

In lieu of complying with subdivisions (e), (f), (h), and (i) of Rule 1402 - Control of Toxic Air Contaminants from Existing Sources, a facility may submit a compliance plan to the District for the Executive Officer's approval within 180 days from the date of Health Risk Assessment approval that demonstrates how a toxicity-weighted emissions reduction efficiency of at least 90.0 percent for toxic organic solvents and at least 99.0 percent for toxic particulate matter emissions has been achieved and will be maintained in the future.

(l) Exemptions

(1) The provisions of paragraph (c)(1) of this rule shall not apply to materials, exclusive of adhesives, with separate formulations that are used in volumes of less than 20 gallons per year provided that the total of such formulations applied annually by a facility is less than 200 gallons.

(2) The provisions of subdivision (c) of this rule shall not apply to a facility which uses a total of less than three gallons of VOC-containing materials on each and every day of operation.

(3) The provisions of paragraphs (c)(1) and (c)(3) of this rule shall not apply to incidental corrosion maintenance repair coating operations at military facilities, provided that the coating use at any maintenance repair location within the facility does not exceed 1.5 gallons per day, and the total coating usage for such operations at the facility does not exceed five gallons per day.

(4) The VOC limits for solvents and strippers shall not apply to space vehicle manufacturing.

(5) The provisions of paragraph (c)(1) shall not apply to clear or translucent coatings applied on clear or transparent substrates.

(6) The provisions of paragraph (c)(3) shall not apply to touch-up and stencil coatings.

(7) The provisions of paragraph (c)(1) shall not apply to the recoating of assembled aircraft at rework facilities if original coating formulations are used.

(8) The provisions of paragraph (c)(1) shall not apply to adhesives with separate formulations that are used in volumes of less than ten gallons per year.

(9) The provisions of paragraph (c)(3) shall not be applied to the application of materials marking coatings.

(10) The provisions of subdivision (c) shall not apply to laboratories which apply materials to test specimens for purposes of research, development, quality control, and testing for production-related operations.

(11) The provisions of subdivision (c) shall not apply to the application of temporary marking coatings.

(12) The VOC limits for solvents shall not apply to the surface cleaning of solar cells, fluid systems, avionic equipment, and laser optics.

(13) The provisions of subdivision (d) and paragraph (c)(3) shall not apply to the application of materials that contain less than 20 g/L of VOC per liter of material.

(14) The provisions of paragraph (c)(3) shall not apply to the use of materials dispensed from airbrush operations.

(15) The provisions of this rule shall not apply to aerosol coating products.

(16) Until January 1, 2005, the VOC limit for fuel tank coatings shall not apply to non-spray rubber solution fuel-tank coating, containing less than 710 g/L of VOC per liter of coating, used on fuel tanks with maximum

capacity of 35 gallons and where the total facilitywide usage of this coating is less than 150 gallons per year. Records shall be maintained pursuant to the requirements of Rule 109 to establish eligibility for this exemption.

(Adopted May 4, 1979)(Amended February 5, 1982)
(Amended December 7, 1984)(Amended May 5, 1989)(Amended March 2, 1990)
(Amended December 7, 1990)(Amended August 2, 1991)
(Amended February 7, 1992)(Amended March 8, 1996)

RULE 1128. PAPER, FABRIC, AND FILM COATING OPERATIONS

(a) Applicability

This rule applies to all persons applying coatings or wash primers to paper, fabric, or film substrates. The drying and curing processes covered under this rule include, but are not limited to, heated, forced-air dried, and non-heated processes.

(b) Definitions

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

(1) AEROSOL COATING PRODUCT is a pressurized coating product containing pigments or resins that dispenses product ingredients by means of a propellant, and is packaged in a disposable can for hand-held application, or for use in specialized equipment for ground traffic/marking applications.

(2) APPLICATION PROCESS is any process where surface coatings are applied and/or cured to paper, fabric, and/or film on a coating line. Such coating line shall include coating applicators, heating or drying ovens, any dryers, and any other equipment where VOC emissions occur.

(3) COATING means a layer of material applied on a substrate that forms a film.

(4) DIE COATER (OR SLIT COATER) is a type of application equipment that coats an object by flowing coatings through a slit directly onto the object moving past the slit.

(5) DIP COATER is a type of application equipment that coats an object by submerging the object in a vat of coating, and subsequently withdrawing the object and draining off the excess coating.

(6) ELECTROSTATIC APPLICATION is a method of applying coating whereby atomized paint droplets are charged and subsequently deposited on the substrate by electrostatic attraction.

(7) EXEMPT COMPOUNDS (See Rule 102-Definition of Terms).

(8) FABRIC COATING is any decorative or protective coating or reinforcing material applied on or impregnated into textile fabric, vinyl coated textile fabric, or vinyl sheets.

(9) FILM COATING is any coating applied in a web coating process on any film substrate other than paper or fabric, including, but not limited to typewriter ribbons, photographic film, magnetic tape, and metal foil gift wrap, but excluding coatings applied to packaging used exclusively for food and health-care products for human or animal consumption.

(10) FLOW COATER is a type of application equipment that coats an object by flowing a stream of coating over the object and draining off any excess coating.

(11) FOAM COATER is a type of application equipment that coats an object by flowing foam through holes or a slit directly onto the object moving underneath it.

(12) GRAMS OF VOC PER LITER OF COATING, LESS WATER AND LESS EXEMPT COMPOUNDS, is the weight of VOC per combined volume of VOC and coating solids, and can be calculated by the following equation:

$$\text{Grams of VOC per Liter of Coating, Less Water and Less Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where:
W_s = weight of volatile compounds, in grams
W_w = weight of water, in grams
W_{es} = weight of exempt compounds, in grams
V_m = volume of material, in liters
V_w = volume of water, in liters
V_{es} = volume of exempt compounds, in liters

(13) GRAMS OF VOC PER LITER OF MATERIAL is the weight of VOC per volume of material and can be calculated by the following equation:

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

Where:
W_s = weight of volatile compounds, in grams
W_w = weight of water, in grams

W_{es} = weight of exempt compounds, in grams
V_m = volume of material in liters

(14) HAND APPLICATION METHOD is a method of applying a coating to a substrate using manually held, non-mechanically operated equipment. Such equipment includes paint brushes, hand rollers, caulking guns, trowels, spatulas, syringe daubers, rags, and sponges.

(15) HEATING OVEN is a device into which paper, fabric or film is put in order to dry or cure the applied coating by applying heat.

(16) HIGH VOLUME LOW PRESSURE (HVLP) SPRAY is an atomized coating application system which is operated between 0.1 and 10 psig air pressure at the air cap/tip of the spray gun.

(17) PAPER COATING is any coating applied on or impregnated into paper, including, but not limited to, adhesive tapes and labels, book covers, post cards, office copier paper, drafting paper, and pressure sensitive tapes.

(18) PLASTISOL is a coating that is a liquid dispersion of small particles of resins and plastisizers that are fused to become a plastic.

(19) PLASTISIZER is a material used to keep plastic material soft and viscous.

(20) ROLL COATER is a type of application equipment in which a series of mechanical rollers form a thin coating film on the surface of a roller, which is subsequently applied to a substrate by moving the substrate underneath the roller.

(21) TRANSFER EFFICIENCY is the ratio of the weight or volume of coating solids adhering to an object to the total weight or volume, respectively, of coating solids used in the application process expressed as a percentage.

(22) VOLATILE ORGANIC COMPOUND (VOC) is any volatile chemical compound which contains the element carbon excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, and exempt compounds.

(23) WASH PRIMER is a material used to clean and/or to activate surfaces of paper, fabric, or film and may contain no more than five percent, by weight, solid materials.

(c) Requirements

(1) Until January 1, 1994, a person shall not use or apply any coating in any paper, fabric, or film coating application process involving the use of heating ovens unless:

(A) the coating contains less than 265 grams of VOC per liter of coating, less water, and less exempt compounds, as applied, and is applied with a minimum transfer efficiency of 95 percent; or

(B) the VOC emissions are collected and reduced to less than 120 grams per liter of coating applied.

(2) On or after January 1, 1994, a person shall not use or apply any coating in any paper, fabric or film coating application process, with or without heating ovens, unless:

(A) The coating contains less than 265 grams of VOC per liter of coating less water, and less exempt compounds, as applied; or

(B) VOC emissions are collected and reduced by an approved emission control system pursuant to subdivisions (d) and (j).

(3) A person shall not use or apply any plastisol to any paper, fabric, or film substrate unless the coating contains less than 20 grams of VOC per liter of coating, less water, and less exempt compounds, as applied.

(4) Until January 1, 1994, a person shall not use wash primer on any paper, fabric, and/or film used in any paper, fabric, and/or film coating application process involving the use of heating ovens, unless:

(A) the wash primer contains less than 265 grams of VOC per liter of material used, or

(B) the VOC emissions from the washing operations are collected and reduced to less than 120 grams per liter of washing material used.

(5) On or after January 1, 1994, a person shall not use wash primer on any paper, fabric, and/or film used in any paper, fabric, and/or film coating application process, with or without heating ovens, unless:

(A) The wash primer contains less than 265 grams of VOC per liter of material used, or

(B) VOC emissions are collected and reduced by an approved emission control system, pursuant to subdivisions (d) and (j).

(6) Application Methods

On or after January 1, 1994, no person shall apply coatings, unless these materials are applied with equipment operated according to manufacturer's specifications, and by the use of one of the following methods:

(A) Flow Coater;

(B) Roll Coater;

(C) Dip Coater;

(D) Foam Coater;

(E) Die Coater;

(F) Hand Application Methods;

(G) High-Volume Low-Pressure (HVLP) spray, only for air-dried coatings; or

(H) Such other alternative spray application methods as are demonstrated in accordance with the provisions of paragraph (f)(4), to be capable of achieving equivalent or better transfer efficiency than the application method listed in subparagraph (c)(6)(G), and for which written approval of the Executive Officer has been obtained;

(7) Containers for organic solvents and mixing tanks for coatings containing organic solvents shall be free from leaks and shall be covered except when adding or removing materials, cleaning, or when the container is empty.

(8) A person shall not:

(A) use VOC-containing materials for the cleaning of application equipment used in paper, fabric, and/or film coating operations, excluding hand wiping, unless:

(i) 85 percent of the VOCs are collected and properly disposed of in such a way that they are not emitted into the atmosphere; or

(ii) the clean-up materials contain 15 percent or less, by weight, VOC.

(B) use other than closed containers for disposal of cloth or paper used for surface preparation, clean-up, and the removal of uncured coatings, which are impregnated with solvent containing VOC.

(C) use other than closed containers for disposal of cloth or paper used in stripping cured coatings, which are impregnated with solvent containing VOC.

(9) Solvent Cleaning Operations: Storage and Disposal of VOC Containing Materials

Subparagraphs (c)(8)(A), (c)(8)(B) and hand wipe cleaning of application equipment used in paper, fabric, and/or film coating operations shall be superseded by paragraphs (c)(1), (c)(2), (c)(4), and (c)(6) of Rule 1171 - Solvent Cleaning Operations, on and after July 1, 1992.

(d) Approved Emission Control System

A person may comply with the provisions of paragraph (c)(2), (c)(5) or (c)(6) by using an emission control system for reducing VOC emissions consisting of collection and control devices, which are approved, in writing, by the Executive Officer and installed in accordance with the Compliance Schedule of subdivision (j) and operated subject to the following provisions:

(1) The emission collection system shall collect at least 90 percent, by weight, of the emissions generated by the source of emissions.

(2) The control device shall reduce emissions from an emission collection system by at least 95 percent, by weight, or the output of the control device is 50 ppm, by volume, calculated as carbon, with no dilution.

(e) Recordkeeping Requirements

Records shall be maintained pursuant to Rule 109.

(f) Compliance Test Methods

For the purpose of this rule, the following test methods shall be used.

(1) The VOC content of materials subject to the provisions of this rule shall be determined by:

(A) The United States Environmental Protection Agency (USEPA) Reference Method 24 (Determination of Volatile Matter Content, Water Content, Density Volume Solids, and Weight Solids of Surface Coatings, Code of Federal Regulations Title 40, Part 60, Appendix A). The exempt compound's content shall be determined by the South Coast Air Quality Management District's (SCAQMD) Laboratory Methods of Analysis for Enforcement Samples - Section III, Methods 19 and 22; or

(B) SCAQMD's Laboratory Methods of Analysis for Enforcement Samples - Section III, Methods 16, 17, 19, 22, and 24.

VOC emissions determined to exceed any limits established by this rule through the use of the above-referenced sets of test methods shall consititute a violation of the rule.

(2) The capture efficiency of the emissions collection system shall be determined by the USEPA method cited in 55 FR (Federal Register) 26865, June 29, 1990.

(3) The efficiency of the control device and the VOC content measured and calculated as carbon in the control device exhaust gases shall be determined by USEPA's Test Method 18, or Air Resources Board (ARB) Method 422 for the determination of emissions of Exempt Compounds and USEPA's Test Methods 25, 25A, or SCAQMD's Method 25.1 (Determination of Total Gaseous Non-Methane Organic Emissions as Carbon) for the determination of total organic compound emissions. Emissions determined to exceed any limits established by this rule through the use of any of the above-referenced test methods shall constitute a violation of the rule.

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

The following classes of compounds: cyclic branched, or linear, completely fluorinated alkanes; cyclic, branched, or linear, completely fluorinated ethers with no unsaturations; cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and sulfur-contained perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine, will be analyzed as exempt compounds for compliance with subdivision (c), only at such time as manufacturers specify which individual compounds are used in the coating formulations and identify the test methods, which, prior to such analysis, have been approved by the USEPA and the SCAQMD, that can be used to quantify the amounts of each exempt compound.

(g) Rule 442 Applicability

Any coating, coating operation, or facility which is exempt from all or a portion of this rule, shall comply with the provisions of Rule 442.

(h) Alternative Emission Control Plan

An owner/operator may comply with subparagraph (c)(1)(A) or (c)(2)(A) by means of an Alternative Emission Control Plan pursuant to Rule 108.

(i) Exemptions

(1) Until January 1, 1994, the provisions of subdivision (c) shall not apply to any coating application facility which applies less than two gallons of coatings per day.

(2) The provisions of this rule shall not apply to aerosol coating products.

(3) The provisions of subparagraph (c)(6) shall not apply to the application of materials that contain less than 20 g/L of VOC per liter of material.

(4) The provisions of subdivision (c) shall not apply to laboratories which apply less than two (2) gallons per day of coatings to test specimens for purposes of testing for production-related operations, research, development, and quality control.

(5) The provisions of this rule shall not apply to the application of coatings to fine arts paintings, or to scenic or theatrical backgrounds for motion pictures, television, and theater.

(6) The provisions of subdivision (c) shall not apply to laboratories located at facilities that manufacture reinforced plastic, structural materials, which apply no more than three (3) gallons per day of coatings to test specimens for either testing production-related operations, research, development, or quality control.

(j) Compliance Schedule

Persons complying with the provisions of subdivision (d) shall comply with the following increments of progress to achieve compliance:

(1) By July 1, 1992, submit required applications for permits to construct and operate, to achieve compliance with paragraphs (c)(2), (c)(5), or (c)(6).

(2) By January 1, 1994, demonstrate compliance with paragraphs (c)(2), (c)(5), or (c)(6).

(Adopted October 3, 1980)(Amended February 1, 1985)(Amended May 5, 1989)
(Amended February 2, 1990)(Amended March 2, 1990)(Amended April 6, 1990)
(Amended June 1, 1990)(Amended November 2, 1990)(Amended December 7, 1990)
(Amended August 2, 1991)(Amended March 6, 1992)(Amended July 9, 1993)
(Amended September 8, 1995)(Amended March 8, 1996)(Amended October 8, 1999)
(Amended May 2, 2014)

RULE 1130. GRAPHIC ARTS

(a) Purpose and Applicability

The purpose of this rule is to reduce Volatile Organic Compound (VOC) emissions from graphic arts operations. This rule applies to any person performing graphic arts operations or who supplies, sells, offers for sale, markets, manufactures, blends, repackages, stores at a worksite, distributes, applies or solicits the application of graphic arts materials for use in the District.

(b) Definitions

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

(1) AEROSOL COATING PRODUCT is a pressurized coating product containing pigments or resins that dispenses product ingredients by means of a propellant, and is packaged in a disposable can for hand-held application, or for use in specialized equipment for ground marking and traffic marking applications.

(2) ALCOHOL is an organic compound that contains a hydroxyl (OH) group and is used in the fountain solution to reduce the surface tension and increase the viscosity of water to prevent piling (ink build-up). For purposes of this rule, alcohol includes, but is not limited to, isopropyl alcohol (isopropanol), n-propanol and ethanol.

(3) ALCOHOL SUBSTITUTE is an additive that contains VOCs but no alcohol and is used in the fountain solution to reduce the surface tension and increase the viscosity of water to prevent piling (ink build-up).

(4) COATING is a material which is applied to a surface in order to beautify, protect or provide a barrier to such surface in a relatively unbroken film.

(5) CAPTURE EFFICIENCY, in percent, is the ratio of the weight of the VOC in the effluent stream entering the control device to the weight of VOC emitted from graphic arts operations, both measured simultaneously, and can be calculated by the following equation:

$$\text{Capture Efficiency} = [W_c/W_e] \times 100$$

Where: W_c = weight of VOC entering control device

W_e = weight of VOC emitted

(6) CONTROL DEVICE EFFICIENCY, in percent, is the ratio of the weight of the VOC removed by the control device from the effluent stream entering the control device to the weight of the VOC in the effluent stream entering the control device, both measured simultaneously, and can be calculated by the following equation:

$$\text{Control Device Efficiency} = [(W_c - W_a)/W_c] \times 100$$

Where: W_c = Weight of VOC entering control device

W_a = Weight of VOC discharged from the control device

(7) END-USER is a person who performs graphic arts operations.

(8) ENERGY CURABLE COATINGS, INKS AND ADHESIVES are single-component reactive products that cure upon exposure to visible-light, ultra-violet light or to an electron beam. The VOC content of thin film Energy Curable Coatings, Inks And Adhesives may be determined by manufacturers using ASTM Test Method 7767-11 "Standard Test Method to Measure Volatiles from Radiation Curable Acrylate Monomers, Oligomers, and Blends and Thin Coatings Made from Them."

(9) EXEMPT COMPOUNDS (See Rule 102-Definition of Terms).

(10) FACILITY is any permit unit or grouping of permit units or other air-contaminant-emitting activities which are located on one or more contiguous properties within the District, in actual physical contact or separated solely by a public roadway or other public right-of-way, and are owned or operated by the same person (or by persons under common control). Such above-described groupings, if non-contiguous, but connected only by land carrying a pipeline, shall not be considered one facility.

(11) FLEXOGRAPHIC PRINTING is a printing method utilizing a flexible rubber or other elastomeric plate in which the image area is raised relative to the non-image area.

(12) FLUORESCENT INK is a printing ink that emits electromagnetic radiation as a result of the absorption of energy from radiation.

(13) FOUNTAIN SOLUTION is the solution used in offset lithographic printing which is applied to the image plate to maintain the hydrophilic properties of the non-image areas. It is primarily water and contains at least one of the following materials: etchants such as mineral salts; hydrophilic gums; or VOC additives to reduce the surface tension of the solution.

(14) GRAMS OF VOC PER LITER OF COATING (OR INK OR ADHESIVE), LESS WATER AND LESS EXEMPT COMPOUNDS, is the weight of VOC per combined volume of VOC and coating (or ink or adhesive) solids and can be calculated by the following equation:

$$\text{Grams of VOC per Liter of Coating (or Ink or Adhesive), Less Water and Less Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where:
- W_s = weight of volatile compounds in grams
- W_w = weight of water in grams
- W_{es} = weight of exempt compounds in grams
- V_m = volume of material in liters
- V_w = volume of water in liters
- V_{es} = volume of exempt compounds in liters

For coatings that contain reactive diluents, the grams of VOC per Liter of Coating (or ink or adhesive), Less Water and Less Exempt Compounds, shall be calculated by the following equation:

$$\text{Grams of VOC per Liter of Coating (or Ink or Adhesive), Less Water and Less Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where:
- W_s = weight of volatile compounds evolved during curing and analysis in grams
- W_w = weight of water evolved during curing and analysis in grams
- W_{es} = weight of exempt compounds evolved during curing and analysis in grams
- V_m = volume of material prior to reaction in liters
- V_w = volume of water evolved during curing and analysis in liters

V_{es} = volume of exempt compounds evolved during curing and analysis in liters

(15) GRAMS OF VOC PER LITER OF MATERIAL is the weight of VOC per volume of material and can be calculated by the following equation:

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

Where: W_s = weight of volatile compounds in grams

W_w = weight of water in grams

W_{es} = weight of exempt compounds in grams

V_m = volume of material in liters

(16) GRAPHIC ARTS OPERATIONS are gravure, letterpress, flexographic, and offset lithographic printing processes or related coating or laminating processes.

(17) GRAPHIC ARTS MATERIALS are any inks, coatings, or adhesives, including added thinners or retarders, used in printing or related coating or laminating processes.

(18) GRAVURE PRINTING is an intaglio printing process in which the ink is carried in minute etched or engraved wells on a roll or cylinder, excess ink being removed from the surface by a doctor blade.

(19) HEATSET INK is an offset lithographic printing ink used on continuous web-fed printing presses that are equipped with hot air high velocity dryers. The ink dries or sets by heat induced evaporation of the ink oils and subsequent chilling of the ink by chill rolls.

(20) LAMINATION is a process of composing two or more layers of material to form a single, multiple-layer sheet by using an adhesive.

(21) LETTERPRESS PRINTING is a printing process in which the image area is raised relative to the non-image area and the ink is transferred to the substrate directly from the image surface.

(22) MATTE FINISH INK is a flexographic printing ink which is used on non-porous substrates in flexographic printing operations and contains at least five (5) percent by weight silicon dioxide flattening agent.

(23) METALLIC INK is a flexographic printing ink which is used on non-porous substrates in flexographic printing operations and contains at least 28 percent by weight elemental metal particles.

(24) NON-HEATSET INK is an offset lithographic printing ink that sets and dries by absorption into the substrate, and hardens by ambient air oxidation that may be accelerated by the use of infrared light sources. For the purposes of this definition energy curable inks are examples of non-heatset inks.

(25) NON-POROUS SUBSTRATE is a substrate whose surface prevents penetration by water, including but not limited to foil, polyethylene, polypropylene, cellophane, paper or paperboard coated with a non-porous material, metalized polyester, nylon, and mylar.

(26) OFFSET LITHOGRAPHIC PRINTING is a planographic printing process in which the image and non-image areas are on the same plane of a thin lithographic plate and are chemically differentiated. The ink film is transferred from the lithographic plate to an intermediary surface, a rubber covered cylinder called a blanket, which, in turn, transfers the ink to the substrate. This printing process differs from other printing processes where the image is typically printed from a raised or recessed surface.

(27) OVERALL CONTROL EFFICIENCY (C.E.), in percent, is the ratio of the weight of the VOC removed by the emission control system from the effluent stream entering the control device to the total VOC emitted from graphic arts operations, both measured simultaneously, and can be calculated by the following equations:

$$\text{C.E.} = \left[\left(W_c - W_a\right)/W_e\right] \text{x } 100$$

$$\text{C.E.} = \left[\left(\text{Capture Efficiency}\right) \text{x } \left(\text{Control Device Efficiency}\right)/100\right]$$

Where: W_c = Weight of VOC entering control device

W_a = Weight of VOC discharged from the control device

W_e = Weight of VOC emitted

(28) PACKAGING GRAVURE is gravure printing on paper, paperboard, foil, film or other substrates used to produce containers or packages.

(29) POROUS SUBSTRATE is a substrate whose surface does not prevent the penetration by water, including but not limited to paper, paperboard, and any paper product that is coated with a porous material.

(30) POTENTIAL TO EMIT is the maximum capacity of a stationary source to emit a regulated air pollutant based on its physical or operational design. Any physical or operational limitation on the capacity of the stationary

source to emit a pollutant, including air pollution control equipment and restrictions on hours of operations or on the type of material combusted, stored, or processed, shall be treated as part of the design only if the limitation is federally enforceable.

(31) PRINTING in the graphic arts is any operation that imparts color, design, alphabet, or numerals on a substrate.

(32) PRINTING INK is a pigmented fluid or viscous material used in printing.

(33) PROOF PRESS is a press used only to check the quality of print, color reproduction, and editorial content.

(34) PUBLICATION GRAVURE is gravure printing on paper subsequently formed into books, magazines, catalogues, brochures, directories, newspaper supplements or other types of printed materials not classified as packaging gravure.

(35) REACTIVE DILUENT is a liquid which is a VOC during application and one in which, through chemical reaction or physical actions, such as adsorption or retention in the substrate, 20 percent or more of the VOC becomes an integral part of a finished product.

(36) REFRIGERATED CHILLER is a device that continuously maintains and supplies fountain solution to a holding tray at a temperature of 55 degrees Fahrenheit or less measured at the supply tank, thereby reducing evaporative emissions of VOCs in fountain solutions.

(37) SOLVENT CLEANING is as defined in Rule 1171 – Solvent Cleaning Operations.

(38) STERILIZATION INDICATING INKS are inks that change color to indicate that sterilization has occurred. Such inks are used to monitor the sterilization of medical instruments, autoclave efficiency, and the thermal processing of foods for prevention of spoilage.

(39) VOLATILE ORGANIC COMPOUND (VOC) is as defined in Rule 102 – Definition of Terms.

(40) WEB-FED is an automatic system which supplies substrate from a continuous roll, or from an extrusion process.

(c) Requirements

(1) VOC Content of Graphic Arts Materials

No person shall supply, sell, offer for sale, market, manufacture, blend, package, repackage, distribute, apply or solicit the application of any

graphic arts material, including any VOC-containing materials added to the original graphic arts materials, for use in the District, which contains VOC in excess of the VOC content limits set-forth in the Table of Standards I below:

TABLE OF STANDARDS I

VOC CONTENT LIMITS Grams of VOC Per Liter of Coating, Ink, and Adhesive, Less Water And Less Exempt Compounds	
GRAPHIC ART MATERIAL	Current Limit (g/L)
Adhesive	150
Coating	300
Flexographic Fluorescent Ink	300
Flexographic Ink: Non-Porous Substrate	300
Flexographic Ink: Porous Substrate	225
Gravure Ink	300
Letterpress Ink	300
Offset Lithographic Ink	300

(2) VOC Content of Fountain Solution

(A) No person shall apply any fountain solution, including any VOC-containing materials added to the original fountain solution for use in a graphic arts operation within the District unless the VOC content in the fountain solution, as applied, complies with the applicable VOC limits set-forth in the Table of Standards II below.

TABLE OF STANDARDS II

VOC CONTENT LIMITS Grams of VOC Per Liter of Material		
FOUNTAIN SOLUTION	1/1/2000 g/L	7/1/2014 g/L
Heatset Web-Fed		
Using Alcohol without Refrigerated Chiller	80	16
Using Alcohol with Refrigerated Chiller	100	30
Using Alcohol Substitute	80	50
Sheet-Fed		
Using Alcohol without Refrigerated Chiller	80	50
Using Alcohol with Refrigerated Chiller	100	85
Using Alcohol Substitute	80	50
Non-Heatset Web-Fed		
Using Alcohol Substitute without Refrigerated Chiller	80	50
Using Alcohol Substitute with Refrigerated Chiller		

(B) The use of alcohol containing fountain solutions is prohibited for use in non-heatset web-fed operations.

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

Solvent cleaning operations and the storage and disposal of VOC-containing materials used in cleaning operations are subject to the provisions of Rule 1171 - Solvent Cleaning Operations.

(4) Prohibition of Storage

Effective July 1, 2014, a person shall not store any graphic arts material at a worksite for use in the District which contains VOC in the excess of the VOC-content limits specified in paragraph (c)(1).

(5) Approved Emission Control System

A person may comply with the provisions of paragraph (c)(1) or (c)(2) by using an emission control system to reduce VOC emissions provided such system is first approved in writing by the Executive Officer and meets the following requirements:

(A) The control device reduces VOC emissions from an emissions collection system by at least 95 percent, by weight, or the output of the air pollution control device is no more than 50 PPM by volume calculated as carbon with no dilution; and

(B) The owner/operator demonstrates that the emission collection system collects at least 90 percent, by weight, of the VOC emissions generated by the sources of emissions.

(6) Alternative Emission Control Plan

A person may comply with the provisions of paragraphs (c)(1) or (c)(2) by means of an approved Alternative Emission Control Plan pursuant to Rule 108 - Alternative Emission Control Plans.

(d) Prohibition of Specification and Sale

(1) No person shall solicit from, or require any other person to use in the District any graphic arts material which, when applied as supplied or thinned or reduced according to the manufacturer's recommendation for application, does not meet the applicable VOC limits in paragraph (c)(1) or subparagraph (i)(4)(C) for the specific application.

(2) No person shall supply, offer for sale, sell, market, blend, package, repackage, manufacture or distribute, to an end-user any graphic arts material for use in the District which, when applied as supplied or thinned or reduced according to the manufacturer's recommendation for application, does not meet the applicable VOC limits in paragraph (c)(1) or subparagraph (i)(4)(C) for the specific application.

(3) The prohibition of sales and use as specified in paragraphs (d)(1) and (d)(2) shall not apply to any manufacturer of graphic arts materials, provided that the manufacturer has complied with the labeling requirements of Rule 443.1 – Labeling of Materials Containing Organic Solvents, and the product is not sold directly to a user located in the District, or the product was sold to an independent distributor or a sales outlet located in the District that is not a subsidiary of, or under the control of the manufacturer, and was informed in writing by the manufacturer about the compliance status of the product with Rule 1130.

(e) Recordkeeping and Reporting Requirements

Records shall be maintained pursuant to Rule 109. For emissions reporting purposes, the following substrate retention factors shall be applied to the lithographic oil content of the inks: 20 percent retention for heatset inks and 95 percent retention for non-heatset inks.

(f) Rule 442 Applicability

Any graphic arts operations exempted from all or a portion of the VOC limits of this rule shall comply with the provisions of Rule 442 – Usage of Solvents.

(g) Emission Reduction Credits

Facilities that use matte finish and metallic inks shall not receive emission reduction credit(s) pursuant to SCAQMD Rule 1309 above those emission reduction credit(s) that the facility would have received if it was operated with coatings having a VOC content of no more than 300 grams per liter, less water and less exempt compounds irrespective of the VOC limits specified in paragraph (i)(4)(C).

(h) Test Methods

(1) VOC Content of Graphic Arts Materials

The VOC content of graphic arts materials except publication rotogravure inks shall be determined by:

(A) United States Environmental Protection Agency (U.S. EPA) Reference Test Method 24, (Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings, Code of Federal Regulations, Title 40, Part 60, Appendix A). The exempt compounds' content shall be determined by South Coast Air Quality Management's (SCAQMD) Laboratory Test Method 302 (Distillation of Solvents from Paints, Coatings and Inks) and 303 (Determination of Exempt Compounds) contained in SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" manual; or

(B) SCAQMD Test Method 304 [Determination of Volatile Organic Compounds (VOCs) in Various Materials] contained in SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" manual.

(2) VOC Content and Density of Publication Rotogravure Ink:

The VOC content and density of publication rotogravure inks shall be determined by:

(A) U.S. EPA Reference Test Method 24A, (Determination of Volatile Matter Content and Density of Publication Rotogravure Inks and Related Publication Rotogravure Coatings, Code of Federal Regulations Title 40, Part 60, Appendix A). The exempt compounds' content shall be determined by SCAQMD's Laboratory Test Method 303 (Determination of Exempt Compounds) contained in SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" manual; or

(B) SCAQMD Test Method 304 [Determination of Volatile Organic Compounds (VOCs) in Various Materials] contained in SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" manual.

(3) Exempt Perfluorocarbon Compounds

The following classes of compounds:

Cyclic, branched, or linear, completely fluorinated alkanes;

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

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

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

will be analyzed as exempt compounds for compliance with subdivision (c) and subparagraph (i)(4)(C), only when manufacturers specify which individual compounds are used in the ink and coating formulations. In addition, the manufacturers must identify U.S. EPA, CARB, and SCAQMD approved test methods, which can be used to quantify the amount of each exempt compound.

(4) Determination of Efficiency of Emission Control Systems

(A) The capture efficiency of an emission control system as specified in paragraph (b)(5) shall be determined by the procedures presented in U.S. EPA technical guideline document, "Guidelines for Determining Capture Efficiency, January 9, 1995". Notwithstanding the test methods specified by the Guidelines, any

other method approved by the U.S. EPA, CARB and the SCAQMD Executive Officer may be substituted.

(B) The efficiency of the control device of the emission control system as specified in paragraph (b)(6) and the VOC content in the control device exhaust gases, measured and calculated as carbon, shall be determined by U.S. EPA Test Methods 25, 25A, SCAQMD Method 25.1 (Determination of Total Gaseous Non-Methane Organic Emissions as Carbon) or SCAQMD Method 25.3 (Determination of Low Concentration Non-Methane Non-Ethane Organic Compound Emissions from Clean Fueled Combustion Sources) as applicable. U.S. EPA Test Method 18, or CARB Method 422 shall be used to determine emissions of exempt compounds.

(5) Equivalent Test Methods

Other test methods determined to be equivalent by the Executive Officer, CARB, and the U.S. EPA, and approved in writing by the District Executive Officer may also be used.

(6) Multiple Test Methods

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

(7) Test Methods Dates

All test methods referenced in this subdivision shall be the most recently approved version by the appropriate governmental entities.

(i) Exemptions

(1) The provisions of this rule shall not apply to:

(A) Fountain solutions used on proof presses.

(B) Coating operations subject to other rules of Regulation XI.

(C) Solar-control window film.

(D) Heat-applied transfer decals.

(E) Graphic arts on ceramic materials.

(F) Circuitry printing.

(G) Blanket repair material used in containers of four ounces or less.

(H) Sterilization indicating inks.

(I) Aerosol coating products.

(J) Graphic arts materials that have a VOC content of no more than 10 g/L or its equivalent, less water and less exempt compounds, as applied.

(2) The prohibition specified in paragraphs (d)(1) or (d)(2) shall not apply to persons offering graphic arts materials for sale to, selling graphic arts materials to, distributing graphic arts materials to, or requiring the use of graphic arts materials from, persons who are operating an approved emission control system under paragraph (c)(5), or complying under paragraph (c)(6), or operating pursuant to paragraphs (i)(1), (i)(4), (i)(5) or (i)(6).

(3) The prohibition specified in subdivision (d) shall not apply to graphic arts materials which will be used solely outside of the District.

(4) The provisions of paragraph (c)(1) shall not apply to metallic and matte finish inks provided that:

(A) The usage of matte finish or metallic inks each as supplied shall not exceed two (2) gallons on any one day and 125 gallons per calendar year at a facility; and

(B) The potential to emit and the actual VOC emissions from a facility which applies matte finish or metallic inks does not exceed ten (10) tons per calendar year from all VOC emission sources; and

(C) The VOC content of matte finish and metallic inks do not exceed 535 and 460 grams per liter (less water and less exempt compounds) respectively, including any VOC containing materials added to the original ink, as applied; and

(D) The owner or operator of the facility certifies in writing to the Executive Officer that they shall not emit VOCs in excess of ten (10) tons per calendar year. Such a certification shall be considered an agreement by the facility to limit the facility's potential to emit.

(5) Facilities operating under the provisions of paragraph (i)(4) whose actual emissions exceed ten (10) tons in any calendar year shall:

(A) henceforth be subject to the requirements of paragraph (c)(1).

(B) In addition to the requirements of subdivision (e), facilities shall retain records of purchase orders and invoices of VOC-containing materials for a minimum of five (5) years.

(6) The provision of paragraph (c)(4) shall not apply to a worksite that stores graphic arts materials provided such graphic arts materials are vented exclusively to printing systems equipped with an approved emission control system pursuant to the requirements of paragraph (c)(5).

(7) The provisions of paragraph (c)(1) shall not apply to postal cancellation inks provided the VOC emissions from these inks, at a facility, do not exceed 60 pounds per calendar month.

(8) The provisions of paragraph (c)(2) shall not apply to sheet-fed offset presses that have a sheet size no larger than 11 inches by 17 inches, or any offset press if the total solution reservoir capacity is one gallon or less, provided the VOC content of the fountain solution used contains no more than 80 grams per liter of material, as applied, or if using a refrigerated chiller, no more than 100 grams per liter of material, as applied.

(Adopted August 2, 1991)(Amended July 9, 1993)
(Amended December 13, 1996)

RULE 1130.1. SCREEN PRINTING OPERATIONS

(a) Purpose and Applicability

The purpose of this rule is to reduce emissions of volatile organic compounds (VOC) from screen printing operations. This rule applies to persons performing screen printing operations or who sell, distribute, or require the use of screen printing materials in the District.

(b) Definitions

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

(1) ADDITIVES are compounds added to screen printing materials to improve flow or workability or to obtain a desired characteristic or property. The term "additives" excludes thinners.

(2) ADHESIVE is any substance that is used to bond one surface to another surface.

(3) CAPTURE EFFICIENCY, in percent, is the ratio of the weight of the VOC in the screen printing operation effluent stream entering the control device to the weight of VOC emitted from screen printing operations, both measured simultaneously, and shall be calculated by the following equation:

$$\text{Capture Efficiency} = \left(\frac{W_c}{W_e}\right) \times 100$$

Where: W_c = weight of VOC in screen printing operation effluent stream entering control device

W_e = weight of VOC emitted

(4) CERAMIC DECALS are water-slide decals which are used to transfer images onto ceramic materials by firing above 800°F.

(5) CERAMIC DECAL INK is any ink which is screen printed onto treated paper stock and is used in the production of ceramic decals.

(6) CHLORINE INDICATOR is a product which is screen printed with an ink that changes color to indicate chlorine concentrations in the range of 0 - 11 parts per million (ppm).

(7) CLEAR INK is a colorless ink that is screen printed on decal paper and either serves as the base film on which opaque inks are screen printed, or as a protective film over opaque inks, and is used in the production of water-slide decals.

(8) COATING is a layer of material applied to a substrate in a substantially unbroken film.

(9) COLD BENDING is a process which subjects the printed color, design, alphabet, symbol, or numeral on a printed object to permanent bending through the application of force.

(10) CONDUCTIVE INKS are screen printing inks which transmit electricity and are used in the production of electronic circuits.

(11) CONTAINERS are plastic products manufactured for storing materials. Containers include, but are not limited to, bottles, buckets, and jars.

(12) CONTROL DEVICE EFFICIENCY, in percent, is the ratio of the weight of the VOC removed by the control device from the screen printing operation effluent stream entering the control device to the weight of the VOC in the screen printing operation effluent stream entering the control device, both measured simultaneously, and shall be calculated by the following equation:

$$\text{Control Device Efficiency} = \left(\frac{W_c - W_a}{W_c}\right) \times 100$$

Where: W_c = weight of VOC in screen printing operation effluent stream entering control device

W_a = weight of VOC discharged from the control device

(13) DEGREE is a unit for measuring temperature or an angle.

(14) ELECTRONIC CIRCUIT is a product which consists of a substrate and a circuitry created by screen printing a conductive ink on the substrate.

(15) EMBOSSING is a process which subjects the printed color, design, alphabet, symbol, or numeral on a printed object to a mechanical force which results in permanently raising the level of the impacted area.

(16) EXEMPT COMPOUNDS (See Rule 102-Definition of Terms).

(17) EXTREME PERFORMANCE SCREEN PRINTING MATERIALS are screen printing inks and coatings which qualify for extreme performance classification under the provisions of subdivision (e).

(18) FINE DETAIL LOOSELEAF BINDER INK is a printing ink used in the manufacturing of loose-leaf binders to print graphics which are lighter in color than the background on which they are printed and which have a width of 1/24th of an inch or smaller.

(19) FLUORESCENT INK is a printing ink which glows brighter than conventional ink when exposed to light due to pigments which have the property of emitting radiation in the visible range as a result of absorption of radiation in the ultraviolet range from some other source.

(20) GRAMS OF VOC PER LITER OF COATING (OR INK OR ADHESIVE), LESS WATER AND LESS EXEMPT COMPOUNDS, is the weight of VOC per combined volume of VOC and coating (or ink or adhesive) solids, and which is calculated by the following equation:

Grams of VOC per Liter of Coating (or Ink or Adhesive),

Less Water and Less Exempt Compounds $= \dfrac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$

Where:
W_s = weight of volatile compounds, in grams
W_w = weight of water, in grams
W_{es} = weight of exempt compounds, in grams
V_m = volume of material, in liters
V_w = volume of water, in liters
V_{es} = volume of exempt compounds, in liters

(21) GRAMS OF VOC PER LITER OF MATERIAL is the weight of VOC per volume of material (ink, coating or adhesive) which is calculated by the following equation:

Grams of VOC per Liter of Material $= \dfrac{W_s - W_w - W_{es}}{V_m}$

Where:
W_s = weight of volatile compounds, in grams
W_w = weight of water, in grams
W_{es} = weight of exempt compounds, in grams
V_m = volume of material, in liters

(22) HEAT-BENDING is a process which subjects the printed color, design, alphabet, symbol, or numeral on a printed object to permanent bending through the application of heat and force.

(23) HIGH-VOC SERIGRAPH INKS are screen printing materials used in making serigraphs and which contain, on an as applied basis, VOC in excess of 400 grams per liter (3.3 pounds per gallon), less water and exempt compounds.

(24) INFLATING is a process of filling a printed object with air or gas which results in the swelling of the printed area of the object.

(25) LOOSE-LEAF BINDER METALLIC INK is a metallic ink as defined in paragraph (b)(29) which is used on loose-leaf binders and is not silver or golden in color.

(26) MAN-MADE FIBERS are threadlike materials produced from the spinning of synthetic organic polymers or cellulose-based organic polymers and which are used in the manufacture of man-made textiles. Man-made fibers include, but are not limited to, rayon, acetate, triacetate, nylon, and polyester and exclude fiberglass.

(27) MAN-MADE TEXTILES are woven or knitted fabrics made of one hundred percent (100%) man-made fibers, or natural fibers which are coated with plastic materials.

(28) MECHANICALLY-FORMED PRODUCTS are screen-printed products made of plastic substrates which are subjected to vacuum-forming, embossing, inflating, heat-bending, or cold bending processes after the screen printing operation.

(29) METALLIC INK is ink containing at least 50 grams of elemental metal particles per liter of ink (0.4 lb/gal) as applied and which is not used in the manufacture of an electronic circuit.

(30) NATURAL FIBERS are naturally-occurring materials, such as wool, silk, cotton, and flax.

(31) NON-POROUS SUBSTRATE is a substrate that has no tiny pores or openings in its physical structure in which to absorb fluids. Non-porous substrates include, but are not limited to, glass, metals and plastics.

(32) OPAQUE INK is an ink containing colored pigments which is screen printed over a clear base ink to form the colored images in the production of water slide decals.

(33) OVERALL CONTROL EFFICIENCY (C.E.), in percent, is the ratio of the weight of the VOC removed by the emission control system from the screen printing operation effluent stream entering the control device to the total VOC emitted from the screen printing operations, both measured simultaneously, and shall be calculated by the following equation:

$$\text{C.E.} = \frac{(W_c - W_a)}{W_e} \times 100$$

$$\text{C.E.} = \frac{(\text{Capture Efficiency}) \times (\text{Control Device Efficiency})}{100}$$

Where: W_c = weight of VOC in screen printing operation effluent stream entering control device

W_a = weight of VOC discharged from the control device

W_e = weight of VOC emitted

(34) OVERLAY is a screen-printed product made of polycarbonate, polyester, or clear vinyl plastic substrate which activates the circuitry on an electronic circuit, as defined in paragraph (b)(14), underneath it when pressed against the electronic circuit. Overlays and electronic circuits are used in membrane switches of products such as computer keyboards, calculators, control panels, and home appliances.

(35) PLASTICS are man-made materials, excluding rubber, produced from high molecular weight synthetic or natural organic polymers which are capable of being shaped or flowing under heat and pressure into desired forms at some stage of their manufacture. Plastics include, but are not limited to, acrylonitrile butadiene styrene (ABS), acrylic, butylate, epoxy, vinyl, polyvinyl chloride (PVC), polyethylene, polypropylene, polystyrene, polycarbonate, polyamide, polyester, and polyurethane.

(36) POLYETHYLENE PRODUCTS are screen-printed flags, banners, signs, or displays made of polyethylene plastic substrate.

(37) PRINTING is any operation that imparts a color, design, alphabet, symbol, or numeral on a substrate.

(38) PRINTING INK is any viscous fluid used in printing, impressing, or transferring an image onto a substrate.

(39) RESISTS are inks that are screen printed to (A) form the required alphabets, numerals, designs, or symbols on the surface of the substrate;

and (B) protect the screen printed or covered surface from the subsequent application of etching or plating solution, and (C) are inks that may be later removed from the substrate by a resist stripper. Resists applications include, but are not limited to, etched electronic circuits, display screens, chemical milling of parts, nameplates and signage.

(40) SCRATCH-OFF INK is an opaque printing ink formulated to be applied on a substrate to hide the information already printed on the substrate and to be scratched-off to reveal the printed information. Scratch-off inks are used to make products, which include but are not limited to, lottery tickets and contest games.

(41) SCREEN PRINTING is a printing process in which printing ink, coating, or adhesive material is passed through a taut web or fabric to which a refined form of stencil has been applied. The stencil openings determine the form and dimensions of the imprint.

(42) SCREEN PRINTING EQUIPMENT is equipment used for applying screen printing materials, including the flash-off area, ovens or dryers, conveyors, or other equipment operating as part of screen printing operations.

(43) SCREEN PRINTING MATERIALS are any inks, coatings, or adhesives, including added thinners or additives, used in screen printing.

(44) SCREEN PRINTING OPERATIONS are operations which include screen printing and any subsequent drying, curing, or conveying of the screen-printed substrate.

(45) SERIGRAPHS are color paintings made by screen printing operations

(46) STAINED GLASS OVERLAY is untreated polyester film, screen printed with polyester-based screen printing ink, to simulate the appearance of stained glass.

(47) STERILIZATION INDICATOR is a product which is screen printed with an ink that changes color to indicate that sterilization has occurred. Sterilization indicators are used to monitor the sterilization of medical instruments, autoclave efficiency, and the thermal processing of foods for prevention of spoilage.

(48) SUB-PRINTED PRODUCTS are screen-printed products, which include, but are not limited to, overlays or nameplates, made of a polycarbonate, polyester, or clear vinyl plastic substrate on which the screen printing material is applied on the unexposed side followed by an adhesive coat.

(49) UNSEALED ALUMINUM is chemically anodized aluminum used to make products which are screen printed with a dye and subsequently immersed in a sealing bath to seal the printed dye in the pores of the aluminum.

(50) VACUUM-FORMING is a process which imparts a desired shape to a printed object by subjecting the screen printed area of the object to a vacuum.

(51) VOLATILE ORGANIC COMPOUND (VOC) is any chemical compound that contains the element carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate and exempt compounds.

(52) WATER SLIDE DECALS are decals which are screen printed onto treated paper stock, and are removable from the stock by the dissolution of an underlying, water-soluble adhesive or a similar carrier.

(53) WATER SLIDE DECAL ADHESIVE is any adhesive which is screen printed onto treated paper stock, in the production of water slide decals.

(c) Requirements

(1) VOC Content of Screen Printing Materials

A person shall not apply to any substrate any screen printing material, excluding extreme performance screen printing materials, which contains, as applied, a total amount of VOC in excess of the limits specified in subparagraphs (c)(1)(A), (c)(1)(B), or (c)(1)(C). The applicable VOC limit for a screen printing operation shall be determined by first looking for the product in subparagraph (c)(1)(A). If the product is not listed in subparagraph (c)(1)A), look for the product's substrate in subparagraph (c)(1)(B). If the substrate is not listed in subparagraph (c)(1)(B), look for the applicable limit in subparagraph (c)(1)(C).

In lieu of meeting the requirements in subparagraph (c)(1)(C), a person may comply with the requirements in paragraph (c)(2) if the screen printing material qualifies for an extreme performance classification under subdivision (e).

(A) For screen printing coatings and inks used in the production of the following products:

PRODUCT	**VOC LIMIT** grams per Liter of Coating (or Ink), Less water and Less Exempt Compounds On and After December 13, 1996	
	g/L	lbs/gal
Chlorine Indicator	500	4.2
Containers	800	6.7
Electronic Circuit	850	7.1
Mechanically-Formed Products	800	6.7
Overlays	800	6.7
Polyethylene Products	800	6.7
Stained Glass Overlay	800	6.7
Sterilization Indicator	600	5.0
Sub-Printed Products	800	6.7
Water Slide Decals:		
Opaque Inks	800	6.7
Clear Inks	800	6.7
Ceramic Decal Inks	800	6.7

(B) For screen printing coatings and inks not regulated by subparagraph (c)(1)(A) and which are applied to the following specified substrates:

SUBSTRATE	**VOC LIMIT** grams per Liter of Coating (or Ink), Less water and Less Exempt Compounds On and After December 13, 1996	
	g/L	lbs/gal
Ceramic	800	6.7
Fiberglass	600	5.0
Glass or Metal	600	5.0
Man-Made Textile	800	6.7
Unsealed Aluminum	800	6.7

If a substrate is regulated under more than one substrate category listed in subparagraph (c)(1)(B), the category with the highest VOC limit shall apply.

(C) For screen printing materials not regulated by the provisions in subparagraph (c)(1)(A) or (c)(1)(B), which have the following material classifications:

SCREEN PRINTING MATERIAL	VOC LIMIT grams per Liter of Coating (or Ink or Adhesive), Less water and Less Exempt Compounds On and After December 13, 1996	
	g/L	lbs/gal
Adhesive	400	3.3
Coating	400	3.3
Fine Detail Loose-leaf Binder Ink	745	6.2
Fluorescent Ink	540	4.5
High-VOC Serigraph Ink	800	6.7
Loose-leaf Binder Metallic Ink	745	6.2
Metallic Ink	400	3.3
Printing Ink	400	3.3
Resists	600	5.0
Scratch-Off Ink	800	6.7
Water-Slide Decal Adhesive	800	6.7

If a screen printing material is regulated under more than one screen printing material category listed in subparagraph (c)(1)(C), the category with the highest VOC limit shall apply.

(2) VOC Content of Extreme Performance Screen Printing Materials

A person shall not apply any extreme performance screen printing material in excess of the limits specified below:

	VOC LIMIT Grams of VOC per Liter of ExtremePerformance Screen Printing Material, Less Water and Less Exempt Compounds	
	g/L	lbs/gal
On and after July 9, 1993	800	6.7
On and after January 1, 2003	400	3.3

(3) Usage of High-VOC Serigraph Inks

The total usage of high-VOC serigraph inks, as defined in paragraph (b)(23), shall not exceed 10 percent, (by volume), of the total usage of

screen printing materials applied on all serigraphs at a facility, on a monthly basis, unless an approved emission control system is used to reduce emissions from high-VOC serigraph inks by an equivalent or greater level to that which would have been achieved by the use of an ink containing 3.3 pounds per gallon VOC (less water and exempt compounds). The required overall control efficiency of the emission control system shall be determined by the equation in paragraph (d)(1).

(4) Solvent Cleaning Operations; Storage and Disposal of VOC-Containing Materials

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

(5) Recordkeeping

Any person who owns or operates a facility at which screen printing operations are conducted shall maintain records in accordance with District Rule 109.

(6) Prohibition of Specification and Sale

No person shall sell, distribute, or require any other person to use in the District any VOC-containing material subject to the provisions of this rule which, when thinned or reduced according to the manufacturer's recommendation for application, does not meet the applicable VOC limits required by this rule for the specific application.

(7) Labeling

Labels of screen printing materials shall comply with the provisions of Rules 443 and 443.1.

(d) Approved Emission Control System

(1) Any person who owns or operates a facility at which screen printing operations are conducted may comply with the provisions of subparagraph (c)(1)(A), (c)(1)(B), or (c)(1)(C), or paragraph (c)(2) by using an approved emission control system for reducing emissions of VOC, consisting of collection and control devices which have been approved in writing by the Executive Officer. The approved emission control system shall reduce the VOC emissions resulting from the use of non-compliant inks, adhesives and coatings by an equivalent or greater level to that which

would have been achieved by the provisions of subparagraph (c)(1)(A), (c)(1)(B), (c)(1)(C), or paragraph (c)(2).

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

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

Where:

C.E.	=	Overall Control Efficiency, percent
VOC_{LWc}	=	VOC Limit of Rule 1130.1, less water and less exempt compounds, g/L, pursuant to subdivision (c).
VOC_{LWc}	=	400 g/L for high-VOC serigraph inks if compliance with the 10% requirement in paragraph (c)(3) is not achieved.
VOC_{LWc}	=	800 g/L for high-VOC serigraph inks if compliance with the 10% requirement in paragraph (c)(3) is achieved.
$VOC_{LWn,Max}$	=	Maximum VOC content of non-compliant ink (or coating or adhesive) used in conjunction with a control device, less water and exempt compounds, g/L.
$D_{n,Max}$	=	Density of solvent, reducer, or thinner contained in the non-compliant ink (or coating, or adhesive) which has the maximum VOC content of all non-compliant inks (or coatings, or adhesives) used on a printing line, g/L.
D_c	=	Density of corresponding solvent, reducer, or thinner used in the compliant ink (or coating, or adhesive) system = 880 g/L

(2) The control device efficiency, as defined in paragraph (b)(12), of a control device shall not be less than 95 percent.

(e) Qualification for Classification as an Extreme Performance Screen Printing Material

A screen printing ink or coating may be classified as an extreme performance screen printing material, provided that the applicator receives written approval of such classification from the Executive Officer prior to the application of such ink or coating, and it is shown that the ink or the coating, in its intended use, is screen printed on a non-porous substrate and exposed to any of the following:

(1) Petroleum-based fuels, or hydraulic fluids containing phosphate esters, or industrial-grade acid or alkaline solutions;

(2) Industrial-grade detergents, cleaners, or abrasive scouring agents;

(3) Other chemicals having similar degrading properties as in paragraphs (e)(1) or (e)(2), as determined by the Executive Officer;

(4) Continuous outdoor conditions for more than five (5) years; or

(5) Other harsh environmental conditions as determined by the Executive Officer.

Screen printing materials subject to subparagraph (c)(1)(A) or (c)(1)(B) shall not be eligible for extreme performance classification. If a screen printing material complies with the requirements of subparagraph (c)(1)(C), an extreme performance classification is not required.

(f) Rule 442 Applicability

Any screen printing operation which is exempt from all or a portion of the VOC limits of this rule shall comply with the provisions of Rule 442.

(g) Test Methods

(1) Methods of Analysis

For purposes of this rule, the following test methods shall be used:

(A) VOC Content of Adhesives, Coatings, and Inks

The VOC content shall be determined by the methods specified in clauses (g)(1)(A)(i) or (g)(1)(A)(ii).

(i) United States Environmental Protection Agency (USEPA) Reference Method 24, (40 Code of Federal Regulations, Part 60, Appendix A). The exempt compounds content shall be determined by District Method 303 (Determination of Exempt Compounds) contained in the District

Laboratory Methods of Analysis for Enforcement Samples manual; or

(ii) District Method 304 [Determination of Volatile Organic Compounds (VOCs) in Various Materials] contained in the District Laboratory Methods of Analysis for Enforcement Samples manual.

(iii) Exempt Perfluorocarbon Compounds

The following classes of compounds: cyclic, branched, or linear, completely fluorinated alkanes; cyclic, branched, or linear, completely fluorinated ethers with no unsaturations; cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and sulfur-containing perfluoro-carbons with no unsaturations and with sulfur bonds only to carbon and fluorine, will be analyzed as exempt compounds for compliance with subdivision (c), only at such time as manufacturers specify which individual compounds are used in the formulation of the screen printing material and identify the test methods, which have been approved by the USEPA and the District prior to such analysis, that can be used to quantify the amount of each exempt compound.

(B) Metal Content in Inks

The metal content of metallic inks shall be determined by District Method 318 (Determination of Elemental Metal in Coatings by X-Ray Diffraction) contained in the District Laboratory Methods of Analysis for Enforcement Samples manual.

(C) Determination of Fibers

The presence of natural fibers in textiles shall be determined by District Method 317 (Determination of Natural Fibers) contained in the District Laboratory Methods of Analysis for Enforcement Samples manual.

(2) Determination of Efficiency of Emission Control Systems

(A) The capture efficiency of an emission control system as defined in paragraph (b)(3) shall be determined by a minimum of three sampling runs subject to the data quality objective (DQO)

presented in the USEPA technical guideline document, "Guidelines for Determining Capture Efficiency, January 9, 1995". Individual capture efficiency test runs subject to the USEPA technical guidelines shall be determined by:

(i) Applicable USEPA Methods 204, 204A, 204B, 204C, 204E, and/or 204F; or

(ii) District's Protocol for Determination of Volatile Organic Compounds (VOC) Capture Efficiency; or

(iii) any other method approved by the USEPA, the California Air Resources Board (ARB), and the District Executive Officer.

(iv) The capture efficiency of a collection device which meets the requirements of a totally enclosed chamber as specified in USEPA methods 204, 204A, 204B, 204C, 204E, and/or 204F shall be deemed 100 percent.

(B) The control device efficiency of an emission control system as defined in paragraph (b)(12) and the VOC content in the control device exhaust gases, measured and calculated as carbon, shall be determined by USEPA Test Methods 25, 25A, or District Method 25.1 (Determination of Total Gaseous Non-Methane Organic Emissions as Carbon) as applicable. USEPA Test Method 18, or ARB Method 422 shall be used to determine emissions of exempt compounds.

(3) Multiple Test Methods

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

(4) Equivalent Test Methods

Other test methods determined to be equivalent after review by the staffs of the District, ARB, and the USEPA, and approved in writing by the District Executive Officer may also be used for methods of analysis.

(5) Test Method Dates

All test methods referenced in this section shall be the most recent versions approved by the District, ARB, and USEPA. The Executive Officer may update test methods as necessary to reflect the most accurate

method available, provided the method does not affect the stringency of the rule. These updates are subject to approval by ARB and USEPA.

(h) Exemptions

(1) The requirements of subparagraphs (c)(1)(A), (c)(1)(B), or (c)(1)(C) shall not apply to a facility which emits two (2) pounds or less of VOC each and every day from the use of screen printing materials.

(2) The requirements of subparagraphs (c)(1)(A), (c)(1)(B), or (c)(1)(C) shall not apply to screen printing operations performed by manufacturers of screen printing materials for purposes of conducting performance laboratory tests or doing research and development, provided that the VOC emissions from such screen printing operations are two (2) pounds or less per day.

(3) The prohibition specified in paragraph (c)(6) shall not apply to VOC-containing materials subject to the provisions of this rule which will be used solely outside of the District if records are maintained to the satisfaction of the Executive Officer.

(4) The prohibition specified in paragraph (c)(6) shall not apply to persons selling to, distributing to, or requiring the use of non-compliant materials by, other persons who are operating an approved emission control system under subdivision (d), or operating pursuant to paragraph (h)(1).

(Adopted August 2, 1991)(Amended May 12, 1995)(Amended September 13, 1996)
(Amended June 13, 1997)(Amended October 8, 1999)(Amended August 2, 2002)
(Amended November 7, 2003)(Amended May 6, 2005)(Amended July 14, 2006)
(Amended February 1, 2008)(Amended May 1, 2009)

RULE 1171. SOLVENT CLEANING OPERATIONS

(a) Purpose and Applicability

The purpose of this rule is to reduce emissions of volatile organic compounds (VOCs), toxic air contaminants, and stratospheric ozone-depleting or global-warming compounds from the use, storage and disposal of solvent cleaning materials in solvent cleaning operations and activities. A solvent cleaning operation is solvent cleaning conducted as part of a business. This rule applies to: all persons who use these solvent materials in solvent cleaning operations during the production, repair, maintenance, or servicing of parts, products, tools, machinery, equipment, or general work areas; all persons who store and dispose of these materials used in solvent cleaning operations; and all solvent suppliers who supply, sell, or offer for sale solvent cleaning materials for use in solvent cleaning operations.

(b) Definitions

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

(1) AEROSOL PRODUCT is a hand-held, non-refillable container which expels pressurized product by means of a propellant-induced force.

(2) APPLICATION EQUIPMENT is a device used to apply adhesive, coating, ink, or polyester resin materials.

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

(4) ARCHITECTURAL COATING is any coating applied to stationary structures and their appurtenances, to mobile homes, to pavements, or to curbs.

(5) BLANKET is a synthetic rubber mat used in offset-lithography to transfer or “offset” an image from a planographic printing plate to the paper or other substrate.

(6) BLANKET WASH is a solvent used to remove ink from the blanket of a press.

(7) CLEAN AIR SOLVENT is as defined in Rule 102.

(8) CLEAN AIR SOLVENT CERTIFICATE is a certificate issued by the District to a manufacturer, distributor, or person for a specific product or class of products that meets the criteria for a Clean Air Solvent.

(9) CURED COATING, CURED INK, OR CURED ADHESIVE is a coating, ink, or adhesive, which is dry to the touch.

(10) ELECTRICAL APPARATUS COMPONENTS is an internal component such as wires, windings, stators, rotors, magnets, contacts, relays, energizers, and connections in an apparatus that generates or transmits electrical energy including, but not limited to: alternators, generators, transformers, electric motors, cables, and circuit breakers, except for the actual cabinet in which the components are housed. Electrical components of graphic arts application equipment and hot-line tools are also included in this category.

(11) ELECTRON BEAM INK is an ink that dries by chemical reaction caused by high energy electrons.

(12) ELECTRONIC COMPONENT is that portion of an assembly, including circuit card assemblies, printed wire assemblies, printed circuit boards, soldered joints, ground wires, bus bars, and other electrical fixtures, except for the actual cabinet in which the components are housed.

(13) EXEMPT COMPOUND is as defined in Rule 102.

(14) FACILITY means a business or businesses engaged in solvent cleaning operations which are owned or operated by the same person or persons and are located on the same or contiguous parcels.

(15) FLEXOGRAPHIC PRINTING is the method in which the image area is raised relative to the non-image area and utilizes flexible rubber or other elastomeric plate and rapid drying liquid inks.

(16) FULL SERVICE SOLVENT PROVIDER is any person that provides both solvents and services to a solvent cleaning operation. Such services may include, but are not limited to, one or more of the following: filling or refilling solvent cleaning equipment with solvent, collection or pick up of customer's solvent-related waste stream, or cleaning equipment sales or rental.

(17) GENERAL WORK SURFACE is an area of a medical device or pharmaceutical facility where solvent cleaning is performed on work surfaces including, but not limited to, tables, countertops, and laboratory

benches. General work surface shall not include items defined under janitorial cleaning.

(18) GRAMS OF VOC PER LITER OF MATERIAL is the weight of VOC per volume of material and can be calculated by the following equation:

$$\text{Grams of VOC per liter of material} = \frac{W_s - W_w - W_{es}}{V_m}$$

Where:	Ws	=	Weight of volatile compounds in gram s
	Ww	=	Weight of water in grams
	Wes	=	Weight of exempt compounds in grams
	Vm	=	Volume of material in liters

(19) GRAPHIC ARTS are all gravure, letterpress, flexographic, and lithographic printing processes.

(20) GRAVURE PRINTING is an intaglio process in which the ink is carried in minute etched or engraved wells on a roll or cylinder. The excess ink is removed from the surface by a doctor blade.

(21) HIGH PRECISION OPTIC is an optical element used in an electro-optical device and is designed to sense, detect, or transmit light energy, including specific wavelengths of light energy and changes in light energy levels.

(22) HOT-LINE TOOL is a specialized tool used primarily on the transmission systems, sub-transmission systems and distribution systems for replacing and repairing circuit components or for other types of work with electrically energized circuits.

(23) INKJET PRINTING is a printing process in which images are formed by the precise placement of small (picoliter-sized) droplets of ink fired at high speeds from the nozzle(s) of computer-controlled printheads.

(24) JANITORIAL CLEANING is the cleaning of building or facility components including, but not limited to, floors, ceilings, walls, windows, doors, stairs, bathrooms, furnishings, and exterior surfaces of office equipment, and excludes the cleaning of work areas where manufacturing or repair activity is performed.

(25) LETTERPRESS PRINTING is the method in which the image area is raised relative to the non-image area and the ink is transferred to the paper directly from the image surface.

(26) LIQUID LEAK is the visible liquid solvent leak from the container at a rate of more than three (3) drops per minute, or a visible liquid mist.

(27) LIQUID-TIGHT FOOD CONTAINER is a paperboard container that can hold liquid food and food products without leaking even when it is held upside-down.

(28) LITHOGRAPHIC PRINTING is a plane-o-graphic method in which the image and non-image areas are on the same plane.

(29) MAINTENANCE CLEANING is a solvent cleaning operation or activity carried out to keep clean general work areas where manufacturing or repair activity is performed, to clean tools, machinery, molds, forms, jigs, and equipment. This definition does not include the cleaning of coatings, adhesives, or ink application equipment.

(30) MANUFACTURING PROCESS is the process of making goods or articles by hand or by machinery.

(31) MEDICAL DEVICE is an instrument, apparatus, implement, machine, contrivance, implant, in vitro reagent or other similar article, including any component or accessory, that meets one of the following conditions:

(A) it is intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment, or prevention of disease; or

(B) it is intended to affect the structure or any function of the body; or

(C) it is defined in the National Formulary or the United States Pharmacopeia, or any supplement to them.

(32) NON-ABSORBENT CONTAINER is a container made of nonporous material, which does not allow the migration of the liquid solvent through it.

(33) NON-ATOMIZED SOLVENT FLOW is the use of a solvent in the form of a liquid stream without atomization to remove uncured adhesives, uncured inks, uncured coatings, and contaminants from an article.

(34) NON-LEAKING CONTAINER is a container without liquid leak.

(35) ON-PRESS COMPONENT is a part, component, or accessory of a press that is cleaned while still being physically attached to the press.

(36) ON-PRESS SCREEN CLEANING is a solvent cleaning activity carried out during press runs in screen printing operation to remove excess inks and contaminants from a screen that is still attached to the press.

(37) PACKAGING PRINTING is any lithographic, flexographic, gravure, or letterpress printing that results in identifying or beautifying paper, paperboard, or cardboard products to be used as containers, enclosures, wrappings, or boxes.

(38) PERSON is any firm, business establishment, association, partnership, corporation or individual, whether acting as principal, agent, employee, or other capacity including any governmental entity or charitable organization.

(39) PHARMACEUTICAL PRODUCT is a preparation or compound of medicinal drugs including, but not limited to, a prescription drug, analgesic, decongestant, antihistamine, cough suppressant, vitamin, mineral and herb, and is used by humans for consumption to enhance personal health.

(40) PHOTOCURABLE RESIN is a chemical material that solidifies upon exposure to light.

(41) PRINTING, in the graphic arts, is any operation that imparts color, design, alphabet, or numerals on a substrate.

(42) RADIATION-EFFECT COATING is a material that prevents radar detection.

(43) REMOTE RESERVOIR CLEANER is a cleaning device in which liquid solvent is pumped from a solvent container to a sink-like work area and the solvent from the sink-like area drains into an enclosed solvent container while parts are being cleaned.

(44) REMOVABLE PRESS COMPONENT is a part, component, or accessory of a press that is physically attached to the press but is disassembled and removed from the press prior to being cleaned. Rollers, blankets, metering rollers, dampening rollers, ink trays, printing plates, fountains, impression cylinders and plates shall not be considered as removable press components.

(45) REPAIR CLEANING is a solvent cleaning operation or activity carried out during a repair process.

(46) REPAIR PROCESS is the process of returning a damaged object or an object not operating properly to good condition.

(47) ROLLER WASH is a solvent used to remove ink from the rollers of a press.

(48) SCIENTIFIC INSTRUMENT is an instrument (including the components, assemblies, and subassemblies used in their manufacture) and associated accessories and reagents that is used for the detection, measurement, analysis, separation, synthesis, or sequencing of various compounds.

(49) SCREEN PRINTING is a process in which the printing ink passes through a web or a fabric to which a refined form of stencil has been applied. The stencil openings determine the form and dimensions of the imprint.

(50) SCREEN RECLAMATION is a solvent cleaning activity carried out in screen printing operation where the screen is completely cleaned for recycling or reuse of the screen for other production runs.

(51) SOLVENT is a VOC-containing liquid used to perform solvent cleaning.

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

(53) SOLVENT FLUSHING is the use of a solvent to remove uncured adhesives, uncured inks, uncured coatings, or contaminants from the internal surfaces and passages of the equipment by flushing solvent through the equipment.

(54) SOLVENT SUPPLIER is any person who sells and delivers or arranges to deliver solvent cleaning materials to a solvent cleaning operation subject to this regulation.

(55) STEREOLITHOGRAPHY is a type of printing process that employs a system using a light to solidify photocurable resins in a desired configuration in order to produce a 3-dimensional object.

(56) SPECIALTY FLEXOGRAPHIC PRINTING is flexographic printing on polyethylene or polypropylene food packaging, fertilizer bags, or liquid-tight food containers.

(57) STERILIZATION INDICATING INK is an ink that changes color to indicate that sterilization has occurred. Such ink is used to monitor the sterilization of medical instruments, autoclave efficiency, and the thermal processing of foods for prevention of spoilage.

(58) STRIPPING is the removal of cured coatings, cured inks, or cured adhesives.

(59) SURFACE PREPARATION is the removal of contaminants such as dust, soil, oil, grease, etc., prior to coating, adhesive, or ink applications.

(60) ULTRAVIOLET INK is an ink that dries by polymerization reaction induced by ultraviolet energy.

(61) VOLATILE ORGANIC COMPOUND (VOC) is as defined in Rule 102.

(62) WIPE CLEANING is the method of cleaning a surface by physically rubbing it with a material such as a rag, paper, sponge or a cotton swab moistened with a solvent.

(c) Requirements

(1) Solvent Requirements

A person shall not use a solvent to perform solvent cleaning operations unless the solvent complies with the applicable requirements set forth below:

SOLVENT CLEANING ACTIVITY	CURRENT LIMITS* VOC g/l (lb/gal)	EFFECTIVE 1/1/2010 VOC g/l (lb/gal)
(A) Product Cleaning During Manufacturing Process Or Surface Preparation For Coating, Adhesive, Or Ink Application		
(i) General	25 (0.21)	
(ii) Electrical Apparatus Components & Electronic Components	100 (0.83)	
(iii) Medical Devices & Pharmaceuticals	800 (6.7)	
(B) Repair and Maintenance Cleaning		
(i) General	25 (0.21)	
(ii) Electrical Apparatus Components & Electronic Components	100 (0.83)	
(iii) Medical Devices & Pharmaceuticals		
(A) Tools, Equipment, & Machinery	800 (6.7)	
(B) General Work Surfaces	600 (5.0)	

SOLVENT CLEANING ACTIVITY (cont.)	CURRENT LIMITS* VOC g/l (lb/gal)	EFFECTIVE 1/1/2010 VOC g/l (lb/gal)
(C) Cleaning of Coatings or Adhesives Application Equipment	25 (0.21)	
(D) Cleaning of Ink Application Equipment		
(i) General	25 (0.21)	
(ii) Flexographic Printing	25 (0.21)	
(iii) Gravure Printing		
(A) Publication	100 (0.83)	
(B) Packaging	25 (0.21)	
(iv) Lithographic (Offset) or Letter Press Printing		
(A) Roller Wash, Blanket Wash, & On-Press Components	100 (0.83)	
(B) Removable Press Components	25 (0.21)	
(v) Screen Printing	100 (0.83)	
(vi) Ultraviolet Ink/ Electron Beam Ink Application Equipment (except screen printing)	650 (5.4)	100 (0.83)
(vii) Specialty Flexographic Printing	100 (0.83)	
(E) Cleaning of Polyester Resin Application Equipment	25 (0.21)	

* The specified limits remain in effect unless revised limits are listed in subsequent columns.

(2) Cleaning Devices and Methods Requirements

A person shall not perform solvent cleaning unless one of the following cleaning devices or methods is used:

(A) Wipe cleaning;

(B) Closed containers or hand held spray bottles from which solvents are applied without a propellant-induced force;

(C) Cleaning equipment which has a solvent container that can be, and is closed during cleaning operations, except when depositing and removing objects to be cleaned, and is closed during non-operation

with the exception of maintenance and repair to the cleaning equipment itself;

(D) Cleaning device which is listed in the Office of Operations' manual "Alternative Devices for Rule 1171 Compliance" dated July 1, 1991. The Executive Officer shall periodically update the manual to identify any additional cleaning devices determined by the Executive Officer to result in equivalent or lower emissions;

(E) Remote reservoir cleaner used pursuant to the provisions of paragraph (c)(3);

(F) Non-atomized solvent flow method where the cleaning solvent is collected in a container or a collection system which is closed except for solvent collection openings and, if necessary, openings to avoid excessive pressure build-up inside the container; or

(G) Solvent flushing method where the cleaning solvent is discharged into a container which is closed except for solvent collection openings and, if necessary, openings to avoid excessive pressure build-up inside the container. The discharged solvent from the equipment must be collected into containers without atomizing into the open air. The solvent may be flushed through the system by air or hydraulic pressure, or by pumping.

(3) Remote Reservoir Cleaners

Any person owning or operating a remote reservoir cleaner shall comply with all of the following requirements in addition to the applicable VOC limits specified in paragraph (c)(1):

(A) Prevent solvent vapors from escaping from the solvent container by using such devices as a cover or a valve when the remote reservoir is not being used, cleaned, or repaired;

(B) Direct solvent flow in a manner that will prevent liquid solvent from splashing outside of the remote reservoir cleaner;

(C) Do not clean porous or absorbent materials, such as cloth, leather, wood, or rope; and

(D) Use only solvent containers free of all liquid leaks. Auxiliary equipment, such as pumps, pipelines, or flanges, shall not have any liquid leaks, visible tears, or cracks. Any liquid leak, visible tear, or crack detected shall be repaired within one (1) calendar day, or

the leaking section of the remote reservoir cold cleaner shall be drained of all solvent and shut down until it is replaced or repaired.

(4) Storage and Disposal

All VOC-containing solvents used in solvent cleaning operations shall be stored in non-absorbent, non-leaking containers which shall be kept closed at all times except when filling or emptying. It is recommended that cloth and paper moistened with VOC-containing solvents be stored in closed, non-absorbent, non-leaking containers.

(5) Control Equipment

In lieu of complying with the requirements in paragraphs (c)(1) or (c)(2), a person may comply by using a VOC emission collection and control system in association with the solvent cleaning operation provided:

(A) the emission control system shall collect at least 90 percent, by weight, of the emissions generated by the solvent cleaning operation and

(i) have a destruction efficiency of at least 95 percent, by weight, or

(ii) have an output of less than 50 parts per million (PPM) calculated as carbon with no dilution; or

(B) the emission control system meets the requirements of the applicable source specific rule of the District's Regulation XI. The collection system for cleaning in graphic arts and screen printing and cleaning of application equipment used for graphic arts materials and screen printing materials, shall collect at least 70 percent, by weight, of the emissions generated. This control system shall reduce emissions from the emission collection system by at least 95 percent.

(6) Recordkeeping Requirements

Records shall be maintained pursuant to Rule 109 for all applications subject to this rule, including those exempted under paragraphs (g)(3) through (g)(11), except facilities required to keep records of VOC used pursuant to any other Regulation XI rules.

(7) Any solvent supplier supplying solvent cleaning material for use by a solvent cleaning operation in the District, shall upon request by the Executive Officer, provide in a District-approved electronic format, the following information: product name of the supplied solvent cleaning

material; the name and address of the solvent cleaning operation that the product was supplied to; dates and quantities in which the product was supplied during the time period specified by the Executive Officer; and the VOC content of the product as supplied. The solvent supplier shall maintain records necessary to provide this required information for three (3) years.

(8) The operator shall maintain at all times, and make available to the Executive officer upon request, the correct written dilution instructions for each solvent cleaning material if dilution is necessary to meet the applicable VOC limits in this rule. A solvent supplier providing solvent cleaning material for use by a solvent cleaning operation in the District shall supply to the operator, upon the operator's request, the correct written dilution instructions for each supplied solvent cleaning material.

(9) Any person who sells or offers for sale solvent cleaning materials for use in the District shall comply with the provisions of Rule 443.1 – Labeling of Materials Containing Organic Solvents.

(d) General Prohibitions

(1) A person shall not atomize any solvent unless it is vented to an air pollution control equipment, which meets the requirements of paragraph (c)(5).

(2) A person shall not specify or require any person to use solvent or equipment subject to the provisions of this rule that does not meet the requirements of this rule.

(3) A person shall not perform solvent cleaning activities or operations subject to the provisions of this rule with any material which contains Group II exempt compounds listed in Rule 102 except cyclic, branched, or linear, completely methylated siloxanes (VMS).

(4) Any person subject to the Airborne Toxic Control Measure for Emissions of Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Activities - Title 17, California Code of Regulations, section 93111, shall comply with its provisions.

(5) No full service solvent provider shall aid, abet or assist a solvent cleaning operation to use a supplied solvent in a non-compliant manner.

(e) Test Methods

For the purpose of this rule, the following test methods shall be used. Other test methods determined to be equivalent after review by the staffs of the District, the Air Resources Board, and the United States Environmental Protection Agency, and approved in writing by the District Executive Officer may also be used.

(1) Determination of VOC Content

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

(A) United States Environmental Protection Agency (USEPA) Reference Method 24 (Code of Federal Regulations, Title 40, Part 60, Appendix A). The exempt compounds' content shall be determined by the South Coast Air Quality Management District's (SCAQMD) Method 303 (Determination of Exempt Compounds) contained in the SCAQMD "Laboratory Methods of Analysis for Enforcement Samples" manual; or,

(B) SCAQMD Method 304 [Determination of Volatile Organic Compounds (VOC) in Various Materials] contained in the SCAQMD "Laboratory Methods of Analysis for Enforcement Samples" manual.

(C) Exempt Perfluorocarbon Compounds

The following classes of compounds:

cyclic, branched, or linear, completely fluorinated alkanes;

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

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

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

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

(2) Determination of Presence of VOC in Cleaning Materials

The presence of VOC in the headspace over the cleaning material shall be determined by SCAQMD Method 313 [Determination of Presence of

Volatile Organic Compounds (VOC) in a Headspace] contained in the SCAQMD "Laboratory Methods of Analysis for Enforcement Samples" manual.

The presence of VOC in liquid cleaning materials shall be determined by SCAQMD Method 308 (Quantitation of Compounds by Gas Chromatography) contained in the SCAQMD "Laboratory Methods of Analysis for Enforcement Samples" manual.

(3) Determination of Efficiency of Emission Control System

(A) The capture efficiency of an emission control system as specified in subparagraph (c)(5)(A) shall be determined by verifying the use of a Permanent Total Enclosure (PTE) and 100% capture efficiency as defined by USEPA Method 204, "Criteria for and Verification of a Permanent or Temporary Total Enclosure." Alternatively, if a USEPA Method 204 defined PTE is not employed, capture efficiency shall be determined using a minimum of three sampling runs subject to data quality criteria presented in the USEPA technical guidance document "Guidelines for Determining Capture Efficiency, January 9, 1995." Individual capture efficiency test runs subject to the USEPA technical guidelines shall be determined by:

(i) The Temporary Total Enclosure (TTE) approach of USEPA Methods 204 through 204F, June 4, 1997; or

(ii) The District "Protocol for Determination of Volatile Organic Compounds (VOC) Capture Efficiency," May 1995.

(B) The control equipment efficiency of an emission control system as specified in subparagraph (c)(5)(A), on a mass emissions basis, and the VOC concentrations in the exhaust gases, measured and calculated as carbon, shall be determined by USEPA Test Methods 25, 25A, SCAQMD Method 25.1 (Determination of Total Gaseous Non-Methane Organic Emissions as Carbon), or SCAQMD Method 25.3 (Determination of Low Concentration Non-Methane Non-Ethane Organic Compound Emissions from Clean Fueled Combustion Sources), as applicable. USEPA Test Method 18, or ARB Method 422 shall be used to determine emissions of exempt compounds.

(4) Multiple Test Methods

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

(5) All test methods referenced in this section shall be the most recently approved version.

(f) Rule 442 Applicability

Any solvent, solvent cleaning activity, solvent cleaning unit operation, or person, which is exempt from all or a portion of this rule except paragraph (c)(6), shall be subject to the applicable requirements of the applicable Regulation XI source specific rule or Rule 442 - Usage of Solvent.

(g) Exemptions

(1) The provisions of this rule, except (c)(1), Solvent Requirements, shall not apply to cleaning operations using a solvent containing no more than 25 grams of VOC per liter of material, provided that, if the Executive Officer determines that a person has violated any provision of paragraph (c)(1), Solvent Requirements, then for a period of three years following such violation, paragraph (c)(6), Recordkeeping Requirements, shall apply to the facility at which the violation occurred.

(2) The following solvent cleaning operations or activities are not subject to any provision of this rule:

(A) Cleaning carried out in batch loaded cold cleaners, vapor degreasers, conveyorized degreasers, or motion picture film cleaning equipment.

(B) Cleaning operations subject to Rule 1102 – Petroleum Solvent Dry Cleaners, and Rule 1421 – Control of Perchloroethylene Emissions from Dry Cleaning Operations.

(C) Cleaning operations subject to Rule 1164 – Semiconductor Manufacturing.

(D) Cleaning operations subject to Rule 1124 – Aerospace Assembly and Component Manufacturing Operations, except coating application equipment cleaning, and storage and disposal of VOC-containing materials used in solvent cleaning operations.

(E) Cleaning operations subject to Rule 1141 – Control of Volatile Organic Compound Emissions from Resin Manufacturing, and Rule 1141.1 – Coatings and Ink Manufacturing.

(F) Janitorial cleaning, including graffiti removal.

(G) Stripping of cured coatings, cured ink, or cured adhesives.

(3) Provisions of paragraph (c)(1) shall not apply to the following applications:

(A) Cleaning of solar cells, laser hardware, scientific instruments, and high-precision optics.

(B) Cleaning conducted with: performance laboratory tests on coatings, adhesives, or inks; research and development programs; and laboratory tests in quality assurance laboratories.

(C) Cleaning of motor vehicles on application lines subject to Rule 1115 - Motor Vehicle Assembly Line Coating Operations.

(D) Cleaning of paper-based gaskets, and clutch assemblies where rubber is bonded to metal by means of an adhesive.

(E) Cleaning of cotton swabs to remove cottonseed oil before cleaning of high-precision optics.

(F) Medical device and pharmaceutical facilities using up to 1.5 gallons per day of solvents.

(G) The cleaning of photocurable resins from stereolithography equipment and models.

(H) Cleaning of adhesive application equipment used for thin metal laminating operations provided the clean-up solvent used contains no more than 950 grams of VOC per liter.

(I) Cleaning of electronic or electrical cables provided the clean-up solvent used contains no more than 400 grams of VOC per liter.

(J) Touch up cleaning performed on printed circuit boards where surface mounted devices have already been attached provided that the solvent used contains no more than 800 grams of VOC per liter.

(4) Cleaning with aerosol products shall not be subject to the provisions of paragraph (c)(1) and paragraph (d)(1) if 160 fluid ounces or less of non-compliant aerosol products are used per day, per facility. The use of such product shall comply with CARB regulations.

(5) The provisions of subparagraph (c)(1)(C) shall not apply to the following applications:

(A) Cleaning of coating and adhesive application processes utilized to manufacture transdermal drug delivery product using less than 3 gallons per day of ethyl acetate averaged over a 30 calendar day period.

(B) Cleaning of application equipment used to apply coatings on satellites and radiation effect coatings.

(C) The cleaning of application equipment used to apply solvent-based fluoropolymer coatings provided the clean-up solvent used for such cleaning contains no more than 900 grams of VOC per liter.

(6) The provisions of subparagraph (c)(1)(D) shall not apply to persons or facilities using less than 1.5 gallons per day of solvents to clean sterilization indicating ink application equipment.

(7) Until January 1, 2010, the provisions of (c)(1)(D)(v) shall not apply to on-press cleaning of screens provided the clean up solvent used for such cleaning activity contains no more than 300 grams of VOC per liter.

(8) Until January 1, 2010, the provisions of (c)(1)(D)(vi) shall not apply to the cleaning of ultraviolet or electron beam lamps and reflectors used for the curing of ultraviolet or electron beam (UV/EB) ink or coatings, and cleaning of metering rollers, dampening rollers and printing plates in UV/EB ink application equipment, provided the clean-up solvent used for such cleaning contains no more than 800 grams of VOC per liter.

(9) Provisions of paragraph (d)(1) shall not apply to the following:

(A) Cleaning of the nozzle tips of automated spray equipment systems, except for robotic systems.

(B) Cleaning with spray bottles or containers described in subparagraph (c)(2)(B).

(C) Printing operations where the roller or blanket wash is applied automatically.

(10) The provisions of this rule shall not apply to cleaning operations in printing pre-press or graphic arts pre-press areas, including the cleaning of film processors, color scanners, plate processors, film cleaning, and plate cleaning.