Proposed Amended Rule 1168 – Adhesive and Sealant Applications

Working Group Meeting #2

April 12, 2022, 10:00 AM (PST)

Join zoom meeting:
https://scaqmd.zoom.us/j/98766362611
Meeting ID: 987 6636 2611
Agenda

- Background
- Progress since Working Group Meeting #1
- Rule Development Process
- Technology Assessment
- Exempt Solvents
- Next Steps
- Staff Contact Information
Progress Since Working Group Meeting #1
Progress of Rule Development

Summary of working group meeting #1 (02/11/2022)

- Provided a background on Rule 1168 – Adhesive and Sealant Applications
- Preliminary technology assessment based on 2017 and 2018 Quantity and Emission Reports (QER) for 10 categories of adhesives and sealants
- Concluded a rule amendment is required to address implementation schedule for certain future effective limits

Since last working group meeting

- Staff continued meeting with stakeholders and trade groups
- Conducted a survey on exempt solvent usage
Rule Development Process
Rule Development Process

Working Group and stakeholder meetings continue throughout process

- **Information Gathering and Technology Assessment**
- **Preliminary Draft Rule and Staff Report**
  - Released 75 days before Public Hearing
- **Public Workshop**
  - Public comment and on Preliminary Draft Rule
- **Draft Rule and Staff Report**
  - Released 30 days before Public Hearing
- **Public Hearing**
  - Public comments and Board action
Information Gathering and Technology Assessment For PAR 1168

• Staff uses data from various sources to perform technology assessment

2013 Survey
Staff conducted a survey of adhesive and sealants during the last rule amendment

2017 and 2018 QERs
Rule 1168 required manufactures to submit their QERs

Shelf Surveys
Staff performs shelf surveys of available products

Working Group Meetings

Stakeholders Input
Comprised of stakeholders including industry, environmental groups, community members, and public agencies.

Objective:
- Build consensus and work through issues
- Opportunity for early input
- Develop a rule that affected facilities can implement

Working group meetings are held throughout the rule development process and open to the public.

Assists staff in understanding:
- Key issues and concerns
- Industry terms, industry practices, etc.
- Applicable technologies
• Stakeholders can provide input during working group meetings and rulemaking process
• Early input is strongly encouraged to help develop proposed rule amendments and to address issues
• Working Group Meetings, Individual Meetings, and Site Visits allow stakeholders to dialogue directly with staff and discuss individual issues
Technology Assessment
Technology Assessment

Roofing Adhesive and Sealants
Background on Roofing Adhesive and Sealants

- Technical assessment will evaluate if further sub-categorization of the Roofing Adhesives and Sealants category is needed
- Staff’s preliminary assessment was to break-up the “All Other Roof Adhesives” category into further subcategories
  - Address the large volume of low-VOC products
- Staff found two types of low-VOC products in this category
• Staff met with roofing representatives of asphalt and non-asphaltic adhesives and sealants
  • Asphaltic roofing adhesives can be very low-VOC but some are still formulated with solvents
  • Non-asphaltic adhesives representatives mainly concerned with meeting future limits because of the potential loss of pCBtF
Asphalt Roofing Industry Feedback

• Stakeholders expressed concerns on staff’s preliminary proposal to create an “asphalt-based roofing adhesive” category with a VOC limit less than 30 g/L

“Cold adhesives” or “mastics” cannot meet the 30 g/L VOC limit. They consist of a mixture of asphalt, solvents, fibers, clay and/or calcium carbonate fillers.

Other type is 100% asphalt adhesives that contain no added solvent can meet 30 g/L VOC limit.

• Used to manufacture two-ply roofing shingles and for built up roofing applications (hot mop).
Preliminary Recommendation on Asphalt Adhesive Categorization

• Staff found two low-VOC products in this category:

  Two ply laminate sheet/shingles
  • Laminate shingles are also known as “laminated architectural” or just “architectural” shingles

Built-up Roofing Asphalt (BURA)
• ARMA defines a built-up roofing system as a roof where multiple layers of asphalt is alternated with ply sheets (felts) applied over the roof deck (vapor retarder)
• In the United States, BURA should meet the current version of ASTM D312
• ASTM D312 defines four types of roofing BURA (Types I, II, III, and IV)
• Used in low slope applications
Preliminary Definitions

• Preliminary definitions for the low-VOC asphalt adhesives

**TWO PLY LAMINATE SHEET/SHINGLE ADHESIVE** means an asphalt-based adhesive used to adhere laminate sheets or shingles when manufacturing two-ply laminate sheets or shingles.

**BUILT-UP ROOFING ASPHALT ADHESIVE** means a solid asphalt adhesive that must be heated in order to be applied.

Note: Rule 1168 will retain the “Other Asphalt Adhesives” categories for the higher-VOC products.

Consider establishing the VOC limit at 30 g/L.
### Roofing Industry Feedback

#### Non-Asphalt Adhesives and Sealants

**Feedback on the use of para-Chlorobenzotrifluoride (pCBtF)**

- Stakeholders indicated there are a considerable number of non-asphalt roofing products that are formulated with pCBtF to meet VOC limits.
- Manufacturers were hesitant to reformulate to meet the 2023 VOC limits due to uncertainty regarding the exempt status of pCBtF.
- Requested South Coast AQMD consider a limited exemption for outdoor applications where exposures is lower.

**Staff Response**

- Staff understands the time and expense that reformulations entails.
- Staff has been directed by the Governing Board to remove the VOC exempt status of pCBtF.
- Staff will discuss the potential exposure from roofing applications later in this presentation.
Top and Trim Background

- During the first WGM, staff’s initial assessment was that 250 g/L limit is feasible because:
  - Higher VOC products were successfully phased out in 2019
  - Sales of low-VOC products increased
Staff met with Top and Trim industry stakeholders
- February 18, 2022 – Adhesive Solutions
- March 23, 2022 – DAP

Removing the 55-gallon facility exemption successfully eliminated the use of high-VOC products (>600 g/L products)

Reformulating to the current 540 g/L was successful
- Supply chain issues and price spikes have creating challenges

Reformulating to 250 g/L has not yet been successful
- Products do not perform to the necessary standards
- Adhesive works well with flat areas, challenging with contoured areas (e.g., seats)
- Manufacturers still see a potential to reformulate to 250 g/L but need more time
- Requested a delay of between 3 to 5 years
Top and Trim Considerations

- Staff has been working with industry for 15 years to achieve lower emissions for Top and Trip adhesives

Since 2007

- Rule 1168 required a future effective VOC limit of 250 g/L
- Technical challenges prevented reformulations

2007 - 2019

- The 55 gallon/year exemption allowed very high VOC top and trim products to be sold (>600 g/L)

After 2019

- Products complying with the 540 g/L VOC have been commercialized, resulting in VOC emission reductions

- Based on stakeholder feedback, staff considering retaining the 250 g/L limit with a delayed effective date
Technology Assessment
Foam Sealants
Foam Sealant Background

- Stakeholders requested further subcategorization of the foam sealant category
- Staff evaluated one and two component foam sealants in the QER data
  - Most two component sealants are formulated below 50 g/L
  - One component foam sealants exceed 50 g/L
- Staff intends to:
  - Create foam sealant subcategories and establish appropriate VOC limits
  - Allow time for manufacturers to reformulate and to meet proposed VOC limit
  - Work with CARB and EPA on metric used to regulate foam products (g/L or weight percent)
Potential Foam Product Subcategorizations

- Staff is considering several options for subcategories and seeking further feedback
  - Should the sealants be separated based on one or two component or high and low pressure?
  - Should Rule 1168 include categories for foam adhesives?
  - Should there be a separate category for handheld products?
- Stakeholders recommended staff consider using the EPA definitions
EPA Categorization on Spray Foam

<table>
<thead>
<tr>
<th>Two-Component High Pressure</th>
<th>Two-Component Low Pressure</th>
<th>One Component Foam (OCF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressurized 800–1600 psi</td>
<td>Pressurized less than 250 psi</td>
<td>Packaged in aerosol cans</td>
</tr>
<tr>
<td>Sold in 2-part pressurized containers</td>
<td>Sold in 2-part pressurized containers</td>
<td>Applied in situ using a gaseous foam blowing agent that is also the propellant for the aerosol formulation</td>
</tr>
<tr>
<td>Sprayed in the field for air sealing of buildings and in roofing applications</td>
<td>Sprayed in the field to air sealing of buildings</td>
<td></td>
</tr>
<tr>
<td>Applied in situ using high-pressure pumps to propel the components</td>
<td>Typically applied in situ relying upon a gaseous foam blowing agent that also serves as a propellant</td>
<td></td>
</tr>
<tr>
<td>May use liquid blowing agents without additional propellant</td>
<td>Pumps typically are not needed</td>
<td></td>
</tr>
</tbody>
</table>
Technology Assessment

Plastic Welding Cement
Feedback From Plastic Welding Cement Manufacturers

Some manufacturers have reformulated most of their products to meet January 1, 2023 future effective VOC limit.

Some manufacturers stated they need more time to reformulate and test products.

Consensus that there are technical challenges and high cost associated with reformulating solvent cement for CPVC used in “life saving systems”.

Staff is continuing discussions with manufacturers and will perform shelf surveys to assess the availability of compliant products.
**CPVC Subcategorization**

- Staff is considering creating a subcategory for “CPVC Welding Cement for Life Saving Systems”

<table>
<thead>
<tr>
<th>Initial Suggested Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPVC WELDING CEMENT FOR LIFE SAVING SYSTEM means Plastic Welding Cement with an increased resistance to high temperatures which is used for Life Saving Systems, including standalone and multipurpose fire sprinkler systems.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Potential VOC limits:</th>
<th>Rule 1168 may require specific labeling requirements to distinguish these products from the lower-VOC CPVC cements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain the 490 g/L limit</td>
<td></td>
</tr>
<tr>
<td>Staff will evaluate the potential foregone emissions</td>
<td></td>
</tr>
</tbody>
</table>
Exempt Solvents

t-BAc and pCBtF
### Background on tBAc and pCBtF

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>U.S. EPA exempted para-Chlorobenzotrifluoride (pCBtF)</td>
</tr>
<tr>
<td>2014</td>
<td>South Coast AQMD added pCBtF as an exempt VOC compound in Rule 102</td>
</tr>
<tr>
<td>2016</td>
<td>Rule 1113 amendment included a resolution that directed staff to review the exemption for t-Butyl Acetate (t-BAc) due to renewed toxicity concerns</td>
</tr>
<tr>
<td>2017</td>
<td>OEHHA finalized their t-BAc assessment, concluding it had a higher cancer potency than previously estimated</td>
</tr>
</tbody>
</table>
| 2018 | Staff presented preliminary t-BAc assessment and summary on pCBtF to Stationary Source Committee which directed staff to:  
  - Remove existing t-BAc exemption in Rules 1113 and 1151 when rules are amended  
  - Request OEHHA review the potential toxicity of pCBtF and remove the exemption, as resources allow, if pCBtF is deemed a potential carcinogen |
| 2020 | pCBtF Hot Spots cancer inhalation unit risk factor document was adopted by OEHHA which indicated pCBtF is a potential carcinogen |
Exempt Solvents

Use of t-BAc and pCBtF based on Survey Results
pCBtF and t-BAc Usage

- During the 2013 survey, staff asked if the product is classified as “other exempt,” which would include pCBtF
  - Only 3% of the reported products were other exempt
- In 2017-2018 survey, 78% of the products reported were waterborne and 22% were solvent based
  - pCBtF and t-BAc are not compatible with waterborne systems
- Preliminary data suggests pCBtF and t-BAc are not used to a great extend in adhesives and sealants
pCBtF Survey

• Staff conducted a survey in February 2022 for adhesive and sealant manufacturers who reported sales into or within the South Coast AQMD

• The intent of the survey was to assist the understanding of the extent to which exempts solvents are used to formulate compliant products
  • The two exempt compounds of interest for this survey were para-chlorobenzotrifluoride (pCBtF), also known as Oxsol 100, and tertiary-Butyl Acetate (t-BAc)
  • The focus of this survey was pCBtF, which is considered a VOC exempt solvent for adhesives and sealants
<table>
<thead>
<tr>
<th>Question</th>
<th>Requested Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Company name, contact person, and an email address</td>
</tr>
<tr>
<td>2. Do you sell adhesives or sealants into or within the South Coast AQMD?</td>
<td></td>
</tr>
<tr>
<td>3. Do any of the adhesives or sealants sold into or within the South Coast AQMD contain para-chlorobenzotrifluoride (pCBtF), also known as Oxsol 100?</td>
<td></td>
</tr>
<tr>
<td>4. Information regarding general adhesives or sealants categories include pCBtF</td>
<td></td>
</tr>
<tr>
<td>5. Describing the product if the category is any other adhesive or sealant in above question, or if the product category was not listed in the survey</td>
<td></td>
</tr>
<tr>
<td>6. The approximate weight percent of pCBtF in formulations</td>
<td></td>
</tr>
<tr>
<td>7. Alternative products that do not contain pCBtF that could replace the pCBtF adhesives or sealants</td>
<td></td>
</tr>
<tr>
<td>8. If the alternate products comply with the Rule 1168 VOC limits</td>
<td></td>
</tr>
<tr>
<td>9. Do any of the adhesives or sealants sold into or within the South Coast AQMD contain tertiary-Butyl Acetate (tBAc)?</td>
<td></td>
</tr>
</tbody>
</table>
Survey Preliminary Results

- 25 manufacturer responded to the survey
- Most reported pCBtF range for these categories was between 4% to 25%
  - Staff will follow up with all 11 manufacturers for more detailed information
  - Five manufacturer reported they have alternatives for pCBtF
- Categories using pCBtF: Architectural Adhesive and Sealants, Roofing Adhesive and Sealants, Adhesive and Sealant Primers, Any Other Adhesive, Any Other Sealant, Flooring Adhesive

Survey Question 2
Do you sell adhesive or Sealants into or within the South Coast AQMD?

Survey Question 3
Do any of the adhesive or Sealants sold into or within the South Coast AQMD contain pCBtF which is also known as Oxsol 100?

Survey Question 9
Do any of the adhesive or Sealants sold into or within the South Coast AQMD contain t-BAc?
Preliminary Conclusion on pCBtF

- Staff will assess specific categories the manufacturers reported using pCBtF
- Reach out to manufacturers for additional details
- Determine the market share of products using pCBtF
- Staff will evaluate next steps
Exempt Solvents

t-BAc and pCBtF in Roofing Applications
Risk Assessment for the use of pCBtF in Roofing Products

• Roofing manufacturers indicated they rely on pCBtF to meet Rule 1168 VOC limits
• Requested staff consider allowing the continued use for pCBtF for roofing applications
  • Roofing applications occur outside reducing potential exposure
• Staff will rely on previous t-BAc assessments to evaluate risks:

<table>
<thead>
<tr>
<th>2017 t-BAc White Paper</th>
</tr>
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<tbody>
<tr>
<td>- Focused on existing limited exemption for automotive and industrial maintenance coatings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk assessment of potential t-BAc use in roofing adhesives</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Stakeholders request an exemption for t-BAc during 2017 amendment</td>
</tr>
<tr>
<td>- Staff evaluated the potential risk associated with t-BAc usage</td>
</tr>
</tbody>
</table>
Assessment of the Risk of t-BAc in Industrial Maintenance and Automotive Coatings

• Due to toxicity concerns, staff reviewed the limited VOC exemption for t-BAc when used in certain automotive coatings and industrial maintenance (IM) coatings in 2017 t-BAc white paper

<table>
<thead>
<tr>
<th></th>
<th>Automotive Coatings</th>
<th>IM Coatings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer Potency Factor (mg/kg-day)^{-1}</td>
<td>6.7 * 10^{-3}</td>
<td>6.7 * 10^{-3}</td>
</tr>
<tr>
<td>Risk Factor (in one million)</td>
<td>17^{(1)}</td>
<td>3.8^{(1)}</td>
</tr>
<tr>
<td>Acute Hazard Index (HI) (non-cancer)</td>
<td>5.11 * 10^{-3}</td>
<td>0.4</td>
</tr>
</tbody>
</table>

^{(1)} HI less than 1 shows no risk; as HI becomes higher than 1 the risk increases

• Staff presented the results to the Stationary Source Committee
  • Recommended removing VOC exemption for tBAc and requesting OEHHA assess the potential toxicity of pCBtF

Finding summarized in draft White Paper (link here)
Assessment of Acute Offsite Risk for the use of t-BAc in Roofing Applications

- During the 2017 rule amendment, staff assessed the health risks associated with potential t-BAc usage in roofing products using the following assumptions:

  - Offsite receptors only exposed to acute effects; adhesives are not continually applied to the same roof, so chronic exposure not evaluated
  - Concentrations estimated by air dispersion modeling
  - Usage estimated at 500 gal/day for 10,000 ft² area elevated at 35 feet
  - Receptor located at a 25-meter distance

<table>
<thead>
<tr>
<th>Toxic Air Contaminant</th>
<th>Acute Hazard Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline 0.5% Ethylbenzene, 10% Toluene and Hexane, 5% Methyl Ethyl Ketone (MEK)</td>
<td>0.9</td>
</tr>
<tr>
<td>Future 50% t-BAc</td>
<td>17</td>
</tr>
</tbody>
</table>

Based on the assessment staff decided not to exempt t-BAc in Rule 1168
OEHHA t-BAc and pCBtF risk factors

- California Office of Environmental Health Hazard Assessment (OEHHA) implements Proposition 65 and compiles the list of substances that cause cancer or reproductive harm
  - OEHHA also provides risk assessments reports
  - 2015 and 2018 t-BAc and 2020 pCBtF reports includes Inhalation Slope Factor (ISF) which is the same factor as previous Cancer Potency Factor (CPF)

<table>
<thead>
<tr>
<th>Report</th>
<th>ISF (CPF) (mg/kg-day)^-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draft OEHAA t-BAc (2015)</td>
<td>6.7 * 10^-3</td>
</tr>
<tr>
<td>Final OEHAA t-BAc (2018)</td>
<td>5.0 * 10^-3</td>
</tr>
<tr>
<td>Final OEHAA pCBtF (2020)</td>
<td>3.0 * 10^-2</td>
</tr>
</tbody>
</table>
Consideration for pCBtF in roofing

RCMA asked staff to consider limited exemption for roofing adhesives

t-BAc toxicity was assessed for a roofing project and Acute HI was calculated to be 17

Rule 1401 – New Source Review of Toxic Air Contaminants limits Acute HI of new projects to less than 1

Cancer Potency Factor for pCBtF is considerably higher than for t-BAc

Staff concludes a limited VOC exemption for roofing should not be allowed
Background on Opteon 1100

2017

- Chemours reached out the South Coast AQMD regarding a possible VOC exemption for Opteon 1100 (HFO-1336mzz-Z, CAS number 692–49–9)
- South Coast AQMD does not exempt a compound unless it is exempted by the U.S. EPA

2019

- U.S. EPA revised the regulatory definition of VOC to exempt Opteon 1100 due to negligible contribution to the formation of tropospheric ozone
- Opteon 1100 is listed as an acceptable substitute by the U.S. EPA under the Significant New Alternatives Policy (SNAP) program for:
  - Foam Blowing Agents, Refrigeration and Air Conditioning, Cleaning Solvents, and Aerosol Solvent

2020

- South Coast AQMD reviewed available toxicology data for Opteon 1100 and did not find anything of concern
Preliminary Assessment on Opteon 1100

- Opteon 1100 could be used as a foam blowing agent for foam products to meet the future effective VOC limits.
- Staff would have to evaluate the technical feasibility and cost-effectiveness.
- Due to toxicity concerns of existing exempt compounds, staff prefers limited case-by-case exemptions.
- Rule 1168 could include a limited exemption for foam sealants and foam insulation.
- South Coast AQMD has a history of exempting HFOs as replacements for compounds with higher global warming potential.
- Similar approach could be considered for HFOs that could replace compounds with higher photochemical reactivity.
Next Steps

Continue Individual Meetings with Manufacturers
Seeking feedback on progress towards meetings future effective VOC limits

Continue to Review Existing Products in the Market
Evaluate availability of future compliant products

Continue Rule Amendment
Report on initial findings and continue discussions
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