

**STATE OF CONNECTICUT  
DEPARTMENT OF ENVIRONMENTAL PROTECTION**



**HEARING REPORT**

**Prepared Pursuant to Section 4-168(d) of the  
Connecticut General Statutes and  
Section 22a-3a-3(d)(5) of the Department of Environmental Protection Rules of Practice**

**Regarding the  
Adoption of Section 22a-174-44 of the  
Regulations of Connecticut State Agencies  
Adhesives and Sealants**

**Hearing Officers:  
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**Date of Hearing: October 16, 2007**

On August 13, 2007, the Commissioner of the Department of Environmental Protection (Commissioner and Department, respectively) signed a notice of intent to adopt section 22a-174-44 (Section 44) of the Regulations of Connecticut State Agencies (RCSA). Pursuant to such notice, a public hearing was held on October 16, 2007, with the public comment period closing on October 19, 2007. The proposal is intended to create ozone precursor emissions reductions to assist the state to attain and maintain the national ambient air quality standard for 8-hour ozone.

**I. Hearing Report Content**

As required by section 4-168(d) of the Connecticut General Statutes (CGS), this report describes the proposal; the principal reasons in support of and in opposition to the proposal; and summarizes and responds to all comments on the proposal. A final recommended version of the text, inclusive of any changes made in response to comment, is also provided.

A statement in satisfaction of CGS section 22a-6(h) is included as Attachment 1.

**II. Summary of the Proposal**

Section 44 limits emissions of volatile organic compounds (VOC) from adhesives, sealants and primers. This section achieves VOC reductions through two basic components: sale and manufacture restrictions that limit the VOC content of specified adhesives, sealants and primers sold in the state; and use restrictions that apply primarily to commercial/industrial operations. As VOC are ground-level ozone precursors, reductions in VOC emissions will assist the state to demonstrate attainment of the federal 8-hour ozone national ambient air quality standard (NAAQS), as required by the Clean Air Act. Although currently mandated controls will achieve significant emissions reductions over the next five to ten years, ozone precursor emission reductions beyond current requirements will be necessary to maintain the 8-hour ozone NAAQS. Thus, following adoption, Section 44 will be submitted to the U.S. Environmental Protection

Agency (EPA) in fulfillment of a written commitment included in the Department's 8-hour ozone NAAQS attainment demonstration.<sup>1</sup>

Section 44 results from efforts of a workgroup composed of state air quality regulators and coordinated by the Ozone Transport Commission (OTC). The goal of the workgroup was the preparation of materials for use by each state to meet its 8-hour ozone NAAQS attainment planning obligations. These materials include model rules to regulate products and activities to reduce ozone precursor emissions. One such model rule, the OTC Model Rule for Adhesives and Sealants (OTC Model Rule), forms the basis of this proposal. The OTC Model Rule is based on the requirements of a reasonably available control technology determination prepared by the California Air Resources Board (CARB) in 1998. The provisions of the CARB determination have been adopted in regulatory form in various air pollution control districts in California. The Commissioner, via signature on resolutions and memorandums of understanding, committed with other states in the OTC to seek adoption of a state regulation based on the OTC Model Rule. Given this foregoing process, consistency with the requirements of the OTC Model Rule was a factor guiding the development of Section 44.

In addition to assisting in ozone attainment planning efforts, proposed Section 44 is consistent with a 2006 environmental initiative of the Department, which focuses on assisting individuals and organizations to decrease their "environmental footprint." Adoption of Section 44 will require some manufacturers of regulated adhesives, sealants and primers to reformulate to reduce the VOC content. Thus, consumers will be able to reduce their environmental impact while continuing to purchase and use customary adhesive and sealant products.

The text of proposed Section 44 is located in Attachment 2 to this report.

### **III. Principal Considerations in Opposition to the Proposal**

The National Paint and Coatings Association (NPCA) opposes adoption of Section 44 as a burden to industry, particularly for industry source categories that are subject to federal standards for hazardous air pollutants.

Much comment on the proposal objects to the level and timing of the standards for single-ply roof membrane adhesives, adhesive primers and sealants. The impact of the Connecticut climate, which is cooler on average than that of the districts in California where the standards are now in effect, on single-ply roofing adhesive application and long-term roof performance and durability is questioned.

A detailed discussion of all comments and responses is set out in the next section of this report.

### **IV. Summary of Comments**

All comments submitted are summarized below with the Department's responses. The comments are divided in two subsections: the first subsection identifies and responds to concerns with the proposed VOC content standards for adhesives, sealants and primers used in single-ply roofing applications, and the second subsection identifies and responds to all other concerns.

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<sup>1</sup> See Section 4 of the attainment demonstration at:  
<http://www.ct.gov/dep/cwp/view.asp?a=2684&q=385886>

Commenters are identified by number in this section and are identified fully at the corresponding number in the list that is Attachment 3 to this report. When changes to the proposed text are indicated in response to comment, new text is in bold font and deleted text is in strikethrough font.

The final regulation maintains consistency as appropriate with the OTC Model Rule, differing in respects better to align the proposal with the Department's policies or in response to new technical information presented in the hearing process. These differences from the OTC Model Rule are created to further the Department's environmental goals but with attention to regional consistency. The Department also remains aware of the rule adoption processes in other OTC states and has shared technical information and discussed Model Rule revisions with staff in these states.

Beyond achieving the VOC emissions reductions that are the primary purpose of this proposal, the responses to these comments, particularly concerning single-ply roofing application, are guided by the importance of regulatory requirements that support other Department initiatives such as energy efficient building construction and solid waste reduction.

#### **A. Single-Ply Roofing**

This section of the report responds to timely comment submitted concerning single-ply roof membrane application products as well as a series of recommendations submitted by the EPDM Roofing Association at the Department's request following the close of the comment period.

**Comment 1: Definition of "single-ply roof membrane."** The definition for "single-ply roof membrane" should be expanded, as follows, to include all types of single-ply roof membrane material rather than only those made of rubber:

"Single-ply roof membrane" means a prefabricated single sheet of compounded synthetic material. Single-ply membranes fall into one of three categories, thermosets that include rubber membranes (EPDM), thermoplastics that include TPO, PVC and KEE membranes and modified bitumen membranes. [4]

**Response:** The Department agrees that the definition of "single-ply roof membrane" is intended to include all single-ply roof membrane materials including ethylene propylenediene monomer (EPDM), polyvinyl chloride, thermal polyolefin and ketone ethylene ester. While EPDM (aka rubber) is the most commonly used single-ply roof membrane material in Connecticut now, the use of thermoplastic membranes is increasing as architects, specifiers and contractors recognize that these other materials offer performance qualities similar to EPDM plus additional benefits such as superior heat island reduction and energy savings.<sup>2</sup>

Modified bitumen roof material is generally not considered a single-ply roof material and, therefore, should not be included in the definition of single-ply membranes.

In response to this comment, the Department should revise the proposed definition of "single-ply roof membrane" in Section 44(a), as follows:

<sup>2</sup>

US EPA. Cool roof product information. [http://www.epa.gov/hiri/strategies/level3\\_roofproducts.html](http://www.epa.gov/hiri/strategies/level3_roofproducts.html)

“Single-ply roof membrane” means a prefabricated single sheet of ~~rubber,~~ normally ethylene-propylenediene-terpolymer, compounded synthetic material such as ethylene propylenediene monomer, polyvinyl chloride, thermal polyolefin or ketone ethylene ester, that is applied in a single layer to a building roof.

**Comment 2: Limited commercial availability.** Two commenters expressed concern that there is a lack of compliant, commercially available adhesives, sealants and primers for use on single-ply roof membranes. [3,5]

**Response:** Various air quality districts in California adopted the CARB recommendations for low-VOC adhesives and sealants, in some cases nearly ten years ago. As a result of such district rules, low-VOC bonding adhesives for roofing are not only available but dominate the market in California. However, the Department acknowledges that California is the only region of the country where low-VOC roofing adhesives dominate, and change in other markets such as the Northeast does require time.<sup>3</sup> The Department believes the best incentive to increase the number of commercially available low-VOC single-ply roof bonding products is the multi-state promulgation of regulations requiring the sale and use of such products. To that end, the Department is proceeding to seek adoption of Section 44 in a form that will meet the Department’s air quality needs and serve to bolster the adoption of very similar requirements in surrounding states.

See the Department’s response to comment 6 for additional responsive text and a recommended change to the final draft of Section 44 that takes into account the concern expressed in this comment.

**Comment 3: Efficacy of low-VOC roof bonding adhesives in the Northeast.** One commenter expressed concern that high solvent levels are necessary to allow for adhesion, particularly in conditions characteristic of Connecticut, such as cold temperatures and long-term exposure to high winds. [4]

**Response:** As noted in the summary in Section II of this report, the OTC Model Rule was primarily based on analysis and recommendations of CARB and on rules adopted in several California air districts. California’s experience provides no indication that a high solvent level – which implies a high VOC content – is necessary for roof adhesion in cold temperatures. Furthermore, the OTC states, along with the OTC’s technical contractor, reviewed the technological basis for the implementation of the rule and the associated reductions in emissions. The OTC Model Rule was developed with feedback from states as well as stakeholders received at OTC public meetings.<sup>4</sup> No information was provided by industry to substantiate concerns that the VOC limits were too low to allow effective performance in the average climate conditions of the northeastern United States. This lack of supportive data, coupled with the continued pressures on states to meet both state

<sup>3</sup> Hoff, J. “The Low-Slope Commercial Roofing Industry in the Northeast United States and the Ozone Transport Commission Model Rule for Adhesives and Sealants: A Study of Risks and Options for Effective Implementation” Dec. 12, 2007: 12, on file with the CT Department of Environmental Protection. Hereinafter referred to as the Hoff Report.

<sup>4</sup> See “Questions and Comments” in Response to Air Quality Control Advisory Council (AQCAC) Meeting of September 10, 2007, Maryland, on file with the CT. Department of Environmental Protection.

and federal ozone standards, led the OTC workgroup to maintain the standards at the level recommended by CARB and adopted in certain California air quality districts.

The Department is aware of at least one single-ply roof adhesive that is available in Connecticut now and that is recommended for use in temperatures below 40°F. While additional procedures may be necessary to store and use low-VOC or water-based adhesives, such adhesives can be used successfully and provide adhesion comparable to higher VOC adhesives.

The Department should not revise Section 44 in response to this comment. *See* the responses to comments 4 through 6 for a final recommendation concerning Section 44 and additional justification for the Department's final recommendation.

**Comment 4: Roof performance and durability.** Several commenters expressed a lack of confidence in the overall performance and durability of low-slope roofs applied with low-VOC adhesives during cold temperatures. Poor adhesive performance would increase roof failure, require more frequent replacement and have a negative impact on the environment as a result of an increase in roofing material in landfills. [4,5,6,7,9]

**Response:** As explained in the response to comment 3, concerns regarding potential durability issues with compliant roofing adhesives were raised during the OTC Model Rule development. As the OTC states did not receive from commenters any substantiating data indicating performance problems, the standards for that category were retained in the OTC Model Rule.

The Department is aware that cold temperatures increase the flash-off time to bonding; that there are currently a limited number of low-VOC roof bonding adhesive products that may be applied successfully in cold weather; and that extra procedures may be required for successful roof installations on colder days. Such additional cold weather application procedures are not unique to low-VOC adhesives, since higher VOC content adhesives may gel if stored or used at temperatures less than 40°F. Particular combinations of temperature and humidity may require roof applications to be delayed or rescheduled. However, once bonding occurs using an adhesive applied as recommended by the manufacturer, there is no evidence that subsequent periods of low temperature destroy such a properly bonded surface. Although California temperatures tend to be warmer, in general, than those in Connecticut, the experience of the Sacramento Air Quality Management District is informative. The Sacramento Air Quality Management District has a history of record low temperatures below 40°F during eight months of the year and experiences an average low of 40°F during December and 41°F during January.<sup>5</sup> This District adopted a regulation similar to Section 44 in 1998. The Department is unaware of any increases in performance problems or of reduced roof durability associated with roof membranes that may have been applied on low temperature days in Sacramento.

<sup>5</sup>

Sacramento average/record temperatures:  
<http://www.weather.com/weather/wxclimatology/monthly/graph/USCA0968?from=search>

In addition, the transition recommended in the response to comment 6 will work to resolve the performance concerns as applicators and specifiers become comfortable with the use of low-VOC and water-based adhesive products, and manufacturers and distributors increase the number and variety of compliant product lines available in Connecticut.

Therefore, the Department should not revise Section 44 in response to this comment.

**Comment 5: Recommendations from EPDM Roofing Association.** At the request of the Department for additional technical information concerning the expressed concerns of the single-ply roofing industry, EPDM Roofing Association submitted a study of the risks to the commercial roofing industry and options for effective implementation of the OTC Model Rule in the Northeast states. Embedded in that study are four recommended revisions to Section 44, which EPDM Roofing Association based on the information reported. The study's recommendations and the Department's responses to each are as follows:

- **Recommendation A:** The proposed VOC content limitations for single-ply roofing adhesives, sealants and primers should apply only during the ozone season, *i.e.*, from May 1 through September 30, of any year. This approach is consistent with that of the Department in the proposed revision to RCSA section 22a-174-20(k) for asphalt paving, and the administrative provisions of that amendment should also be included in Section 44.

EPDM Roofing Association arrives at this recommendation based on both the need for user training, set out more fully in Recommendation B, and to provide additional time for the marketing in the Northeast of more single-ply roof bonding products that meet the proposed VOC content limit.

- **Recommendation B:** In addition to a permanent ozone season limitation on the VOC content limits for single-ply roofing adhesives, sealants and primers, the Department should provide a transitional period during which the application of the such standards is further limited, as follows:

<u>Year</u>	<u>Apply Single-Ply Roofing Product Standards in These Months</u>
2009	July through August
2010	June through September
2011 and after	May through September

EPDM Roofing Association justifies the need for the transitional period to provide time for commercial installers to be trained in the use of the low-VOC products. Currently, high-VOC bonding adhesives for single-ply roofing membranes dominate the market in the Northeast. As a result, there has been virtually no training in the application of low-VOC products outside of California, where the low-VOC products dominate the market as a result of the adoption of air quality rules in many of the California air quality management districts. An abrupt change to low-VOC products in the Northeast will cause an increased risk of liability to the construction industry for roof failures.

- **Recommendation C:** The final rule should include provisions to allow the use of high-VOC single-ply roofing adhesives, sealants and primers on low temperature days in the month of May, provided that appropriate records of such use are maintained.

- **Recommendation D:** The Department should encourage the development of more low-VOC roof bonding products and ultimately help the industry reach a goal of virtual elimination of VOC. [7]

**Response:** In response to each recommendation, the Department notes the following:

- **Recommendation A:** Connecticut is required to attain the federal 8-hour ozone NAAQS by 2010. Connecticut committed to other states in the region and to EPA to implement a regulation to reduce the VOC content of adhesives, sealants and primers. Regional modeling to support NAAQS attainment included reductions in VOC emissions from adhesives and sealants in all states in the region. While the reductions created by Section 44 are annual, reductions are most crucial in the summer months when ozone levels typically exceed national standards on the hottest days; for air quality purposes, the period from May 1 to September 30 is called the “ozone season,” and many control strategies are focused on these months. Also contributing to the high ozone levels experienced on the hottest days of summer are increased emissions from electricity production. The hottest days of summer are also the highest electricity demand days experienced in the Northeast states, requiring that high-emitting peaking and emergency generators operate to meet the demand.

Thus, while the Department may temporarily limit the application of low-VOC standards for the single-ply roofing industry to only the summer months and achieve important air quality benefits, the application of the standards for only a few months of each year is not as meaningful from an air regulatory perspective as an annual standard and may jeopardize EPA’s approval of the Department’s 8-hour ozone attainment plan and the Department’s ability to create federally mandated reductions, not only in Connecticut but in the larger Northeast region. Meeting commitments to reduce ozone precursors has elevated importance now given EPA’s March 12, 2008 decision to revise the ozone NAAQS, which will likely require the State to adopt additional control measures.

As explained in the response to comment 6, the Department should revise Section 44 to require seasonal single-ply roof bonding product standards for the initial three years following rule adoption and add a three-year extension on the sale and manufacture restrictions for single-ply roof application products. This phase-in will allow for 8-hour ozone attainment needs, provide additional time for applicator training and allow the introduction of more low-VOC roof application products in the Connecticut and wider Northeast markets.

- **Recommendation B:** As explained in the responses to Recommendation A and comment 6, the Department should allow a three-year transition period (2009-2011), during which the proposed VOC content standards for single-ply roofing adhesives, sealants and primers are required only during certain summer months. Beginning January 1, 2012, the standards shall apply at all times. This transitional time provides necessary VOC emissions reductions in the crucial summer months, while taking into account the need for additional roofing industry training and providing an opportunity for manufacturers and distributors to increase the number of low-VOC roof bonding products available in the Northeast.
- **Recommendation C:** Given the commercial availability now of at least one single-ply roof bonding adhesive that meets the proposed VOC content limit and that bonds effectively in temperatures below 40°F and a likely increase in the number of such compliant adhesives in the near term, the Department should not implement the

recommended change. Such a change would reduce the emissions reductions obtained from the rule, complicate enforcement and decrease the incentive for the release of additional, effective products.

- **Recommendation D:** The Department believes the best incentive to increase the number of commercially available low-VOC single-ply roof bonding products is the multi-state promulgation of regulations requiring the sale and use of such products. To that end, the Department is proceeding to seek adoption of Section 44 in a form that will meet the Department's air quality needs and serve to bolster the adoption of very similar requirements in surrounding states.

**Comment 6: Impact on the roofing industry.** Several commenters expressed concern that the compliant products currently available have application restrictions, which limit product use when temperatures are equal to or less than 40°F. Such temperature restrictions were not addressed by CARB, nor were such restrictions concerns in the California air districts that adopted regulations since warmer, average annual temperatures predominate in California. Given the year-round nature of roof assembly and repair in Connecticut, these application restrictions will substantially impact the roofing industry, possibly limit construction projects in general, and thereby have a significant, negative economic impact on the state. [4,5,6,7,9]

An underlying concern of the roofing contractors is an increased risk of compromised roofing installations and roofing-related construction litigation. [7]

**Response:** As stated earlier in this report, the primary purpose of Section 44 is to reduce emissions of VOC, an ozone precursor, to assist the state to attain the federal 8-hour ozone NAAQS. One roofing industry estimate puts single-ply roof membrane bonding adhesive use in Connecticut at approximately 200,000 gallons annually.<sup>6</sup> Such adhesive contains, on average, 600g/L of VOC -- significantly higher than the proposed VOC content limit of 250g/L. If all of the VOC within these single-ply roofing adhesives volatilized into the atmosphere, these adhesives would generate approximately 573 tons of VOC in Connecticut each year.<sup>7</sup> As Section 44 is projected to reduce emissions from all regulated adhesives and sealants by 4.2 tons per summer day, the VOC emissions reductions from single-ply roofing adhesive, primer and sealant standards are a potentially significant portion -- perhaps 25% -- of the total emissions reductions from Section 44.<sup>8</sup>

The Department is committed to adopting a regulation based on the OTC Model Rule in a form that will preserve the expected air quality improvements. Further, the Department disagrees with the comment concerning the level of negative impact Section 44 will have on commercial construction in Connecticut. Single-ply roof membrane installation can be accomplished by fully adhering the membrane to the substrate, by using mechanical fasteners and by using ballast stones. In Connecticut, the preferred method of installation

<sup>6</sup> Hoff Report at 12.

<sup>7</sup> Hoff Report at 12.

<sup>8</sup> The exact level of the emissions reductions of Section 44 attributed to reductions in roof bonding products is difficult to determine as they depend on cycles in the construction industry, seasonal differences in construction and actual amounts of VOC volatilized. Further, the contributions from all the adhesives and sealants regulated in Section 44 has not been separated according to single products or product categories. The regional inventory that forms the basis for the OTC's emissions reductions and Connecticut's stationary source/area source inventory are developed using top-down national estimates of total industrial adhesive use, allocated to states based on population or industrial activity levels. There is no information to provide a verifiable breakdown by subcategories.



of single-ply roof membranes is to adhere them, as this method is highly resistant to wind, water and dimensional changes.<sup>9</sup> Ballasting is not commonplace in Connecticut due to the lack of suitable ballast stones. Mechanically attaching the membrane with fasteners, though used in other cold-weather states, has not been standard practice in Connecticut. Thus, adoption of the proposed rule would limit the roofing industry, during cold weather, to three realistic options in Connecticut: use of an available compliant adhesive that adheres without application restrictions when ambient temperatures are at and below 40°F; use of modified bitumen (not a single-ply roofing method) with cold adhesives; or mechanically fastening the roofing membrane.

The Department recognizes the majority of compliant adhesives now available in Connecticut have temperature restrictions that limit application in cold temperatures. The Department also understands that the number of roof bonding adhesives that adhere at low temperatures with a VOC content that meets the proposed limits is expected to increase in the near future. However, in the summer months when ozone formation is of particular concern, temperatures are generally suitable for the use of a number of currently available roof bonding adhesives that have a VOC content at or below the standard proposed in Section 44.<sup>10</sup>

To maintain the integrity of the Department's air quality goals while taking into account the need for construction worker training (see comment 5 and response) and the limited number of compliant roofing adhesives now marketed in Connecticut, the Department should revise Section 44 to allow a limited phase-in of the single-ply roof membrane application product standards. That phase-in should begin in 2009, when the Department should require the use of single-ply roof adhesives and primers with a VOC content less than or equal to 250 g/L (or 450 g/L in the case of single-ply roof membrane sealants) from June 1 through August 31. In 2010 and 2011, the Department should extend the compliance period to the length of the ozone season (May 1 through September 30). Beginning January 1, 2012, the 250 g/L VOC content limit for the single-ply roof membrane adhesives and primers (450 g/L in the case of single-ply roof membrane sealants) should apply throughout each year.

The three-year phase-in period will allow the Department to achieve necessary reductions in VOC emissions in the critical summer months while providing additional time for the widespread distribution of low-VOC roof bonding products in the Northeast market and for the construction industry to appreciate the performance characteristics of low-VOC roof application products. Once applicators have become accustomed to any differences in application techniques, workers may even find the low- and no-VOC products preferable in terms of cleanup, and, in some cases, the products may reduce potential exposure to toxic air emissions; many VOC are also considered toxic compounds, so reductions in VOC may produce reductions in toxic compounds.

<sup>9</sup> See Steve Hardy and Mark Boulay, "Making Sense of Single-Ply Roofing" *Architectural Record*, p. 8. (January 2000).

<sup>10</sup> Hoff Report at 15. See also Weather Channel website at <http://www.weather.com/weather/wxclimatology/monthly/graph/USCA0968?from=search>. The month of May has an average low temperature of 48°F and average high temperature of 70°F. September has an average low temperature of 51°F and average high temperature of 71°F.

Section 44 also restricts the sale and manufacture of non-compliant adhesives, sealants and primers. Those sale and manufacture restrictions should be delayed until January 1, 2012 for the single-ply roof membrane application products. However, the Department notes that prudent manufacturers, sellers and distributors will begin now to increase their inventory of low-VOC roof application products and decrease the inventory of non-compliant products.

The identified language in subsections (c), (d) and (e) and in Table 44-1 should be revised to implement the temporary ozone-season only standards and delay in the sales and manufacture restrictions for single-ply roof application products, as follows:

- Subsection (c), addition of new subdivisions (10) and (11)

**(10) The requirements of this section shall apply to the use of single-ply roof membrane installation or repair adhesive, single-ply roof membrane sealant and single-ply roof membrane adhesive primer on the following schedule:**

- (A) For the year 2009, from June 1 through August 31;**
- (B) For the years 2010 and 2011, from May 1 through September 30; and**
- (C) On and after January 1, 2012.**

**(11) The requirements of this section shall not apply to any manufacturer or distributor who sells, supplies or offers for sale any single-ply roof membrane installation or repair adhesive, single-ply roof membrane sealant or single-ply roof membrane adhesive primer prior to January 1, 2012.**

- Subsection (d), revision of subdivision (3)

(3) Except as provided in subsections (c)(1) through (c)(4), (c)(7), (c)(9), (c)(10), (c)(11) and (d)(6) of this section, on or after January 1, 2009, no person shall use or apply, or solicit the use or application of, any adhesive, sealant, adhesive primer or sealant primer within the State of Connecticut unless such adhesive, sealant, adhesive primer or sealant primer as applied complies with the applicable VOC content limits specified in Table 44-1 or Table 44-2 of this section and the applicable requirements of this subsection.

- Subsection (e), revision of subdivision (1)

(1) Any person who sells, supplies, offers for sale or manufactures an adhesive, sealant, adhesive primer or sealant primer subject to this section on or after January 1, 2009 for sale in the State of Connecticut shall possess documentation that such adhesive, sealant, adhesive primer or sealant primer complies with the VOC content limits of Table 44-1 of this section, where the VOC content is determined according to the requirements of subdivisions (2) and (3) of this subsection. **For single-ply roof membrane installation or repair adhesive, single-ply roof membrane sealant and single-ply roof membrane adhesive primer, such documentation is required on and after January 1, 2012.**

- Table 44-1, addition of a column designating the date on which each standard applies

Table 44-1. As Applied VOC Content Limits for Adhesives, Sealants, Adhesive Primers and Sealant Primers

Adhesive, sealant, adhesive primer or sealant primer category	As applied VOC content limit (g VOC/L)	Date on which standard applies
<i>Adhesives</i>		
ABS welding	400	January 1, 2009
Ceramic tile installation	130	January 1, 2009
Computer diskette jacket manufacturing	850	January 1, 2009
Contact bond	250	January 1, 2009
Cove base installation	150	January 1, 2009
CPVC welding	490	January 1, 2009
Indoor floor covering installation	150	January 1, 2009
Metal-to-elastomer molding or casting	850	January 1, 2009
Multipurpose construction	200	January 1, 2009
Nonmembrane roof installation or repair	300	January 1, 2009
Plastic cement welding	510	January 1, 2009
Outdoor floor covering installation	250	January 1, 2009
PVC welding	510	January 1, 2009
Single-ply roof membrane installation or repair	250	For 2009: June 1 through August 31; For 2010 & 2011: May 1 through September 30; and On and after January 1, 2012.
Structural glazing	100	January 1, 2009
Thin metal laminating	780	January 1, 2009
Tire retread	100	January 1, 2009
Perimeter bonded sheet vinyl flooring installation	660	January 1, 2009
Waterproof resorcinol glue	170	January 1, 2009
Sheet-applied rubber installation	850	January 1, 2009
<i>Sealants</i>		
Architectural	250	January 1, 2009
Marine deck	760	January 1, 2009
Nonmembrane roof installation or repair	300	January 1, 2009
Roadway	250	January 1, 2009
Single-ply roof membrane	450	For 2009: June 1 through August 31; For 2010 & 2011: May 1 through September 30; and On and after January 1, 2012.
Other	420	January 1, 2009
<i>Adhesive primers</i>		
Automotive glass	700	January 1, 2009
Plastic cement welding	650	January 1, 2009
Single-ply roof membrane	250	For 2009: June 1 through August 31; For 2010 & 2011: May 1 through September 30; and On and after January 1, 2012.
Traffic marking tape	150	January 1, 2009
Other	250	January 1, 2009
<i>Sealant primers</i>		
Non-porous architectural	250	January 1, 2009
Porous architectural	775	January 1, 2009
Marine deck	760	January 1, 2009
Other	750	January 1, 2009

**B. All Other (Not Roofing) Concerns**

Aside from single-ply roof membrane adhesion concerns, comment on Section 44 focused on comparisons of Section 44 with the OTC Model Rule or with other federal requirements.

**Comment 7: Definitions.** Connecticut's draft rule is closely based on the OTC's Model Rule. A majority of the definitions are the same in both rules, but EPA notes that those definitions identified in the table below are not. The Department should confirm that these differences are intended:

CT's Definition	OTC Definition
"Cyanoacrylate adhesive" means any single-component reactive diluent adhesive that contains at least 85% by weight methyl, ethyl, methoxymethyl or other functional groupings of cyanoacrylate.	"Cyanoacrylate adhesive" means any adhesive with a cyanoacrylate content of at least 95% by weight.
"Plasticizer" means any substance, such as a high boiling point organic solvent, that is added to a hard plastic to provide flexibility or pliability.	"Plasticizer" means a material, such as a high boiling point organic solvent, that is incorporated into a vinyl to increase its flexibility, workability, or distensibility, as determined by ASTM Method E-260-96.
"Reactive diluent" means a liquid reactant in an uncured adhesive, sealant or primer that reacts chemically or physically during the curing process to become an integral part of the cured adhesive, sealant or primer.	"Reactive diluent" means a liquid that is a reactive organic compound during application and one in that, through chemical and/or physical reactions, such as polymerization, twenty (20) percent or more of the reactive organic compound becomes an integral part of a finished material
"Sealant" means any material with adhesive properties that is formulated primarily to fill, seal, waterproof or weatherproof gaps or joints between two surfaces. Sealers and other materials that are applied to a single substrate to protect or decorate are not "sealants."	"Sealant" means any material with adhesive properties that is formulated primarily to fill, seal, waterproof or weatherproof gaps or joints between two surfaces. Sealants include sealant primers and caulks.
"Single-ply roof membrane installation or repair adhesive" means any adhesive intended by the manufacturer for use in the installation or repair of single-ply roof membrane.	"Single-ply roof membrane installation and repair adhesive" means any adhesive labeled for use in the installation or repair of single-ply roof membrane. Installation includes, as a minimum, attaching the edge of the membrane to the edge of the roof and applying flashings to vents, pipes and ducts that protrude through the membrane. Repair includes gluing the edges of torn membrane together, attaching a patch over a hole and reapplying flashings to vents, pipes or ducts installed through the membrane.

[1]

**Response:** The Department acknowledges the EPA-identified differences between proposed Section 44 and the OTC Model Rule. The differences result in clearer definitions by eliminating unnecessary words or phrases or substituting more specific language. Some of the differences result from comparisons of the OTC Model Rule with similar rules now in effect in some of the California air quality management districts, while others result from the informal comment by the regulated community. Such

revised definitions thus benefit from the adoption process in the California districts as well as the Department's considerable regulatory drafting experience.

The differences identified by EPA are not intended to create new product categories, alter the applicability or change the emissions reductions anticipated. For example, the language distinguishing "repair" from "installation" in relation to the definition of "single-ply roof membrane installation or repair adhesive" is unnecessary since both activities are undertaken using the same adhesive product.

**Comment 8: Emission reduction calculation.** Connecticut's proposed rule indicates that it will generate approximately four tons per summer day in VOC emission reductions. Connecticut should document how this estimate was determined, and include a discussion of how the exemption for aerosol coatings was addressed in quantifying emission reductions. [1]

**Response:** Emissions calculations for Connecticut's adhesives and sealants regulation are fully documented in the Department's proposed ozone attainment demonstration.<sup>11</sup> For regional consistency, emissions were determined using an approach agreed to by the Control Measures Workgroup of the OTC. For Connecticut, 2002 base year emissions of 1714 tons/year were obtained from an EPA-funded study<sup>12</sup> that applied a solvent mass balance approach to estimate emissions from various solvent source categories. Future year emission estimates include a 64.4% reduction in VOC emissions attributed to the adoption of an adhesives and sealants rule in each OTC state. This level of reduction represents the low end of the 64.4% to 77.8% range estimated by CARB<sup>13</sup> for the development of a regulation based on the CARB reasonably available control technology determination and its adoption in the California air quality management districts.

Connecticut's proposed adhesives and sealants regulation includes an exemption for aerosol adhesives. This exemption is included because the VOC content of aerosol adhesives is regulated by Connecticut's consumer products regulation, RCSA section 22a-174-40(d)(4). RCSA section 22a-174-40 assigns VOC content limits to five categories of aerosol adhesives. The combination of an exemption for aerosol adhesives and regulation under a separate rule is consistent with the regulatory treatment of aerosol adhesives in the California air quality management districts (Bay Area, El Dorado, Placer County, San Joaquin Valley, Ventura County, *e.g.*). Such an exemption was not included in the CARB determination underlying the district rules since it preceded, in some cases, adoption of consumer product regulations in the air quality management districts. The lack of inclusion of such an exemption in the OTC Model Rule was an oversight.

As a result, we do not anticipate that the exemption will significantly alter the level of estimated emissions reductions realized by Section 44. The reasonableness of the

<sup>11</sup> See Section 4 and Appendix 4E of the proposed attainment demonstration at: [http://www.ct.gov/dep/cwp/view.asp?a=2684&q=385886&depNav\\_GID=1619](http://www.ct.gov/dep/cwp/view.asp?a=2684&q=385886&depNav_GID=1619)

<sup>12</sup> "Solvent Mass Balance Approach for Estimating VOC Emissions from Eleven Nonpoint Solvent Source Categories"; draft report prepared by EC/R, Inc. for EPA's Office of Air Quality Planning and Standards; EPA Contract No. 68-D-02-064; Work Assignment No. 3-05; March 28, 2005.

<sup>13</sup> See "Determination of Reasonably Available Control Technology and Best Available Retrofit Control Technology for Adhesives and Sealants"; California Air Resources Board; December, 1998.

emission reduction estimate is also founded on the OTC's choice of a control factor (*i.e.*, 64.4%) from the low end of the range identified by CARB.

**Comment 9: Uniformity of regulations.** The adoption of uniform regulations in all states in the Northeastern U.S. is the primary interest of the NPCA. [8]

**Response:** The Department understands the importance of uniformity in essential requirements of state regulations conceived at the regional level and shares the goal of creating one seamless regional market in which a product may be sold in every state under the same label and containing the same product formulation. To maintain uniformity to the extent possible despite new information raised during the comment period, the Department staff is in frequent contact with staff in other OTC states now pursuing the adoption of OTC Model Rule-based regulations.

Nonetheless, differences among state regulations are inevitable. To the extent Connecticut's regulation strays from the exact text of the OTC Model Rule, it does so to meet Connecticut-specific concerns, to improve the environmental result based on information and concerns not raised during the Model Rule creation, to clarify or to match Department formatting conventions. Such differences will not prevent the creation of a regional market in which significant compliance requirements are the same from state-to-state.

**Comment 10: Rule development.** In 1999, NPCA was involved in the process of developing the CARB determination, the document that provides the basis for the OTC Model Rule, which, in turn, forms the basis for Section 44. The CARB determination reflects industry input at that time concerning technical and legal concerns. Industry developments since the issuance of the CARB determination should be -- and are not -- incorporated into the OTC Model Rule or Section 44. This lack is a concern. [8]

**Response:** The key emissions-reducing provision of Section 44 is the inclusion of VOC content standards for defined categories of adhesives and sealants. The requirement to comply with these VOC content standards falls on the manufacturers and sellers of the products. Users are also required to use products that comply with the standards, in accordance with the manufacturer recommendations. A number of factors encourage the adhesive industry to develop low-VOC and water-based products, including state and federal requirements intended to create ozone precursor reductions, green building standards and consumer concerns about toxic chemicals. Given these pressures on manufacturers, the OTC workgroup that developed the OTC Model Rule was concerned that the VOC content standards of the CARB determination may not represent the lowest achievable standards of the current adhesives industry. The OTC workgroup chose to move forward without reducing those standards given that the CARB determination standards would yield significant emissions reductions for the states in the region.

In light of this background, the NPCA's comment is puzzling; the industry should be poised to meet lower VOC content standards than those provided in Section 44. Furthermore, while the NPCA expresses legal and technical concerns with certain categories of product, NPCA offers no specific concerns that the Department might act upon in an information gathering process. For this reason, the Department should not revise Section 44 in response to this comment.

**Comment 11: Compliance date.** Section 44's compliance date should be at least 18 months after rule promulgation to provide regulated industries time to substitute compliant materials or install control equipment. [8]

**Response:** The proposed date on which the standards and most other requirements of Section 44 apply to regulated persons is January 1, 2009. Should the rule adoption process extend so that promulgation will occur close to that date, the Department may consider moving that compliance date to the future. However, the Department committed to EPA to adopt this rule as one of the Department's means of attaining the federal 8-hour ozone NAAQS, and is therefore under an obligation to move on a schedule that will create the intended emissions reductions as of January 1, 2009.<sup>14</sup> Manufacturers, distributors and sellers of regulated products are thus put on notice of the Department's intentions and should note the efforts of other OTC states including Maryland, New Jersey and Massachusetts to also complete the adoption of state regulations based on the OTC Model Rule.

**Comment 12: NESHAPs.** Facilities subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for Miscellaneous Metal Parts and Products (40 CFR 63 Subpart MMMM) or Surface Coating of Plastic Parts and Products (40 CFR 63 Subpart PPPP) should not be regulated by Section 44. Such companies are subject to VOC and hazardous air pollutant (HAP) emission standards including source-specific emissions limits, which are enforced in operating facility permits. Subjecting these facilities to Section 44 may limit operational flexibility and will make compliance more complicated. For example, the NESHAPs measure compliance on a twelve-month rolling average, which allows the operator to use adhesives with a VOC content that exceeds the average at any given time, as long as lower VOC content products are used to maintain the average. The standards of Section 44 would force such a facility to look to the installation and use of pollution control equipment or to use non-VOC products. However, control equipment may be expensive or even infeasible. As a result, some facilities may shut or move to another state. Furthermore, the use of control equipment will result in an increase in carbon dioxide emissions. Finally, a shift to the use of aqueous or non-VOC containing adhesives will never happen at a facility that has installed control equipment. [8]

**Response:** The ozone attainment-driven requirements of Section 44 and the NESHAPs are independent requirements that serve different purposes. Neither may substitute for the other, given the differences in the purpose, applicability and standards. Compliance with one does not exclude – and may even further – compliance with another.

Section 44 is proposed to limit VOC emissions from the use of regulated adhesives, primers and sealants. The main mechanism to realize the emissions reductions are the VOC content limits for regulated adhesives, sealants, primers, cleanup and surface preparation solvents. Thus, Section 44 is applicable to manufacturers and sellers of the regulated adhesives, sealants, primers and solvents. Section 44 also includes requirements that apply to facilities at which the regulated adhesives, sealants, primers and solvents are used, but those requirements are relatively limited and apply to any process or activity using a regulated product.

<sup>14</sup> The commitment is made in the 8-hour Ozone Attainment Demonstration. Available at: [http://www.ct.gov/dep/cwp/view.asp?a=2684&q=331234&depNav\\_GID=1619](http://www.ct.gov/dep/cwp/view.asp?a=2684&q=331234&depNav_GID=1619)

In contrast, the NESHAPs are promulgated by EPA to reduce HAPs from certain facilities based on the activity or process occurring at the facility. The applicability is only to the owners or operators of facilities at which the identified process is occurring, and the applicability thresholds are determined by the facility's potential to emit HAPs. NESHAPs do not include VOC or HAP content limits for products, but require the owners of the regulated facilities to meet HAP emissions standards on a 12-month rolling average basis. While some of the regulated HAPs are also VOC, thereby creating coincident reductions in VOC emissions, the creation of VOC emissions reductions is not the primary purpose – or necessary result – of the NESHAPs.

Any facility that is subject to a NESHAP and at which an adhesive regulated by Section 44 is used will need to comply with both requirements. For some facilities, the use of products that comply with Section 44 will further compliance with the NESHAP; in other facilities, the requirements of Section 44 will not so do. For some facilities this will add some elements to their record keeping system. Section 44 is designed with some flexibility to facility operators in designing record keeping, as long as records are sufficient to determine compliance with applicable requirements.<sup>15</sup> Compliance with a NESHAP and Section 44 will not necessarily require the installation of control equipment where no such equipment is now required. Finally, a general suggestion that a source using control equipment has no incentive to switch to low-VOC or aqueous adhesives and sealants is groundless; cost, employee safety, hazardous waste disposal needs, product safety and a desire to “do the right thing” may all influence the choice of products or control equipment at any facility.

Finally, to claim that the installation of air pollution control equipment would be a deciding factor in the continued operation of a number of businesses is extreme and unsubstantiated.

The Department should not revise Section 44 in response to this comment.

**Comment 13: Consistency with a MACT.** Section 44 should use definitions consistent with the Miscellaneous Metal Surface Coating MACT Standard. [8]

**Response:** As explained in the response to comment 12, the requirements of 40 CFR 63 subpart Mmmm concerning surface coating of miscellaneous metal parts serves a purpose different than that of Section 44 and applies to a group of persons for the conduct of activities outside the applicability of Section 44. Thus, not surprisingly, almost none of the terms defined in 40 CFR 63.3981 are used in Section 44. In the case of the few terms defined in both Section 44 and 40 CFR 63.3981, there is no clear advantage to substituting the federal definitions.

The Department should not revise Section 44 in response to this comment.

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<sup>15</sup> See, e.g., Section 44(f)(1).



**Comment 14: Concerns about a specific facility.** The proposal should include requirements to limit VOC from manufacturing facilities that use paint and also specify the use of monitoring equipment to measure VOC in the outside air whenever a complaint is filed. The commenters offer this comment in light of their dissatisfaction with odors emitted by a neighboring factory and frustration that repeated visits by inspectors from the Department in response to complaints have not discovered any violations at the neighboring factory. [2]

**Response:** The Department should not revise the proposal in response to this comment as the recommendations concerning the regulation of VOC emissions from paint and the use of monitoring equipment are outside the noticed scope of this proceeding. Regarding the use of paint in manufacturing processes, the Department adopted a regulation in July 2007, RCSA section 22a-174-41, that regulates the VOC content of many paints, stains, varnishes and other coatings used in certain industrial applications. The Department's regulations always include requirements for the testing and monitoring necessary to determine compliance with limits and standards.

The Department also operates a statewide air monitoring network that is a crucial component of compliance efforts to meet federal air quality standards and to evaluate the success of our pollution control strategies. More information about that monitoring network is available at:

[http://www.ct.gov/dep/cwp/view.asp?a=2684&Q=321790&depNav\\_GID=1744&depNav=](http://www.ct.gov/dep/cwp/view.asp?a=2684&Q=321790&depNav_GID=1744&depNav=)

In response to the complaint about the emissions from a neighboring facility, as the commenters note, the Department's inspectors have found the facility to be operating in compliance with all applicable air quality regulations. Any future complaints will be investigated should the commenters continue to experience unsatisfactory conditions.

## VI. Additional Comments from the Hearing Officers

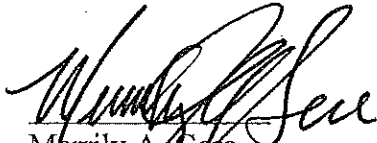
In addition to the above-recommended revisions, the Department should make the following technical corrections and clarifications to the final version of Section 44:

- The phrase "for use" should be added to subsection (d)(2) so the language mirrors the corresponding applicability requirement in subsection (b)(2), as follows:
  - (2) Except as provided in subsections (c) and (d)(6) of this section, on or after January 1, 2009, no person shall manufacture for sale **for use** in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer unless such adhesive, sealant, adhesive primer or sealant primer complies with the applicable VOC content limits specified in Table 44-1 of this section and the applicable requirements of this subsection.
- The July 1, 2008 date in the labeling requirements of subsection (g)(1) should be changed to January 1, 2009, so the labeling requirements coincide with all other provisions in the section, as follows:
  - (1) As of ~~July 1, 2008~~ **January 1, 2009**, each manufacturer of an adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section shall display the following information on the container or label . . .


- The ASTM test methods referenced in subsection (e)(3) are not the current active methods and should be revised to reflect the current active methods, as follows:
  - ASTM D4457-85 should be replaced with **ASTM D4457-02**;
  - ASTM E260-96 and ASTM E260-91 should be replaced with **ASTM E260-96(2006)**;
  - ASTM D3792-91 should be replaced with **ASTM D3792-05**; and
  - ASTM D2879-96 should be replaced with **ASTM D2879-97(2007)**.

## VII. Conclusion

Based upon the comments submitted by interested parties and addressed in this Hearing Report, we recommend the final new section, included as Attachment 4 to this report, be submitted by the Commissioner for approval by the Attorney General and the Legislative Regulations Review Committee. Based upon the same considerations, we also recommend that upon promulgation the new section be submitted to EPA as a revision to the State Implementation Plan and as a control measure in support of Connecticut's plan to attain and maintain the 8-hour ozone NAAQS.

  
Merrily A. Gere  
Hearing Officer

06/12/08  
Date

  
Anne B. Hulick  
Hearing Officer

06/12/2008  
Date

## ATTACHMENT 1

### **Federal Standards Analysis Pursuant to Section 22a-6(h) of the General Statutes**

Pursuant to the provisions of section 22a-6(h) of the Connecticut General Statutes (C.G.S.), the Commissioner of the Department of Environmental Protection (the Department) is authorized to adopt regulations pertaining to activities for which the federal government has adopted standards or procedures. At the time of public notice, the Commissioner must distinguish clearly all provisions of a proposed regulation that differ from federal standards or procedures. The Commissioner must distinguish any such provisions either on the face of such proposed regulation or through supplemental documentation accompanying the proposed regulation. In addition, the Commissioner must provide an explanation for all such provisions in the regulation-making record required under Title 4, Chapter 54 of the C.G.S. and make such explanation publicly available at the time of the notice of public hearing required under C.G.S. section 4-168.

In accordance with the requirements of C.G.S. section 22a-6(h), the following statement is entered into the public administrative record in the matter of the proposed adoption of section 22a-174-44 (Section 44) of the Regulations of Connecticut State Agencies:

There are no comparable federal standards intended to improve ambient air quality by regulating the VOC content of adhesives, and, therefore, no further analysis is required.

While the U.S. Environmental Protection Agency (EPA) published a consumer and commercial products rule on September 11, 1998 (40 CFR Part 59 Subpart D), which include five types of household adhesives, Section 44 includes an exemption for adhesives that are subject to R.C.S.A. section 22a-174-40, the state's counterpart to the Federal Part 59 rule for consumer products. Regulated products do not otherwise overlap.

In addition, EPA has promulgated national emissions standards for hazardous pollutants for source categories in 40 CFR 63, which address hazardous air emissions from adhesives and cleaning solvents used in a limited number of source categories, including wood furniture manufacturing, shipbuilding and aerospace. The limited overlap is addressed in some instances through the exemptions of Section 44. In a few other cases, such as the contact adhesive limits of Subpart JJ for wood furniture manufacturing operations, compliance with the Part 63 requirements will allow for compliance with the standard for contact bond adhesives in Section 44 for newer sources. Older source owners will find that the contact bond adhesive standard in Section 44 is stricter than that of Subpart JJ.

May 21, 2007  
Date

\_\_\_\_\_  
/s/Merrily A. Gere  
Bureau of Air Management

**ATTACHMENT 2**

**Proposed RCSA Section 22a-174-44**

**DRAFT 11 – August 8, 2007**

The Regulations of Connecticut State Agencies are amended by adding section 22a-174-44, as follows:

**(NEW)**

**Section 22a-174-44 Adhesives and sealants.**

**(a) Definitions.** For the purposes of this section, the following definitions shall apply:

“Acrylonitrile-butadiene-styrene welding adhesive” or “ABS welding adhesive” means any adhesive intended by the manufacturer to weld acrylonitrile-butadiene-styrene pipe, which is made by reacting monomers of acrylonitrile, butadiene and styrene.

“Adhesive” means any chemical compound, although typically “adhesives” are organic polymers, that is applied for the purpose of bonding two surfaces together by other than mechanical means.

“Adhesive primer” means any product intended by the manufacturer for application to a substrate, prior to the application of an adhesive, to enhance the bonding surface.

“Aerosol adhesive” means an adhesive packaged as an aerosol in which the spray mechanism is permanently housed in a non-refillable can designed for handheld application without ancillary hoses or spray equipment.

“Aerospace component” means the fabricated part, assembly of parts or completed unit of any aircraft, helicopter, missile or space vehicle, including passenger safety equipment.

“Architectural” means pertaining 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.

“As applied” means the composition of an adhesive, sealant or primer at the time it is applied to a substrate, including any solvent, catalyst or other substance added to the as supplied adhesive, sealant or primer.

“As supplied” means the composition of an adhesive, sealant or primer as sold to a retail customer. For multi-component adhesives, sealants or primers, “as supplied” means the composition after the component parts are combined as specified by the manufacturer and before the addition, at the user’s initiative, of any ancillary substances.

“Automotive glass adhesive primer” means an adhesive primer intended by the manufacturer to be applied to automotive glass prior to installation of the glass using an adhesive. “Automotive glass adhesive primer” improves the adhesion to the pinch weld and blocks ultraviolet light.

“CARB” means the California Air Resources Board.

“Ceramic tile installation adhesive” means any adhesive intended for use in the installation of ceramic tiles.

“Chlorinated polyvinyl chloride welding adhesive” or “CPVC welding adhesive” means any adhesive intended for welding of CPCV plastic pipe.

“Cleanup solvent” means a VOC-containing solvent used to remove a loosely held uncured adhesive or sealant from a substrate or to clean equipment used in applying an adhesive, a sealant or a primer.

“Computer diskette jacket manufacturing adhesive” means any adhesive intended by the manufacturer to glue the fold-over flaps to the body of a vinyl computer diskette jacket.

“Contact bond adhesive” means any adhesive that forms an instantaneous, non-repositionable bond when substrates, on which the adhesive was applied and allowed to dry, are brought together using momentary pressure. “Contact bond adhesive” does not include rubber cements that are primarily intended for use on paper substrates or vulcanizing fluids designed and labeled for tire repair only.

“Cove base” means a flooring trim unit, generally made of vinyl or rubber, having a concave radius on one edge and a convex radius on the opposite edge that is used in forming a junction between the bottom wall course and the floor or in forming an inside corner.

“Cove base installation adhesive” means any adhesive intended by the manufacturer for the installation of cove base or wall base on a wall or vertical surface at floor level.

“Cyanoacrylate adhesive” means any single-component reactive diluent adhesive that contains at least 85% by weight methyl, ethyl, methoxymethyl or other functional groupings of cyanoacrylate.

“Exempt compound” means compounds of carbon excluded from the definition of “VOC” in section 22a-174-1 of the Regulations of Connecticut State Agencies.

“Flexible vinyl” means non-rigid polyvinyl chloride plastic with at least five percent, by weight, plasticizer content.

“Fiberglass” means a material made of extremely fine filaments of glass.

“Indoor floor covering installation adhesive” means any adhesive intended by the manufacturer for use in the installation of finish surface wood flooring, carpet, resilient tile, vinyl tile, vinyl backed carpet, resilient sheet and roll or artificial grass. Adhesive used to install ceramic tile or perimeter bonded sheet vinyl flooring is not “indoor floor covering installation adhesive.”

“Laminate” means a material made by bonding two or more sheets or layers.

“Low-solids adhesive, sealant or primer” means any adhesive, sealant or primer product that contains 120 grams or less of solids per liter of product.

“Marine deck sealant” or “marine deck sealant primer” means any sealant or sealant primer intended by the manufacturer for application to wooden marine decks.

“Medical equipment manufacturing” means the manufacture of medical devices, such as, but not limited to, catheters, heart valves, blood cardioplegia machines, tracheostomy tubes, blood oxygenators or cardiatory reservoirs.

“Metal-to-elastomer molding or casting adhesive” means any adhesive intended by the manufacturer to bond metal to rubber or urethane elastomers using a heated molding or casting process in order to fabricate products.

“Multipurpose construction adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of various construction materials, including, but not limited to, dry wall, subfloor, panel, fiberglass reinforced plastic, ceiling tile or acoustical tile.

“Nonmembrane roof installation or repair adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of nonmembrane roofs, including, but not limited to, plastic or asphalt roof cement, asphalt roof coating or cold application cement. Adhesive intended for use in the installation of pre-fabricated single-ply roof membrane is not “nonmembrane roof installation or repair adhesive.”

“Outdoor floor covering installation adhesive” means any adhesive intended by the manufacturer for use in the installation of floor covering that is not in an enclosure and that is exposed to ambient weather conditions during normal use.

“Panel installation” means the installation of plywood, pre-decorated hardboard (or tileboard), fiberglass reinforced plastic, or similar pre-decorated or non-decorated panels to studs or solid surfaces using an adhesive formulated for that purpose.

“Perimeter bonded sheet vinyl flooring installation” means the installation of sheet flooring with vinyl backing onto a nonporous substrate using an adhesive designed to be applied only to a strip no more than four inches wide around the perimeter of the sheet flooring.

“Plastic cement welding adhesive” means any adhesive intended by the manufacturer for use to dissolve the surface of plastic to form a bond between mating surfaces.

“Plastic cement welding primer” means any primer intended by the manufacturer for use to prepare plastic substrates prior to bonding or welding.

“Plasticizer” means any substance, such as a high boiling point organic solvent, that is added to a hard plastic to provide flexibility or pliability.

“Polyvinyl chloride welding adhesive” or “PVC welding adhesive” means any adhesive intended by the manufacturer for use in the welding of PVC plastic pipe.

“Porous material” means wood, paper, corrugated paperboard or other solid that has tiny openings, often microscopic, in which fluids may be absorbed or discharged.

“Reactive diluent” means a liquid reactant in an uncured adhesive, sealant or primer that reacts chemically or physically during the curing process to become an integral part of the cured adhesive, sealant or primer.

“Roadway sealant” means any sealant intended by the manufacturer for application to public streets, highways and other surfaces, including, but not limited to, curbs, berms, driveways or parking lots.

“Rubber” means any natural or manmade elastomer, including, but not limited to, styrene-butadiene rubber, polychloroprene (neoprene), butyl rubber, nitrile rubber, chlorosulfonated polyethylene or ethylene propylene diene terpolymer.

“SCAQMD” means the South Coast Air Quality Management District, a part of the California Air Resources Board, which is responsible for the regulation of air quality in the State of California.

“Sealant primer” means any product intended by the manufacturer for application to a substrate, prior to the application of a sealant, to enhance the bonding surface.

“Sealant” means any material with adhesive properties that is formulated primarily to fill, seal, waterproof or weatherproof gaps or joints between two surfaces. Sealers and other materials that are applied to a single substrate to protect or decorate are not “sealants.”

“Sheet-applied rubber installation” means the process of applying sheet rubber liners by hand to metal or plastic substrates to protect the underlying substrate from corrosion or abrasion, inclusive of the process of laminating sheet rubber to fabric by hand.

“Single-ply roof membrane” means a prefabricated single sheet of rubber, normally ethylene-propylenediene terpolymer, that is applied in a single layer to a building roof.

“Single-ply roof membrane installation or repair adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of single-ply roof membrane.

“Single-ply roof membrane adhesive primer” means any primer intended by the manufacturer for use to clean and promote adhesion of the single-ply roof membrane seams or splices prior to bonding.

“Single-ply roof membrane sealant” means any sealant intended by the manufacturer for application to single-ply roof membrane.

“Solvent” means any organic compounds that are used as diluents, thinners, dissolvers, viscosity reducers, cleaning agents or other related uses.

“Structural glazing adhesive” means any adhesive intended by the manufacturer to apply glass, ceramic, metal, stone or composite panels to exterior building frames.

“Surface preparation solvent” means a solvent used to remove dirt, oil and other contaminants from a substrate prior to the application of a primer, adhesive or sealant.

“Thin metal laminating adhesive” means any adhesive intended by the manufacturer for use in bonding multiple layers of metal to metal or metal to plastic, in the production of electronic or magnetic components, in which the thickness of the bond line(s) is less than 0.25 mils.



“Tire repair” means a process that includes expanding a hole, tear, fissure or blemish in a tire casing by grinding or gouging, applying adhesive and filling the hole or crevice with rubber.

“Tire retread adhesive” means any adhesive intended by the manufacturer for application to the back of pre-cure tread rubber and to the casing and cushion rubber. “Tire retread adhesive” may also be used to seal buffed tire casings to prevent oxidation while the tire is being prepared for a new tread.

“Traffic marking tape” means preformed reflective film intended by the manufacturer for application to streets, highways and other surfaces where pavement markings are desired, including, but not limited to, curbs, berms, driveways and parking lots.

“Traffic marking tape adhesive primer” means any primer intended by the manufacturer for application to a substrate prior to installation of traffic marking tape.

“Twelve-month rolling aggregate” means the amount of adhesives, sealants, primers or solvents used in a twelve-month period, calculated each month by adding the current month’s adhesive, sealant, primer or solvent use to the amount used in each of the previous eleven months.

“Undersea-based weapons systems components” means the fabrication of parts, assembly of parts or completed units of any portion of a missile launching system used on submarines.

“Waterproof resorcinol glue” means a two-part resorcinol-resin-based adhesive intended for continuous water immersion.

**(b) Applicability.**

(1) Except as provided in subsection (c) of this section, this section applies to any person who, on or after January 1, 2009, sells, supplies or offers for sale for use in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section.

(2) Except as provided in subsection (c) of this section, this section applies to any person who, on or after January 1, 2009, manufactures for sale for use in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section.

(3) Except as provided in subsection (c) of this section, this section applies to any person who, on or after January 1, 2009, uses or applies within the State of Connecticut, or solicits the use or application of within the State of Connecticut, any adhesive, sealant, adhesive primer or sealant primer with an applicable VOC content limit in either Table 44-1 or Table 44-2 of this section.

**(c) Exemptions and exceptions.**

(1) The requirements of this section shall not apply, except as otherwise noted, to the manufacture, sale or use of the following adhesives, sealants, adhesive primers, sealant primers or solvents:

- (A) Adhesives, sealants, adhesive primers or sealant primers being tested or evaluated in any research and development, quality assurance or analytical laboratory, provided that records are maintained as specified in subsection (f)(4) of this section;
  - (B) Adhesives or sealants that contain less than 20 grams of VOC per liter of adhesive or sealant, less water and exempt compounds, as applied;
  - (C) Cyanoacrylate adhesives;
  - (D) Aerosol adhesives;
  - (E) Adhesives, sealants, adhesive primers or sealant primers that are sold or supplied by the manufacturer or supplier in containers with a net volume of 16 fluid ounces or less, or a net weight of one pound or less, except plastic cement welding adhesives and contact bond adhesives;
  - (F) Adhesives, sealants, adhesive primers and sealant primers that are subject to a VOC content limit in section 22a-174-40 of the Regulations of Connecticut State Agencies;
  - (G) Contact bond adhesives that are sold or supplied by the manufacturer or supplier in a container with a net volume of one gallon or less; or
  - (H) Adhesives, cleanup solvents and surface preparation solvents used in the assembly, repair and manufacture of submarines, when the use of a noncomplying adhesive or solvent is necessary to meet military performance specifications, provided that records of the use of such noncompliant adhesives or solvents are maintained in accordance with subsection (f)(1) of this section.
- (2) The requirements of this section shall not apply to the use of adhesives, sealants, adhesive primers, sealant primers, surface preparation solvent and cleanup solvent in the following operations:
- (A) Tire repair operations, provided the label of the adhesive states "**For tire repair only;**"
  - (B) Assembly, repair or manufacture of undersea-based weapon systems;
  - (C) Assembly, repair or manufacture of aerospace components;
  - (D) Manufacture of medical equipment;
  - (E) Metal cleaning performed in accordance with section 22a-174-20(I) of the Regulations of Connecticut State Agencies; or
  - (F) Plaque laminating operations in which adhesives are used to bond clear, polyester acetate laminate to wood with lamination equipment installed prior to July 1, 1992. Any person claiming exemption pursuant to this subparagraph shall record

and maintain monthly operational records sufficient to demonstrate compliance with this exemption and in accordance with subsection (f) of this section.

(3) The provisions of this section shall not apply to the use of adhesives, sealants, adhesive primers or sealant primers at a facility if the total VOC emissions from all adhesives, sealants, adhesive primers and sealant primers used at the facility are less than 200 pounds, or an equivalent volume, per any twelve-month rolling aggregate. Emissions from cold cleaning units, vapor degreasers and aerosol products shall not be included in determining the total VOC emissions. Any person claiming exemption pursuant to this subparagraph shall record and maintain monthly operational records sufficient to demonstrate continued eligibility for this exemption and in accordance with subsection (f) of this section, as applicable.

(4) The VOC content limits in Tables 44-1 and 44-2 and the requirements of subsections (d)(7) and (d)(8) of this section shall not apply to the use of any adhesives, sealants, adhesive primers, sealant primers, cleanup solvents and surface preparation solvents provided the total volume of noncomplying adhesives, sealants, primers, cleanup and surface preparation solvents applied facility-wide does not exceed 55 gallons per any twelve-month rolling aggregate. Any person claiming exemption pursuant to this subdivision shall record and maintain monthly operational records sufficient to demonstrate compliance with this exemption and in accordance with subsection (f) of this section.

(5) This section shall not apply to any manufacturer or distributor who sells, supplies or offers for sale in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer that does not comply with the VOC content limits specified in Table 44-1 of this section provided that such manufacturer or distributor makes and keeps records demonstrating:

- (A) The adhesive, sealant, adhesive primer or sealant primer is intended for shipment and use outside of the State of Connecticut; and
- (B) The manufacturer or distributor has taken reasonable precautions to assure that the adhesive, sealant, adhesive primer or sealant primer is not distributed to or within the State of Connecticut.

(6) Subdivision (5) of this subsection shall not apply to any manufacturer or distributor who sells, supplies or offers for sale any adhesive, sealant, adhesive primer or sealant primer to a retail outlet in the State of Connecticut.

(7) The VOC content limits of Table 44-1 of this section shall not apply to the sale of any adhesive, sealant, adhesive primer or sealant primer to a person using add-on air pollution control equipment to control emissions of VOC from such adhesive, sealant, adhesive primer or sealant primer at the stationary source, if the add-on air pollution control equipment meets the requirements of subsection (d)(6) of this section.

(8) This section shall not apply to the use of any adhesive, sealant, adhesive primer, sealant primer, cleanup solvent or surface preparation solvent at a private residence for non-commercial purposes.

(9) The requirements of this section shall not apply to any adhesive, sealant, adhesive primer, sealant primer, cleanup solvent or surface preparation solvent that is distributed or transferred by

a branch of the United States military to, from or within a premises operated by that branch of the United States military.

**(d) Standards.**

(1) Except as provided in subsections (c) and (d)(6) of this section, on or after January 1, 2009, no person shall sell, supply or offer for sale in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer manufactured on or after January 1, 2009 unless such adhesive, sealant, adhesive primer or sealant primer complies with the applicable VOC content limits specified in Table 44-1 of this section and the applicable requirements of this subsection.

(2) Except as provided in subsections (c) and (d)(6) of this section, on or after January 1, 2009, no person shall manufacture for sale in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer unless such adhesive, sealant, adhesive primer or sealant primer complies with the applicable VOC content limits specified in Table 44-1 of this section and the applicable requirements of this subsection.

(3) Except as provided in subsections (c)(1) through (c)(4), (c)(7), (c)(9) and (d)(6) of this section, on or after January 1, 2009, no person shall use or apply, or solicit the use or application of, any adhesive, sealant, adhesive primer or sealant primer within the State of Connecticut unless such adhesive, sealant, adhesive primer or sealant primer as applied complies with the applicable VOC content limits specified in Table 44-1 or Table 44-2 of this section and the applicable requirements of this subsection.

(4) For adhesives, the VOC content limits of Tables 44-1 and 44-2 of this section shall apply as follows:

- (A) If a person uses an adhesive subject to a specific VOC content limit in Table 44-1, such specific limit shall apply, and no limit in Table 44-2 shall apply; and
- (B) If an adhesive is not listed in Table 44-1, a VOC content limit in Table 44-2 shall apply based on the substrate bonded by the adhesive. If an adhesive is used to bond two different substrates together, the substrate assigned the higher VOC content limit shall apply to such use.

(5) Any person using adhesives, sealants, adhesive primers, sealant primers, surface preparation solvents or clean-up solvents subject to this section shall store or dispose of all absorbent materials, such as cloth or paper, which are moistened with such adhesives, sealants, primers or solvents, in non-absorbent containers that shall be closed except when placing materials in or removing materials from the container.

(6) A person using an adhesive, sealant, adhesive primer or sealant primer subject to this section may comply with the VOC content limits of Tables 44-1 and 44-2 of this section using add-on air pollution control equipment if such equipment meets the following requirements:

- (A) The VOC emissions from the use of all adhesives, sealants, adhesive primers or sealant primers subject to this section are reduced by an overall capture and control efficiency of at least 85%, by weight;

- (B) The combustion temperature is monitored continuously if a thermal incinerator is operated;
  - (C) Inlet and exhaust gas temperatures are monitored continuously if a catalytic incinerator is operated;
  - (D) The VOC concentration of the inlet and exhaust gas is measured continuously if a carbon absorber or control device other than a thermal or catalytic incinerator is operated; and
  - (E) Operational records sufficient to demonstrate compliance with the requirements of this subdivision are maintained as required by subsection (f) of this section.
- (7) Any person using a surface preparation solvent shall:
- (A) Except as provided in subparagraph (B) of this subdivision for single-ply roofing, limit the VOC content of surface preparation solvent used to less than 70 grams per liter; or
  - (B) If a surface preparation solvent is used in applying single-ply roofing, limit the composite vapor pressure, excluding water and exempt compounds, of the surface preparation solvent used to less than or equal to 45 mmHg at 20 degrees Celsius.
- (8) Any person using a cleanup solvent shall:
- (A) Except as provided in subparagraph (B) of this subdivision, limit the composite vapor pressure of a cleanup solvent to less than 45 mmHg at 20 degrees Celsius; or
  - (B) When cleaning spray application equipment, perform the removal of an adhesive, sealant, adhesive primer or sealant primer from the parts of spray application equipment in accordance with either subparagraph (i) or (ii), as follows:
    - (i) In an enclosed cleaning system, or equivalent cleaning system as determined by the test method identified in subsection (e)(4) of this section, or
    - (ii) Using a solvent with a VOC content less than or equal to 70 grams of VOC per liter. As necessary, parts containing dried adhesive may be soaked in a solvent if the composite vapor pressure of the solvent, excluding water and exempt compounds, is less than or equal to 9.5 mmHg at 20 degrees Celsius, and the parts and solvent are in a closed container that remains closed except when adding parts to or removing parts from the container.
- (9) No person who applies or solicits the application of any adhesive, sealant, adhesive primer or sealant primer subject to this section shall add solvent to such adhesive, sealant or primer in an amount in excess of the manufacturer's recommendation for application, if such

addition causes the adhesive, sealant or primer to exceed the applicable VOC content limit of this section.

**(e) Compliance procedures and test methods.**

(1) Any person who sells, supplies, offers for sale or manufactures an adhesive, sealant, adhesive primer or sealant primer subject to this section on or after January 1, 2009 for sale in the State of Connecticut shall possess documentation that such adhesive, sealant, adhesive primer or sealant primer complies with the VOC content limits of Table 44-1 of this section, where the VOC content is determined according to the requirements of subdivisions (2) and (3) of this subsection.

(2) The VOC content (grams per liter and percent by weight) of adhesive, sealant, primer and solvent products subject to this section, shall be determined according to the following calculations:

- (A) For products that do not contain reactive diluents, grams of VOC per liter of product thinned to the manufacturer's recommendation, less water and exempt compounds, shall be calculated according to the following equation:

$$\text{Grams of VOC per liter of product} = \frac{W_s - W_w - W_e}{V_m - V_w - V_e}$$

Where

$W_s$	=	weight of volatile compounds, in grams
$W_w$	=	weight of water, in grams
$W_e$	=	weight of exempt compounds, in grams
$V_m$	=	volume of product, as supplied, in liters
$V_w$	=	volume of water, in liters
$V_e$	=	volume of exempt compounds, in liters;

- (B) For products that contain reactive diluents, the VOC content of the product is determined after curing. The grams of VOC per liter of product thinned to the manufacturer's recommendation, less water and exempt compounds, shall be calculated according to the following equation:

$$\text{Grams of VOC per liter of product} = \frac{W_{rs} - W_{rw} - W_{re}}{V_{rm} - V_{rw} - V_{re}}$$

Where

$W_{rs}$	=	weight of volatile compounds not consumed during curing, in grams
$W_{rw}$	=	weight of water not consumed during curing, in grams
$W_{re}$	=	weight of exempt compounds not consumed during curing, in grams
$V_{rm}$	=	volume of product, as supplied, not consumed during curing, in liters
$V_{rw}$	=	volume of water not consumed during curing, in liters

$V_{re}$  = volume of exempt compounds not consumed during curing, in liters;

- (C) Grams of VOC per liter of product thinned to the manufacturer's recommendation shall be calculated according to the following equation:

$$\text{Grams of VOC per liter of product} = \frac{W_s - W_w - W_e}{V_m}$$

Where

$W_s$  = weight of volatile compounds, in grams  
 $W_w$  = weight of water, in grams  
 $W_e$  = weight of exempt compounds, in grams  
 $V_m$  = volume of product, in liters; and

- (D) Percent VOC by weight shall be calculated according to the following equation:

$$\% \text{ VOC by weight} = [(W_v / W)] \times 100$$

Where

$W_v$  = weight of VOCs in grams  
 $W$  = weight of product in grams

(3) The following procedures shall be used to determine the properties of the specified adhesives, sealants, primers, solvents or components thereof in order to perform the calculations required pursuant to subdivision (2) of this subsection or to verify calculations based on formulation data:

- (A) Except as provided in subparagraphs (C), (D) and (E) of this subdivision, the VOC and solids content of all adhesives, adhesive primers, sealants, sealant primers, surface preparation solvents and cleanup solvents shall be determined using 40 CFR 60, Appendix A, Reference Method 24, or SCAQMD Method 304;
- (B) The volatile organic content of exempt organic compounds shall be determined using ASTM D4457-85 or the most current version of such test, as applicable;
- (C) The VOC content of any plastic welding cement adhesive or primer shall be determined using SCAQMD Method 316A;
- (D) The amount of reactive diluent in a product shall be determined using SCAQMD Method 316A;
- (E) The composite vapor pressure of volatile organic compounds in surface preparation solvents and cleanup solvents shall be determined by quantifying the amount of each compound in the blend using gas chromatographic analysis (ASTM E 260-96 or its most current replacement test) for organics and ASTM D3792-91 or the most current version of such test, for water content, as applicable, and the following equation:

$$P_{pc} = \left[ \sum_{i=1}^n (W_i)(V_{pi}) / M_{wi} \right] / \left[ (W_w / M_{ww}) + \sum_{i=1}^n (W_e / M_{we}) + \sum_{i=1}^n (W_i / M_{wi}) \right]$$

Where

$P_{pc}$  = VOC composite partial pressure at 20 degrees C, in mmHg

$W_i$  = Weight of the "i"th VOC compound, in grams, as determined by ASTM E 260-96 or the most current version of such test

$V_{pi}$  = Vapor pressure of the "i"th VOC compound at 20 degrees C, in mmHg, as determined by subparagraph (F) of this subdivision

$M_{wi}$  = Molecular weight of the "i"th VOC compound, in grams per g-mole, as given in chemical reference literature

$W_w$  = Weight of water, in grams as determined by ASTM D 3792-91 or the most current version of such test

$M_{ww}$  = Molecular weight of water, 18 grams per g-mole

$W_e$  = Weight of the "i"th exempt compound, in grams, as determined by ASTM E 260-91 or the most current version of such test

$M_{we}$  = Molecular weight of the "i"th exempt compound, in grams per g-mole, as given in chemical reference literature

- (F) The vapor pressure of each single component compound may be determined from ASTM D2879-86, or the most current version of such test, or may be obtained from any of the following sources:
- (i) The most recent edition of *The Vapor Pressure of Pure Substances*, Boublik, Fried, and Hala, eds., Elsevier Scientific Publishing Company, New York,
  - (ii) The most recent edition of *Perry's Chemical Engineer's Handbook*, McGraw-Hill Book Company,
  - (iii) The most recent edition of *CRC Handbook of Chemistry and Physics*, Chemical Rubber Publishing Company,
  - (iv) The most recent edition of *Lange's Handbook of Chemistry*, John Dean, editor, McGraw-Hill Book Company, or
  - (v) Additional sources approved for this purpose by the Commissioner.

(4) The active and passive solvent losses from spray gun cleaning systems shall be determined using SCAQMD's "General Test Method for Determining Solvent Losses from Spray Gun Cleaning Systems," dated October 3, 1989. The test solvent for this determination shall be



any lacquer thinner with a minimum vapor pressure of 105 mm of Hg at 20 degrees Celsius, and the minimum test temperature shall be 15 degrees Celsius.

(5) Control device efficiency shall be measured in accordance with 40 CFR 60 Appendix A, Reference Methods 18, 25, 25A and 25B or CARB Method 100.

(6) If the organization responsible for preparing any reference or test method identified in this subsection replaces that method with an equivalent method, then either the identified method or its replacement may be used for the purposes of this section.

**(f) Record keeping and reporting requirements.**

(1) Except as provided in subsection (c)(8) of this section, or except if add-on air pollution control equipment is used to comply with the VOC content limits of Tables 44-1 or 44-2 of this section, as provided in subsection (d)(6) of this section, and records are maintained as required in subsection (f)(2) of this section, each person subject to this section shall maintain records of the information necessary and sufficient for the Commissioner to determine compliance with the applicable requirements of this section. Such information may include:

- (A) A list of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent in use and in storage;
- (B) Identification of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent by product name and description;
- (C) The VOC content of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent product as supplied;
- (D) The mix ratio of any catalysts, reducers or other components used;
- (E) The final VOC content or vapor pressure of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent, as applied; or
- (F) The monthly volume of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent or surface preparation solvent used.

(2) Any person who complies with the VOC content limits of Table 44-1 or Table 44-2 of this section through the use of add-on air pollution control equipment shall record the key operating parameters for the control equipment, including but not limited to, the following information:

- (A) The volume used per day of each adhesive, sealant, adhesive primer, sealant primer or solvent that is subject to a VOC content limit in Table 44-1 or Table 44-2 of this section and that exceeds such a limit;
- (B) On a daily basis, the combustion temperature, inlet and exhaust gas temperatures and control device efficiency, as appropriate, pursuant to subsection (d)(6) of this section;

- (C) Daily hours of control equipment operation;
- (D) All maintenance performed on control equipment including the date and type of maintenance; and
- (E) Records documenting that such equipment is operated in compliance with the control and capture efficiency requirement of subsection (d)(6) of this section.

(3) All records made to determine compliance with this section shall be maintained on the premises for five years from the date such record is created and shall be made available to the Commissioner within 90 days of a request.

(4) For adhesives, sealants, adhesive primers and sealant primers subject to the laboratory testing exemption of subsection (c)(1)(A) of this section, the person conducting the testing shall make and maintain records of all such adhesives, sealants, primers and solvents used in the preparation or evaluation process, including, as appropriate, the product name, manufacturer and description.

(5) Upon written notice, the Commissioner may require any person subject to this section to report information sufficient to determine compliance with the applicable requirements of this section.

(6) Any document submitted to the Commissioner pursuant to this section shall include a certification signed by an individual identified in section 22a-174-2a(a)(1) of the Regulations of Connecticut State Agencies, and by the individual or individuals responsible for actually preparing such document, each of whom shall examine and be familiar with the information submitted in the document and all attachments thereto, and shall make inquiry of those individuals responsible for obtaining the information to determine that the information is true, accurate, and complete, and each of whom shall certify in writing as follows:

“I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that any false statement made in the submitted information may be punishable as a criminal offense under section 22a-175 of the Connecticut General Statutes, under section 53a-157b of the Connecticut General Statutes, and in accordance with any applicable statute.”

**(g) Container labeling.**

(1) As of July 1, 2008, each manufacturer of an adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section shall display the following information on the container or label for such adhesive, sealant, adhesive primer or sealant primer:

- (A) The category name of the product;

- (B) A statement of the manufacturer's recommendation regarding thinning, reducing or mixing, where:
    - (i) A statement is not required for thinning, reducing or mixing with water, and
    - (ii) If thinning prior to use is not necessary, the recommendation shall specify that the product is to be applied as supplied;
  - (C) The maximum or the actual VOC content as supplied, displayed in grams of VOC per liter of product; and
  - (D) The maximum or the actual VOC content as applied in accordance with the manufacturer's recommendation regarding thinning, reducing or mixing, displayed in grams of VOC per liter of applied product.
- (2) The VOC content of an adhesive, sealant, adhesive primer or sealant primer shall be calculated using the manufacturer's formulation data or determined using the calculations, procedures and test methods in subsection (e) of this section.
- (3) Any person applying an adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Tables 44-1 or 44-2 of this section may rely on the manufacturer's representation on the container or label, if such product is applied as recommended for a use specified on the container or label.

**Table 44-1. As Applied VOC Content Limits for Adhesives, Sealants,  
Adhesive Primers and Sealant Primers**

Adhesive, sealant, adhesive primer or sealant primer category	As applied VOC content limit (grams VOC per liter)
<i>Adhesives</i>	
ABS welding	400
Ceramic tile installation	130
Computer diskette jacket manufacturing	850
Contact bond	250
Cove base installation	150
CPVC welding	490
Indoor floor covering installation	150
Metal-to-elastomer molding or casting	850
Multipurpose construction	200
Nonmembrane roof installation or repair	300
Plastic cement welding	510
Outdoor floor covering installation	250
PVC welding	510
Single-ply roof membrane installation or repair	250
Structural glazing	100
Thin metal laminating	780
Tire retread	100
Perimeter bonded sheet vinyl flooring installation	660
Waterproof resorcinol glue	170
Sheet-applied rubber installation	850
<i>Sealants</i>	
Architectural	250
Marine deck	760
Nonmembrane roof installation or repair	300
Roadway	250
Single-ply roof membrane	450
Other	420
<i>Adhesive primers</i>	
Automotive glass	700
Plastic cement welding	650
Single-ply roof membrane	250
Traffic marking tape	150
Other	250
<i>Sealant primers</i>	
Non-porous architectural	250
Porous architectural	775
Marine deck	760
Other	750

**Table 44-2. As Applied VOC Content Limits for Adhesives Applied to the Listed Substrate**

Substrate	As applied VOC content limit (grams VOC per liter)
Flexible vinyl	250
Fiberglass	200
Metal	30
Porous material	120
Rubber	250
Other substrates	250

**Statement of Purpose:** This new section of the air quality regulations limits emissions of volatile organic compounds (VOCs) from adhesives, sealants and primers. This section achieves VOC reductions through two basic components: sale and manufacture restrictions that limit the VOC content of specified adhesives, sealants and primers sold in the state; and use restrictions that apply primarily to commercial/industrial operations such as wood product manufacturers, upholstery shops, adhesives retailers and architectural trades, such as building construction, floor covering installation and roof repair. By reducing the availability of higher VOC content adhesives and sealants within the state, the sales prohibition is also intended to address adhesive and sealant usage at area sources. In addition to the VOC content limits and use requirements, this section includes requirements for cleanup and preparation solvents and a compliance alternative in the form of add-on air pollution control equipment.

This section is based on a model rule of the Ozone Transport Commission, which is, in turn, based on a reasonably available control technology determination prepared by the California Air Resources Board (CARB) in 1998. In the years 1998-2001, the provisions of the CARB determination were adopted in regulatory form in various air pollution control districts in California.

The associated emissions reductions, which are estimated to be nearly 4 tons per summer day, will support attainment of the 8-hour national ambient air quality standard.

## ATTACHMENT 3

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**ATTACHMENT 4**

**Final Text  
RCSA Section 22a-174-44**



The Regulations of Connecticut State Agencies are amended by adding section 22a-174-44, as follows:

**(NEW)**

**Section 22a-174-44 Adhesives and sealants.**

**(a) Definitions.** For the purposes of this section, the following definitions shall apply:

“Acrylonitrile-butadiene-styrene welding adhesive” or “ABS welding adhesive” means any adhesive intended by the manufacturer to weld acrylonitrile-butadiene-styrene pipe, which is made by reacting monomers of acrylonitrile, butadiene and styrene.

“Adhesive” means any chemical compound, although typically “adhesives” are organic polymers, that is applied for the purpose of bonding two surfaces together by other than mechanical means.

“Adhesive primer” means any product intended by the manufacturer for application to a substrate, prior to the application of an adhesive, to enhance the bonding surface.

“Aerosol adhesive” means an adhesive packaged as an aerosol in which the spray mechanism is permanently housed in a non-refillable can designed for handheld application without ancillary hoses or spray equipment.

“Aerospace component” means the fabricated part, assembly of parts or completed unit of any aircraft, helicopter, missile or space vehicle, including passenger safety equipment.

“Architectural” means pertaining 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.

“As applied” means the composition of an adhesive, sealant or primer at the time it is applied to a substrate, including any solvent, catalyst or other substance added to the as supplied adhesive, sealant or primer.

“As supplied” means the composition of an adhesive, sealant or primer as sold to a retail customer. For multi-component adhesives, sealants or primers, “as supplied” means the composition after the component parts are combined as specified by the manufacturer and before the addition, at the user’s initiative, of any ancillary substances.

“Automotive glass adhesive primer” means an adhesive primer intended by the manufacturer to be applied to automotive glass prior to installation of the glass using an adhesive. “Automotive glass adhesive primer” improves the adhesion to the pinch weld and blocks ultraviolet light.

“CARB” means the California Air Resources Board.

“Ceramic tile installation adhesive” means any adhesive intended for use in the installation of ceramic tiles.

“Chlorinated polyvinyl chloride welding adhesive” or “CPVC welding adhesive” means any adhesive intended for welding of CPCV plastic pipe.

“Cleanup solvent” means a VOC-containing solvent used to remove a loosely held uncured adhesive or sealant from a substrate or to clean equipment used in applying an adhesive, a sealant or a primer.

“Computer diskette jacket manufacturing adhesive” means any adhesive intended by the manufacturer to glue the fold-over flaps to the body of a vinyl computer diskette jacket.

“Contact bond adhesive” means any adhesive that forms an instantaneous, non-repositionable bond when substrates, on which the adhesive was applied and allowed to dry, are brought together using momentary pressure. “Contact bond adhesive” does not include rubber cements that are primarily intended for use on paper substrates or vulcanizing fluids designed and labeled for tire repair only.

“Cove base” means a flooring trim unit, generally made of vinyl or rubber, having a concave radius on one edge and a convex radius on the opposite edge that is used in forming a junction between the bottom wall course and the floor or in forming an inside corner.

“Cove base installation adhesive” means any adhesive intended by the manufacturer for the installation of cove base or wall base on a wall or vertical surface at floor level.

“Cyanoacrylate adhesive” means any single-component reactive diluent adhesive that contains at least 85% by weight methyl, ethyl, methoxymethyl or other functional groupings of cyanoacrylate.

“Exempt compound” means compounds of carbon excluded from the definition of “VOC” in section 22a-174-1 of the Regulations of Connecticut State Agencies.

“Flexible vinyl” means non-rigid polyvinyl chloride plastic with at least five percent, by weight, plasticizer content.

“Fiberglass” means a material made of extremely fine filaments of glass.

“Indoor floor covering installation adhesive” means any adhesive intended by the manufacturer for use in the installation of finish surface wood flooring, carpet, resilient tile, vinyl tile, vinyl backed carpet, resilient sheet and roll or artificial grass. Adhesive used to install ceramic tile or perimeter bonded sheet vinyl flooring is not “indoor floor covering installation adhesive.”

“Laminate” means a material made by bonding two or more sheets or layers.

“Low-solids adhesive, sealant or primer” means any adhesive, sealant or primer product that contains 120 grams or less of solids per liter of product.

“Marine deck sealant” or “marine deck sealant primer” means any sealant or sealant primer intended by the manufacturer for application to wooden marine decks.

“Medical equipment manufacturing” means the manufacture of medical devices, such as, but not limited to, catheters, heart valves, blood cardioplegia machines, tracheostomy tubes, blood oxygenators or cardiatory reservoirs.

“Metal-to-elastomer molding or casting adhesive” means any adhesive intended by the manufacturer to bond metal to rubber or urethane elastomers using a heated molding or casting process in order to fabricate products.

“Multipurpose construction adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of various construction materials, including, but not limited to, dry wall, subfloor, panel, fiberglass reinforced plastic, ceiling tile or acoustical tile.

“Nonmembrane roof installation or repair adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of nonmembrane roofs, including, but not limited to, plastic or asphalt roof cement, asphalt roof coating or cold application cement. Adhesive intended for use in the installation of pre-fabricated single-ply roof membrane is not “nonmembrane roof installation or repair adhesive.”

“Outdoor floor covering installation adhesive” means any adhesive intended by the manufacturer for use in the installation of floor covering that is not in an enclosure and that is exposed to ambient weather conditions during normal use.

“Panel installation” means the installation of plywood, pre-decorated hardboard (or tileboard), fiberglass reinforced plastic, or similar pre-decorated or non-decorated panels to studs or solid surfaces using an adhesive formulated for that purpose.

“Perimeter bonded sheet vinyl flooring installation” means the installation of sheet flooring with vinyl backing onto a nonporous substrate using an adhesive designed to be applied only to a strip no more than four inches wide around the perimeter of the sheet flooring.

“Plastic cement welding adhesive” means any adhesive intended by the manufacturer for use to dissolve the surface of plastic to form a bond between mating surfaces.

“Plastic cement welding primer” means any primer intended by the manufacturer for use to prepare plastic substrates prior to bonding or welding.

“Plasticizer” means any substance, such as a high boiling point organic solvent, that is added to a hard plastic to provide flexibility or pliability.

“Polyvinyl chloride welding adhesive” or “PVC welding adhesive” means any adhesive intended by the manufacturer for use in the welding of PVC plastic pipe.

“Porous material” means wood, paper, corrugated paperboard or other solid that has tiny openings, often microscopic, in which fluids may be absorbed or discharged.

“Reactive diluent” means a liquid reactant in an uncured adhesive, sealant or primer that reacts chemically or physically during the curing process to become an integral part of the cured adhesive, sealant or primer.

“Roadway sealant” means any sealant intended by the manufacturer for application to public streets, highways and other surfaces, including, but not limited to, curbs, berms, driveways or parking lots.

“Rubber” means any natural or manmade elastomer, including, but not limited to, styrene-butadiene rubber, polychloroprene (neoprene), butyl rubber, nitrile rubber, chlorosulfonated polyethylene or ethylene propylene diene terpolymer.

“SCAQMD” means the South Coast Air Quality Management District, a part of the California Air Resources Board, which is responsible for the regulation of air quality in the State of California.

“Sealant primer” means any product intended by the manufacturer for application to a substrate, prior to the application of a sealant, to enhance the bonding surface.

“Sealant” means any material with adhesive properties that is formulated primarily to fill, seal, waterproof or weatherproof gaps or joints between two surfaces. Sealers and other materials that are applied to a single substrate to protect or decorate are not “sealants.”

“Sheet-applied rubber installation” means the process of applying sheet rubber liners by hand to metal or plastic substrates to protect the underlying substrate from corrosion or abrasion, inclusive of the process of laminating sheet rubber to fabric by hand.

“Single-ply roof membrane” means a prefabricated single sheet of compounded synthetic material such as ethylene propylenediene monomer, polyvinyl chloride, thermal polyolefin or ketone ethylene ester that is applied in a single layer to a building roof.

“Single-ply roof membrane installation or repair adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of single-ply roof membrane.

“Single-ply roof membrane adhesive primer” means any primer intended by the manufacturer for use to clean and promote adhesion of the single-ply roof membrane seams or splices prior to bonding.

“Single-ply roof membrane sealant” means any sealant intended by the manufacturer for application to single-ply roof membrane.

“Solvent” means any organic compounds that are used as diluents, thinners, dissolvers, viscosity reducers, cleaning agents or other related uses.

“Structural glazing adhesive” means any adhesive intended by the manufacturer to apply glass, ceramic, metal, stone or composite panels to exterior building frames.

“Surface preparation solvent” means a solvent used to remove dirt, oil and other contaminants from a substrate prior to the application of a primer, adhesive or sealant.

“Thin metal laminating adhesive” means any adhesive intended by the manufacturer for use in bonding multiple layers of metal to metal or metal to plastic, in the production of electronic or magnetic components, in which the thickness of the bond line(s) is less than 0.25 mils.

“Tire repair” means a process that includes expanding a hole, tear, fissure or blemish in a tire casing by grinding or gouging, applying adhesive and filling the hole or crevice with rubber.

“Tire retread adhesive” means any adhesive intended by the manufacturer for application to the back of pre-cure tread rubber and to the casing and cushion rubber. “Tire retread adhesive” may also be used to seal buffed tire casings to prevent oxidation while the tire is being prepared for a new tread.

“Traffic marking tape” means preformed reflective film intended by the manufacturer for application to streets, highways and other surfaces where pavement markings are desired, including, but not limited to, curbs, berms, driveways and parking lots.

“Traffic marking tape adhesive primer” means any primer intended by the manufacturer for application to a substrate prior to installation of traffic marking tape.

“Twelve-month rolling aggregate” means the amount of adhesives, sealants, primers or solvents used in a twelve-month period, calculated each month by adding the current month’s adhesive, sealant, primer or solvent use to the amount used in each of the previous eleven months.

“Undersea-based weapons systems components” means the fabrication of parts, assembly of parts or completed units of any portion of a missile launching system used on submarines.

“Waterproof resorcinol glue” means a two-part resorcinol-resin-based adhesive intended for continuous water immersion.

**(b) Applicability.**

(1) Except as provided in subsection (c) of this section, this section applies to any person who, on or after January 1, 2009, sells, supplies or offers for sale for use in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section.

(2) Except as provided in subsection (c) of this section, this section applies to any person who, on or after January 1, 2009, manufactures for sale for use in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section.

(3) Except as provided in subsection (c) of this section, this section applies to any person who, on or after January 1, 2009, uses or applies within the State of Connecticut, or solicits the use or application of within the State of Connecticut, any adhesive, sealant, adhesive primer or sealant primer with an applicable VOC content limit in either Table 44-1 or Table 44-2 of this section.

**(c) Exemptions and exceptions.**

(1) The requirements of this section shall not apply, except as otherwise noted, to the manufacture, sale or use of the following adhesives, sealants, adhesive primers, sealant primers or solvents:

- (A) Adhesives, sealants, adhesive primers or sealant primers being tested or evaluated in any research and development, quality assurance or analytical laboratory, provided that records are maintained as specified in subsection (f)(4) of this section;
  - (B) Adhesives or sealants that contain less than 20 grams of VOC per liter of adhesive or sealant, less water and exempt compounds, as applied;
  - (C) Cyanoacrylate adhesives;
  - (D) Aerosol adhesives;
  - (E) Adhesives, sealants, adhesive primers or sealant primers that are sold or supplied by the manufacturer or supplier in containers with a net volume of 16 fluid ounces or less, or a net weight of one pound or less, except plastic cement welding adhesives and contact bond adhesives;
  - (F) Adhesives, sealants, adhesive primers and sealant primers that are subject to a VOC content limit in section 22a-174-40 of the Regulations of Connecticut State Agencies;
  - (G) Contact bond adhesives that are sold or supplied by the manufacturer or supplier in a container with a net volume of one gallon or less; or
  - (H) Adhesives, cleanup solvents and surface preparation solvents used in the assembly, repair and manufacture of submarines, when the use of a noncomplying adhesive or solvent is necessary to meet military performance specifications, provided that records of the use of such noncompliant adhesives or solvents are maintained in accordance with subsection (f)(1) of this section.
- (2) The requirements of this section shall not apply to the use of adhesives, sealants, adhesive primers, sealant primers, surface preparation solvent and cleanup solvent in the following operations:
- (A) Tire repair operations, provided the label of the adhesive states "**For tire repair only**;"
  - (B) Assembly, repair or manufacture of undersea-based weapon systems;
  - (C) Assembly, repair or manufacture of aerospace components;
  - (D) Manufacture of medical equipment;
  - (E) Metal cleaning performed in accordance with section 22a-174-20(l) of the Regulations of Connecticut State Agencies; or
  - (F) Plaque laminating operations in which adhesives are used to bond clear, polyester acetate laminate to wood with lamination equipment installed prior to July 1,

1992. Any person claiming exemption pursuant to this subparagraph shall record and maintain monthly operational records sufficient to demonstrate compliance with this exemption and in accordance with subsection (f) of this section.

(3) The provisions of this section shall not apply to the use of adhesives, sealants, adhesive primers or sealant primers at a facility if the total VOC emissions from all adhesives, sealants, adhesive primers and sealant primers used at the facility are less than 200 pounds, or an equivalent volume, per any twelve-month rolling aggregate. Emissions from cold cleaning units, vapor degreasers and aerosol products shall not be included in determining the total VOC emissions. Any person claiming exemption pursuant to this subparagraph shall record and maintain monthly operational records sufficient to demonstrate continued eligibility for this exemption and in accordance with subsection (f) of this section, as applicable.

(4) The VOC content limits in Tables 44-1 and 44-2 and the requirements of subsections (d)(7) and (d)(8) of this section shall not apply to the use of any adhesives, sealants, adhesive primers, sealant primers, cleanup solvents and surface preparation solvents provided the total volume of noncomplying adhesives, sealants, primers, cleanup and surface preparation solvents applied facility-wide does not exceed 55 gallons per any twelve-month rolling aggregate. Any person claiming exemption pursuant to this subdivision shall record and maintain monthly operational records sufficient to demonstrate compliance with this exemption and in accordance with subsection (f) of this section.

(5) This section shall not apply to any manufacturer or distributor who sells, supplies or offers for sale in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer that does not comply with the VOC content limits specified in Table 44-1 of this section provided that such manufacturer or distributor makes and keeps records demonstrating:

- (A) The adhesive, sealant, adhesive primer or sealant primer is intended for shipment and use outside of the State of Connecticut; and
- (B) The manufacturer or distributor has taken reasonable precautions to assure that the adhesive, sealant, adhesive primer or sealant primer is not distributed to or within the State of Connecticut.

(6) Subdivision (5) of this subsection shall not apply to any manufacturer or distributor who sells, supplies or offers for sale any adhesive, sealant, adhesive primer or sealant primer to a retail outlet in the State of Connecticut.

(7) The VOC content limits of Table 44-1 of this section shall not apply to the sale of any adhesive, sealant, adhesive primer or sealant primer to a person using add-on air pollution control equipment to control emissions of VOC from such adhesive, sealant, adhesive primer or sealant primer at the stationary source, if the add-on air pollution control equipment meets the requirements of subsection (d)(6) of this section.

(8) This section shall not apply to the use of any adhesive, sealant, adhesive primer, sealant primer, cleanup solvent or surface preparation solvent at a private residence for non-commercial purposes.

(9) The requirements of this section shall not apply to any adhesive, sealant, adhesive primer, sealant primer, cleanup solvent or surface preparation solvent that is distributed or transferred by a branch of the United States military to, from or within a premises operated by that branch of the United States military.

(10) The requirements of this section shall apply to the use of single-ply roof membrane installation or repair adhesive, single-ply roof membrane sealant and single-ply roof membrane adhesive primer on the following schedule:

- (A) For the year 2009, from June 1 through August 31;
- (B) For the years 2010 and 2011, from May 1 through September 30; and
- (C) On and after January 1, 2012.

(11) The requirements of this section shall not apply to any manufacturer or distributor who sells, supplies or offers for sale any single-ply roof membrane installation or repair adhesive, single-ply roof membrane sealant or single-ply roof membrane adhesive primer prior to January 1, 2012.

**(d) Standards.**

(1) Except as provided in subsections (c) and (d)(6) of this section, on or after January 1, 2009, no person shall sell, supply or offer for sale for use in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer manufactured on or after January 1, 2009 unless such adhesive, sealant, adhesive primer or sealant primer complies with the applicable VOC content limits specified in Table 44-1 of this section and the applicable requirements of this subsection.

(2) Except as provided in subsections (c) and (d)(6) of this section, on or after January 1, 2009, no person shall manufacture for sale for use in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer unless such adhesive, sealant, adhesive primer or sealant primer complies with the applicable VOC content limits specified in Table 44-1 of this section and the applicable requirements of this subsection.

(3) Except as provided in subsections (c)(1) through (c)(4), (c)(7), (c)(9), (c)(10), (c)(11) and (d)(6) of this section, on or after January 1, 2009, no person shall use or apply, or solicit the use or application of, any adhesive, sealant, adhesive primer or sealant primer within the State of Connecticut unless such adhesive, sealant, adhesive primer or sealant primer as applied complies with the applicable VOC content limits specified in Table 44-1 or Table 44-2 of this section and the applicable requirements of this subsection.

(4) For adhesives, the VOC content limits of Tables 44-1 and 44-2 of this section shall apply as follows:

- (A) If a person uses an adhesive subject to a specific VOC content limit in Table 44-1, such specific limit shall apply, and no limit in Table 44-2 shall apply; and



- (B) If an adhesive is not listed in Table 44-1, a VOC content limit in Table 44-2 shall apply based on the substrate bonded by the adhesive. If an adhesive is used to bond two different substrates together, the substrate assigned the higher VOC content limit shall apply to such use.
- (5) Any person using adhesives, sealants, adhesive primers, sealant primers, surface preparation solvents or clean-up solvents subject to this section shall store or dispose of all absorbent materials, such as cloth or paper, which are moistened with such adhesives, sealants, primers or solvents, in non-absorbent containers that shall be closed except when placing materials in or removing materials from the container.
- (6) A person using an adhesive, sealant, adhesive primer or sealant primer subject to this section may comply with the VOC content limits of Tables 44-1 and 44-2 of this section using add-on air pollution control equipment if such equipment meets the following requirements:
- (A) The VOC emissions from the use of all adhesives, sealants, adhesive primers or sealant primers subject to this section are reduced by an overall capture and control efficiency of at least 85%, by weight;
  - (B) The combustion temperature is monitored continuously if a thermal incinerator is operated;
  - (C) Inlet and exhaust gas temperatures are monitored continuously if a catalytic incinerator is operated;
  - (D) The VOC concentration of the inlet and exhaust gas is measured continuously if a carbon absorber or control device other than a thermal or catalytic incinerator is operated; and
  - (E) Operational records sufficient to demonstrate compliance with the requirements of this subdivision are maintained as required by subsection (f) of this section.
- (7) Any person using a surface preparation solvent shall:
- (A) Except as provided in subparagraph (B) of this subdivision for single-ply roofing, limit the VOC content of surface preparation solvent used to less than 70 grams per liter; or
  - (B) If a surface preparation solvent is used in applying single-ply roofing, limit the composite vapor pressure, excluding water and exempt compounds, of the surface preparation solvent used to less than or equal to 45 mmHg at 20 degrees Celsius.
- (8) Any person using a cleanup solvent shall:
- (A) Except as provided in subparagraph (B) of this subdivision, limit the composite vapor pressure of a cleanup solvent to less than 45 mmHg at 20 degrees Celsius; or

(B) When cleaning spray application equipment, perform the removal of an adhesive, sealant, adhesive primer or sealant primer from the parts of spray application equipment in accordance with either subparagraph (i) or (ii), as follows:

- (i) In an enclosed cleaning system, or equivalent cleaning system as determined by the test method identified in subsection (e)(4) of this section, or
- (ii) Using a solvent with a VOC content less than or equal to 70 grams of VOC per liter. As necessary, parts containing dried adhesive may be soaked in a solvent if the composite vapor pressure of the solvent, excluding water and exempt compounds, is less than or equal to 9.5 mmHg at 20 degrees Celsius, and the parts and solvent are in a closed container that remains closed except when adding parts to or removing parts from the container.

(9) No person who applies or solicits the application of any adhesive, sealant, adhesive primer or sealant primer subject to this section shall add solvent to such adhesive, sealant or primer in an amount in excess of the manufacturer's recommendation for application, if such addition causes the adhesive, sealant or primer to exceed the applicable VOC content limit of this section.

**(e) Compliance procedures and test methods.**

(1) Any person who sells, supplies, offers for sale or manufactures an adhesive, sealant, adhesive primer or sealant primer subject to this section on or after January 1, 2009 for sale in the State of Connecticut shall possess documentation that such adhesive, sealant, adhesive primer or sealant primer complies with the VOC content limits of Table 44-1 of this section, where the VOC content is determined according to the requirements of subdivisions (2) and (3) of this subsection. For single-ply roof membrane installation or repair adhesive, single-ply roof membrane sealant and single-ply roof membrane adhesive primer, such documentation is required on and after January 1, 2012.

(2) The VOC content (grams per liter and percent by weight) of adhesive, sealant, primer and solvent products subject to this section, shall be determined according to the following calculations:

- (A) For products that do not contain reactive diluents, grams of VOC per liter of product thinned to the manufacturer's recommendation, less water and exempt compounds, shall be calculated according to the following equation:

$$\text{Grams of VOC per liter of product} = \frac{W_s - W_w - W_e}{V_m - V_w - V_e}$$

Where

- $W_s$  = weight of volatile compounds, in grams
- $W_w$  = weight of water, in grams
- $W_e$  = weight of exempt compounds, in grams
- $V_m$  = volume of product, as supplied, in liters

$V_w$  = volume of water, in liters  
 $V_e$  = volume of exempt compounds, in liters;

- (B) For products that contain reactive diluents, the VOC content of the product is determined after curing. The grams of VOC per liter of product thinned to the manufacturer's recommendation, less water and exempt compounds, shall be calculated according to the following equation:

$$\text{Grams of VOC per liter of product} = \frac{W_{rs} - W_{rw} - W_{re}}{V_{rm} - V_{rw} - V_{re}}$$

Where

$W_{rs}$  = weight of volatile compounds not consumed during curing, in grams  
 $W_{rw}$  = weight of water not consumed during curing, in grams  
 $W_{re}$  = weight of exempt compounds not consumed during curing, in grams  
 $V_{rm}$  = volume of product, as supplied, not consumed during curing, in liters  
 $V_{rw}$  = volume of water not consumed during curing, in liters  
 $V_{re}$  = volume of exempt compounds not consumed during curing, in liters;

- (C) Grams of VOC per liter of product thinned to the manufacturer's recommendation shall be calculated according to the following equation:

$$\text{Grams of VOC per liter of product} = \frac{W_s - W_w - W_e}{V_m}$$

Where

$W_s$  = weight of volatile compounds, in grams  
 $W_w$  = weight of water, in grams  
 $W_e$  = weight of exempt compounds, in grams  
 $V_m$  = volume of product, in liters; and

- (D) Percent VOC by weight shall be calculated according to the following equation:

$$\% \text{ VOC by weight} = [(W_v / W)] \times 100$$

Where

$W_v$  = weight of VOCs in grams  
 $W$  = weight of product in grams

- (3) The following procedures shall be used to determine the properties of the specified adhesives, sealants, primers, solvents or components thereof in order to perform the calculations required pursuant to subdivision (2) of this subsection or to verify calculations based on formulation data:

- (A) Except as provided in subparagraphs (C), (D) and (E) of this subdivision, the VOC and solids content of all adhesives, adhesive primers, sealants, sealant primers, surface preparation solvents and cleanup solvents shall be determined using 40 CFR 60, Appendix A, Reference Method 24, or SCAQMD Method 304;
- (B) The volatile organic content of exempt organic compounds shall be determined using ASTM D4457-02 or the most current version of such test, as applicable;
- (C) The VOC content of any plastic welding cement adhesive or primer shall be determined using SCAQMD Method 316A;
- (D) The amount of reactive diluent in a product shall be determined using SCAQMD Method 316A;
- (E) The composite vapor pressure of volatile organic compounds in surface preparation solvents and cleanup solvents shall be determined by quantifying the amount of each compound in the blend using gas chromatographic analysis (ASTM E260-96(2006) or the most current version of such test) for organics and ASTM D3792-05 or the most current version of such test, for water content, as applicable, and the following equation:

$$P_{pc} = \left[ \sum_{i=1}^n (W_i)(V_{pi}) / M_{wi} \right] / \left[ (W_w / M_{ww}) + \sum_{i=1}^n (W_e / M_{we}) + \sum_{i=1}^n (W_i / M_{wi}) \right]$$

Where

$P_{pc}$  = VOC composite partial pressure at 20 degrees C, in mmHg

$W_i$  = Weight of the "i"th VOC compound, in grams, as determined by ASTM E260-96(2006) or the most current version of such test

$V_{pi}$  = Vapor pressure of the "i"th VOC compound at 20 degrees C, in mmHg, as determined by subparagraph (F) of this subdivision

$M_{wi}$  = Molecular weight of the "i"th VOC compound, in grams per g-mole, as given in chemical reference literature

$W_w$  = Weight of water, in grams as determined by ASTM D3792-05 or the most current version of such test

$M_{ww}$  = Molecular weight of water, 18 grams per g-mole

$W_e$  = Weight of the "i"th exempt compound, in grams, as determined by ASTM E260-96(2006) or the most current version of such test

$M_{we}$  = Molecular weight of the "i"th exempt compound, in grams per g-mole, as given in chemical reference literature

- (F) The vapor pressure of each single component compound may be determined from ASTM D2879-97(2007), or the most current version of such test, or may be obtained from any of the following sources:
- (i) The most recent edition of *The Vapor Pressure of Pure Substances*, Boublik, Fried, and Hala, eds., Elsevier Scientific Publishing Company, New York,
  - (ii) The most recent edition of *Perry's Chemical Engineer's Handbook*, McGraw-Hill Book Company,
  - (iii) The most recent edition of *CRC Handbook of Chemistry and Physics*, Chemical Rubber Publishing Company,
  - (iv) The most recent edition of *Lange's Handbook of Chemistry*, John Dean, editor, McGraw-Hill Book Company, or
  - (v) Additional sources approved for this purpose by the Commissioner.

(4) The active and passive solvent losses from spray gun cleaning systems shall be determined using SCAQMD's "General Test Method for Determining Solvent Losses from Spray Gun Cleaning Systems," dated October 3, 1989. The test solvent for this determination shall be any lacquer thinner with a minimum vapor pressure of 105 mm of Hg at 20 degrees Celsius, and the minimum test temperature shall be 15 degrees Celsius.

(5) Control device efficiency shall be measured in accordance with 40 CFR 60 Appendix A, Reference Methods 18, 25, 25A and 25B or CARB Method 100.

(6) If the organization responsible for preparing any reference or test method identified in this subsection replaces that method with an equivalent method, then either the identified method or its replacement may be used for the purposes of this section.

**(f) Record keeping and reporting requirements.**

(1) Except as provided in subsection (c)(8) of this section, or except if add-on air pollution control equipment is used to comply with the VOC content limits of Tables 44-1 or 44-2 of this section, as provided in subsection (d)(6) of this section, and records are maintained as required in subsection (f)(2) of this section, each person subject to this section shall maintain records of the information necessary and sufficient for the Commissioner to determine compliance with the applicable requirements of this section. Such information may include:

- (A) A list of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent in use and in storage;
- (B) Identification of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent by product name and description;
- (C) The VOC content of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent product as supplied;

- (D) The mix ratio of any catalysts, reducers or other components used;
  - (E) The final VOC content or vapor pressure of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent, as applied; or
  - (F) The monthly volume of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent or surface preparation solvent used.
- (2) Any person who complies with the VOC content limits of Table 44-1 or Table 44-2 of this section through the use of add-on air pollution control equipment shall record the key operating parameters for the control equipment, including but not limited to, the following information:
- (A) The volume used per day of each adhesive, sealant, adhesive primer, sealant primer or solvent that is subject to a VOC content limit in Table 44-1 or Table 44-2 of this section and that exceeds such a limit;
  - (B) On a daily basis, the combustion temperature, inlet and exhaust gas temperatures and control device efficiency, as appropriate, pursuant to subsection (d)(6) of this section;
  - (C) Daily hours of control equipment operation;
  - (D) All maintenance performed on control equipment including the date and type of maintenance; and
  - (E) Records documenting that such equipment is operated in compliance with the control and capture efficiency requirement of subsection (d)(6) of this section.
- (3) All records made to determine compliance with this section shall be maintained on the premises for five years from the date such record is created and shall be made available to the Commissioner within 90 days of a request.
- (4) For adhesives, sealants, adhesive primers and sealant primers subject to the laboratory testing exemption of subsection (c)(1)(A) of this section, the person conducting the testing shall make and maintain records of all such adhesives, sealants, primers and solvents used in the preparation or evaluation process, including, as appropriate, the product name, manufacturer and description.
- (5) Upon written notice, the Commissioner may require any person subject to this section to report information sufficient to determine compliance with the applicable requirements of this section.
- (6) Any document submitted to the Commissioner pursuant to this section shall include a certification signed by an individual identified in section 22a-174-2a(a)(1) of the Regulations of Connecticut State Agencies, and by the individual or individuals responsible for actually preparing such document, each of whom shall examine and be familiar with the information

submitted in the document and all attachments thereto, and shall make inquiry of those individuals responsible for obtaining the information to determine that the information is true, accurate, and complete, and each of whom shall certify in writing as follows:

“I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that any false statement made in the submitted information may be punishable as a criminal offense under section 22a-175 of the Connecticut General Statutes, under section 53a-157b of the Connecticut General Statutes, and in accordance with any applicable statute.”

**(g) Container labeling.**

(1) As of January 1, 2009, each manufacturer of an adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section shall display the following information on the container or label for such adhesive, sealant, adhesive primer or sealant primer:

- (A) The category name of the product;
- (B) A statement of the manufacturer’s recommendation regarding thinning, reducing or mixing, where:
  - (i) A statement is not required for thinning, reducing or mixing with water, and
  - (ii) If thinning prior to use is not necessary, the recommendation shall specify that the product is to be applied as supplied;
- (C) The maximum or the actual VOC content as supplied, displayed in grams of VOC per liter of product; and
- (D) The maximum or the actual VOC content as applied in accordance with the manufacturer’s recommendation regarding thinning, reducing or mixing, displayed in grams of VOC per liter of applied product.

(2) The VOC content of an adhesive, sealant, adhesive primer or sealant primer shall be calculated using the manufacturer’s formulation data or determined using the calculations, procedures and test methods in subsection (e) of this section.

(3) Any person applying an adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Tables 44-1 or 44-2 of this section may rely on the manufacturer’s representation on the container or label, if such product is applied as recommended for a use specified on the container or label.

Table 44-1. As Applied VOC Content Limits for Adhesives, Sealants, Adhesive Primers and Sealant Primers

Adhesive, sealant, adhesive primer or sealant primer category	As applied VOC content limit (g VOC/L)	Date on which standard applies
<i>Adhesives</i>		
ABS welding	400	January 1, 2009
Ceramic tile installation	130	January 1, 2009
Computer diskette jacket manufacturing	850	January 1, 2009
Contact bond	250	January 1, 2009
Cove base installation	150	January 1, 2009
CPVC welding	490	January 1, 2009
Indoor floor covering installation	150	January 1, 2009
Metal-to-elastomer molding or casting	850	January 1, 2009
Multipurpose construction	200	January 1, 2009
Nonmembrane roof installation or repair	300	January 1, 2009
Plastic cement welding	510	January 1, 2009
Outdoor floor covering installation	250	January 1, 2009
PVC welding	510	January 1, 2009
Single-ply roof membrane installation or repair	250	For 2009: June 1 through August 31; For 2010 & 2011: May 1 through September 30; and On and after January 1, 2012.
Structural glazing	100	January 1, 2009
Thin metal laminating	780	January 1, 2009
Tire retread	100	January 1, 2009
Perimeter bonded sheet vinyl flooring installation	660	January 1, 2009
Waterproof resorcinol glue	170	January 1, 2009
Sheet-applied rubber installation	850	January 1, 2009
<i>Sealants</i>		
Architectural	250	January 1, 2009
Marine deck	760	January 1, 2009
Nonmembrane roof installation or repair	300	January 1, 2009
Roadway	250	January 1, 2009
Single-ply roof membrane	450	For 2009: June 1 through August 31; For 2010 & 2011: May 1 through September 30; and On and after January 1, 2012.
Other	420	January 1, 2009
<i>Adhesive primers</i>		
Automotive glass	700	January 1, 2009
Plastic cement welding	650	January 1, 2009
Single-ply roof membrane	250	For 2009: June 1 through August 31; For 2010 & 2011: May 1 through September 30; and On and after January 1, 2012.
Traffic marking tape	150	January 1, 2009
Other	250	January 1, 2009
<i>Sealant primers</i>		
Non-porous architectural	250	January 1, 2009
Porous architectural	775	January 1, 2009
Marine deck	760	January 1, 2009
Other	750	January 1, 2009



**Table 44-2. As Applied VOC Content Limits for Adhesives Applied to the Listed Substrate**

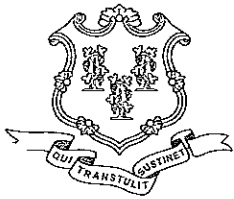
Substrate	As applied VOC content limit (grams VOC per liter)
Flexible vinyl	250
Fiberglass	200
Metal	30
Porous material	120
Rubber	250
Other substrates	250

**Statement of Purpose:** This new section of the air quality regulations limits emissions of volatile organic compounds (VOCs) from adhesives, sealants and primers. This section achieves VOC reductions through two basic components: sale and manufacture restrictions that limit the VOC content of specified adhesives, sealants and primers sold in the state; and use restrictions that, in general, apply to commercial/industrial operations such as wood product manufacturers, upholstery shops, adhesives retailers and architectural trades, such as building construction, floor covering installation and roof repair. By reducing the availability of higher VOC content adhesives and sealants within the state, the sales prohibition is also intended to address adhesive and sealant usage at area sources. In addition to the VOC content limits and use requirements, this section includes requirements for cleanup and preparation solvents and a compliance alternative in the form of add-on air pollution control equipment.

This section is based on a model rule of the Ozone Transport Commission, which is, in turn, based on a reasonably available control technology determination prepared by the California Air Resources Board (CARB) in 1998. In the years 1998-2001, the provisions of the CARB determination were adopted in regulatory form in various air pollution control districts in California.

The associated emissions reductions, which are estimated to be nearly 4 tons per summer day, will support attainment of the 1997 and 2008 national ambient air quality standards for ozone.





**STATE OF CONNECTICUT  
DEPARTMENT OF ENVIRONMENTAL PROTECTION**



**HEARING REPORT**

**Prepared Pursuant to Section 4-168(d) of the  
Connecticut General Statutes and  
Section 22a-3a-3(d)(5) of the Department of Environmental Protection Rules of Practice**

**Regarding the  
Adoption of Section 22a-174-44 of the  
Regulations of Connecticut State Agencies  
Adhesives and Sealants**

**Hearing Officers:  
Merrily A. Gere  
Anne B. Hulick**

**Date of Hearing: October 16, 2007**

On August 13, 2007, the Commissioner of the Department of Environmental Protection (Commissioner and Department, respectively) signed a notice of intent to adopt section 22a-174-44 (Section 44) of the Regulations of Connecticut State Agencies (RCSA). Pursuant to such notice, a public hearing was held on October 16, 2007, with the public comment period closing on October 19, 2007. The proposal is intended to create ozone precursor emissions reductions to assist the state to attain and maintain the national ambient air quality standard for 8-hour ozone.

**I. Hearing Report Content**

As required by section 4-168(d) of the Connecticut General Statutes (CGS), this report describes the proposal; the principal reasons in support of and in opposition to the proposal; and summarizes and responds to all comments on the proposal. A final recommended version of the text, inclusive of any changes made in response to comment, is also provided.

A statement in satisfaction of CGS section 22a-6(h) is included as Attachment 1.

**II. Summary of the Proposal**

Section 44 limits emissions of volatile organic compounds (VOC) from adhesives, sealants and primers. This section achieves VOC reductions through two basic components: sale and manufacture restrictions that limit the VOC content of specified adhesives, sealants and primers sold in the state; and use restrictions that apply primarily to commercial/industrial operations. As VOC are ground-level ozone precursors, reductions in VOC emissions will assist the state to demonstrate attainment of the federal 8-hour ozone national ambient air quality standard (NAAQS), as required by the Clean Air Act. Although currently mandated controls will achieve significant emissions reductions over the next five to ten years, ozone precursor emission reductions beyond current requirements will be necessary to maintain the 8-hour ozone NAAQS. Thus, following adoption, Section 44 will be submitted to the U.S. Environmental Protection

Agency (EPA) in fulfillment of a written commitment included in the Department's 8-hour ozone NAAQS attainment demonstration.<sup>1</sup>

Section 44 results from efforts of a workgroup composed of state air quality regulators and coordinated by the Ozone Transport Commission (OTC). The goal of the workgroup was the preparation of materials for use by each state to meet its 8-hour ozone NAAQS attainment planning obligations. These materials include model rules to regulate products and activities to reduce ozone precursor emissions. One such model rule, the OTC Model Rule for Adhesives and Sealants (OTC Model Rule), forms the basis of this proposal. The OTC Model Rule is based on the requirements of a reasonably available control technology determination prepared by the California Air Resources Board (CARB) in 1998. The provisions of the CARB determination have been adopted in regulatory form in various air pollution control districts in California. The Commissioner, via signature on resolutions and memorandums of understanding, committed with other states in the OTC to seek adoption of a state regulation based on the OTC Model Rule. Given this foregoing process, consistency with the requirements of the OTC Model Rule was a factor guiding the development of Section 44.

In addition to assisting in ozone attainment planning efforts, proposed Section 44 is consistent with a 2006 environmental initiative of the Department, which focuses on assisting individuals and organizations to decrease their "environmental footprint." Adoption of Section 44 will require some manufacturers of regulated adhesives, sealants and primers to reformulate to reduce the VOC content. Thus, consumers will be able to reduce their environmental impact while continuing to purchase and use customary adhesive and sealant products.

The text of proposed Section 44 is located in Attachment 2 to this report.

### **III. Principal Considerations in Opposition to the Proposal**

The National Paint and Coatings Association (NPCA) opposes adoption of Section 44 as a burden to industry, particularly for industry source categories that are subject to federal standards for hazardous air pollutants.

Much comment on the proposal objects to the level and timing of the standards for single-ply roof membrane adhesives, adhesive primers and sealants. The impact of the Connecticut climate, which is cooler on average than that of the districts in California where the standards are now in effect, on single-ply roofing adhesive application and long-term roof performance and durability is questioned.

A detailed discussion of all comments and responses is set out in the next section of this report.

### **IV. Summary of Comments**

All comments submitted are summarized below with the Department's responses. The comments are divided in two subsections: the first subsection identifies and responds to concerns with the proposed VOC content standards for adhesives, sealants and primers used in single-ply roofing applications, and the second subsection identifies and responds to all other concerns.

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<sup>1</sup> See Section 4 of the attainment demonstration at:  
<http://www.ct.gov/dep/cwp/view.asp?a=2684&q=385886>

Commenters are identified by number in this section and are identified fully at the corresponding number in the list that is Attachment 3 to this report. When changes to the proposed text are indicated in response to comment, new text is in bold font and deleted text is in strikethrough font.

The final regulation maintains consistency as appropriate with the OTC Model Rule, differing in respects better to align the proposal with the Department's policies or in response to new technical information presented in the hearing process. These differences from the OTC Model Rule are created to further the Department's environmental goals but with attention to regional consistency. The Department also remains aware of the rule adoption processes in other OTC states and has shared technical information and discussed Model Rule revisions with staff in these states.

Beyond achieving the VOC emissions reductions that are the primary purpose of this proposal, the responses to these comments, particularly concerning single-ply roofing application, are guided by the importance of regulatory requirements that support other Department initiatives such as energy efficient building construction and solid waste reduction.

#### **A. Single-Ply Roofing**

This section of the report responds to timely comment submitted concerning single-ply roof membrane application products as well as a series of recommendations submitted by the EPDM Roofing Association at the Department's request following the close of the comment period.

**Comment 1: Definition of "single-ply roof membrane."** The definition for "single-ply roof membrane" should be expanded, as follows, to include all types of single-ply roof membrane material rather than only those made of rubber:

"Single-ply roof membrane" means a prefabricated single sheet of compounded synthetic material. Single-ply membranes fall into one of three categories, thermosets that include rubber membranes (EPDM), thermoplastics that include TPO, PVC and KEE membranes and modified bitumen membranes. [4]

**Response:** The Department agrees that the definition of "single-ply roof membrane" is intended to include all single-ply roof membrane materials including ethylene propylenediene monomer (EPDM), polyvinyl chloride, thermal polyolefin and ketone ethylene ester. While EPDM (aka rubber) is the most commonly used single-ply roof membrane material in Connecticut now, the use of thermoplastic membranes is increasing as architects, specifiers and contractors recognize that these other materials offer performance qualities similar to EPDM plus additional benefits such as superior heat island reduction and energy savings.<sup>2</sup>

Modified bitumen roof material is generally not considered a single-ply roof material and, therefore, should not be included in the definition of single-ply membranes.

In response to this comment, the Department should revise the proposed definition of "single-ply roof membrane" in Section 44(a), as follows:

<sup>2</sup>

US EPA. Cool roof product information. [http://www.epa.gov/hiri/strategies/level3\\_roofproducts.html](http://www.epa.gov/hiri/strategies/level3_roofproducts.html)

“Single-ply roof membrane” means a prefabricated single sheet of ~~rubber, normally ethylene propylenediene terpolymer,~~ **compounded synthetic material such as ethylene propylenediene monomer, polyvinyl chloride, thermal polyolefin or ketone ethylene ester,** that is applied in a single layer to a building roof.

**Comment 2: Limited commercial availability.** Two commenters expressed concern that there is a lack of compliant, commercially available adhesives, sealants and primers for use on single-ply roof membranes. [3,5]

**Response:** Various air quality districts in California adopted the CARB recommendations for low-VOC adhesives and sealants, in some cases nearly ten years ago. As a result of such district rules, low-VOC bonding adhesives for roofing are not only available but dominate the market in California. However, the Department acknowledges that California is the only region of the country where low-VOC roofing adhesives dominate, and change in other markets such as the Northeast does require time.<sup>3</sup> The Department believes the best incentive to increase the number of commercially available low-VOC single-ply roof bonding products is the multi-state promulgation of regulations requiring the sale and use of such products. To that end, the Department is proceeding to seek adoption of Section 44 in a form that will meet the Department’s air quality needs and serve to bolster the adoption of very similar requirements in surrounding states.

See the Department’s response to comment 6 for additional responsive text and a recommended change to the final draft of Section 44 that takes into account the concern expressed in this comment.

**Comment 3: Efficacy of low-VOC roof bonding adhesives in the Northeast.** One commenter expressed concern that high solvent levels are necessary to allow for adhesion, particularly in conditions characteristic of Connecticut, such as cold temperatures and long-term exposure to high winds. [4]

**Response:** As noted in the summary in Section II of this report, the OTC Model Rule was primarily based on analysis and recommendations of CARB and on rules adopted in several California air districts. California’s experience provides no indication that a high solvent level – which implies a high VOC content – is necessary for roof adhesion in cold temperatures. Furthermore, the OTC states, along with the OTC’s technical contractor, reviewed the technological basis for the implementation of the rule and the associated reductions in emissions. The OTC Model Rule was developed with feedback from states as well as stakeholders received at OTC public meetings.<sup>4</sup> No information was provided by industry to substantiate concerns that the VOC limits were too low to allow effective performance in the average climate conditions of the northeastern United States. This lack of supportive data, coupled with the continued pressures on states to meet both state

<sup>3</sup> Hoff, J. “The Low-Slope Commercial Roofing Industry in the Northeast United States and the Ozone Transport Commission Model Rule for Adhesives and Sealants: A Study of Risks and Options for Effective Implementation” Dec. 12, 2007: 12, on file with the CT Department of Environmental Protection. Hereinafter referred to as the Hoff Report.

<sup>4</sup> See “Questions and Comments” in Response to Air Quality Control Advisory Council (AQCAC) Meeting of September 10, 2007, Maryland, on file with the CT. Department of Environmental Protection.

and federal ozone standards, led the OTC workgroup to maintain the standards at the level recommended by CARB and adopted in certain California air quality districts.

The Department is aware of at least one single-ply roof adhesive that is available in Connecticut now and that is recommended for use in temperatures below 40°F. While additional procedures may be necessary to store and use low-VOC or water-based adhesives, such adhesives can be used successfully and provide adhesion comparable to higher VOC adhesives.

The Department should not revise Section 44 in response to this comment. See the responses to comments 4 through 6 for a final recommendation concerning Section 44 and additional justification for the Department's final recommendation.

**Comment 4: Roof performance and durability.** Several commenters expressed a lack of confidence in the overall performance and durability of low-slope roofs applied with low-VOC adhesives during cold temperatures. Poor adhesive performance would increase roof failure, require more frequent replacement and have a negative impact on the environment as a result of an increase in roofing material in landfills. [4,5,6,7,9]

**Response:** As explained in the response to comment 3, concerns regarding potential durability issues with compliant roofing adhesives were raised during the OTC Model Rule development. As the OTC states did not receive from commenters any substantiating data indicating performance problems, the standards for that category were retained in the OTC Model Rule.

The Department is aware that cold temperatures increase the flash-off time to bonding; that there are currently a limited number of low-VOC roof bonding adhesive products that may be applied successfully in cold weather; and that extra procedures may be required for successful roof installations on colder days. Such additional cold weather application procedures are not unique to low-VOC adhesives, since higher VOC content adhesives may gel if stored or used at temperatures less than 40°F. Particular combinations of temperature and humidity may require roof applications to be delayed or rescheduled. However, once bonding occurs using an adhesive applied as recommended by the manufacturer, there is no evidence that subsequent periods of low temperature destroy such a properly bonded surface. Although California temperatures tend to be warmer, in general, than those in Connecticut, the experience of the Sacramento Air Quality Management District is informative. The Sacramento Air Quality Management District has a history of record low temperatures below 40°F during eight months of the year and experiences an average low of 40°F during December and 41°F during January.<sup>5</sup> This District adopted a regulation similar to Section 44 in 1998. The Department is unaware of any increases in performance problems or of reduced roof durability associated with roof membranes that may have been applied on low temperature days in Sacramento.

<sup>5</sup>

Sacramento average/record temperatures:  
<http://www.weather.com/weather/wxclimatology/monthly/graph/USCA0968?from=search>

In addition, the transition recommended in the response to comment 6 will work to resolve the performance concerns as applicators and specifiers become comfortable with the use of low-VOC and water-based adhesive products, and manufacturers and distributors increase the number and variety of compliant product lines available in Connecticut.

Therefore, the Department should not revise Section 44 in response to this comment.

**Comment 5: Recommendations from EPDM Roofing Association.** At the request of the Department for additional technical information concerning the expressed concerns of the single-ply roofing industry, EPDM Roofing Association submitted a study of the risks to the commercial roofing industry and options for effective implementation of the OTC Model Rule in the Northeast states. Embedded in that study are four recommended revisions to Section 44, which EPDM Roofing Association based on the information reported. The study's recommendations and the Department's responses to each are as follows:

- **Recommendation A:** The proposed VOC content limitations for single-ply roofing adhesives, sealants and primers should apply only during the ozone season, *i.e.*, from May 1 through September 30, of any year. This approach is consistent with that of the Department in the proposed revision to RCSA section 22a-174-20(k) for asphalt paving, and the administrative provisions of that amendment should also be included in Section 44.

EPDM Roofing Association arrives at this recommendation based on both the need for user training, set out more fully in Recommendation B, and to provide additional time for the marketing in the Northeast of more single-ply roof bonding products that meet the proposed VOC content limit.

- **Recommendation B:** In addition to a permanent ozone season limitation on the VOC content limits for single-ply roofing adhesives, sealants and primers, the Department should provide a transitional period during which the application of the such standards is further limited, as follows:

<u>Year</u>	<u>Apply Single-Ply Roofing Product Standards in These Months</u>
2009	July through August
2010	June through September
2011 and after	May through September

EPDM Roofing Association justifies the need for the transitional period to provide time for commercial installers to be trained in the use of the low-VOC products. Currently, high-VOC bonding adhesives for single-ply roofing membranes dominate the market in the Northeast. As a result, there has been virtually no training in the application of low-VOC products outside of California, where the low-VOC products dominate the market as a result of the adoption of air quality rules in many of the California air quality management districts. An abrupt change to low-VOC products in the Northeast will cause an increased risk of liability to the construction industry for roof failures.

- **Recommendation C:** The final rule should include provisions to allow the use of high-VOC single-ply roofing adhesives, sealants and primers on low temperature days in the month of May, provided that appropriate records of such use are maintained.



- **Recommendation D:** The Department should encourage the development of more low-VOC roof bonding products and ultimately help the industry reach a goal of virtual elimination of VOC. [7]

**Response:** In response to each recommendation, the Department notes the following:

- **Recommendation A:** Connecticut is required to attain the federal 8-hour ozone NAAQS by 2010. Connecticut committed to other states in the region and to EPA to implement a regulation to reduce the VOC content of adhesives, sealants and primers. Regional modeling to support NAAQS attainment included reductions in VOC emissions from adhesives and sealants in all states in the region. While the reductions created by Section 44 are annual, reductions are most crucial in the summer months when ozone levels typically exceed national standards on the hottest days; for air quality purposes, the period from May 1 to September 30 is called the “ozone season,” and many control strategies are focused on these months. Also contributing to the high ozone levels experienced on the hottest days of summer are increased emissions from electricity production. The hottest days of summer are also the highest electricity demand days experienced in the Northeast states, requiring that high-emitting peaking and emergency generators operate to meet the demand.

Thus, while the Department may temporarily limit the application of low-VOC standards for the single-ply roofing industry to only the summer months and achieve important air quality benefits, the application of the standards for only a few months of each year is not as meaningful from an air regulatory perspective as an annual standard and may jeopardize EPA’s approval of the Department’s 8-hour ozone attainment plan and the Department’s ability to create federally mandated reductions, not only in Connecticut but in the larger Northeast region. Meeting commitments to reduce ozone precursors has elevated importance now given EPA’s March 12, 2008 decision to revise the ozone NAAQS, which will likely require the State to adopt additional control measures.

As explained in the response to comment 6, the Department should revise Section 44 to require seasonal single-ply roof bonding product standards for the initial three years following rule adoption and add a three-year extension on the sale and manufacture restrictions for single-ply roof application products. This phase-in will allow for 8-hour ozone attainment needs, provide additional time for applicator training and allow the introduction of more low-VOC roof application products in the Connecticut and wider Northeast markets.

- **Recommendation B:** As explained in the responses to Recommendation A and comment 6, the Department should allow a three-year transition period (2009-2011), during which the proposed VOC content standards for single-ply roofing adhesives, sealants and primers are required only during certain summer months. Beginning January 1, 2012, the standards shall apply at all times. This transitional time provides necessary VOC emissions reductions in the crucial summer months, while taking into account the need for additional roofing industry training and providing an opportunity for manufacturers and distributors to increase the number of low-VOC roof bonding products available in the Northeast.
- **Recommendation C:** Given the commercial availability now of at least one single-ply roof bonding adhesive that meets the proposed VOC content limit and that bonds effectively in temperatures below 40°F and a likely increase in the number of such compliant adhesives in the near term, the Department should not implement the

recommended change. Such a change would reduce the emissions reductions obtained from the rule, complicate enforcement and decrease the incentive for the release of additional, effective products.

- **Recommendation D:** The Department believes the best incentive to increase the number of commercially available low-VOC single-ply roof bonding products is the multi-state promulgation of regulations requiring the sale and use of such products. To that end, the Department is proceeding to seek adoption of Section 44 in a form that will meet the Department's air quality needs and serve to bolster the adoption of very similar requirements in surrounding states.

**Comment 6: Impact on the roofing industry.** Several commenters expressed concern that the compliant products currently available have application restrictions, which limit product use when temperatures are equal to or less than 40°F. Such temperature restrictions were not addressed by CARB, nor were such restrictions concerns in the California air districts that adopted regulations since warmer, average annual temperatures predominate in California. Given the year-round nature of roof assembly and repair in Connecticut, these application restrictions will substantially impact the roofing industry, possibly limit construction projects in general, and thereby have a significant, negative economic impact on the state. [4,5,6,7,9]

An underlying concern of the roofing contractors is an increased risk of compromised roofing installations and roofing-related construction litigation. [7]

**Response:** As stated earlier in this report, the primary purpose of Section 44 is to reduce emissions of VOC, an ozone precursor, to assist the state to attain the federal 8-hour ozone NAAQS. One roofing industry estimate puts single-ply roof membrane bonding adhesive use in Connecticut at approximately 200,000 gallons annually.<sup>6</sup> Such adhesive contains, on average, 600g/L of VOC -- significantly higher than the proposed VOC content limit of 250g/L. If all of the VOC within these single-ply roofing adhesives volatilized into the atmosphere, these adhesives would generate approximately 573 tons of VOC in Connecticut each year.<sup>7</sup> As Section 44 is projected to reduce emissions from all regulated adhesives and sealants by 4.2 tons per summer day, the VOC emissions reductions from single-ply roofing adhesive, primer and sealant standards are a potentially significant portion – perhaps 25% – of the total emissions reductions from Section 44.<sup>8</sup>

The Department is committed to adopting a regulation based on the OTC Model Rule in a form that will preserve the expected air quality improvements. Further, the Department disagrees with the comment concerning the level of negative impact Section 44 will have on commercial construction in Connecticut. Single-ply roof membrane installation can be accomplished by fully adhering the membrane to the substrate, by using mechanical fasteners and by using ballast stones. In Connecticut, the preferred method of installation

<sup>6</sup> Hoff Report at 12.

<sup>7</sup> Hoff Report at 12.

<sup>8</sup> The exact level of the emissions reductions of Section 44 attributed to reductions in roof bonding products is difficult to determine as they depend on cycles in the construction industry, seasonal differences in construction and actual amounts of VOC volatilized. Further, the contributions from all the adhesives and sealants regulated in Section 44 has not been separated according to single products or product categories. The regional inventory that forms the basis for the OTC's emissions reductions and Connecticut's stationary source/area source inventory are developed using top-down national estimates of total industrial adhesive use, allocated to states based on population or industrial activity levels. There is no information to provide a verifiable breakdown by subcategories.

of single-ply roof membranes is to adhere them, as this method is highly resistant to wind, water and dimensional changes.<sup>9</sup> Ballasting is not commonplace in Connecticut due to the lack of suitable ballast stones. Mechanically attaching the membrane with fasteners, though used in other cold-weather states, has not been standard practice in Connecticut. Thus, adoption of the proposed rule would limit the roofing industry, during cold weather, to three realistic options in Connecticut: use of an available compliant adhesive that adheres without application restrictions when ambient temperatures are at and below 40°F; use of modified bitumen (not a single-ply roofing method) with cold adhesives; or mechanically fastening the roofing membrane.

The Department recognizes the majority of compliant adhesives now available in Connecticut have temperature restrictions that limit application in cold temperatures. The Department also understands that the number of roof bonding adhesives that adhere at low temperatures with a VOC content that meets the proposed limits is expected to increase in the near future. However, in the summer months when ozone formation is of particular concern, temperatures are generally suitable for the use of a number of currently available roof bonding adhesives that have a VOC content at or below the standard proposed in Section 44.<sup>10</sup>

To maintain the integrity of the Department's air quality goals while taking into account the need for construction worker training (see comment 5 and response) and the limited number of compliant roofing adhesives now marketed in Connecticut, the Department should revise Section 44 to allow a limited phase-in of the single-ply roof membrane application product standards. That phase-in should begin in 2009, when the Department should require the use of single-ply roof adhesives and primers with a VOC content less than or equal to 250 g/L (or 450 g/L in the case of single-ply roof membrane sealants) from June 1 through August 31. In 2010 and 2011, the Department should extend the compliance period to the length of the ozone season (May 1 through September 30). Beginning January 1, 2012, the 250 g/L VOC content limit for the single-ply roof membrane adhesives and primers (450 g/L in the case of single-ply roof membrane sealants) should apply throughout each year.

The three-year phase-in period will allow the Department to achieve necessary reductions in VOC emissions in the critical summer months while providing additional time for the widespread distribution of low-VOC roof bonding products in the Northeast market and for the construction industry to appreciate the performance characteristics of low-VOC roof application products. Once applicators have become accustomed to any differences in application techniques, workers may even find the low- and no-VOC products preferable in terms of cleanup, and, in some cases, the products may reduce potential exposure to toxic air emissions; many VOC are also considered toxic compounds, so reductions in VOC may produce reductions in toxic compounds.

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<sup>9</sup> See Steve Hardy and Mark Boulay, "Making Sense of Single-Ply Roofing" *Architectural Record*, p. 8. (January 2000).

<sup>10</sup> Hoff Report at 15. See also Weather Channel website at <http://www.weather.com/weather/wxclimatology/monthly/graph/USCA0968?from=search> The month of May has an average low temperature of 48°F and average high temperature of 70°F. September has an average low temperature of 51°F and average high temperature of 71°F.

Section 44 also restricts the sale and manufacture of non-compliant adhesives, sealants and primers. Those sale and manufacture restrictions should be delayed until January 1, 2012 for the single-ply roof membrane application products. However, the Department notes that prudent manufacturers, sellers and distributors will begin now to increase their inventory of low-VOC roof application products and decrease the inventory of non-compliant products.

The identified language in subsections (c), (d) and (e) and in Table 44-1 should be revised to implement the temporary ozone-season only standards and delay in the sales and manufacture restrictions for single-ply roof application products, as follows:

- Subsection (c), addition of new subdivisions (10) and (11)

**(10) The requirements of this section shall apply to the use of single-ply roof membrane installation or repair adhesive, single-ply roof membrane sealant and single-ply roof membrane adhesive primer on the following schedule:**

- (A) For the year 2009, from June 1 through August 31;
- (B) For the years 2010 and 2011, from May 1 through September 30; and
- (C) On and after January 1, 2012.

**(11) The requirements of this section shall not apply to any manufacturer or distributor who sells, supplies or offers for sale any single-ply roof membrane installation or repair adhesive, single-ply roof membrane sealant or single-ply roof membrane adhesive primer prior to January 1, 2012.**

- Subsection (d), revision of subdivision (3)

(3) Except as provided in subsections (c)(1) through (c)(4), (c)(7), (c)(9), (c)(10), (c)(11) and (d)(6) of this section, on or after January 1, 2009, no person shall use or apply, or solicit the use or application of, any adhesive, sealant, adhesive primer or sealant primer within the State of Connecticut unless such adhesive, sealant, adhesive primer or sealant primer as applied complies with the applicable VOC content limits specified in Table 44-1 or Table 44-2 of this section and the applicable requirements of this subsection.

- Subsection (e), revision of subdivision (1)

(1) Any person who sells, supplies, offers for sale or manufactures an adhesive, sealant, adhesive primer or sealant primer subject to this section on or after January 1, 2009 for sale in the State of Connecticut shall possess documentation that such adhesive, sealant, adhesive primer or sealant primer complies with the VOC content limits of Table 44-1 of this section, where the VOC content is determined according to the requirements of subdivisions (2) and (3) of this subsection. **For single-ply roof membrane installation or repair adhesive, single-ply roof membrane sealant and single-ply roof membrane adhesive primer, such documentation is required on and after January 1, 2012.**

- Table 44-1, addition of a column designating the date on which each standard applies

Table 44-1. As Applied VOC Content Limits for Adhesives, Sealants, Adhesive Primers and Sealant Primers

Adhesive, sealant, adhesive primer or sealant primer category	As applied VOC content limit (g VOC/L)	Date on which standard applies
<i>Adhesives</i>		
ABS welding	400	January 1, 2009
Ceramic tile installation	130	January 1, 2009
Computer diskette jacket manufacturing	850	January 1, 2009
Contact bond	250	January 1, 2009
Cove base installation	150	January 1, 2009
CPVC welding	490	January 1, 2009
Indoor floor covering installation	150	January 1, 2009
Metal-to-elastomer molding or casting	850	January 1, 2009
Multipurpose construction	200	January 1, 2009
Nonmembrane roof installation or repair	300	January 1, 2009
Plastic cement welding	510	January 1, 2009
Outdoor floor covering installation	250	January 1, 2009
PVC welding	510	January 1, 2009
Single-ply roof membrane installation or repair	250	For 2009: June 1 through August 31; For 2010 & 2011: May 1 through September 30; and On and after January 1, 2012.
Structural glazing	100	January 1, 2009
Thin metal laminating	780	January 1, 2009
Tire retread	100	January 1, 2009
Perimeter bonded sheet vinyl flooring installation	660	January 1, 2009
Waterproof resorcinol glue	170	January 1, 2009
Sheet-applied rubber installation	850	January 1, 2009
<i>Sealants</i>		
Architectural	250	January 1, 2009
Marine deck	760	January 1, 2009
Nonmembrane roof installation or repair	300	January 1, 2009
Roadway	250	January 1, 2009
Single-ply roof membrane	450	For 2009: June 1 through August 31; For 2010 & 2011: May 1 through September 30; and On and after January 1, 2012.
Other	420	January 1, 2009
<i>Adhesive primers</i>		
Automotive glass	700	January 1, 2009
Plastic cement welding	650	January 1, 2009
Single-ply roof membrane	250	For 2009: June 1 through August 31; For 2010 & 2011: May 1 through September 30; and On and after January 1, 2012.
Traffic marking tape	150	January 1, 2009
Other	250	January 1, 2009
<i>Sealant primers</i>		
Non-porous architectural	250	January 1, 2009
Porous architectural	775	January 1, 2009
Marine deck	760	January 1, 2009
Other	750	January 1, 2009

**B. All Other (Not Roofing) Concerns**

Aside from single-ply roof membrane adhesion concerns, comment on Section 44 focused on comparisons of Section 44 with the OTC Model Rule or with other federal requirements.

**Comment 7: Definitions.** Connecticut's draft rule is closely based on the OTC's Model Rule. A majority of the definitions are the same in both rules, but EPA notes that those definitions identified in the table below are not. The Department should confirm that these differences are intended:

CT's Definition	OTC Definition
"Cyanoacrylate adhesive" means any single-component reactive diluent adhesive that contains at least 85% by weight methyl, ethyl, methoxymethyl or other functional groupings of cyanoacrylate.	"Cyanoacrylate adhesive" means any adhesive with a cyanoacrylate content of at least 95% by weight.
"Plasticizer" means any substance, such as a high boiling point organic solvent, that is added to a hard plastic to provide flexibility or pliability.	"Plasticizer" means a material, such as a high boiling point organic solvent, that is incorporated into a vinyl to increase its flexibility, workability, or distensibility, as determined by ASTM Method E-260-96.
"Reactive diluent" means a liquid reactant in an uncured adhesive, sealant or primer that reacts chemically or physically during the curing process to become an integral part of the cured adhesive, sealant or primer.	"Reactive diluent" means a liquid that is a reactive organic compound during application and one in that, through chemical and/or physical reactions, such as polymerization, twenty (20) percent or more of the reactive organic compound becomes an integral part of a finished material
"Sealant" means any material with adhesive properties that is formulated primarily to fill, seal, waterproof or weatherproof gaps or joints between two surfaces. Sealers and other materials that are applied to a single substrate to protect or decorate are not "sealants."	"Sealant" means any material with adhesive properties that is formulated primarily to fill, seal, waterproof or weatherproof gaps or joints between two surfaces. Sealants include sealant primers and caulks.
"Single-ply roof membrane installation or repair adhesive" means any adhesive intended by the manufacturer for use in the installation or repair of single-ply roof membrane.	"Single-ply roof membrane installation and repair adhesive" means any adhesive labeled for use in the installation or repair of single-ply roof membrane. Installation includes, as a minimum, attaching the edge of the membrane to the edge of the roof and applying flashings to vents, pipes and ducts that protrude through the membrane. Repair includes gluing the edges of torn membrane together, attaching a patch over a hole and reapplying flashings to vents, pipes or ducts installed through the membrane.

[1]

**Response:** The Department acknowledges the EPA-identified differences between proposed Section 44 and the OTC Model Rule. The differences result in clearer definitions by eliminating unnecessary words or phrases or substituting more specific language. Some of the differences result from comparisons of the OTC Model Rule with similar rules now in effect in some of the California air quality management districts, while others result from the informal comment by the regulated community. Such

revised definitions thus benefit from the adoption process in the California districts as well as the Department's considerable regulatory drafting experience.

The differences identified by EPA are not intended to create new product categories, alter the applicability or change the emissions reductions anticipated. For example, the language distinguishing "repair" from "installation" in relation to the definition of "single-ply roof membrane installation or repair adhesive" is unnecessary since both activities are undertaken using the same adhesive product.

**Comment 8: Emission reduction calculation.** Connecticut's proposed rule indicates that it will generate approximately four tons per summer day in VOC emission reductions. Connecticut should document how this estimate was determined, and include a discussion of how the exemption for aerosol coatings was addressed in quantifying emission reductions. [1]

**Response:** Emissions calculations for Connecticut's adhesives and sealants regulation are fully documented in the Department's proposed ozone attainment demonstration.<sup>11</sup> For regional consistency, emissions were determined using an approach agreed to by the Control Measures Workgroup of the OTC. For Connecticut, 2002 base year emissions of 1714 tons/year were obtained from an EPA-funded study<sup>12</sup> that applied a solvent mass balance approach to estimate emissions from various solvent source categories. Future year emission estimates include a 64.4% reduction in VOC emissions attributed to the adoption of an adhesives and sealants rule in each OTC state. This level of reduction represents the low end of the 64.4% to 77.8% range estimated by CARB<sup>13</sup> for the development of a regulation based on the CARB reasonably available control technology determination and its adoption in the California air quality management districts.

Connecticut's proposed adhesives and sealants regulation includes an exemption for aerosol adhesives. This exemption is included because the VOC content of aerosol adhesives is regulated by Connecticut's consumer products regulation, RCSA section 22a-174-40(d)(4). RCSA section 22a-174-40 assigns VOC content limits to five categories of aerosol adhesives. The combination of an exemption for aerosol adhesives and regulation under a separate rule is consistent with the regulatory treatment of aerosol adhesives in the California air quality management districts (Bay Area, El Dorado, Placer County, San Joaquin Valley, Ventura County, *e.g.*). Such an exemption was not included in the CARB determination underlying the district rules since it preceded, in some cases, adoption of consumer product regulations in the air quality management districts. The lack of inclusion of such an exemption in the OTC Model Rule was an oversight.

As a result, we do not anticipate that the exemption will significantly alter the level of estimated emissions reductions realized by Section 44. The reasonableness of the

<sup>11</sup> See Section 4 and Appendix 4E of the proposed attainment demonstration at: [http://www.ct.gov/dep/cwp/view.asp?a=2684&q=385886&depNav\\_GID=1619](http://www.ct.gov/dep/cwp/view.asp?a=2684&q=385886&depNav_GID=1619)

<sup>12</sup> "Solvent Mass Balance Approach for Estimating VOC Emissions from Eleven Nonpoint Solvent Source Categories"; draft report prepared by EC/R, Inc. for EPA's Office of Air Quality Planning and Standards; EPA Contract No. 68-D-02-064; Work Assignment No. 3-05; March 28, 2005.

<sup>13</sup> See "Determination of Reasonably Available Control Technology and Best Available Retrofit Control Technology for Adhesives and Sealants"; California Air Resources Board; December, 1998.

emission reduction estimate is also founded on the OTC's choice of a control factor (*i.e.*, 64.4%) from the low end of the range identified by CARB.

**Comment 9: Uniformity of regulations.** The adoption of uniform regulations in all states in the Northeastern U.S. is the primary interest of the NPCA. [8]

**Response:** The Department understands the importance of uniformity in essential requirements of state regulations conceived at the regional level and shares the goal of creating one seamless regional market in which a product may be sold in every state under the same label and containing the same product formulation. To maintain uniformity to the extent possible despite new information raised during the comment period, the Department staff is in frequent contact with staff in other OTC states now pursuing the adoption of OTC Model Rule-based regulations.

Nonetheless, differences among state regulations are inevitable. To the extent Connecticut's regulation strays from the exact text of the OTC Model Rule, it does so to meet Connecticut-specific concerns, to improve the environmental result based on information and concerns not raised during the Model Rule creation, to clarify or to match Department formatting conventions. Such differences will not prevent the creation of a regional market in which significant compliance requirements are the same from state-to-state.

**Comment 10: Rule development.** In 1999, NPCA was involved in the process of developing the CARB determination, the document that provides the basis for the OTC Model Rule, which, in turn, forms the basis for Section 44. The CARB determination reflects industry input at that time concerning technical and legal concerns. Industry developments since the issuance of the CARB determination should be -- and are not -- incorporated into the OTC Model Rule or Section 44. This lack is a concern. [8]

**Response:** The key emissions-reducing provision of Section 44 is the inclusion of VOC content standards for defined categories of adhesives and sealants. The requirement to comply with these VOC content standards falls on the manufacturers and sellers of the products. Users are also required to use products that comply with the standards, in accordance with the manufacturer recommendations. A number of factors encourage the adhesive industry to develop low-VOC and water-based products, including state and federal requirements intended to create ozone precursor reductions, green building standards and consumer concerns about toxic chemicals. Given these pressures on manufacturers, the OTC workgroup that developed the OTC Model Rule was concerned that the VOC content standards of the CARB determination may not represent the lowest achievable standards of the current adhesives industry. The OTC workgroup chose to move forward without reducing those standards given that the CARB determination standards would yield significant emissions reductions for the states in the region.

In light of this background, the NPCA's comment is puzzling; the industry should be poised to meet lower VOC content standards than those provided in Section 44. Furthermore, while the NPCA expresses legal and technical concerns with certain categories of product, NPCA offers no specific concerns that the Department might act upon in an information gathering process. For this reason, the Department should not revise Section 44 in response to this comment.



**Comment 11: Compliance date.** Section 44's compliance date should be at least 18 months after rule promulgation to provide regulated industries time to substitute compliant materials or install control equipment. [8]

**Response:** The proposed date on which the standards and most other requirements of Section 44 apply to regulated persons is January 1, 2009. Should the rule adoption process extend so that promulgation will occur close to that date, the Department may consider moving that compliance date to the future. However, the Department committed to EPA to adopt this rule as one of the Department's means of attaining the federal 8-hour ozone NAAQS, and is therefore under an obligation to move on a schedule that will create the intended emissions reductions as of January 1, 2009.<sup>14</sup> Manufacturers, distributors and sellers of regulated products are thus put on notice of the Department's intentions and should note the efforts of other OTC states including Maryland, New Jersey and Massachusetts to also complete the adoption of state regulations based on the OTC Model Rule.

**Comment 12: NESHAPs.** Facilities subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for Miscellaneous Metal Parts and Products (40 CFR 63 Subpart MMMM) or Surface Coating of Plastic Parts and Products (40 CFR 63 Subpart PPPP) should not be regulated by Section 44. Such companies are subject to VOC and hazardous air pollutant (HAP) emission standards including source-specific emissions limits, which are enforced in operating facility permits. Subjecting these facilities to Section 44 may limit operational flexibility and will make compliance more complicated. For example, the NESHAPs measure compliance on a twelve-month rolling average, which allows the operator to use adhesives with a VOC content that exceeds the average at any given time, as long as lower VOC content products are used to maintain the average. The standards of Section 44 would force such a facility to look to the installation and use of pollution control equipment or to use non-VOC products. However, control equipment may be expensive or even infeasible. As a result, some facilities may shut or move to another state. Furthermore, the use of control equipment will result in an increase in carbon dioxide emissions. Finally, a shift to the use of aqueous or non-VOC containing adhesives will never happen at a facility that has installed control equipment. [8]

**Response:** The ozone attainment-driven requirements of Section 44 and the NESHAPs are independent requirements that serve different purposes. Neither may substitute for the other, given the differences in the purpose, applicability and standards. Compliance with one does not exclude – and may even further – compliance with another.

Section 44 is proposed to limit VOC emissions from the use of regulated adhesives, primers and sealants. The main mechanism to realize the emissions reductions are the VOC content limits for regulated adhesives, sealants, primers, cleanup and surface preparation solvents. Thus, Section 44 is applicable to manufacturers and sellers of the regulated adhesives, sealants, primers and solvents. Section 44 also includes requirements that apply to facilities at which the regulated adhesives, sealants, primers and solvents are used, but those requirements are relatively limited and apply to any process or activity using a regulated product.

<sup>14</sup> The commitment is made in the 8-hour Ozone Attainment Demonstration. Available at: [http://www.ct.gov/dep/cwp/view.asp?a=2684&q=331234&depNav\\_GID=1619](http://www.ct.gov/dep/cwp/view.asp?a=2684&q=331234&depNav_GID=1619)

In contrast, the NESHAPs are promulgated by EPA to reduce HAPs from certain facilities based on the activity or process occurring at the facility. The applicability is only to the owners or operators of facilities at which the identified process is occurring, and the applicability thresholds are determined by the facility's potential to emit HAPs. NESHAPs do not include VOC or HAP content limits for products, but require the owners of the regulated facilities to meet HAP emissions standards on a 12-month rolling average basis. While some of the regulated HAPs are also VOC, thereby creating coincident reductions in VOC emissions, the creation of VOC emissions reductions is not the primary purpose – or necessary result – of the NESHAPs.

Any facility that is subject to a NESHAP and at which an adhesive regulated by Section 44 is used will need to comply with both requirements. For some facilities, the use of products that comply with Section 44 will further compliance with the NESHAP; in other facilities, the requirements of Section 44 will not so do. For some facilities this will add some elements to their record keeping system. Section 44 is designed with some flexibility to facility operators in designing record keeping, as long as records are sufficient to determine compliance with applicable requirements.<sup>15</sup> Compliance with a NESHAP and Section 44 will not necessarily require the installation of control equipment where no such equipment is now required. Finally, a general suggestion that a source using control equipment has no incentive to switch to low-VOC or aqueous adhesives and sealants is groundless; cost, employee safety, hazardous waste disposal needs, product safety and a desire to “do the right thing” may all influence the choice of products or control equipment at any facility.

Finally, to claim that the installation of air pollution control equipment would be a deciding factor in the continued operation of a number of businesses is extreme and unsubstantiated.

The Department should not revise Section 44 in response to this comment.

**Comment 13: Consistency with a MACT.** Section 44 should use definitions consistent with the Miscellaneous Metal Surface Coating MACT Standard. [8]

**Response:** As explained in the response to comment 12, the requirements of 40 CFR 63 subpart Mmmm concerning surface coating of miscellaneous metal parts serves a purpose different than that of Section 44 and applies to a group of persons for the conduct of activities outside the applicability of Section 44. Thus, not surprisingly, almost none of the terms defined in 40 CFR 63.3981 are used in Section 44. In the case of the few terms defined in both Section 44 and 40 CFR 63.3981, there is no clear advantage to substituting the federal definitions.

The Department should not revise Section 44 in response to this comment.

<sup>15</sup> See, e.g., Section 44(f)(1).

**Comment 14: Concerns about a specific facility.** The proposal should include requirements to limit VOC from manufacturing facilities that use paint and also specify the use of monitoring equipment to measure VOC in the outside air whenever a complaint is filed. The commenters offer this comment in light of their dissatisfaction with odors emitted by a neighboring factory and frustration that repeated visits by inspectors from the Department in response to complaints have not discovered any violations at the neighboring factory. [2]

**Response:** The Department should not revise the proposal in response to this comment as the recommendations concerning the regulation of VOC emissions from paint and the use of monitoring equipment are outside the noticed scope of this proceeding. Regarding the use of paint in manufacturing processes, the Department adopted a regulation in July 2007, RCSA section 22a-174-41, that regulates the VOC content of many paints, stains, varnishes and other coatings used in certain industrial applications. The Department's regulations always include requirements for the testing and monitoring necessary to determine compliance with limits and standards.

The Department also operates a statewide air monitoring network that is a crucial component of compliance efforts to meet federal air quality standards and to evaluate the success of our pollution control strategies. More information about that monitoring network is available at:

[http://www.ct.gov/dep/cwp/view.asp?a=2684&Q=321790&depNav\\_GID=1744&depNav=|](http://www.ct.gov/dep/cwp/view.asp?a=2684&Q=321790&depNav_GID=1744&depNav=|)

In response to the complaint about the emissions from a neighboring facility, as the commenters note, the Department's inspectors have found the facility to be operating in compliance with all applicable air quality regulations. Any future complaints will be investigated should the commenters continue to experience unsatisfactory conditions.

## VI. Additional Comments from the Hearing Officers

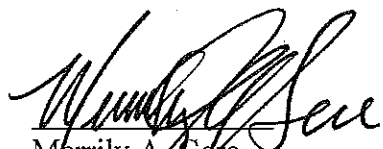
In addition to the above-recommended revisions, the Department should make the following technical corrections and clarifications to the final version of Section 44:

- The phrase "for use" should be added to subsection (d)(2) so the language mirrors the corresponding applicability requirement in subsection (b)(2), as follows:
  - (2) Except as provided in subsections (c) and (d)(6) of this section, on or after January 1, 2009, no person shall manufacture for sale **for use** in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer unless such adhesive, sealant, adhesive primer or sealant primer complies with the applicable VOC content limits specified in Table 44-1 of this section and the applicable requirements of this subsection.
- The July 1, 2008 date in the labeling requirements of subsection (g)(1) should be changed to January 1, 2009, so the labeling requirements coincide with all other provisions in the section, as follows:
  - (1) As of ~~July 1, 2008~~ **January 1, 2009**, each manufacturer of an adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section shall display the following information on the container or label . . .


- The ASTM test methods referenced in subsection (e)(3) are not the current active methods and should be revised to reflect the current active methods, as follows:
  - ASTM D4457-85 should be replaced with **ASTM D4457-02**;
  - ASTM E260-96 and ASTM E260-91 should be replaced with **ASTM E260-96(2006)**;
  - ASTM D3792-91 should be replaced with **ASTM D3792-05**; and
  - ASTM D2879-96 should be replaced with **ASTM D2879-97(2007)**.

## VII. Conclusion

Based upon the comments submitted by interested parties and addressed in this Hearing Report, we recommend the final new section, included as Attachment 4 to this report, be submitted by the Commissioner for approval by the Attorney General and the Legislative Regulations Review Committee. Based upon the same considerations, we also recommend that upon promulgation the new section be submitted to EPA as a revision to the State Implementation Plan and as a control measure in support of Connecticut's plan to attain and maintain the 8-hour ozone NAAQS.

  
Merrily A. Gere  
Hearing Officer

06/12/08  
Date

  
Anne B. Hulick  
Hearing Officer

06/12/2008  
Date



**ATTACHMENT 2**

**Proposed RCSA Section 22a-174-44**

**DRAFT 11 – August 8, 2007**

The Regulations of Connecticut State Agencies are amended by adding section 22a-174-44, as follows:

**(NEW)**

**Section 22a-174-44 Adhesives and sealants.**

**(a) Definitions.** For the purposes of this section, the following definitions shall apply:

“Acrylonitrile-butadiene-styrene welding adhesive” or “ABS welding adhesive” means any adhesive intended by the manufacturer to weld acrylonitrile-butadiene-styrene pipe, which is made by reacting monomers of acrylonitrile, butadiene and styrene.

“Adhesive” means any chemical compound, although typically “adhesives” are organic polymers, that is applied for the purpose of bonding two surfaces together by other than mechanical means.

“Adhesive primer” means any product intended by the manufacturer for application to a substrate, prior to the application of an adhesive, to enhance the bonding surface.

“Aerosol adhesive” means an adhesive packaged as an aerosol in which the spray mechanism is permanently housed in a non-refillable can designed for handheld application without ancillary hoses or spray equipment.

“Aerospace component” means the fabricated part, assembly of parts or completed unit of any aircraft, helicopter, missile or space vehicle, including passenger safety equipment.

“Architectural” means pertaining 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.

“As applied” means the composition of an adhesive, sealant or primer at the time it is applied to a substrate, including any solvent, catalyst or other substance added to the as supplied adhesive, sealant or primer.

“As supplied” means the composition of an adhesive, sealant or primer as sold to a retail customer. For multi-component adhesives, sealants or primers, “as supplied” means the composition after the component parts are combined as specified by the manufacturer and before the addition, at the user’s initiative, of any ancillary substances.

“Automotive glass adhesive primer” means an adhesive primer intended by the manufacturer to be applied to automotive glass prior to installation of the glass using an adhesive. “Automotive glass adhesive primer” improves the adhesion to the pinch weld and blocks ultraviolet light.

“CARB” means the California Air Resources Board.

“Ceramic tile installation adhesive” means any adhesive intended for use in the installation of ceramic tiles.

“Chlorinated polyvinyl chloride welding adhesive” or “CPVC welding adhesive” means any adhesive intended for welding of CPCV plastic pipe.

“Cleanup solvent” means a VOC-containing solvent used to remove a loosely held uncured adhesive or sealant from a substrate or to clean equipment used in applying an adhesive, a sealant or a primer.

“Computer diskette jacket manufacturing adhesive” means any adhesive intended by the manufacturer to glue the fold-over flaps to the body of a vinyl computer diskette jacket.

“Contact bond adhesive” means any adhesive that forms an instantaneous, non-repositionable bond when substrates, on which the adhesive was applied and allowed to dry, are brought together using momentary pressure. “Contact bond adhesive” does not include rubber cements that are primarily intended for use on paper substrates or vulcanizing fluids designed and labeled for tire repair only.

“Cove base” means a flooring trim unit, generally made of vinyl or rubber, having a concave radius on one edge and a convex radius on the opposite edge that is used in forming a junction between the bottom wall course and the floor or in forming an inside corner.

“Cove base installation adhesive” means any adhesive intended by the manufacturer for the installation of cove base or wall base on a wall or vertical surface at floor level.

“Cyanoacrylate adhesive” means any single-component reactive diluent adhesive that contains at least 85% by weight methyl, ethyl, methoxymethyl or other functional groupings of cyanoacrylate.

“Exempt compound” means compounds of carbon excluded from the definition of “VOC” in section 22a-174-1 of the Regulations of Connecticut State Agencies.

“Flexible vinyl” means non-rigid polyvinyl chloride plastic with at least five percent, by weight, plasticizer content.

“Fiberglass” means a material made of extremely fine filaments of glass.

“Indoor floor covering installation adhesive” means any adhesive intended by the manufacturer for use in the installation of finish surface wood flooring, carpet, resilient tile, vinyl tile, vinyl backed carpet, resilient sheet and roll or artificial grass. Adhesive used to install ceramic tile or perimeter bonded sheet vinyl flooring is not “indoor floor covering installation adhesive.”

“Laminate” means a material made by bonding two or more sheets or layers.

“Low-solids adhesive, sealant or primer” means any adhesive, sealant or primer product that contains 120 grams or less of solids per liter of product.

“Marine deck sealant” or “marine deck sealant primer” means any sealant or sealant primer intended by the manufacturer for application to wooden marine decks.



“Medical equipment manufacturing” means the manufacture of medical devices, such as, but not limited to, catheters, heart valves, blood cardioplegia machines, tracheostomy tubes, blood oxygenators or cardiatory reservoirs.

“Metal-to-elastomer molding or casting adhesive” means any adhesive intended by the manufacturer to bond metal to rubber or urethane elastomers using a heated molding or casting process in order to fabricate products.

“Multipurpose construction adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of various construction materials, including, but not limited to, dry wall, subfloor, panel, fiberglass reinforced plastic, ceiling tile or acoustical tile.

“Nonmembrane roof installation or repair adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of nonmembrane roofs, including, but not limited to, plastic or asphalt roof cement, asphalt roof coating or cold application cement. Adhesive intended for use in the installation of pre-fabricated single-ply roof membrane is not “nonmembrane roof installation or repair adhesive.”

“Outdoor floor covering installation adhesive” means any adhesive intended by the manufacturer for use in the installation of floor covering that is not in an enclosure and that is exposed to ambient weather conditions during normal use.

“Panel installation” means the installation of plywood, pre-decorated hardboard (or tileboard), fiberglass reinforced plastic, or similar pre-decorated or non-decorated panels to studs or solid surfaces using an adhesive formulated for that purpose.

“Perimeter bonded sheet vinyl flooring installation” means the installation of sheet flooring with vinyl backing onto a nonporous substrate using an adhesive designed to be applied only to a strip no more than four inches wide around the perimeter of the sheet flooring.

“Plastic cement welding adhesive” means any adhesive intended by the manufacturer for use to dissolve the surface of plastic to form a bond between mating surfaces.

“Plastic cement welding primer” means any primer intended by the manufacturer for use to prepare plastic substrates prior to bonding or welding.

“Plasticizer” means any substance, such as a high boiling point organic solvent, that is added to a hard plastic to provide flexibility or pliability.

“Polyvinyl chloride welding adhesive” or “PVC welding adhesive” means any adhesive intended by the manufacturer for use in the welding of PVC plastic pipe.

“Porous material” means wood, paper, corrugated paperboard or other solid that has tiny openings, often microscopic, in which fluids may be absorbed or discharged.

“Reactive diluent” means a liquid reactant in an uncured adhesive, sealant or primer that reacts chemically or physically during the curing process to become an integral part of the cured adhesive, sealant or primer.

“Roadway sealant” means any sealant intended by the manufacturer for application to public streets, highways and other surfaces, including, but not limited to, curbs, berms, driveways or parking lots.

“Rubber” means any natural or manmade elastomer, including, but not limited to, styrene-butadiene rubber, polychloroprene (neoprene), butyl rubber, nitrile rubber, chlorosulfonated polyethylene or ethylene propylene diene terpolymer.

“SCAQMD” means the South Coast Air Quality Management District, a part of the California Air Resources Board, which is responsible for the regulation of air quality in the State of California.

“Sealant primer” means any product intended by the manufacturer for application to a substrate, prior to the application of a sealant, to enhance the bonding surface.

“Sealant” means any material with adhesive properties that is formulated primarily to fill, seal, waterproof or weatherproof gaps or joints between two surfaces. Sealers and other materials that are applied to a single substrate to protect or decorate are not “sealants.”

“Sheet-applied rubber installation” means the process of applying sheet rubber liners by hand to metal or plastic substrates to protect the underlying substrate from corrosion or abrasion, inclusive of the process of laminating sheet rubber to fabric by hand.

“Single-ply roof membrane” means a prefabricated single sheet of rubber, normally ethylene-propylenediene terpolymer, that is applied in a single layer to a building roof.

“Single-ply roof membrane installation or repair adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of single-ply roof membrane.

“Single-ply roof membrane adhesive primer” means any primer intended by the manufacturer for use to clean and promote adhesion of the single-ply roof membrane seams or splices prior to bonding.

“Single-ply roof membrane sealant” means any sealant intended by the manufacturer for application to single-ply roof membrane.

“Solvent” means any organic compounds that are used as diluents, thinners, solvers, viscosity reducers, cleaning agents or other related uses.

“Structural glazing adhesive” means any adhesive intended by the manufacturer to apply glass, ceramic, metal, stone or composite panels to exterior building frames.

“Surface preparation solvent” means a solvent used to remove dirt, oil and other contaminants from a substrate prior to the application of a primer, adhesive or sealant.

“Thin metal laminating adhesive” means any adhesive intended by the manufacturer for use in bonding multiple layers of metal to metal or metal to plastic, in the production of electronic or magnetic components, in which the thickness of the bond line(s) is less than 0.25 mils.

“Tire repair” means a process that includes expanding a hole, tear, fissure or blemish in a tire casing by grinding or gouging, applying adhesive and filling the hole or crevice with rubber.

“Tire retread adhesive” means any adhesive intended by the manufacturer for application to the back of pre-cure tread rubber and to the casing and cushion rubber. “Tire retread adhesive” may also be used to seal buffed tire casings to prevent oxidation while the tire is being prepared for a new tread.

“Traffic marking tape” means preformed reflective film intended by the manufacturer for application to streets, highways and other surfaces where pavement markings are desired, including, but not limited to, curbs, berms, driveways and parking lots.

“Traffic marking tape adhesive primer” means any primer intended by the manufacturer for application to a substrate prior to installation of traffic marking tape.

“Twelve-month rolling aggregate” means the amount of adhesives, sealants, primers or solvents used in a twelve-month period, calculated each month by adding the current month’s adhesive, sealant, primer or solvent use to the amount used in each of the previous eleven months.

“Undersea-based weapons systems components” means the fabrication of parts, assembly of parts or completed units of any portion of a missile launching system used on submarines.

“Waterproof resorcinol glue” means a two-part resorcinol-resin-based adhesive intended for continuous water immersion.

**(b) Applicability.**

(1) Except as provided in subsection (c) of this section, this section applies to any person who, on or after January 1, 2009, sells, supplies or offers for sale for use in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section.

(2) Except as provided in subsection (c) of this section, this section applies to any person who, on or after January 1, 2009, manufactures for sale for use in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section.

(3) Except as provided in subsection (c) of this section, this section applies to any person who, on or after January 1, 2009, uses or applies within the State of Connecticut, or solicits the use or application of within the State of Connecticut, any adhesive, sealant, adhesive primer or sealant primer with an applicable VOC content limit in either Table 44-1 or Table 44-2 of this section.

**(c) Exemptions and exceptions.**

(1) The requirements of this section shall not apply, except as otherwise noted, to the manufacture, sale or use of the following adhesives, sealants, adhesive primers, sealant primers or solvents:

- (A) Adhesives, sealants, adhesive primers or sealant primers being tested or evaluated in any research and development, quality assurance or analytical laboratory, provided that records are maintained as specified in subsection (f)(4) of this section;
- (B) Adhesives or sealants that contain less than 20 grams of VOC per liter of adhesive or sealant, less water and exempt compounds, as applied;
- (C) Cyanoacrylate adhesives;
- (D) Aerosol adhesives;
- (E) Adhesives, sealants, adhesive primers or sealant primers that are sold or supplied by the manufacturer or supplier in containers with a net volume of 16 fluid ounces or less, or a net weight of one pound or less, except plastic cement welding adhesives and contact bond adhesives;
- (F) Adhesives, sealants, adhesive primers and sealant primers that are subject to a VOC content limit in section 22a-174-40 of the Regulations of Connecticut State Agencies;
- (G) Contact bond adhesives that are sold or supplied by the manufacturer or supplier in a container with a net volume of one gallon or less; or
- (H) Adhesives, cleanup solvents and surface preparation solvents used in the assembly, repair and manufacture of submarines, when the use of a noncomplying adhesive or solvent is necessary to meet military performance specifications, provided that records of the use of such noncompliant adhesives or solvents are maintained in accordance with subsection (f)(1) of this section.

(2) The requirements of this section shall not apply to the use of adhesives, sealants, adhesive primers, sealant primers, surface preparation solvent and cleanup solvent in the following operations:

- (A) Tire repair operations, provided the label of the adhesive states "**For tire repair only**;"
- (B) Assembly, repair or manufacture of undersea-based weapon systems;
- (C) Assembly, repair or manufacture of aerospace components;
- (D) Manufacture of medical equipment;
- (E) Metal cleaning performed in accordance with section 22a-174-20(l) of the Regulations of Connecticut State Agencies; or
- (F) Plaque laminating operations in which adhesives are used to bond clear, polyester acetate laminate to wood with lamination equipment installed prior to July 1, 1992. Any person claiming exemption pursuant to this subparagraph shall record

and maintain monthly operational records sufficient to demonstrate compliance with this exemption and in accordance with subsection (f) of this section.

(3) The provisions of this section shall not apply to the use of adhesives, sealants, adhesive primers or sealant primers at a facility if the total VOC emissions from all adhesives, sealants, adhesive primers and sealant primers used at the facility are less than 200 pounds, or an equivalent volume, per any twelve-month rolling aggregate. Emissions from cold cleaning units, vapor degreasers and aerosol products shall not be included in determining the total VOC emissions. Any person claiming exemption pursuant to this subparagraph shall record and maintain monthly operational records sufficient to demonstrate continued eligibility for this exemption and in accordance with subsection (f) of this section, as applicable.

(4) The VOC content limits in Tables 44-1 and 44-2 and the requirements of subsections (d)(7) and (d)(8) of this section shall not apply to the use of any adhesives, sealants, adhesive primers, sealant primers, cleanup solvents and surface preparation solvents provided the total volume of noncomplying adhesives, sealants, primers, cleanup and surface preparation solvents applied facility-wide does not exceed 55 gallons per any twelve-month rolling aggregate. Any person claiming exemption pursuant to this subdivision shall record and maintain monthly operational records sufficient to demonstrate compliance with this exemption and in accordance with subsection (f) of this section.

(5) This section shall not apply to any manufacturer or distributor who sells, supplies or offers for sale in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer that does not comply with the VOC content limits specified in Table 44-1 of this section provided that such manufacturer or distributor makes and keeps records demonstrating:

- (A) The adhesive, sealant, adhesive primer or sealant primer is intended for shipment and use outside of the State of Connecticut; and
- (B) The manufacturer or distributor has taken reasonable precautions to assure that the adhesive, sealant, adhesive primer or sealant primer is not distributed to or within the State of Connecticut.

(6) Subdivision (5) of this subsection shall not apply to any manufacturer or distributor who sells, supplies or offers for sale any adhesive, sealant, adhesive primer or sealant primer to a retail outlet in the State of Connecticut.

(7) The VOC content limits of Table 44-1 of this section shall not apply to the sale of any adhesive, sealant, adhesive primer or sealant primer to a person using add-on air pollution control equipment to control emissions of VOC from such adhesive, sealant, adhesive primer or sealant primer at the stationary source, if the add-on air pollution control equipment meets the requirements of subsection (d)(6) of this section.

(8) This section shall not apply to the use of any adhesive, sealant, adhesive primer, sealant primer, cleanup solvent or surface preparation solvent at a private residence for non-commercial purposes.

(9) The requirements of this section shall not apply to any adhesive, sealant, adhesive primer, sealant primer, cleanup solvent or surface preparation solvent that is distributed or transferred by

a branch of the United States military to, from or within a premises operated by that branch of the United States military.

**(d) Standards.**

(1) Except as provided in subsections (c) and (d)(6) of this section, on or after January 1, 2009, no person shall sell, supply or offer for sale in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer manufactured on or after January 1, 2009 unless such adhesive, sealant, adhesive primer or sealant primer complies with the applicable VOC content limits specified in Table 44-1 of this section and the applicable requirements of this subsection.

(2) Except as provided in subsections (c) and (d)(6) of this section, on or after January 1, 2009, no person shall manufacture for sale in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer unless such adhesive, sealant, adhesive primer or sealant primer complies with the applicable VOC content limits specified in Table 44-1 of this section and the applicable requirements of this subsection.

(3) Except as provided in subsections (c)(1) through (c)(4), (c)(7), (c)(9) and (d)(6) of this section, on or after January 1, 2009, no person shall use or apply, or solicit the use or application of, any adhesive, sealant, adhesive primer or sealant primer within the State of Connecticut unless such adhesive, sealant, adhesive primer or sealant primer as applied complies with the applicable VOC content limits specified in Table 44-1 or Table 44-2 of this section and the applicable requirements of this subsection.

(4) For adhesives, the VOC content limits of Tables 44-1 and 44-2 of this section shall apply as follows:

(A) If a person uses an adhesive subject to a specific VOC content limit in Table 44-1, such specific limit shall apply, and no limit in Table 44-2 shall apply; and

(B) If an adhesive is not listed in Table 44-1, a VOC content limit in Table 44-2 shall apply based on the substrate bonded by the adhesive. If an adhesive is used to bond two different substrates together, the substrate assigned the higher VOC content limit shall apply to such use.

(5) Any person using adhesives, sealants, adhesive primers, sealant primers, surface preparation solvents or clean-up solvents subject to this section shall store or dispose of all absorbent materials, such as cloth or paper, which are moistened with such adhesives, sealants, primers or solvents, in non-absorbent containers that shall be closed except when placing materials in or removing materials from the container.

(6) A person using an adhesive, sealant, adhesive primer or sealant primer subject to this section may comply with the VOC content limits of Tables 44-1 and 44-2 of this section using add-on air pollution control equipment if such equipment meets the following requirements:

(A) The VOC emissions from the use of all adhesives, sealants, adhesive primers or sealant primers subject to this section are reduced by an overall capture and control efficiency of at least 85%, by weight;

- (B) The combustion temperature is monitored continuously if a thermal incinerator is operated;
  - (C) Inlet and exhaust gas temperatures are monitored continuously if a catalytic incinerator is operated;
  - (D) The VOC concentration of the inlet and exhaust gas is measured continuously if a carbon absorber or control device other than a thermal or catalytic incinerator is operated; and
  - (E) Operational records sufficient to demonstrate compliance with the requirements of this subdivision are maintained as required by subsection (f) of this section.
- (7) Any person using a surface preparation solvent shall:
- (A) Except as provided in subparagraph (B) of this subdivision for single-ply roofing, limit the VOC content of surface preparation solvent used to less than 70 grams per liter; or
  - (B) If a surface preparation solvent is used in applying single-ply roofing, limit the composite vapor pressure, excluding water and exempt compounds, of the surface preparation solvent used to less than or equal to 45 mmHg at 20 degrees Celsius.
- (8) Any person using a cleanup solvent shall:
- (A) Except as provided in subparagraph (B) of this subdivision, limit the composite vapor pressure of a cleanup solvent to less than 45 mmHg at 20 degrees Celsius; or
  - (B) When cleaning spray application equipment, perform the removal of an adhesive, sealant, adhesive primer or sealant primer from the parts of spray application equipment in accordance with either subparagraph (i) or (ii), as follows:
    - (i) In an enclosed cleaning system, or equivalent cleaning system as determined by the test method identified in subsection (e)(4) of this section, or
    - (ii) Using a solvent with a VOC content less than or equal to 70 grams of VOC per liter. As necessary, parts containing dried adhesive may be soaked in a solvent if the composite vapor pressure of the solvent, excluding water and exempt compounds, is less than or equal to 9.5 mmHg at 20 degrees Celsius, and the parts and solvent are in a closed container that remains closed except when adding parts to or removing parts from the container.
- (9) No person who applies or solicits the application of any adhesive, sealant, adhesive primer or sealant primer subject to this section shall add solvent to such adhesive, sealant or primer in an amount in excess of the manufacturer's recommendation for application, if such

addition causes the adhesive, sealant or primer to exceed the applicable VOC content limit of this section.

(e) **Compliance procedures and test methods.**

(1) Any person who sells, supplies, offers for sale or manufactures an adhesive, sealant, adhesive primer or sealant primer subject to this section on or after January 1, 2009 for sale in the State of Connecticut shall possess documentation that such adhesive, sealant, adhesive primer or sealant primer complies with the VOC content limits of Table 44-1 of this section, where the VOC content is determined according to the requirements of subdivisions (2) and (3) of this subsection.

(2) The VOC content (grams per liter and percent by weight) of adhesive, sealant, primer and solvent products subject to this section, shall be determined according to the following calculations:

- (A) For products that do not contain reactive diluents, grams of VOC per liter of product thinned to the manufacturer's recommendation, less water and exempt compounds, shall be calculated according to the following equation:

$$\text{Grams of VOC per liter of product} = \frac{W_s - W_w - W_e}{V_m - V_w - V_e}$$

Where

$W_s$	=	weight of volatile compounds, in grams
$W_w$	=	weight of water, in grams
$W_e$	=	weight of exempt compounds, in grams
$V_m$	=	volume of product, as supplied, in liters
$V_w$	=	volume of water, in liters
$V_e$	=	volume of exempt compounds, in liters;

- (B) For products that contain reactive diluents, the VOC content of the product is determined after curing. The grams of VOC per liter of product thinned to the manufacturer's recommendation, less water and exempt compounds, shall be calculated according to the following equation:

$$\text{Grams of VOC per liter of product} = \frac{W_{rs} - W_{rw} - W_{re}}{V_{rm} - V_{rw} - V_{re}}$$

Where

$W_{rs}$	=	weight of volatile compounds not consumed during curing, in grams
$W_{rw}$	=	weight of water not consumed during curing, in grams
$W_{re}$	=	weight of exempt compounds not consumed during curing, in grams
$V_{rm}$	=	volume of product, as supplied, not consumed during curing, in liters
$V_{rw}$	=	volume of water not consumed during curing, in liters



$V_{re}$  = volume of exempt compounds not consumed during curing, in liters;

- (C) Grams of VOC per liter of product thinned to the manufacturer's recommendation shall be calculated according to the following equation:

$$\text{Grams of VOC per liter of product} = \frac{W_s - W_w - W_e}{V_m}$$

Where

$W_s$  = weight of volatile compounds, in grams  
 $W_w$  = weight of water, in grams  
 $W_e$  = weight of exempt compounds, in grams  
 $V_m$  = volume of product, in liters; and

- (D) Percent VOC by weight shall be calculated according to the following equation:

$$\% \text{ VOC by weight} = [(W_v / W)] \times 100$$

Where

$W_v$  = weight of VOCs in grams  
 $W$  = weight of product in grams

(3) The following procedures shall be used to determine the properties of the specified adhesives, sealants, primers, solvents or components thereof in order to perform the calculations required pursuant to subdivision (2) of this subsection or to verify calculations based on formulation data:

- (A) Except as provided in subparagraphs (C), (D) and (E) of this subdivision, the VOC and solids content of all adhesives, adhesive primers, sealants, sealant primers, surface preparation solvents and cleanup solvents shall be determined using 40 CFR 60, Appendix A, Reference Method 24, or SCAQMD Method 304;
- (B) The volatile organic content of exempt organic compounds shall be determined using ASTM D4457-85 or the most current version of such test, as applicable;
- (C) The VOC content of any plastic welding cement adhesive or primer shall be determined using SCAQMD Method 316A;
- (D) The amount of reactive diluent in a product shall be determined using SCAQMD Method 316A;
- (E) The composite vapor pressure of volatile organic compounds in surface preparation solvents and cleanup solvents shall be determined by quantifying the amount of each compound in the blend using gas chromatographic analysis (ASTM E 260-96 or its most current replacement test) for organics and ASTM D3792-91 or the most current version of such test, for water content, as applicable, and the following equation:

$$P_{pc} = \left[ \sum_{i=1}^n (W_i)(V_{pi}) / M_{wi} \right] / \left[ (W_w / M_{ww}) + \sum_{i=1}^n (W_e / M_{we}) + \sum_{i=1}^n (W_i / M_{wi}) \right]$$

Where

$P_{pc}$  = VOC composite partial pressure at 20 degrees C, in mmHg

$W_i$  = Weight of the "i"th VOC compound, in grams, as determined by ASTM E 260-96 or the most current version of such test

$V_{pi}$  = Vapor pressure of the "i"th VOC compound at 20 degrees C, in mmHg, as determined by subparagraph (F) of this subdivision

$M_{wi}$  = Molecular weight of the "i"th VOC compound, in grams per g-mole, as given in chemical reference literature

$W_w$  = Weight of water, in grams as determined by ASTM D 3792-91 or the most current version of such test

$M_{ww}$  = Molecular weight of water, 18 grams per g-mole

$W_e$  = Weight of the "i"th exempt compound, in grams, as determined by ASTM E 260-91 or the most current version of such test

$M_{we}$  = Molecular weight of the "i"th exempt compound, in grams per g-mole, as given in chemical reference literature

- (F) The vapor pressure of each single component compound may be determined from ASTM D2879-86, or the most current version of such test, or may be obtained from any of the following sources:
- (i) The most recent edition of *The Vapor Pressure of Pure Substances*, Boublik, Fried, and Hala, eds., Elsevier Scientific Publishing Company, New York,
  - (ii) The most recent edition of *Perry's Chemical Engineer's Handbook*, McGraw-Hill Book Company,
  - (iii) The most recent edition of *CRC Handbook of Chemistry and Physics*, Chemical Rubber Publishing Company,
  - (iv) The most recent edition of *Lange's Handbook of Chemistry*, John Dean, editor, McGraw-Hill Book Company, or
  - (v) Additional sources approved for this purpose by the Commissioner.

(4) The active and passive solvent losses from spray gun cleaning systems shall be determined using SCAQMD's "General Test Method for Determining Solvent Losses from Spray Gun Cleaning Systems," dated October 3, 1989. The test solvent for this determination shall be

any lacquer thinner with a minimum vapor pressure of 105 mm of Hg at 20 degrees Celsius, and the minimum test temperature shall be 15 degrees Celsius.

(5) Control device efficiency shall be measured in accordance with 40 CFR 60 Appendix A, Reference Methods 18, 25, 25A and 25B or CARB Method 100.

(6) If the organization responsible for preparing any reference or test method identified in this subsection replaces that method with an equivalent method, then either the identified method or its replacement may be used for the purposes of this section.

**(f) Record keeping and reporting requirements.**

(1) Except as provided in subsection (c)(8) of this section, or except if add-on air pollution control equipment is used to comply with the VOC content limits of Tables 44-1 or 44-2 of this section, as provided in subsection (d)(6) of this section, and records are maintained as required in subsection (f)(2) of this section, each person subject to this section shall maintain records of the information necessary and sufficient for the Commissioner to determine compliance with the applicable requirements of this section. Such information may include:

- (A) A list of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent in use and in storage;
- (B) Identification of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent by product name and description;
- (C) The VOC content of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent product as supplied;
- (D) The mix ratio of any catalysts, reducers or other components used;
- (E) The final VOC content or vapor pressure of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent, as applied; or
- (F) The monthly volume of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent or surface preparation solvent used.

(2) Any person who complies with the VOC content limits of Table 44-1 or Table 44-2 of this section through the use of add-on air pollution control equipment shall record the key operating parameters for the control equipment, including but not limited to, the following information:

- (A) The volume used per day of each adhesive, sealant, adhesive primer, sealant primer or solvent that is subject to a VOC content limit in Table 44-1 or Table 44-2 of this section and that exceeds such a limit;
- (B) On a daily basis, the combustion temperature, inlet and exhaust gas temperatures and control device efficiency, as appropriate, pursuant to subsection (d)(6) of this section;

- (C) Daily hours of control equipment operation;
- (D) All maintenance performed on control equipment including the date and type of maintenance; and
- (E) Records documenting that such equipment is operated in compliance with the control and capture efficiency requirement of subsection (d)(6) of this section.

(3) All records made to determine compliance with this section shall be maintained on the premises for five years from the date such record is created and shall be made available to the Commissioner within 90 days of a request.

(4) For adhesives, sealants, adhesive primers and sealant primers subject to the laboratory testing exemption of subsection (c)(1)(A) of this section, the person conducting the testing shall make and maintain records of all such adhesives, sealants, primers and solvents used in the preparation or evaluation process, including, as appropriate, the product name, manufacturer and description.

(5) Upon written notice, the Commissioner may require any person subject to this section to report information sufficient to determine compliance with the applicable requirements of this section.

(6) Any document submitted to the Commissioner pursuant to this section shall include a certification signed by an individual identified in section 22a-174-2a(a)(1) of the Regulations of Connecticut State Agencies, and by the individual or individuals responsible for actually preparing such document, each of whom shall examine and be familiar with the information submitted in the document and all attachments thereto, and shall make inquiry of those individuals responsible for obtaining the information to determine that the information is true, accurate, and complete, and each of whom shall certify in writing as follows:

“I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that any false statement made in the submitted information may be punishable as a criminal offense under section 22a-175 of the Connecticut General Statutes, under section 53a-157b of the Connecticut General Statutes, and in accordance with any applicable statute.”

**(g) Container labeling.**

(1) As of July 1, 2008, each manufacturer of an adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section shall display the following information on the container or label for such adhesive, sealant, adhesive primer or sealant primer:

- (A) The category name of the product;

- (B) A statement of the manufacturer's recommendation regarding thinning, reducing or mixing, where:
    - (i) A statement is not required for thinning, reducing or mixing with water, and
    - (ii) If thinning prior to use is not necessary, the recommendation shall specify that the product is to be applied as supplied;
  - (C) The maximum or the actual VOC content as supplied, displayed in grams of VOC per liter of product; and
  - (D) The maximum or the actual VOC content as applied in accordance with the manufacturer's recommendation regarding thinning, reducing or mixing, displayed in grams of VOC per liter of applied product.
- (2) The VOC content of an adhesive, sealant, adhesive primer or sealant primer shall be calculated using the manufacturer's formulation data or determined using the calculations, procedures and test methods in subsection (e) of this section.
- (3) Any person applying an adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Tables 44-1 or 44-2 of this section may rely on the manufacturer's representation on the container or label, if such product is applied as recommended for a use specified on the container or label.

**Table 44-1. As Applied VOC Content Limits for Adhesives, Sealants,  
Adhesive Primers and Sealant Primers**

Adhesive, sealant, adhesive primer or sealant primer category	As applied VOC content limit (grams VOC per liter)
<i>Adhesives</i>	
ABS welding	400
Ceramic tile installation	130
Computer diskette jacket manufacturing	850
Contact bond	250
Cove base installation	150
CPVC welding	490
Indoor floor covering installation	150
Metal-to-elastomer molding or casting	850
Multipurpose construction	200
Nonmembrane roof installation or repair	300
Plastic cement welding	510
Outdoor floor covering installation	250
PVC welding	510
Single-ply roof membrane installation or repair	250
Structural glazing	100
Thin metal laminating	780
Tire retread	100
Perimeter bonded sheet vinyl flooring installation	660
Waterproof resorcinol glue	170
Sheet-applied rubber installation	850
<i>Sealants</i>	
Architectural	250
Marine deck	760
Nonmembrane roof installation or repair	300
Roadway	250
Single-ply roof membrane	450
Other	420
<i>Adhesive primers</i>	
Automotive glass	700
Plastic cement welding	650
Single-ply roof membrane	250
Traffic marking tape	150
Other	250
<i>Sealant primers</i>	
Non-porous architectural	250
Porous architectural	775
Marine deck	760
Other	750

**Table 44-2. As Applied VOC Content Limits for Adhesives Applied to the Listed Substrate**

Substrate	As applied VOC content limit (grams VOC per liter)
Flexible vinyl	250
Fiberglass	200
Metal	30
Porous material	120
Rubber	250
Other substrates	250

**Statement of Purpose:** This new section of the air quality regulations limits emissions of volatile organic compounds (VOCs) from adhesives, sealants and primers. This section achieves VOC reductions through two basic components: sale and manufacture restrictions that limit the VOC content of specified adhesives, sealants and primers sold in the state; and use restrictions that apply primarily to commercial/industrial operations such as wood product manufacturers, upholstery shops, adhesives retailers and architectural trades, such as building construction, floor covering installation and roof repair. By reducing the availability of higher VOC content adhesives and sealants within the state, the sales prohibition is also intended to address adhesive and sealant usage at area sources. In addition to the VOC content limits and use requirements, this section includes requirements for cleanup and preparation solvents and a compliance alternative in the form of add-on air pollution control equipment.

This section is based on a model rule of the Ozone Transport Commission, which is, in turn, based on a reasonably available control technology determination prepared by the California Air Resources Board (CARB) in 1998. In the years 1998-2001, the provisions of the CARB determination were adopted in regulatory form in various air pollution control districts in California.

The associated emissions reductions, which are estimated to be nearly 4 tons per summer day, will support attainment of the 8-hour national ambient air quality standard.

## ATTACHMENT 3

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**ATTACHMENT 4**

**Final Text  
RCSA Section 22a-174-44**

The Regulations of Connecticut State Agencies are amended by adding section 22a-174-44, as follows:

**(NEW)**

**Section 22a-174-44 Adhesives and sealants.**

**(a) Definitions.** For the purposes of this section, the following definitions shall apply:

“Acrylonitrile-butadiene-styrene welding adhesive” or “ABS welding adhesive” means any adhesive intended by the manufacturer to weld acrylonitrile-butadiene-styrene pipe, which is made by reacting monomers of acrylonitrile, butadiene and styrene.

“Adhesive” means any chemical compound, although typically “adhesives” are organic polymers, that is applied for the purpose of bonding two surfaces together by other than mechanical means.

“Adhesive primer” means any product intended by the manufacturer for application to a substrate, prior to the application of an adhesive, to enhance the bonding surface.

“Aerosol adhesive” means an adhesive packaged as an aerosol in which the spray mechanism is permanently housed in a non-refillable can designed for handheld application without ancillary hoses or spray equipment.

“Aerospace component” means the fabricated part, assembly of parts or completed unit of any aircraft, helicopter, missile or space vehicle, including passenger safety equipment.

“Architectural” means pertaining 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.

“As applied” means the composition of an adhesive, sealant or primer at the time it is applied to a substrate, including any solvent, catalyst or other substance added to the as supplied adhesive, sealant or primer.

“As supplied” means the composition of an adhesive, sealant or primer as sold to a retail customer. For multi-component adhesives, sealants or primers, “as supplied” means the composition after the component parts are combined as specified by the manufacturer and before the addition, at the user’s initiative, of any ancillary substances.

“Automotive glass adhesive primer” means an adhesive primer intended by the manufacturer to be applied to automotive glass prior to installation of the glass using an adhesive. “Automotive glass adhesive primer” improves the adhesion to the pinch weld and blocks ultraviolet light.

“CARB” means the California Air Resources Board.

“Ceramic tile installation adhesive” means any adhesive intended for use in the installation of ceramic tiles.

“Chlorinated polyvinyl chloride welding adhesive” or “CPVC welding adhesive” means any adhesive intended for welding of CPCV plastic pipe.

“Cleanup solvent” means a VOC-containing solvent used to remove a loosely held uncured adhesive or sealant from a substrate or to clean equipment used in applying an adhesive, a sealant or a primer.

“Computer diskette jacket manufacturing adhesive” means any adhesive intended by the manufacturer to glue the fold-over flaps to the body of a vinyl computer diskette jacket.

“Contact bond adhesive” means any adhesive that forms an instantaneous, non-repositionable bond when substrates, on which the adhesive was applied and allowed to dry, are brought together using momentary pressure. “Contact bond adhesive” does not include rubber cements that are primarily intended for use on paper substrates or vulcanizing fluids designed and labeled for tire repair only.

“Cove base” means a flooring trim unit, generally made of vinyl or rubber, having a concave radius on one edge and a convex radius on the opposite edge that is used in forming a junction between the bottom wall course and the floor or in forming an inside corner.

“Cove base installation adhesive” means any adhesive intended by the manufacturer for the installation of cove base or wall base on a wall or vertical surface at floor level.

“Cyanoacrylate adhesive” means any single-component reactive diluent adhesive that contains at least 85% by weight methyl, ethyl, methoxymethyl or other functional groupings of cyanoacrylate.

“Exempt compound” means compounds of carbon excluded from the definition of “VOC” in section 22a-174-1 of the Regulations of Connecticut State Agencies.

“Flexible vinyl” means non-rigid polyvinyl chloride plastic with at least five percent, by weight, plasticizer content.

“Fiberglass” means a material made of extremely fine filaments of glass.

“Indoor floor covering installation adhesive” means any adhesive intended by the manufacturer for use in the installation of finish surface wood flooring, carpet, resilient tile, vinyl tile, vinyl backed carpet, resilient sheet and roll or artificial grass. Adhesive used to install ceramic tile or perimeter bonded sheet vinyl flooring is not “indoor floor covering installation adhesive.”

“Laminate” means a material made by bonding two or more sheets or layers.

“Low-solids adhesive, sealant or primer” means any adhesive, sealant or primer product that contains 120 grams or less of solids per liter of product.

“Marine deck sealant” or “marine deck sealant primer” means any sealant or sealant primer intended by the manufacturer for application to wooden marine decks.

“Medical equipment manufacturing” means the manufacture of medical devices, such as, but not limited to, catheters, heart valves, blood cardioplegia machines, tracheostomy tubes, blood oxygenators or cardiatory reservoirs.

“Metal-to-elastomer molding or casting adhesive” means any adhesive intended by the manufacturer to bond metal to rubber or urethane elastomers using a heated molding or casting process in order to fabricate products.

“Multipurpose construction adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of various construction materials, including, but not limited to, dry wall, subfloor, panel, fiberglass reinforced plastic, ceiling tile or acoustical tile.

“Nonmembrane roof installation or repair adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of nonmembrane roofs, including, but not limited to, plastic or asphalt roof cement, asphalt roof coating or cold application cement. Adhesive intended for use in the installation of pre-fabricated single-ply roof membrane is not “nonmembrane roof installation or repair adhesive.”

“Outdoor floor covering installation adhesive” means any adhesive intended by the manufacturer for use in the installation of floor covering that is not in an enclosure and that is exposed to ambient weather conditions during normal use.

“Panel installation” means the installation of plywood, pre-decorated hardboard (or tileboard), fiberglass reinforced plastic, or similar pre-decorated or non-decorated panels to studs or solid surfaces using an adhesive formulated for that purpose.

“Perimeter bonded sheet vinyl flooring installation” means the installation of sheet flooring with vinyl backing onto a nonporous substrate using an adhesive designed to be applied only to a strip no more than four inches wide around the perimeter of the sheet flooring.

“Plastic cement welding adhesive” means any adhesive intended by the manufacturer for use to dissolve the surface of plastic to form a bond between mating surfaces.

“Plastic cement welding primer” means any primer intended by the manufacturer for use to prepare plastic substrates prior to bonding or welding.

“Plasticizer” means any substance, such as a high boiling point organic solvent, that is added to a hard plastic to provide flexibility or pliability.

“Polyvinyl chloride welding adhesive” or “PVC welding adhesive” means any adhesive intended by the manufacturer for use in the welding of PVC plastic pipe.

“Porous material” means wood, paper, corrugated paperboard or other solid that has tiny openings, often microscopic, in which fluids may be absorbed or discharged.

“Reactive diluent” means a liquid reactant in an uncured adhesive, sealant or primer that reacts chemically or physically during the curing process to become an integral part of the cured adhesive, sealant or primer.

“Roadway sealant” means any sealant intended by the manufacturer for application to public streets, highways and other surfaces, including, but not limited to, curbs, berms, driveways or parking lots.

“Rubber” means any natural or manmade elastomer, including, but not limited to, styrene-butadiene rubber, polychloroprene (neoprene), butyl rubber, nitrile rubber, chlorosulfonated polyethylene or ethylene propylene diene terpolymer.

“SCAQMD” means the South Coast Air Quality Management District, a part of the California Air Resources Board, which is responsible for the regulation of air quality in the State of California.

“Sealant primer” means any product intended by the manufacturer for application to a substrate, prior to the application of a sealant, to enhance the bonding surface.

“Sealant” means any material with adhesive properties that is formulated primarily to fill, seal, waterproof or weatherproof gaps or joints between two surfaces. Sealers and other materials that are applied to a single substrate to protect or decorate are not “sealants.”

“Sheet-applied rubber installation” means the process of applying sheet rubber liners by hand to metal or plastic substrates to protect the underlying substrate from corrosion or abrasion, inclusive of the process of laminating sheet rubber to fabric by hand.

“Single-ply roof membrane” means a prefabricated single sheet of compounded synthetic material such as ethylene propylenediene monomer, polyvinyl chloride, thermal polyolefin or ketone ethylene ester that is applied in a single layer to a building roof.

“Single-ply roof membrane installation or repair adhesive” means any adhesive intended by the manufacturer for use in the installation or repair of single-ply roof membrane.

“Single-ply roof membrane adhesive primer” means any primer intended by the manufacturer for use to clean and promote adhesion of the single-ply roof membrane seams or splices prior to bonding.

“Single-ply roof membrane sealant” means any sealant intended by the manufacturer for application to single-ply roof membrane.

“Solvent” means any organic compounds that are used as diluents, thinners, dissolvers, viscosity reducers, cleaning agents or other related uses.

“Structural glazing adhesive” means any adhesive intended by the manufacturer to apply glass, ceramic, metal, stone or composite panels to exterior building frames.

“Surface preparation solvent” means a solvent used to remove dirt, oil and other contaminants from a substrate prior to the application of a primer, adhesive or sealant.

“Thin metal laminating adhesive” means any adhesive intended by the manufacturer for use in bonding multiple layers of metal to metal or metal to plastic, in the production of electronic or magnetic components, in which the thickness of the bond line(s) is less than 0.25 mils.

“Tire repair” means a process that includes expanding a hole, tear, fissure or blemish in a tire casing by grinding or gouging, applying adhesive and filling the hole or crevice with rubber.

“Tire retread adhesive” means any adhesive intended by the manufacturer for application to the back of pre-cure tread rubber and to the casing and cushion rubber. “Tire retread adhesive” may also be used to seal buffed tire casings to prevent oxidation while the tire is being prepared for a new tread.

“Traffic marking tape” means preformed reflective film intended by the manufacturer for application to streets, highways and other surfaces where pavement markings are desired, including, but not limited to, curbs, berms, driveways and parking lots.

“Traffic marking tape adhesive primer” means any primer intended by the manufacturer for application to a substrate prior to installation of traffic marking tape.

“Twelve-month rolling aggregate” means the amount of adhesives, sealants, primers or solvents used in a twelve-month period, calculated each month by adding the current month’s adhesive, sealant, primer or solvent use to the amount used in each of the previous eleven months.

“Undersea-based weapons systems components” means the fabrication of parts, assembly of parts or completed units of any portion of a missile launching system used on submarines.

“Waterproof resorcinol glue” means a two-part resorcinol-resin-based adhesive intended for continuous water immersion.

**(b) Applicability.**

(1) Except as provided in subsection (c) of this section, this section applies to any person who, on or after January 1, 2009, sells, supplies or offers for sale for use in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section.

(2) Except as provided in subsection (c) of this section, this section applies to any person who, on or after January 1, 2009, manufactures for sale for use in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section.

(3) Except as provided in subsection (c) of this section, this section applies to any person who, on or after January 1, 2009, uses or applies within the State of Connecticut, or solicits the use or application of within the State of Connecticut, any adhesive, sealant, adhesive primer or sealant primer with an applicable VOC content limit in either Table 44-1 or Table 44-2 of this section.

**(c) Exemptions and exceptions.**

(1) The requirements of this section shall not apply, except as otherwise noted, to the manufacture, sale or use of the following adhesives, sealants, adhesive primers, sealant primers or solvents:

- (A) Adhesives, sealants, adhesive primers or sealant primers being tested or evaluated in any research and development, quality assurance or analytical laboratory, provided that records are maintained as specified in subsection (f)(4) of this section;
  - (B) Adhesives or sealants that contain less than 20 grams of VOC per liter of adhesive or sealant, less water and exempt compounds, as applied;
  - (C) Cyanoacrylate adhesives;
  - (D) Aerosol adhesives;
  - (E) Adhesives, sealants, adhesive primers or sealant primers that are sold or supplied by the manufacturer or supplier in containers with a net volume of 16 fluid ounces or less, or a net weight of one pound or less, except plastic cement welding adhesives and contact bond adhesives;
  - (F) Adhesives, sealants, adhesive primers and sealant primers that are subject to a VOC content limit in section 22a-174-40 of the Regulations of Connecticut State Agencies;
  - (G) Contact bond adhesives that are sold or supplied by the manufacturer or supplier in a container with a net volume of one gallon or less; or
  - (H) Adhesives, cleanup solvents and surface preparation solvents used in the assembly, repair and manufacture of submarines, when the use of a noncomplying adhesive or solvent is necessary to meet military performance specifications, provided that records of the use of such noncompliant adhesives or solvents are maintained in accordance with subsection (f)(1) of this section.
- (2) The requirements of this section shall not apply to the use of adhesives, sealants, adhesive primers, sealant primers, surface preparation solvent and cleanup solvent in the following operations:
- (A) Tire repair operations, provided the label of the adhesive states "**For tire repair only**;"
  - (B) Assembly, repair or manufacture of undersea-based weapon systems;
  - (C) Assembly, repair or manufacture of aerospace components;
  - (D) Manufacture of medical equipment;
  - (E) Metal cleaning performed in accordance with section 22a-174-20(l) of the Regulations of Connecticut State Agencies; or
  - (F) Plaque laminating operations in which adhesives are used to bond clear, polyester acetate laminate to wood with lamination equipment installed prior to July 1,



1992. Any person claiming exemption pursuant to this subparagraph shall record and maintain monthly operational records sufficient to demonstrate compliance with this exemption and in accordance with subsection (f) of this section.

(3) The provisions of this section shall not apply to the use of adhesives, sealants, adhesive primers or sealant primers at a facility if the total VOC emissions from all adhesives, sealants, adhesive primers and sealant primers used at the facility are less than 200 pounds, or an equivalent volume, per any twelve-month rolling aggregate. Emissions from cold cleaning units, vapor degreasers and aerosol products shall not be included in determining the total VOC emissions. Any person claiming exemption pursuant to this subparagraph shall record and maintain monthly operational records sufficient to demonstrate continued eligibility for this exemption and in accordance with subsection (f) of this section, as applicable.

(4) The VOC content limits in Tables 44-1 and 44-2 and the requirements of subsections (d)(7) and (d)(8) of this section shall not apply to the use of any adhesives, sealants, adhesive primers, sealant primers, cleanup solvents and surface preparation solvents provided the total volume of noncomplying adhesives, sealants, primers, cleanup and surface preparation solvents applied facility-wide does not exceed 55 gallons per any twelve-month rolling aggregate. Any person claiming exemption pursuant to this subdivision shall record and maintain monthly operational records sufficient to demonstrate compliance with this exemption and in accordance with subsection (f) of this section.

(5) This section shall not apply to any manufacturer or distributor who sells, supplies or offers for sale in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer that does not comply with the VOC content limits specified in Table 44-1 of this section provided that such manufacturer or distributor makes and keeps records demonstrating:

- (A) The adhesive, sealant, adhesive primer or sealant primer is intended for shipment and use outside of the State of Connecticut; and
- (B) The manufacturer or distributor has taken reasonable precautions to assure that the adhesive, sealant, adhesive primer or sealant primer is not distributed to or within the State of Connecticut.

(6) Subdivision (5) of this subsection shall not apply to any manufacturer or distributor who sells, supplies or offers for sale any adhesive, sealant, adhesive primer or sealant primer to a retail outlet in the State of Connecticut.

(7) The VOC content limits of Table 44-1 of this section shall not apply to the sale of any adhesive, sealant, adhesive primer or sealant primer to a person using add-on air pollution control equipment to control emissions of VOC from such adhesive, sealant, adhesive primer or sealant primer at the stationary source, if the add-on air pollution control equipment meets the requirements of subsection (d)(6) of this section.

(8) This section shall not apply to the use of any adhesive, sealant, adhesive primer, sealant primer, cleanup solvent or surface preparation solvent at a private residence for non-commercial purposes.

(9) The requirements of this section shall not apply to any adhesive, sealant, adhesive primer, sealant primer, cleanup solvent or surface preparation solvent that is distributed or transferred by a branch of the United States military to, from or within a premises operated by that branch of the United States military.

(10) The requirements of this section shall apply to the use of single-ply roof membrane installation or repair adhesive, single-ply roof membrane sealant and single-ply roof membrane adhesive primer on the following schedule:

- (A) For the year 2009, from June 1 through August 31;
- (B) For the years 2010 and 2011, from May 1 through September 30; and
- (C) On and after January 1, 2012.

(11) The requirements of this section shall not apply to any manufacturer or distributor who sells, supplies or offers for sale any single-ply roof membrane installation or repair adhesive, single-ply roof membrane sealant or single-ply roof membrane adhesive primer prior to January 1, 2012.

**(d) Standards.**

(1) Except as provided in subsections (c) and (d)(6) of this section, on or after January 1, 2009, no person shall sell, supply or offer for sale for use in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer manufactured on or after January 1, 2009 unless such adhesive, sealant, adhesive primer or sealant primer complies with the applicable VOC content limits specified in Table 44-1 of this section and the applicable requirements of this subsection.

(2) Except as provided in subsections (c) and (d)(6) of this section, on or after January 1, 2009, no person shall manufacture for sale for use in the State of Connecticut any adhesive, sealant, adhesive primer or sealant primer unless such adhesive, sealant, adhesive primer or sealant primer complies with the applicable VOC content limits specified in Table 44-1 of this section and the applicable requirements of this subsection.

(3) Except as provided in subsections (c)(1) through (c)(4), (c)(7), (c)(9), (c)(10), (c)(11) and (d)(6) of this section, on or after January 1, 2009, no person shall use or apply, or solicit the use or application of, any adhesive, sealant, adhesive primer or sealant primer within the State of Connecticut unless such adhesive, sealant, adhesive primer or sealant primer as applied complies with the applicable VOC content limits specified in Table 44-1 or Table 44-2 of this section and the applicable requirements of this subsection.

(4) For adhesives, the VOC content limits of Tables 44-1 and 44-2 of this section shall apply as follows:

- (A) If a person uses an adhesive subject to a specific VOC content limit in Table 44-1, such specific limit shall apply, and no limit in Table 44-2 shall apply; and

- (B) If an adhesive is not listed in Table 44-1, a VOC content limit in Table 44-2 shall apply based on the substrate bonded by the adhesive. If an adhesive is used to bond two different substrates together, the substrate assigned the higher VOC content limit shall apply to such use.
- (5) Any person using adhesives, sealants, adhesive primers, sealant primers, surface preparation solvents or clean-up solvents subject to this section shall store or dispose of all absorbent materials, such as cloth or paper, which are moistened with such adhesives, sealants, primers or solvents, in non-absorbent containers that shall be closed except when placing materials in or removing materials from the container.
- (6) A person using an adhesive, sealant, adhesive primer or sealant primer subject to this section may comply with the VOC content limits of Tables 44-1 and 44-2 of this section using add-on air pollution control equipment if such equipment meets the following requirements:
- (A) The VOC emissions from the use of all adhesives, sealants, adhesive primers or sealant primers subject to this section are reduced by an overall capture and control efficiency of at least 85%, by weight;
  - (B) The combustion temperature is monitored continuously if a thermal incinerator is operated;
  - (C) Inlet and exhaust gas temperatures are monitored continuously if a catalytic incinerator is operated;
  - (D) The VOC concentration of the inlet and exhaust gas is measured continuously if a carbon absorber or control device other than a thermal or catalytic incinerator is operated; and
  - (E) Operational records sufficient to demonstrate compliance with the requirements of this subdivision are maintained as required by subsection (f) of this section.
- (7) Any person using a surface preparation solvent shall:
- (A) Except as provided in subparagraph (B) of this subdivision for single-ply roofing, limit the VOC content of surface preparation solvent used to less than 70 grams per liter; or
  - (B) If a surface preparation solvent is used in applying single-ply roofing, limit the composite vapor pressure, excluding water and exempt compounds, of the surface preparation solvent used to less than or equal to 45 mmHg at 20 degrees Celsius.
- (8) Any person using a cleanup solvent shall:
- (A) Except as provided in subparagraph (B) of this subdivision, limit the composite vapor pressure of a cleanup solvent to less than 45 mmHg at 20 degrees Celsius; or

- (B) When cleaning spray application equipment, perform the removal of an adhesive, sealant, adhesive primer or sealant primer from the parts of spray application equipment in accordance with either subparagraph (i) or (ii), as follows:
- (i) In an enclosed cleaning system, or equivalent cleaning system as determined by the test method identified in subsection (e)(4) of this section, or
  - (ii) Using a solvent with a VOC content less than or equal to 70 grams of VOC per liter. As necessary, parts containing dried adhesive may be soaked in a solvent if the composite vapor pressure of the solvent, excluding water and exempt compounds, is less than or equal to 9.5 mmHg at 20 degrees Celsius, and the parts and solvent are in a closed container that remains closed except when adding parts to or removing parts from the container.

(9) No person who applies or solicits the application of any adhesive, sealant, adhesive primer or sealant primer subject to this section shall add solvent to such adhesive, sealant or primer in an amount in excess of the manufacturer's recommendation for application, if such addition causes the adhesive, sealant or primer to exceed the applicable VOC content limit of this section.

**(e) Compliance procedures and test methods.**

(1) Any person who sells, supplies, offers for sale or manufactures an adhesive, sealant, adhesive primer or sealant primer subject to this section on or after January 1, 2009 for sale in the State of Connecticut shall possess documentation that such adhesive, sealant, adhesive primer or sealant primer complies with the VOC content limits of Table 44-1 of this section, where the VOC content is determined according to the requirements of subdivisions (2) and (3) of this subsection. For single-ply roof membrane installation or repair adhesive, single-ply roof membrane sealant and single-ply roof membrane adhesive primer, such documentation is required on and after January 1, 2012.

(2) The VOC content (grams per liter and percent by weight) of adhesive, sealant, primer and solvent products subject to this section, shall be determined according to the following calculations:

- (A) For products that do not contain reactive diluents, grams of VOC per liter of product thinned to the manufacturer's recommendation, less water and exempt compounds, shall be calculated according to the following equation:

$$\text{Grams of VOC per liter of product} = \frac{W_s - W_w - W_e}{V_m - V_w - V_e}$$

Where

$W_s$	=	weight of volatile compounds, in grams
$W_w$	=	weight of water, in grams
$W_e$	=	weight of exempt compounds, in grams
$V_m$	=	volume of product, as supplied, in liters

$V_w$  = volume of water, in liters  
 $V_e$  = volume of exempt compounds, in liters;

- (B) For products that contain reactive diluents, the VOC content of the product is determined after curing. The grams of VOC per liter of product thinned to the manufacturer's recommendation, less water and exempt compounds, shall be calculated according to the following equation:

$$\text{Grams of VOC per liter of product} = \frac{W_{rs} - W_{rw} - W_{re}}{V_{rm} - V_{rw} - V_{re}}$$

Where

$W_{rs}$  = weight of volatile compounds not consumed during curing, in grams  
 $W_{rw}$  = weight of water not consumed during curing, in grams  
 $W_{re}$  = weight of exempt compounds not consumed during curing, in grams  
 $V_{rm}$  = volume of product, as supplied, not consumed during curing, in liters  
 $V_{rw}$  = volume of water not consumed during curing, in liters  
 $V_{re}$  = volume of exempt compounds not consumed during curing, in liters;

- (C) Grams of VOC per liter of product thinned to the manufacturer's recommendation shall be calculated according to the following equation:

$$\text{Grams of VOC per liter of product} = \frac{W_s - W_w - W_e}{V_m}$$

Where

$W_s$  = weight of volatile compounds, in grams  
 $W_w$  = weight of water, in grams  
 $W_e$  = weight of exempt compounds, in grams  
 $V_m$  = volume of product, in liters; and

- (D) Percent VOC by weight shall be calculated according to the following equation:

$$\% \text{ VOC by weight} = [(W_v / W)] \times 100$$

Where

$W_v$  = weight of VOCs in grams  
 $W$  = weight of product in grams

- (3) The following procedures shall be used to determine the properties of the specified adhesives, sealants, primers, solvents or components thereof in order to perform the calculations required pursuant to subdivision (2) of this subsection or to verify calculations based on formulation data:

- (A) Except as provided in subparagraphs (C), (D) and (E) of this subdivision, the VOC and solids content of all adhesives, adhesive primers, sealants, sealant primers, surface preparation solvents and cleanup solvents shall be determined using 40 CFR 60, Appendix A, Reference Method 24, or SCAQMD Method 304;
- (B) The volatile organic content of exempt organic compounds shall be determined using ASTM D4457-02 or the most current version of such test, as applicable;
- (C) The VOC content of any plastic welding cement adhesive or primer shall be determined using SCAQMD Method 316A;
- (D) The amount of reactive diluent in a product shall be determined using SCAQMD Method 316A;
- (E) The composite vapor pressure of volatile organic compounds in surface preparation solvents and cleanup solvents shall be determined by quantifying the amount of each compound in the blend using gas chromatographic analysis (ASTM E260-96(2006) or the most current version of such test) for organics and ASTM D3792-05 or the most current version of such test, for water content, as applicable, and the following equation:

$$P_{pc} = \left[ \sum_{i=1}^n (W_i)(V_{pi}) / M_{wi} \right] / \left[ (W_w / M_{ww}) + \sum_{i=1}^n (W_e / M_{we}) + \sum_{i=1}^n (W_i / M_{wi}) \right]$$

Where

$P_{pc}$  = VOC composite partial pressure at 20 degrees C, in mmHg

$W_i$  = Weight of the "i"th VOC compound, in grams, as determined by ASTM E260-96(2006) or the most current version of such test

$V_{pi}$  = Vapor pressure of the "i"th VOC compound at 20 degrees C, in mmHg, as determined by subparagraph (F) of this subdivision

$M_{wi}$  = Molecular weight of the "i"th VOC compound, in grams per g-mole, as given in chemical reference literature

$W_w$  = Weight of water, in grams as determined by ASTM D3792-05 or the most current version of such test

$M_{ww}$  = Molecular weight of water, 18 grams per g-mole

$W_e$  = Weight of the "i"th exempt compound, in grams, as determined by ASTM E260-96(2006) or the most current version of such test

$M_{we}$  = Molecular weight of the "i"th exempt compound, in grams per g-mole, as given in chemical reference literature

- (F) The vapor pressure of each single component compound may be determined from ASTM D2879-97(2007), or the most current version of such test, or may be obtained from any of the following sources:
- (i) The most recent edition of *The Vapor Pressure of Pure Substances*, Boublik, Fried, and Hala, eds., Elsevier Scientific Publishing Company, New York,
  - (ii) The most recent edition of *Perry's Chemical Engineer's Handbook*, McGraw-Hill Book Company,
  - (iii) The most recent edition of *CRC Handbook of Chemistry and Physics*, Chemical Rubber Publishing Company,
  - (iv) The most recent edition of *Lange's Handbook of Chemistry*, John Dean, editor, McGraw-Hill Book Company, or
  - (v) Additional sources approved for this purpose by the Commissioner.

(4) The active and passive solvent losses from spray gun cleaning systems shall be determined using SCAQMD's "General Test Method for Determining Solvent Losses from Spray Gun Cleaning Systems," dated October 3, 1989. The test solvent for this determination shall be any lacquer thinner with a minimum vapor pressure of 105 mm of Hg at 20 degrees Celsius, and the minimum test temperature shall be 15 degrees Celsius.

(5) Control device efficiency shall be measured in accordance with 40 CFR 60 Appendix A, Reference Methods 18, 25, 25A and 25B or CARB Method 100.

(6) If the organization responsible for preparing any reference or test method identified in this subsection replaces that method with an equivalent method, then either the identified method or its replacement may be used for the purposes of this section.

**(f) Record keeping and reporting requirements.**

(1) Except as provided in subsection (c)(8) of this section, or except if add-on air pollution control equipment is used to comply with the VOC content limits of Tables 44-1 or 44-2 of this section, as provided in subsection (d)(6) of this section, and records are maintained as required in subsection (f)(2) of this section, each person subject to this section shall maintain records of the information necessary and sufficient for the Commissioner to determine compliance with the applicable requirements of this section. Such information may include:

- (A) A list of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent in use and in storage;
- (B) Identification of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent by product name and description;
- (C) The VOC content of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent product as supplied;

- (D) The mix ratio of any catalysts, reducers or other components used;
  - (E) The final VOC content or vapor pressure of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent and surface preparation solvent, as applied; or
  - (F) The monthly volume of each adhesive, sealant, adhesive primer, sealant primer, cleanup solvent or surface preparation solvent used.
- (2) Any person who complies with the VOC content limits of Table 44-1 or Table 44-2 of this section through the use of add-on air pollution control equipment shall record the key operating parameters for the control equipment, including but not limited to, the following information:
- (A) The volume used per day of each adhesive, sealant, adhesive primer, sealant primer or solvent that is subject to a VOC content limit in Table 44-1 or Table 44-2 of this section and that exceeds such a limit;
  - (B) On a daily basis, the combustion temperature, inlet and exhaust gas temperatures and control device efficiency, as appropriate, pursuant to subsection (d)(6) of this section;
  - (C) Daily hours of control equipment operation;
  - (D) All maintenance performed on control equipment including the date and type of maintenance; and
  - (E) Records documenting that such equipment is operated in compliance with the control and capture efficiency requirement of subsection (d)(6) of this section.
- (3) All records made to determine compliance with this section shall be maintained on the premises for five years from the date such record is created and shall be made available to the Commissioner within 90 days of a request.
- (4) For adhesives, sealants, adhesive primers and sealant primers subject to the laboratory testing exemption of subsection (c)(1)(A) of this section, the person conducting the testing shall make and maintain records of all such adhesives, sealants, primers and solvents used in the preparation or evaluation process, including, as appropriate, the product name, manufacturer and description.
- (5) Upon written notice, the Commissioner may require any person subject to this section to report information sufficient to determine compliance with the applicable requirements of this section.
- (6) Any document submitted to the Commissioner pursuant to this section shall include a certification signed by an individual identified in section 22a-174-2a(a)(1) of the Regulations of Connecticut State Agencies, and by the individual or individuals responsible for actually preparing such document, each of whom shall examine and be familiar with the information



submitted in the document and all attachments thereto, and shall make inquiry of those individuals responsible for obtaining the information to determine that the information is true, accurate, and complete, and each of whom shall certify in writing as follows:

“I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that any false statement made in the submitted information may be punishable as a criminal offense under section 22a-175 of the Connecticut General Statutes, under section 53a-157b of the Connecticut General Statutes, and in accordance with any applicable statute.”

**(g) Container labeling.**

(1) As of January 1, 2009, each manufacturer of an adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Table 44-1 of this section shall display the following information on the container or label for such adhesive, sealant, adhesive primer or sealant primer:

- (A) The category name of the product;
- (B) A statement of the manufacturer’s recommendation regarding thinning, reducing or mixing, where:
  - (i) A statement is not required for thinning, reducing or mixing with water, and
  - (ii) If thinning prior to use is not necessary, the recommendation shall specify that the product is to be applied as supplied;
- (C) The maximum or the actual VOC content as supplied, displayed in grams of VOC per liter of product; and
- (D) The maximum or the actual VOC content as applied in accordance with the manufacturer’s recommendation regarding thinning, reducing or mixing, displayed in grams of VOC per liter of applied product.

(2) The VOC content of an adhesive, sealant, adhesive primer or sealant primer shall be calculated using the manufacturer’s formulation data or determined using the calculations, procedures and test methods in subsection (e) of this section.

(3) Any person applying an adhesive, sealant, adhesive primer or sealant primer subject to a VOC content limit in Tables 44-1 or 44-2 of this section may rely on the manufacturer’s representation on the container or label, if such product is applied as recommended for a use specified on the container or label.

Table 44-1. As Applied VOC Content Limits for Adhesives, Sealants, Adhesive Primers and Sealant Primers

Adhesive, sealant, adhesive primer or sealant primer category	As applied VOC content limit (g VOC/L)	Date on which standard applies
<i>Adhesives</i>		
ABS welding	400	January 1, 2009
Ceramic tile installation	130	January 1, 2009
Computer diskette jacket manufacturing	850	January 1, 2009
Contact bond	250	January 1, 2009
Cove base installation	150	January 1, 2009
CPVC welding	490	January 1, 2009
Indoor floor covering installation	150	January 1, 2009
Metal-to-elastomer molding or casting	850	January 1, 2009
Multipurpose construction	200	January 1, 2009
Nonmembrane roof installation or repair	300	January 1, 2009
Plastic cement welding	510	January 1, 2009
Outdoor floor covering installation	250	January 1, 2009
PVC welding	510	January 1, 2009
Single-ply roof membrane installation or repair	250	For 2009: June 1 through August 31; For 2010 & 2011: May 1 through September 30; and On and after January 1, 2012.
Structural glazing	100	January 1, 2009
Thin metal laminating	780	January 1, 2009
Tire retread	100	January 1, 2009
Perimeter bonded sheet vinyl flooring installation	660	January 1, 2009
Waterproof resorcinol glue	170	January 1, 2009
Sheet-applied rubber installation	850	January 1, 2009
<i>Sealants</i>		
Architectural	250	January 1, 2009
Marine deck	760	January 1, 2009
Nonmembrane roof installation or repair	300	January 1, 2009
Roadway	250	January 1, 2009
Single-ply roof membrane	450	For 2009: June 1 through August 31; For 2010 & 2011: May 1 through September 30; and On and after January 1, 2012.
Other	420	January 1, 2009
<i>Adhesive primers</i>		
Automotive glass	700	January 1, 2009
Plastic cement welding	650	January 1, 2009
Single-ply roof membrane	250	For 2009: June 1 through August 31; For 2010 & 2011: May 1 through September 30; and On and after January 1, 2012.
Traffic marking tape	150	January 1, 2009
Other	250	January 1, 2009
<i>Sealant primers</i>		
Non-porous architectural	250	January 1, 2009
Porous architectural	775	January 1, 2009
Marine deck	760	January 1, 2009
Other	750	January 1, 2009

**Table 44-2. As Applied VOC Content Limits for Adhesives Applied to the Listed Substrate**

Substrate	As applied VOC content limit (grams VOC per liter)
Flexible vinyl	250
Fiberglass	200
Metal	30
Porous material	120
Rubber	250
Other substrates	250

**Statement of Purpose:** This new section of the air quality regulations limits emissions of volatile organic compounds (VOCs) from adhesives, sealants and primers. This section achieves VOC reductions through two basic components: sale and manufacture restrictions that limit the VOC content of specified adhesives, sealants and primers sold in the state; and use restrictions that, in general, apply to commercial/industrial operations such as wood product manufacturers, upholstery shops, adhesives retailers and architectural trades, such as building construction, floor covering installation and roof repair. By reducing the availability of higher VOC content adhesives and sealants within the state, the sales prohibition is also intended to address adhesive and sealant usage at area sources. In addition to the VOC content limits and use requirements, this section includes requirements for cleanup and preparation solvents and a compliance alternative in the form of add-on air pollution control equipment.

This section is based on a model rule of the Ozone Transport Commission, which is, in turn, based on a reasonably available control technology determination prepared by the California Air Resources Board (CARB) in 1998. In the years 1998-2001, the provisions of the CARB determination were adopted in regulatory form in various air pollution control districts in California.

The associated emissions reductions, which are estimated to be nearly 4 tons per summer day, will support attainment of the 1997 and 2008 national ambient air quality standards for ozone.