



Rule 1168 – Adhesive and Sealant Applications

Working Group Meeting

November 18 2025, 10:00 AM (PST)

Join zoom meeting:

<https://aqmd.zoomgov.com/j/1604304915>

Meeting ID: 160 430 4915

Agenda

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- Exempt Compounds and Rule Background
 - Phase Out Approach
 - Quantity and Emission Reports (QERs)
 - Technology Check In Process
 - QERS Results
 - Next Steps

Background

Rule 1168

- Adopted in 1989, last amended in 2022, including pCBtF and t-BAc phase-out schedule
- Regulates VOC emissions from adhesives, adhesive primers, sealants, and sealant primers
- Includes quantity and emissions reporting requirement schedule for manufacturers



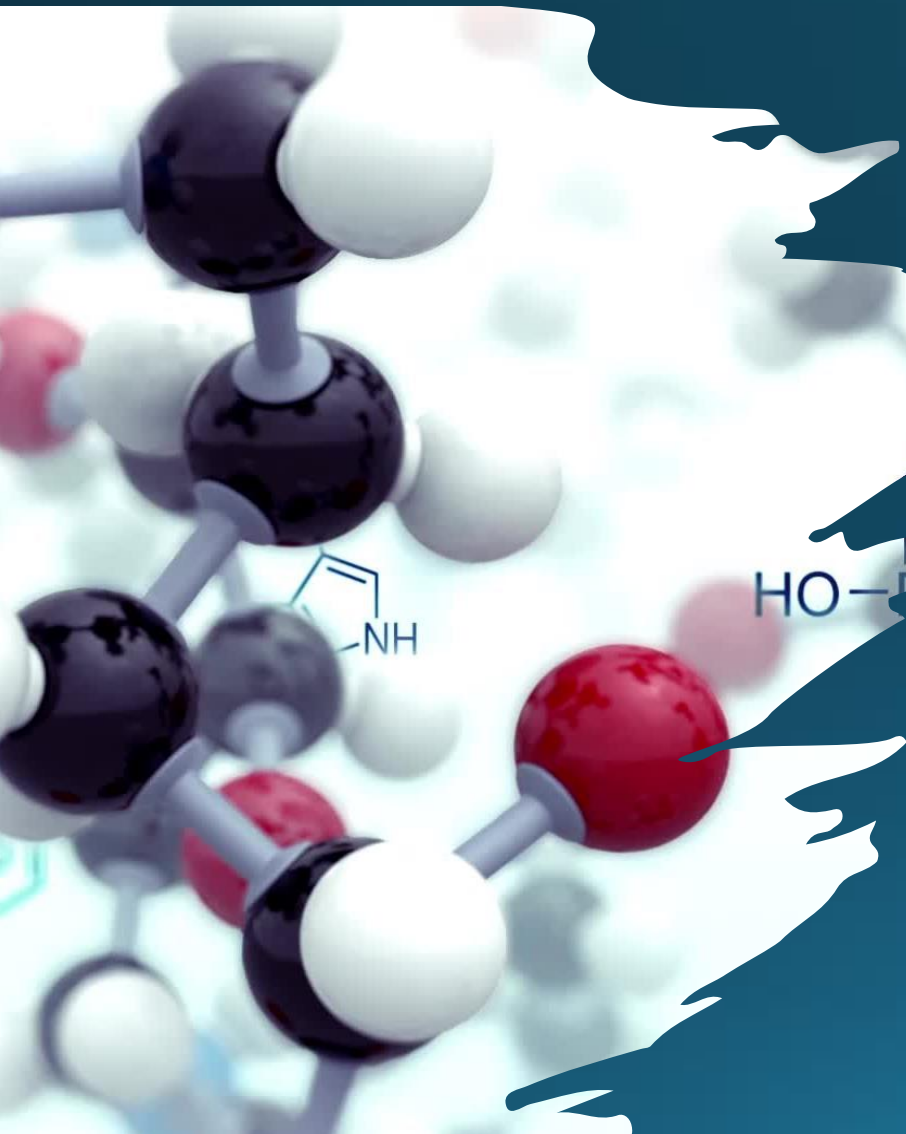
|Volatile Organic Compounds (VOC)*

- VOCs are photochemically reactive chemicals and major contributor to Ozone formation (smog)
 - South Coast AQMD is classified as an extreme non-attainment area for the 2015 Ozone National Ambient Air Quality Standards (NAAQS)
- VOCs emitted from different sources
 - Common sources of VOCs are mobile sources, industrial processes, biogenic (e.g., wildfires), coatings, adhesives, etc.



* Definition of VOC (per Rule 102): Carbon-based volatile compounds excluding: methane, CO, CO₂, carbonic acid, metallic carbides/carbonates, ammonium carbonate, and exempt compounds

Exempt Compounds



- U.S. EPA VOC Exemptions
 - Solvents with low photochemical reactivity (less than ethane)
 - Does not consider toxicity in exemptions
 - Key exempt compounds include acetone, pCBtF, and t-BAc
- South Coast AQMD Approach
 - Considers U.S. EPA exemptions plus toxicity, ozone depletion, and environmental impact
 - Rule 102 Exempt Compound Groups:
 - Group I: Not expected to be restricted
 - Group II: Often prohibited in VOC rules
- Special Exemptions
 - t-BAc has limited use exemption in:
 - Rule 1113 (Architectural Coatings) and Rule 1151 (Motor Vehicle Coatings)
 - Never considered an exempt compound in Rule 1168

Rule 1168 Development History

- 2017 rule amendment required a technology check-in for several future effective VOC limit reductions
- Staff identified the need to amend rule during the 2022 technology check-in
 - Choose to also address the risk from pCBtF and t-BAc
 - First rule to consider and propose a phase out for pCBtF and t-BAc
- After extensive discussions with stakeholders, staff determined that roofing product categories required additional time to transition to formulations without pCBtF and t-BAc
- Resolution adopted by South Coast AQMD Governing Board committed staff to update the Stationary Source Committee to evaluate progress of pCBtF and t-BAc phase out

BE IT FURTHER RESOLVED, that the South Coast AQMD Governing Board directs staff to report back to the Stationary Source Committee in January 2026 to provide an update on the progress of the pCBtF and t-BAc phase-out, including data reported in the Rule 1168 Quantity and Emission Reports and feedback from manufacturers of roofing adhesives and sealants; and

pCBtF and t-BAc Background



1994	U.S. EPA exempted pCBtF as a VOC due to negligible photochemical reactivity
1995	South Coast AQMD exempted pCBtF as a VOC due to negligible photochemical reactivity
2004	U.S. EPA exempted t-BAc as a VOC due to negligible photochemical reactivity
2005 – 2006	South Coast AQMD included limited exemption for t-BAc in Rule 1151 and Rule 1113
2015	Office of Environmental Health Hazard Assessment (OEHHA) released draft Cancer Potency Factor for t-BAc, more toxic than previously believed
2017	Staff drafted t-BAc white paper and presented findings to the Stationary Source Committee, who directed staff to prioritize toxicity over VOC emission reductions
2018	OEHHA finalized t-BAc Cancer Potency Factor, concluding poses potential cancer risk to humans, South Coast AQMD requested OEHHA evaluate toxicity of pCBtF
2020	OEHHA finalized pCBtF Inhalation Cancer Potency Factor, concluding pCBtF poses greater cancer risk to humans than t-BAc

Rule Amendments to Address pCBtF and t-BAc



- **Rule 1168 – Adhesive and Sealant Applications**
- **Rule 1151 – Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations**
- **Rule 1171 – Solvent Cleaning Operations**
- **Rule 1107 – Coating of Metal Parts and Products**
- **Rule 1124 – Aerospace Assembly and Component Manufacturing Operations**
- **Rule 1136 – Wood Products Coatings**

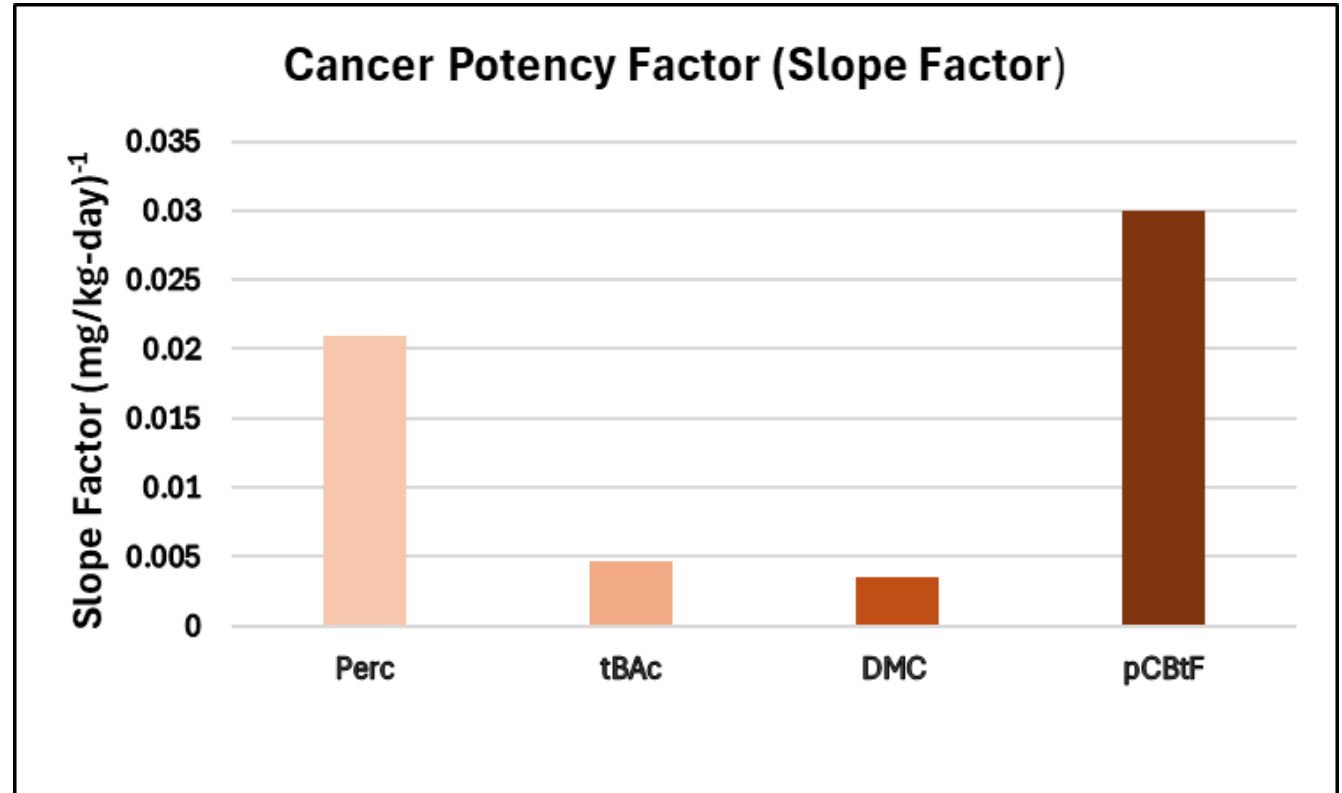
2022 Rule 1168 Amendment

- Staff considered several approaches to address toxicity concerns for pCBtF and t-BAc
 - Remove the exemption but allow the use of the solvents
 - Approach would not necessarily reduce the use or toxic exposure of the solvents
 - Allow limited uses, e.g., outdoor applications
 - Modeling demonstrated the off-site health risk was too high
- Staff compared the toxicity of other solvents that are prohibited in VOC rules to the toxicity of pCBtF and t-BAc



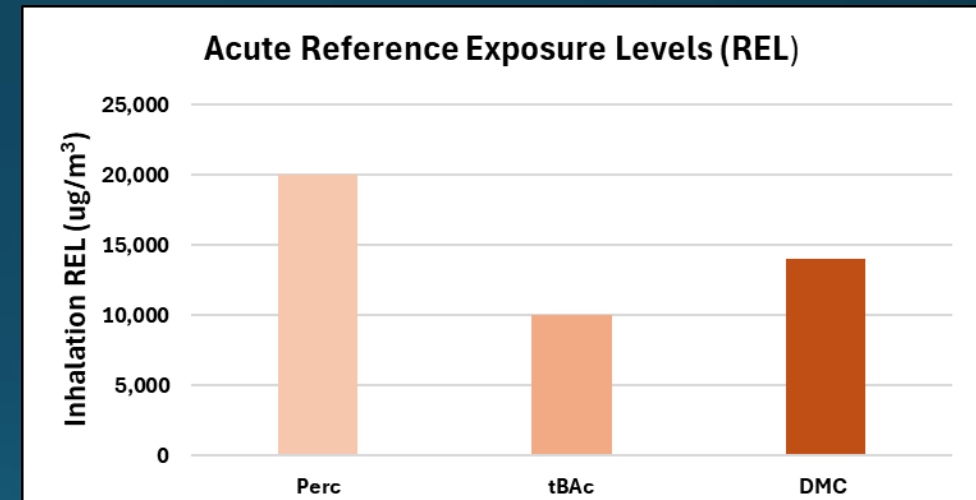
pCBtF and t-BAc Cancer Potency Factor Comparison

- Cancer Potency Factor (Slope Factor) for other compounds with toxicity concerns
- pCBtF has the highest Cancer Potency Factor amongst perchloroethylene (perc), t-BAc, and Dimethyl Carbonate (DMC), almost 50% higher than perc



Solvents REL Comparison

- Acute Health Impact (HI) has an inverse correlation with REL
 - t-BAc has the lowest REL meaning the highest risk among other compounds of concern
- Cancer Potency Factor for pCBtF is much higher than t-BAc, perc, and DMC, but there is no established REL for pCBtF



Staff's Conclusions

Additional modeling supported the Stationary Source Committee's recommendation to remove the VOC exempt status of t-BAC

OEHHA's assessment of pCBtF and t-BAC shows compounds to be as toxic as chemicals currently prohibited

Staff recommended phasing out the use of pCBtF and t-BAC

Rule 1168 Phase Out Approach

- Staff provided different timelines for categories that relied on pCBtF or t-BAc in formulations
- pCBtF use was more extensive in roofing categories
 - Provided longer time for categories with higher use
- t-BAc use was limited
 - Created separate phase out timeline
 - Applies to all regulated products

Table 3: pCBtF and t-BAc Prohibition Timeline

Category	Prohibition Effective Date	Sell-through End Date	Use-through End Date
pCBtF Prohibition Effective Dates			
Cut Edge Single Ply Roof Membrane Sealant	January 1, 2027	January 1, 2028	January 1, 2028
EPDM/TPO Single Ply Roof Membrane Adhesive			
Roof Adhesive Primer			
Single Ply Roof Membrane Adhesive (Except EPDM/TPO)	January 1, 2025	January 1, 2028	January 1, 2028
Single Ply Roof Membrane Sealant (Except Cut Edge)			
All Other Roof Sealant			
Roof Sealant Primer			
Clear, Paintable, and Immediately Water-Resistant Sealant	January 1, 2026	January 1, 2028	January 1, 2028
All Regulated Products not listed above	January 1, 2024	January 1, 2027	January 1, 2028
t-BAc Prohibition Effective Dates			
All Regulated Products	January 1, 2024	January 1, 2027	January 1, 2028

Quantity and Emission Reports (QERs)

- Rule 1168 requires manufacturers and private labelers to submit QERs for regulated products sold into or within the South Coast AQMD
- Staff have received three sets of QERs in 2019, 2022, and 2025
- For 2025 reports, staff revised QERs to include t-BAC and pCBtF content
- No data on t-BAC and pCBtF content were reported in previous QER cycles

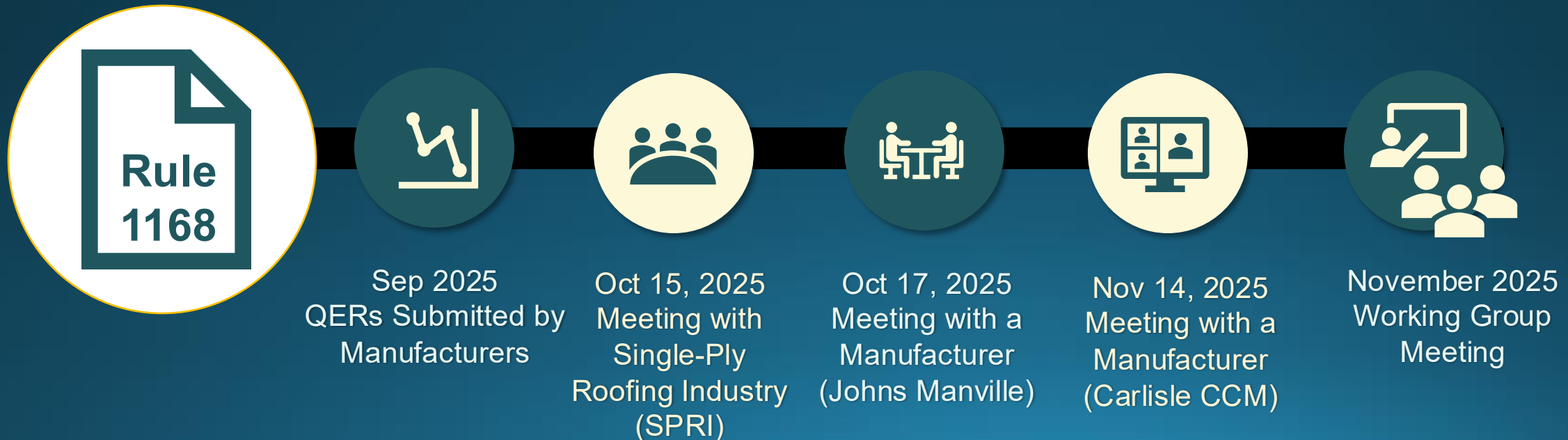
Table 2: Reporting Timeline

Reporting Deadlines		Reported Years
Manufacturers & Private Labelers	Big Box Retailers & Distribution Centers	
September 1, 2019	May 1, 2019	2017, 2018
September 1, 2022	May 1, 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

Rule 1168 Technology Check-In

Technology Check-In

- During 2022 rule amendment, Governing Board directed staff to assess progress on pCBtF and t-BAC phaseout and to report back to the Stationary Source Committee
- Technology check-in includes meeting with manufacturer, industry trade group reported data and feedback



Meeting with Stakeholders

Staff engaged with roofing industry stakeholders, including trade associations and manufacturers

Meetings were held with SPRI, Johns Manville, and Carlisle CCM, in October and November 2025

Stakeholders did not raise phase-out concerns for most categories, except for Ethylene Propylene Diene Monomer (EPDM) roofing adhesive primers

For most products, the phase-out has already been implemented

- Remaining products are undergoing testing prior to commercial release

QER Results

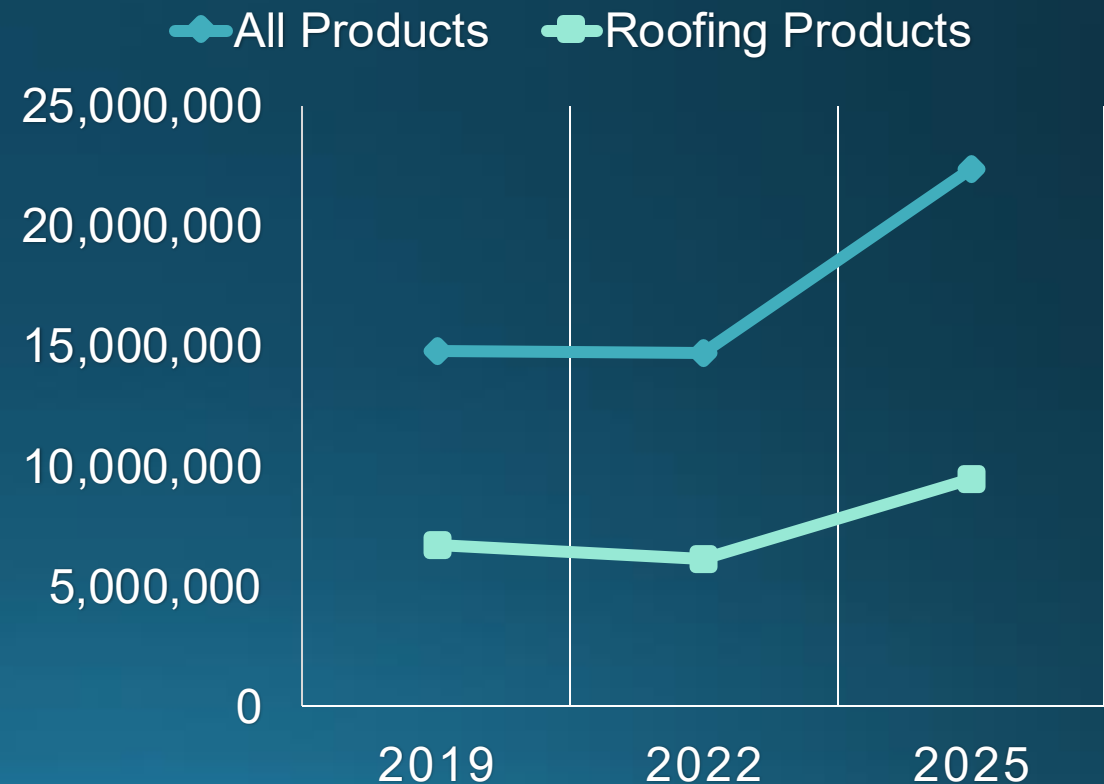
Staff received 60 to 70 QERs in three reporting cycles

Total product sales increased from approximately 15 million gallons in 2019 and 2022 to 22 million gallons in 2025

2022 QERs covered calendar years 2020 and 2021 showing COVID-19 impacts and supply chain disruptions

Based on follow-up with manufacturers, the increase in 2025 is primarily attributed to resolving prior supply chain constraints

PRODUCT SALES IN LAST THREE REPORTING CYCLES



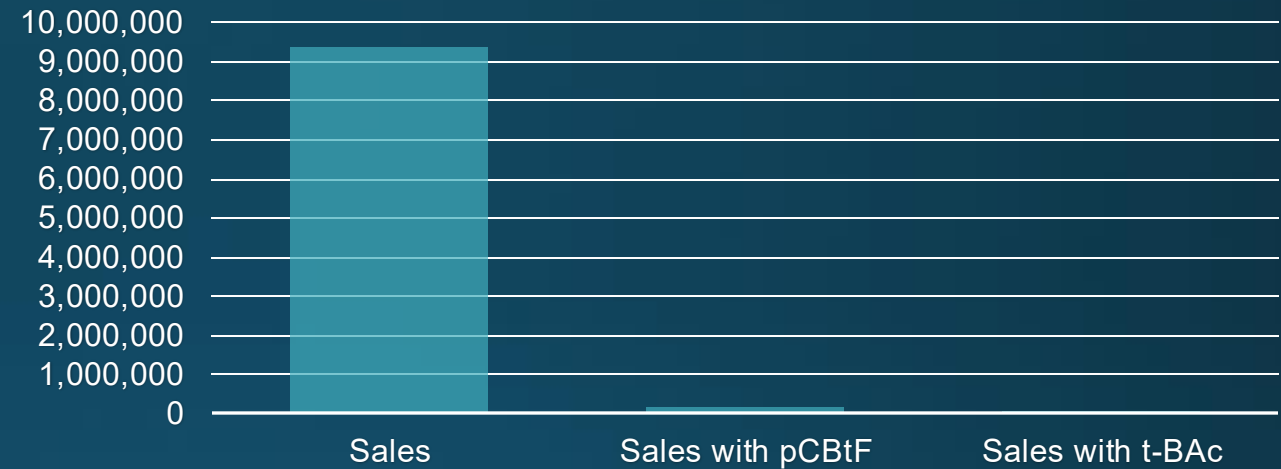
Roofing Categories use of pCBtF and t-BAc

~ Nine million or 42% of total reported products in 2025 reported QERs were roofing products

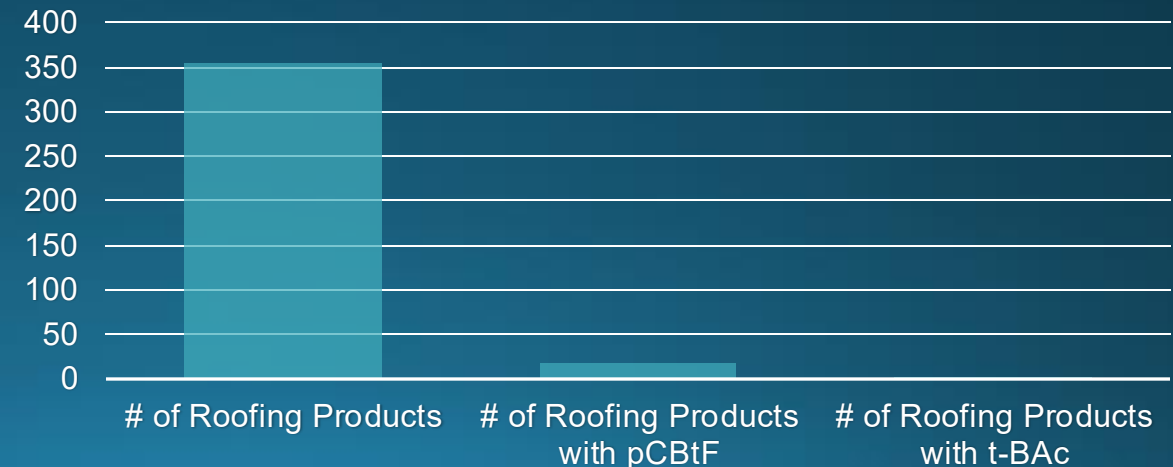
- Only 1.7% of roofing products contain pCBtF
- Equal to 0.7% of total reported products
- Only 18 products contain pCBtF and two products contain t-BAc

On average the percent pCBtF in products was ~ ten percent

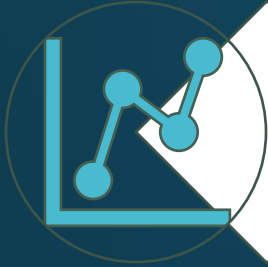
Roofing Products Sales (Gallons)



of Roofing Products



Findings from 2025 QERs

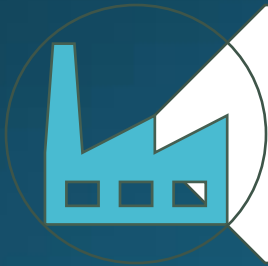


The most recent QERs shows increasing sales of roofing products without pCBtF and/or t-BAC

- Products containing pCBtF and t-BAC account for less than one percent of total product sales



Most manufacturers and trade associations did not express concern on the phase out



One manufacturer reported challenges formulating compliant non-pCBtF EPDM Roofing Adhesive Primers

EPDM Roofing Adhesive Primers

EPDM Roofing Adhesive Primers

- Low-use specialty coatings but a critical component to EPDM roofing systems
- Low-solids coatings with high percentage of pCBtF to meet current 250 g/L limit
- No reported EPDM Adhesive primer is formulated without pCBtF

Staff Recommendations

- Check-in with manufacturers and trade associations to inquire on progress developing compliant non-pCBtF EPDM Roofing Adhesive Primers
- Consider options if reformulations not progressing
 - Amend rule to extend pCBtF phase out
 - Raise VOC limit for this specialty category
 - Find other VOC limit reductions that could offset any potential VOC increase

Next Steps

Reach out to
EPDM Roofing
Adhesive Primer
Manufacturers

Report to
Stationary Source
Committee 2nd
Quarter 2026 to
Update on Primer
Reformulations

Determine if Rule
Amendment is
Needed

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