**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT**

# Draft Staff Report
# Proposed Amended Rule 1145 – Plastic, Rubber, Leather and Glass Coatings

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# Executive Summary

Rule 1145 – Plastic, Rubber, Leather, and Glass Coatings, was originally adopted by the South Coast Air Quality Management District Governing Board on July 8, 1983, to regulate Volatile Organic Compounds ("VOC") emissions from plastic, rubber, and glass coating operations (leather substrates were added to the rule during the December 3, 2004 amendment). At this time, the rule has been amended fifteen times since the adoption date of July 8, 1983. This proposed sixteenth amendment would, in part, implement control measure MCS-07 – Application of All Feasible Measures of the 2007 AQMP.

This proposed amendment to Rule 1145 is designed to: (1) revise the VOC limit for the multi-color coatings category and bring it inline with the September 2008 U.S. EPA Control Techniques Guidelines ("CTG"), (2) establish a new coating category for a niche manufacturing process where a one inch wide border is coated onto glass panels during the manufacturing of refrigerated glass doors for refrigeration cabinets, for which a compliant product is currently not available, (3) update the rule with the deletion of paragraph (c)(3), where automotive coatings can be used in certain circumstances, and (4) make minor clarifications and editorial corrections to the rule.

The first proposed amendment seeks to reduce the VOC limit for the multi-color category from 685 g/L VOC to 680 g/L VOC, to match the U.S. EPA CTG. Based on a 260 days per year work schedule, AQMD staff calculated the theoretical VOC reduction to be approximately 0.4 lbs/day.

The second proposed amendment seeks to add a new coating category to the Table of Standards in Rule 1145. This new proposed coating category, refrigerated glass door coatings, will allow the continued operation for one facility that has been operating under a Hearing Board Variance for the last two years. As per conditions of the Hearing Board Variance, the facility was required to test VOC compliant coatings as part of their increments of progress requirement. AQMD staff agrees that the facility has been unable to locate a VOC compliant coating that would perform to the expected performance standards the refrigerated doors must adhere to. The current version of Rule 1145 would place this facility's roll-coating operation into the two-component coating category which is currently limited to one pound of VOC per gallon. The proposed refrigerated glass door coating category will be limited to 4.0 pounds of VOC per gallon and would allow the facility to continue operating in compliance after their Hearing Board Variance expires. This new proposed coating category will result in a minor increase of VOC emissions forgone but

these emissions will only be from one facility. AQMD staff calculated these emissions to be approximately 2.1 lbs/day of VOC forgone.

The combined total emissions for the proposed amendments to the multi-color category and the addition of the refrigerated glass door coatings calculate to approximately 1.7 lbs/day of VOC emissions forgone.

The third proposed amendment seeks to delete paragraph (c)(3) in Rule 1145 which allowed automotive coatings to be used on plastic, rubber, leather, and glass products to match the existing coating of motor vehicles provided that the applicator applied for and received written approval from the Executive Officer. Staff has determined that paragraph (c)(3) is now obsolete language based on recent July 1, 2008 provisions in Rule 1151 contained in its Appendix A. The new definition for *Associated Parts and Components* in the current version of Rule 1151 (Appendix A) includes parts and components that are not attached to a motor vehicle or mobile equipment. Therefore, paragraph (c)(3) in Rule 1145 should be removed since the current version of Rule 1151 addresses the issue of associated parts and components that are not attached to a motor vehicle or mobile equipment.

The fourth proposed amendment will include minor clarifications and editorial corrections to the rule. The Table of Standards has obsolete dates for VOC limit reductions in various coating categories that are no longer relevant and should be removed. This amendment will present the most current VOC limits.

There is no expected cost increase associated with the reduction of the VOC limit for the multi-color coating category or the addition of a coating category for refrigerated glass door coatings.

# CHAPTER 1: BACKGROUND

**INTRODUCTION**

**REGULATORY HISTORY**

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## INTRODUCTION

AQMD staff reviewed the September 2008 U.S. EPA CTG for Miscellaneous Metal and Plastic Parts Coatings and found a VOC limit discrepancy with the multi-color coating category in AQMD Rule 1145 – Plastic, Rubber, Leather, and Glass Coatings. The review found that the VOC limit in the current version of Rule 1145, for the multi-color coating category, was listed as 685 g/L of VOC whereas the CTG VOC limit, for the multi-color coating category, was listed as 680 g/L. AQMD staff proposes this amendment to Rule 1145 to reduce the VOC limit for multi-color coating category and bring it inline with U.S. EPA's current recommended VOC limit of 680 g/L.

## REGULATORY HISTORY

Rule 1145 was originally adopted by the AQMD Governing Board on July 8, 1983 and has undergone fifteen subsequent adopted amendments. The multi-color coating category was adopted on February 14, 1997 and the maximum allowable VOC limit was listed as 685 g/L. On October 24, 2008, AQMD staff found the VOC limit out of alignment with the multi-color coating category of the CTG, while reviewing U.S. EPA's CTG. The CTG specified a maximum allowable VOC limit of 680 g/L for the multi-color coating category contrary to the 685 g/L VOC limit shown in the AQMD Rule 1145 multi-color coating category.

## AFFECTED INDUSTRIES

Approximately, 5% of the coatings subject to Rule 1145 fall into the multi-color coating category and the first proposed amendment is intended to align the allowable VOC limit in the multi-color coating category in AQMD Rule 1145 with the allowable VOC limit in the multi-color coating category in the September 2008 U.S. EPA's CTG. AQMD staff does not expect this amendment to affect any facility under the purview of Rule 1145.

There is one facility that would be impacted by the second proposed amendment which proposes to add a new coating category, the refrigerated glass door coating category. This facility currently operates under a two-year variance that will provide continued coverage until December 31, 2009. This facility has worked with AQMD planning and rules staff since February 2008 and has tried several coating chemistries to comply with the increments of progress required by the variance but has not found a coating system that can successfully meet the adhesion requirements for their niche operation.

# CHAPTER 2: SUMMARY OF PROPOSED AMENDED RULE 1145

## PROPOSED AMENDMENTS TO RULE 1145

## Proposed Amendments to Rule 1145

There are four recommended amendments proposed for Rule 1145.

1. Reduce the VOC limit for the multi-color coating category from 685 g/L to 680 g/L
2. Add one additional coating category for refrigerated glass doors to the Table of Standards in the rule
3. Remove paragraph (c)(3) from Rule 1145; the July 1, 2008 version of Rule 1151 provides language for associated parts and components not attached to a motor vehicle and mobile equipment
4. Make minor clarifications and editorial corrections to the rule

As the first amendment, Rule 1145 has a coating category that has a VOC limit that is contrary to the U.S. EPA CTG VOC limit. The CTG specifies a maximum VOC limit for multi-color coatings used on plastic parts to be limited to 680 g/L of VOC. Rule 1145 has a multi-color coating category that specifies a maximum VOC limit at 685 g/L VOC. The first proposed amendment would be to align the 685 g/L VOC limit for the multi-color coating category in Rule 1145 with the CTG recommended VOC limit of 680 g/L for the multi-color coating category.

The second proposed amendment requires additional discussion. AQMD staff proposes to add a new coating category to Rule 1145 to be known as the refrigerated glass door coating category. AQMD staff recognizes one facility that has a niche operation and cannot meet the current VOC limits in Rule 1145 for a two-component coating (the current two-component coating VOC limit is 1.0 lbs/gal). The facility filed and was granted a two-year variance by the AQMD Hearing Board and is allowed to continue operating using the existing coating products that were known to work without adhesion failures until December 31, 2009. The variance was granted on December 19, 2007 as a Hearing Board Action Item and it required the facility to meet increments of progress which included the testing of coatings that may have been viable compliant alternatives to their current coatings. AQMD staff has been working with the facility since February 2008 and has noted that of all the low-VOC alternate coatings they have tried, none have met all of the facility's adhesion requirements for this niche operation. The coating used by the facility is hand roll-coated along the edges of a large glass pane, approximately one inch wide, which not only serves as an opaque border to hide the undesirable rough edges, hinges and related hardware of the glass panel, but also provides a substrate for the spacer and sealant that is used to bond three glass panes together (sandwiched) to make one glass door assembly for refrigerated cabinets. These are the doors that are commonly seen at grocery stores in the frozen food aisles as well as the

cold beverages aisles. If the coating fails to adhere to the glass substrate, the seal between the glass panels will fail and the door will be subject to replacement by the facility under the purview of their warranty. AQMD staff reviewed the Standard Industrial Classification ("SIC") codes[1] for glass coatings and found that the facility conducting this operation is the only facility in the South Coast jurisdiction that conducts this type of operation.

The manufactured triple plate glass door assembly is sealed to provide moisture prevention between the glass panels. Several alternative coatings were tried as potential low-VOC replacements to the two current screen printing ink systems but none have adequately adhered to the glass substrate and as a result, the coating lost adhesion to the glass panels which then resulted in spacer and sealant failure between the glass panels. As a consequence, the glass door assembly became a defective door assembly that was rejected while in service and required replacement under warranty. The facility also tried powder coating applications as well as silk-screening operations in the past but both technologies resulted in multiple rejections leading to multiple warranty issues.

The facility states that it is imperative that the border coating stick to the glass substrate or the seal between the glass panels will fail to prevent moisture entering in between the individual glass panels and raise warranty issues. The facility recently worked with a UV coating manufacturer to determine if a low-VOC Ultra-Violet ("UV") cured coating could work for this particular niche operation. The UV coating manufacturer coated glass sample plates using the UV technology and upon testing for adhesion the facility commented that the UV coating appeared to be satisfactory. The facility requested a second round of testing from the UV coating manufacturer and upon inspection of these UV coated glass sample plates, it was observed that two out of three sample plates did not pass the facility's adhesion requirements. The facility became concerned with the second round of tests after the UV coating manufacturer, when asked, informed them that they could not warranty the UV coatings.

The facility uses ASTM D3359-97, the test method used to measure adhesion by tape. The test is a simple tape pull off test that is performed by first inscribing six parallel lines in the coating all the way down to the substrate and then crosshatching six more lines, perpendicular to the first six lines, again all the way down to the substrate, in a cross-hatched pattern. A piece of masking tape is then applied directly over the cross-hatched pattern and a pencil eraser is used to rub the tape onto the surface. The tape is then pulled up at a constant rate, but not in a jerky or a fast pull motion, but in a uniform constant pull motion. A 100%

[1] See reference section for SIC code references

successful test will reveal that none of the small squares in the cross-hatched pattern were pulled up. If there are any small squares on the tape the total number of the squares on the tape is divided by 25 (there are 25 squares in the crosshatched pattern) and then multiplied by 100 to determine the percentage of squares that came off on the tape. The facility considers any squares on the tape to be a failure.

AQMD staff contacted the UV coating manufacturer who informed AQMD staff that the adhesion strength could have been enhanced with a pretreatment such as a flame/plasma application treatment, this process is also known as pure or silicate flaming. This pretreatment operation is conducted in an oven where the flame application is applied onto the glass surface to raise the tensile strength of the glass surface to enhance the coatings adhesion to the glass. This type of equipment could be employed but at significant expense to the facility as well as increased NOx (oxides of nitrogen), CO (carbon monoxide), particulate emissions and increased greenhouse gases. In addition, the thermal effects impacted on the glass substrate would have to be considered in the manufacturing process of the refrigerated glass door assembly as they may potentially cause undesirable tempering that could alter the physical properties of the glass door panels. The UV coating manufacturer informed staff that given more research and development time, they may be able to develop a UV coating that would work for the facility and satisfy all their adhesion requirements. However, the facility's variance expires December 31, 2009.

The third proposed amendment will delete paragraph (c)(3) from Rule 1145. Rule 1145, paragraph (c)(3), is no longer necessary after the sunset date of June 30, 2008 for Rule 1151 - Motor Vehicle and Mobile Equipment Non-assembly Line Coating Operations. Rule 1151 was amended back on December 2, 2005 and the provisions of the rule were replaced with the provisions of Rule 1151, Appendix A, on July 1, 2008. AQMD Rule 1151 now includes a new definition for Associated Parts and Components which reads; "*means structures, devices, pieces, modules, sections, assemblies, subassemblies, or elements of motor vehicles or mobile equipment that are designed to be a part of motor vehicles or mobile equipment but which are not attached to motor vehicles or mobile equipment at the time of coating the structure, device, piece, module, section, assembly, subassembly, or element. The Associated parts and components definition does not include circuit boards. Any associated parts or components that are not attached to a motor vehicle or mobile equipment but are designed to be a part of a motor vehicle or mobile equipment is now governed under Rule 1151"*.

The fourth proposed amendment will include minor clarifications and editorial corrections to the rule. The Table of Standards has obsolete dates for the VOC limit reductions in various

coating categories that are no longer relevant and will be removed. Subparagraph (i)(1)(E) exempts individual coating categories using less than 50 gallons in any one year, if compliant coatings are not available, and provided that the total usage of all such coatings does not exceed 200 gallons per year, per facility. Facilities that have opted for this exemption have been required to provide supporting documentation to AQMD to qualify for this exemption and were subject to the exemption if they received written approval from the Executive Officer. AQMD staff added the language "*and for which written approval of the Executive Officer has been obtained*" at the end of the subparagraph to provide enhanced clarification on this exemption. There will also be some other minor editorial clarifications in the rule as well.

# CHAPTER 3: IMPACT ASSESSMENT

## INTRODUCTION

The current version of Rule 1145 applies to plastic, rubber, leather, and glass coating operations. There are approximately 115 facilities that fall under the purview of Rule 1145 and these facilities include aerospace, automotive, electronic, and medical industries.

There is no sales specific data available for the classification of the emission inventory in terms of specific coating categories for Rule 1145. For this reason, the model used in the 2004 Staff Report for Rule 1145 will be implemented. The distribution of the emission inventory is based on the results of a survey that was conducted by AQMD in late 2002 and on other verbal information received by coatings suppliers. The 2002 survey included 58 facilities representing a diverse group of industries that perform Rule 1145 coating operations and from this data it was determined that the multi-color coating category populated 5% of the total distribution studied for all the coating categories. AQMD staff believes that this distribution for the multi-color coating category continues to be relevant.

The emissions inventory for the Rule 1145 universe was provided by the AQMD emissions reporting branch. The inventory was based on the year 2007 and the total emission inventory for Rule 1145, for 2007, was 0.49 tons per day ("tpd") of VOC emissions.

## IMPACT ASSESSMENT FOR FACILITIES SUBJECT TO RULE 1145

*VOC Limit Modification for Multi-color Coating Category:*

The first proposed amendment seeks to reduce the VOC limit in Rule 1145 for the multi-color coating category from 685 g/L to 680 g/L of VOC which will yield a theoretical emission benefit that can be calculated. The estimated emissions inventory for multi-color coating category can be calculated by;

*0.49 tpd * 5% = 0.03 tpd = 49.0 lbs/day,*

Next, the gallons of the multi-color coating can be calculated,

*5.716 lbs/gal * X gal = 49.0 lb/day, and (Note: 685 g/L VOC = 5.716 lbs/gal VOC),*

*X gal = 8.6 gallon/day so,*

Using 680 g/L VOC instead of 685 g/L VOC yields,

*5.675 lbs/gal * 8.6 gal/day = 48.6 lbs/day (Note: 680 g/L VOC = 5.675 lbs/Gal VOC),*

Therefore, the difference between the 680 and 685 g/L VOC calculations is the theoretical emission benefit, which calculates to 0.4 lbs/day (based on 260 working days per year).

*Adding a New Coating Category for Refrigerated Glass Door Operations:*

The second proposed amendment seeks to add a new coating category to the Table of Standards in Rule 1145 to provide relief to one facility that is currently operating under a two-year variance but has not been able to find a lower VOC alternate coating that could be used successfully in their roll-coating application. In lieu of this, the new coating category, refrigerated glass door coatings, will be limited to 4 lbs/gal of VOC. The two coating systems currently used by the facility are actually screen printing inks and have been proven to provide satisfactory performance results for their refrigerated glass doors.

*Nazdar ADE Series Epoxy Screen Ink System:*

AQMD staff calculated the mix ratios for the Nazdar system and determined by using the facility's usage records for CY2007 ("CY is for Calendar Year") that on average 4.6 parts of ink were mixed with one part of catalyst. Staff then calculated the quantity of thinner used and found that on average 5.9 parts of the ink/catalyst mix were mixed with one part thinner. Using this information, staff calculated the VOC content of the Nazdar system,

The ink mixed 4.6 parts ink to 1 part catalyst yields,

*{4.6*(3.1 lbs/gal) + 1*(4.15 lbs/gal)}/5.6 = {14.26 lbs/gal + 4.15 lbs/gal}/5.6 = 3.29 lbs/gal,*

*[where the VOC of the ink = 3.1 lbs/gal and the VOC of the catalyst = 4.15 lbs/gal)],*

The ink/catalyst mixture is then mixed with 15% (of that mix) with the RE 190 Thinner,

*5.6 * 0.15 = 0.84 = 0.8 and,*

*{5.6*(3.29 lbs/gal) + 0.8*(8.08 lbs/gal)}/6.4 = 3.89 lbs/gal*

*[Where the VOC of the RE 190 Thinner = 8.08 lbs/gal]*

Based on this information staff recognizes that a VOC limit of 480 g/L (4.0 lbs/gal) will be appropriate for the new refrigerated glass door coatings category.

AQMD staff determined, after review of the facility's usage records that the largest quantity used for the Nazdar system was in CY2007; when 123.7 gallons of the Nazdar ADE Series Epoxy Screen Ink was used, 27.0 gallons of the ADE677 catalyst was used, and 25.4 gallons of the RE 190 Thinner was used. AQMD staff summed up the totals for the ink, catalyst and the thinner used in terms of pounds of emissions for CY2007 and found,

*123.7 gal*(3.1 lbs/gal) + 27.0 gal*(4.15 lbs/gal) + 25.4 gal*(8.08 lbs/gal) = 700.7 pounds of VOC*

The emissions forgone for the Nazdar system can be calculated by comparing the result of the equation above with the allowable limit in Rule 1145. This type of roll-coating operation would normally fall into the two-component coating category where the VOC limit is one

pound per gallon of VOC. Using the same volumes as the equation above and then calculating the pounds VOC,

*123.7 gal + 27.0 gal + 25.4 gal = 176.1 gallons, and*

*176.1 gal * 1.0 lbs/gal = 176.1 pounds of VOC*

Therefore, the emissions forgone for the Nazdar system would be,

*700.7 pounds of VOC – 176.1 pounds of VOC = 524.6 pounds of VOC forgone.*

*Enthone 50 Series Cat-L-Ink System:*

AQMD staff calculated the mix ratios for the Enthone system and determined by using the facility's usage records for CY2007 that on average 10.4 parts of ink were mixed with one part of catalyst. Staff then calculated the quantity of thinner used and found that on average 12.8 parts of the ink/catalyst mix were mixed with one part thinner. Using this information, staff calculated the VOC content of the Enthone system,

*{5.0*(3.64 lbs/gal) + 0.5*(0.83 lbs/gal)}/5.5 = {18.2 lbs/gal + 0.42 lbs/gal}/5.5 = 3.38 lbs/gal,*

*[where the VOC of the ink = 3.64 lbs/gal and the VOC of the catalyst = 0.83 lbs/gal)],*

The ink/catalyst is then mixed with 6% (of that mix) with the Nazdar RE 190 Thinner,

*5.5 * 0.06 = 0.33 = 0.3 and,*

*{5.5*(3.64 lbs/gal) + 0.3*(8.08 lbs/gal)}/5.8 = 3.87 lbs/gal*

*[Where the VOC of the RE 190 Thinner = 8.08 lbs/gal]*

Based on this information staff recognizes that a VOC limit of 480 g/L (4.0 lbs/gal) will be appropriate for the new refrigerated glass door coating category.

AQMD staff, after a thorough review of the facility's usage records, also determined that the largest quantity of the Enthone system was in CY2007; when 5.0 gallons of the Enthone 50-Series Cat-L-Link Epoxy Screen Ink was used, 0.5 gallons of the Enthone Catalyst 45 Part B was used and 0.4 gallons of the Nazdar RE 190 Thinner was used. AQMD staff summed up the totals for the ink, catalyst and the thinner used in terms of pounds of emissions for CY2007 and found,

*5.0 gal*(3.64 lbs/gal) + 0.5 gal*(0.83 lbs/gal) + 0.4 gal*(8.08 lbs/gal) = 21.8 pounds of VOC*

The emissions forgone for the Enthone system can be calculated by comparing the result of the equation above with the allowable limit in Rule 1145. This type of roll-coating operation would normally fall into the two-component coating category and the VOC limit is one

pound per gallon VOC. Using the same volumes as the equation above and then calculating the pounds VOC,

*5.0 gal + 0.5 gal + 0.4 gal = 5.9 gallons, and*

*5.9 gallons * 1.0 lbs/gal = 5.9 pounds of VOC*

Therefore, the emissions forgone for the Enthone system would be,

*21.8 pounds of VOC – 5.9 pounds of VOC = 15.9 pounds of VOC forgone.*

Combining the emissions forgone for both the Nazdar and the Enthone systems yields,

*524.6 lbs VOC/CY2007 forgone + 15.9 lbs VOC/CY2007 forgone = 540.5 lbs VOC/CY2007 forgone*

The emissions for the first two amendments to this rule can now be calculated. The amendment to the multi-color category combined with the emissions forgone for the refrigerated glass door coatings yields,

*540.5 lbs/year VOC emissions forgone - 104 lbs/year VOC emission benefit = 436.5 lbs/year VOC = 1.7 lbs/day (based on a 260 working days per year) of emissions, forgone.*

## SOCIOECONOMIC ASSESSMENT

Since PAR 1145 does not significantly affect air quality or emissions limitations, a socioeconomic analysis is not required [H&SC 40440.8(a)]. Proposed Amended Rule 1145 (PAR 1145) has four separate provisions. The first provision of PAR 1145 reduces the VOC limit for the multi-color coatings category from 685 g/L to 680 g/L to align it with the September 2008 U.S. EPA Control Techniques Guidelines (CTG). No additional costs from such alignment are expected. The second provision of PAR 1145 creates a new coating category for refrigerated commercial glass door coatings. The change provides additional flexibility for one facility with special manufacturing requirements, which would lead to savings for the facility. The third provision deletes paragraph (c)(3) that is obsolete language. The fourth provision of PAR 1145 will be to make editorial changes to the existing rule language that have no associated cost implications.

In summary, PAR 1145 does not increase the cost of compliance for any facility and therefore will not have any significant socioeconomic impacts.

## POTENTIAL ENVIRONMENTAL IMPACTS

Pursuant to the California Environmental Quality Act (CEQA) and the AQMD's Certified Regulatory Program (Rule 110), appropriate documentation will be prepared to analyze any

potential adverse environmental impacts associated with the Proposed Amended Rule 1145. Comments received at the public workshop and CEQA scoping meeting will be considered when preparing the CEQA document.

## DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727

Before adopting, amending or repealing a rule, the AQMD shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference, as defined in Health and Safety Code Section 40727. The draft findings are as follows:

**Necessity** - The AQMD Governing Board finds and determines that Proposed Amended Rule 1145 - Plastic, Rubber, Leather and Glass Coatings, is necessary in order to implement control measure MCS-07 – Application of All Feasible Measures of the 2007 AQMP. A new coating category for Refrigerated Glass Doors is necessary as there is no current compliant coating that will meet the performance specifications and the current rule VOC limits.

**Authority** - The AQMD Governing Board obtains its authority to adopt, amend or repeal rules and regulations from Health and Safety Code §§40000, 40001, and 40440.

**Clarity** - The AQMD Governing Board finds and determines that Proposed Amended Rule 1145, is written and displayed so that the meaning can be easily understood by persons directly affected by it.

**Consistency** – The AQMD Governing Board finds and determines that Proposed Amended Rule 1145 is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, or federal or state regulations.

**Non-Duplication** – The AQMD Governing Board has determined that Proposed Amended Rule 1145 does not impose the same requirement as any existing state or federal regulation, and the proposed amendments are necessary and proper to execute the powers and duties granted to, and imposed upon, the AQMD.

**Reference** - In adopting these proposed amendments, the AQMD Governing Board references the following statutes which AQMD hereby implements, interprets or makes specific: Health and Safety Code Sections 40001 and 40440.

**Problem Finding** – The AQMD governing Board finds and determines that Proposed Amended Rule 1145 will reduce the VOC limit for the multi-color coating category to align it with the CTG recommended limit to promote the attainment or maintenance of state and federal ambient air quality standards.

# COMPARATIVE ANALYSIS

## Health and Safety Code Section 40727.2

As required by Health and Safety Code Section 40727.2, the purpose of this analysis is to identify and compare any other AQMD or federal regulations that apply to the same equipment or source type. The existing as well as the proposed VOC limits in Rule 1145 are not in conflict with the National Emission Standard for Hazardous Air Pollutants ("NESHAP") for Surface Coating of Plastic Parts and Products ("Plastic Substrates"); 69 FR 20990, April 19, 2004, Title 40, Subpart PPPP. The U.S. EPA CTG does have one conflict with the current version of AQMD Rule 1145 and that is the VOC limit for the multi-color coating category. This amendment seeks to align AQMD Rule 1145 multi-color coating category with the recommended VOC limit for that coating category in the CTG.

The NESHAP for Plastic Substrates sets forth Hazardous Air Pollutants ("HAP") emission limits for existing and new and reconstructed affected sources. Affected sources under this NESHAP are plastic coating operations that are major sources under federal law or are coating operations located within the confines of a federal major source. The NESHAP for plastics explicitly exempts non-major sources, operations regulated under another NESHAP, military installations, research facilities, and reinforced plastic composites.

The CTG is intended to provide state and local air pollution authorities information that shall assist them in determining RACT for VOCs for metal and plastic parts surface coating operations.

The proposed amendments to Rule 1145 will result in minor VOC emissions forgone, but Rule 1145 and the proposed amendments do not regulate HAP emissions directly. Therefore, the existing as well as the proposed VOC limits of Rule 1145 are not in conflict with federal regulations.

A table has been prepared to show comparisons between AQMD Rule 1145, the CTG and the NESHAP regulation.

| CATEGORY | SCAQMD RULE 1145 | U.S.EPA CTG Metal & Plastic Parts | USEPA NESHAP 40 CFR 63 Sub-part PPPP |
|---|---|---|---|
| **Purpose** | Reduce VOC emissions from plastic, rubber, leather and glass coatings. | The CTG is intended to provide state and local air pollution authorities information that shall assist them in determining RACT for VOCs for metal & plastic parts surface coating operations. | Establishes National Emission Standards for Hazardous Air Pollutants for plastic parts $ products surface coating facilities. |
| **Applicability** | Rule 1145 applies to any plastic, rubber, leather or glass coating operation. | Applies to facilities that perform surface coating operations to metal & plastic parts. | Applies to surface coating facilities & requires initial and continuous demonstration of compliance with emission limits. |
| **Averaging Provisions** | None | None | None |
| **Units** | Mass/Volume Grams/Liter or Pounds/gallon. | Mass/Volume Kilogram VOC/Liter or Pounds VOC/Gallon. | Mass fraction of coating solids Kg organic HAP/KG coating solids used. |
| **Operating Parameters** | Application equipment transfer efficiency requirements. | Application equipment transfer efficiency requirements. | The NESHAP does not mention the use of HVLP type transfer efficiency for application equipment. |
| **Method to Determine VOC** | U.S.EPA Method 24 | The CTG does not mention U.S.EPA Methods. | U.S.EPA Method 24 |
| **Capture Efficiency** | U.S.EPA Method 204 | The CTG does not mention U.S.EPA Methods. | U.S.EPA Method 204 |
| **Control Device Efficiency** | U.S.EPA Method 25 & 25A | The CTG does not mention U.S.EPA Methods. | U.S.EPA Method 25 & 25A |
| **Work Practices** | Rule 1145 defers to Rule 1171 storage and disposal of VOC containing materials. | VOC containing containers to be kept closed when not using. | VOC containing containers to be kept closed when not using. |
| | | Minimize spills of VOC containing materials. | Minimize spills of VOC containing materials. |
| **Monitoring** | None | None | None |
| **Reporting** | None | There is no mention for reporting in the CTG. | Annual reporting period of 6 months and 12 months. |
| **Recordkeeping** | Rule 1145 defers recordkeeping to Rule 109, records to be kept annually. | There is no mention for recordkeeping in the CTG. | Comprehensive records required annually to support compliance with NESHAP for plastics. |
| **Other Elements** | Prohibition of sale for coatings that do not comply with the VOC limits in the rule. | There is no mention of a prohibition of sale requirement in the CTG. | The NESHAP does not mention a prohibition of sale for coatings.. |
| | Exemptions provided for processes that would otherwise be deemed not compliant by the rule and do not have an alternate means to comply. | The CTG recommends the exemptions in SCAQMD Rule 1145 and Michigan Rule 336.1632. | The NESHAP offs one exemption and that is the presidential compliance exemption. |

## PUBLIC COMMENTS AND STAFF RESPONSES

**1. COMMENT:** As AQMD staff is aware, we have diligently pursued a means to compliance short of rule amendment. The pursuit has included numerous inquiries to vendors and multiple tests of alternative coatings, including UV coatings. Moreover, the pursuit has required the commitment of significant time and resources. Unfortunately, the pursuit has yet to yield a viable solution to our compliance problems and SCAQMD staff has expressed its concurrence that no sufficient alternative coating is likely to become available in the near future. We sincerely hope the SCAQMD Governing Board will consider these facts as it moves toward a final decision on the Proposed Rule. Given the small quantity of VOC emissions that will be generated by adoption of the Proposed Rule, it does not make sense to force our niche operation to stop and move production.

***STAFF RESPONSE:*** *AQMD staff agrees that the facility has tried several alternate coating technologies such as powder coating, silk-screening and UV coatings over the last 17 months and that all of them have yielded unsatisfactory results using the industry standard ASTM Test Method D3359-97, which showed unsatisfactory adhesion measurements. The facility has shown due diligence in complying with their variance commitments to try and facilitate new low VOC emitting technology. AQMD staff further recognizes that if a low VOC technology becomes available in the future that we will reassess this coating category for a lower VOC content, but at this time due to the expiration of their variance on December 31, 2009 it is recommended that a new coating category for refrigerated glass door coatings be made.*

**2. COMMENT:** Radtech disagrees with the District findings that UV and EB technology does not meet the adhesion test data. Does the District have data from the facility to verify these claims?

***STAFF RESPONSE:*** *Staff met with the facility back on February 24, 2009 and was presented with three UV coated glass sample plates that were tested under ASTM test method D3359-97, the test method used to measure adhesion by tape test. Staff documented the results and found that even though the first round of testing showed positive results, the second round of testing yielded two out of three adhesion test failures. AQMD staff observed the two glass sample plates where the UV coating flaked along the scribe lines. The facility staff informed AQMD staff that during the testing of the UV coating system they asked the UV coating manufacturer if they would warranty their coating to which the UV coating manufacturer informed them that they would not. The District also has progress reports from the facility that are required quarterly by the facility's variance that requirement will show how the coatings they tried performed.*

**3. COMMENT:** What really strikes me is that the thinner used at the refrigerated glass door facility is at 890 g/L VOC content and recently the District board adopted Rule 1143 for the consumer paint thinners and I believe some of those limits were down to 25 g/L. So, it strikes me, as a consumer in my garage, I can't have thinners above 25 g/L but in this particular rule there's a 890 g/L thinner.

***STAFF RESPONSE:*** *Rule 1143 – Consumer Paint Thinners and Multi-purpose Solvents and Rule 1145 – Plastic, Rubber, Leather, and Glass Coatings are two different rules. The main difference is Rule 1143 is intended for consumer product based paint thinners and multi-purpose solvents whereas Rule 1145 is intended for industrial source specific facilities. Rule 1145 does not regulate the VOC emissions from paint thinners and multi-purpose solvents rather it regulates the coating VOC, as applied to plastic, rubber, leather and glass applications. So, even though the thinner used by the refrigerated glass door facility has a high-VOC content of 969.7 g/L (8.08 lbs/Gal), not 890 g/L as stated by the commentator, the end result is that the coating would have to meet the VOC limit for it's specific coating category. The facility that is manufacturing refrigerated glass*

*doors for refrigeration cabinets is using the Nazdar coating system and they are following the recommended products for the coating system as specified on the Nazdar technical data sheet. The thinner is used at 15% by weight to reduce the viscosity of the ink coating. However, the amount of the coating used by the facility is rather small, which equates to just 2.1 pounds of VOC per day, based on a 260 working day year, of VOC emissions forgone. AQMD staff calculated the maximum VOC limit for the new proposed refrigerated glass door coating category by using the facility's highest VOC constituents for the ink, catalyst and thinner. The proposed new coating category, refrigerated glass door coatings, will be limited to a maximum limit of 480 g/L of VOC, as applied. The consumer product rule, Rule 1143, will take effect on January 1, 2010 and the VOC limit for the interim period will be 300 g/L of VOC followed by the final VOC limit of 25 g/L effective on January 1, 2011. Currently, these consumer product solvents are sold in large box stores and hardware stores and have VOC contents of 800 g/L and higher.*

**4. COMMENT:** Basically, the SCAQMD has concluded in this Rule 1145 staff report that UV coatings do not work for glass coating applications. We have been contacted by environmental groups to provide technical data on the feasibility of UV coatings for:

(1) Multi-colored coatings

(2) Glass coatings for refrigerated doors

***STAFF RESPONSE:*** *AQMD staff did not conclude that UV coatings do not work for glass coating applications as stated in the paragraph above. AQMD staff acknowledges that the facility required a coating for their refrigerated glass doors and they did investigate UV coatings. AQMD staff contacted Radtech back on February 12, 2009 and informed them of a facility that was not able to meet the VOC limit for Rule 1145. Radtech provided only one UV coating manufacturer contact that was the same contact that worked with the facility to test a UV coating that could meet all of the facility's performance requirements. The coating*

*manufacturer that was provided by Radtech did prepare several glass plate samples that were coated using UV coatings however, there were some adhesion failures. The coating manufacturer informed the facility that they would not warranty their coatings.*

**5. COMMENT:** The adhesion problems cited in the staff report may be overcome with certain pre-treatment steps. The attached article by Petra Burger of Fusion UV (Glass worldwide, issue fourteen 2007, Page 50) shows how a UV coating fails adhesion tests without pre-treatment and how the same coating gets 100 percent adhesion with the proper pre-treatment. The same article illustrates that UV coatings are being used in glass bottles. Coatings on beverage containers have to withstand refrigeration by consumers. The article by Dawn Skinner (page S20 Annual ESMA Glass Publication 2009) talks about the importance of pre-treatment to achieve good adhesion results.

***STAFF RESPONSE:*** *AQMD staff has had conversations with UV coating manufacturers and one topic that was discussed was glass pretreatment. One of the UV coating manufacturers stated that they did not know of any liquid pretreatments for glass but for plastics, the pretreatment is to simply wipe down the substrate with acetone. For glass, and in the case of large glass panels, a flame/plasma application treatment such as pure or silicate flaming will increase the adhesion characteristics of the UV coating. This operation is conducted in an oven where the flame application is applied onto the glass surface to raise the tensile strength of the glass surface to enhance the coatings adhesion to the glass. This type of equipment could be employed but at significant expense to the facility as well as increased NOx (oxides of nitrogen), CO (carbon monoxide), particulate emissions and greenhouse gases. In addition, the thermal application impacted on the glass substrate would have to be considered in the manufacturing process of the refrigerated glass door assembly as potential undesirable*

*tempering effects could alter the physical properties of the glass door panels.*

**6. COMMENT:** The South Coast Air Quality Management District (SCAQMD), is proposing amendments to their Rule 1145—Plastic, Rubber, Leather and Glass Coatings. According to the agency, the changes would mirror the requirements of the Environmental Protection Agency's Control Techniques Guidelines and create some exemptions. There are approximately 115 facilities that fall under the purview of Rule 1145 involved in the following processes:

- Aerospace
- Automotive
- Electronic and
- Medical industries

According to the rule staff report, the changes to Rule 1145 will result in an increase in emissions of 436.5 pounds per year from a single facility. This is mostly due to the creation of a new coating category "for a niche manufacturing process where coated glass panels are used in the manufacturing of refrigerated glass doors for refrigeration cabinets, for which a compliant product is currently not available. "The staff concluded that the facility should be allowed to continue to use its conventional 2 component coating system which requires the use of a thinner with a VOC content of 890 grams/liter. Staff also accepted the facility's claims that lower VOC coatings, including UV/EB coatings, failed adhesion tests by the facility. The report states that "AQMD staff has determined that the facility has been unable to locate a VOC compliant coating that would perform to the expected performance standards the refrigerated doors must adhere to." AQMD staff calculated these emissions to be approximately 540.5 lbs/year (2.1 lbs/day) of VOC forgone.

The emissions reduction in the rule can be attributed to an amendment changing the VOC limit for multi-colored coatings from 685 grams per liter to 680 grams per liter, as per the EPA's CTG. The combined total emissions for the proposed

amendments to the multi-colored category and the addition of the refrigerated glass door coatings calculate to approximately 436.5 lbs/year (1.7 lbs/day) of VOC emissions forgone.

I wanted to let you know that Radtech members have met with district staff and provided data to show that UV coatings would work for the refrigerated doors. The district did not include any of our data in the report. We made comments yesterday at the workshop and requested the company's data as a matter of public record, that data which allegedly shows that UV coatings fail adhesion tests, was also not included in the report or provided at the workshop.

***STAFF RESPONSE:*** *The first paragraph is not entirely accurate when stating that the rule would have changes that would mirror the requirements of the Environmental Protection Agency's Control Techniques Guidelines and create some exemptions. The proposed amendments to Rule 1145 do not include any additional exemptions. The proposed amendment does include an additional coating category for refrigerated glass door coatings which is intended to allow one facility to operate in compliance with Rule 1145 after their variance expires on December 31, 2009.*

*In the second paragraph Radtech states that AQMD staff accepted the facility's claims. AQMD staff has worked with the facility since February 2008 and over the course of the testing period has been shown several glass plate samples where coatings, including UV coatings, have failed ASTM test method D3359-97, the test method used to measure adhesion by tape test. The adhesion requirements are two-fold for the facility's operation. The coatings must adhere to the glass substrate not just for aesthetics but also as a substrate for the spacer and sealant that is used to seal the triplicate glass panels together to complete the refrigerated glass door assembly. The seal cannot fail; if it does the warranty requires a complete door replacement. The UV coating manufacturer informed the facility that they would not warranty their coating. The facility has not found a readily available VOC compliant alternate*

*coating that can meet the performance requirements for their product. The facility has shown their due diligence by complying with the requirements of their variance and by testing several low-VOC alternate coatings, but none have been found satisfactory.*

**7. COMMENT:** We oppose the amendments to Rule 1145 – Plastic, Rubber, Leather and Glass Coatings. Several months ago, district staff contacted us to assist the facility manufacturing refrigerated glass doors in the conversion to compliant coatings. At a June 10, 2009 meeting, we shared with district staff our disappointment that the facility did not appear committed to the prospect of conversion to UV technology, despite the fact that a viable UV coating was available to meet their performance needs as we understood them. The facility did not provide us with specifics such as product specifications and performance data. As a service to the industry and to support SCAQMD efforts, we made an exception to its charge policy for the facility. We conducted significant work and testing for the facility at no charge. We typically charge prospective customers for development work; a fee that was waived for the facility. We incurred a significant amount of cost with zero return, on behalf of the facility. The facility's staff failure to provide a prompt response to us indicated that finding compliant coatings was not a priority for the facility and that the inquiry process they engaged us in was a mere formality.

***STAFF RESPONSE:*** *AQMD staff disagrees with the commentator that a viable coating was available to meet the facility's performance needs. AQMD staff has worked with the facility since February 2008 and has been privy to observe the UV coated glass plate samples. The facility admitted to the first round of testing having positive results but when the second round of testing was conducted, two out of the three UV coating glass plate samples were failures. In addition, the facility stated that the coating manufacturer informed them that they would not warranty their UV coating. AQMD staff does not get involved with business*

*arrangements between companies, and therefore, will not comment on research fees.*

**8. COMMENT:** At a June 10, 2009 meeting, we shared with district staff our disappointment that the facility did not appear committed to the prospect of conversion to UV technology, despite the fact that a viable UV coating was available to meet their performance needs as we understood them. The facility did not provide us with specifics such as product specifications and performance data. The materials used in our process have negligible VOC's. Therefore, the facility's conversion to UV would render its process "super-compliant" with current district requirements. Our company services the glass coatings industry. The UV coatings used in the process meet the performance requirements specified by our customers, good adhesion to the substrate is one of those requirements.

***STAFF RESPONSE:*** *AQMD staff recognizes and appreciates the efforts that the commentator continues to put forth toward developing a UV coating that could work successfully without failures and that would be a "super-compliant coating". However, as it stands, the facility does not have a low-VOC alternate coating available that can perform without failures at this time. AQMD staff encourages the commentator to continue their efforts to develop and formulate a UV coating and field test it to ensure that it will meet the performance requirements for this niche coating operation. The facility requires a coating that must have complete opacity, permanently adhere to the glass and survive in its end-use environment where temperatures continually range between 35 to 70 degrees Fahrenheit. In addition, the coating must also serve as a substrate for the spacer and sealant that bonds the three glass panels together for the final refrigeration glass door assembly.*

**9. COMMENT:** We are involved in Ultraviolet/Electron Beam technology. Our company is working towards a project to service the glass coatings industry. The UV coatings used in the process meet the performance requirements specified by our customers; good

adhesion to the substrate is one of those requirements. The end goal of the continued development work on the formulations is for the materials used in the process to have negligible VOC's. Under the current Rule 1145 proposal, a new category would be created to exempt refrigerated glass doors. The amendment would result in an unwarranted emissions increase to the basin because UV coatings can meet the VOC requirements. Furthermore, the staff report erroneously concluded that UV/EB coatings failed to adequately adhere to glass. Our company's UV products show good adhesion to glass. We look forward to the incorporation of our company's comment in the Rule 1145 rulemaking.

***STAFF RESPONSE:*** *AQMD staff appreciates you taking time to participate during the public workshop comment period. The proposed amendment for the refrigerated glass door coating category is intended to allow one manufacturer to continue operating in the South Coast District. AQMD staff did a comprehensive analysis and determined that the facility was the only facility in the AQMD jurisdiction that conducts the niche operation of applying a border coating to glass plate panels that not only has to meet customer satisfaction for aesthetics but also has to serve as a substrate for the spacer and sealant that bonds three of these large glass plate panels in a sandwich like configuration to complete the refrigerated glass door assembly. As of this time, the facility has not found a readily available low-VOC coating that will satisfy the performance requirements without failures. Based on this information, AQMD staff believes that the additional coating category for refrigerated glass doors should be included in the amendment and will continue to support UV coating manufacturers such as yours to continue development for a suitable UV coating that will be available as a low-VOC alternate coating for this niche operation.*

**10. COMMENT:** Under the current Rule 1145 proposal, a new category would be created to exempt refrigerated glass doors based on one facility. The amendment would result in an unwarranted emissions increase to the basin because UV coatings can meet the VOC

requirements. Furthermore, the staff report erroneously concluded that UV/EB coatings failed to adequately adhere to glass. Our company's UV products show good adhesion to glass by the facility engineer's own admission. AQMD's exception for the facility is not reasonable and should not be approved. Furthermore, conventional glass coatings may contain heavy metals. We are not aware of the district taking this issue into consideration in its staff analysis. We supply compliant UV coatings that are essentially VOC free, with no toxics, and can meet industrial demands. We look forward to working with the district staff in the Rule 1145 rulemaking.

***STAFF RESPONSE:*** *The AQMD is not providing an additional exemption in the rule but is proposing a new coating category to be added to the Table of Standards. AQMD staff disagrees with the statement "the staff report erroneously concluded that UV/EB coatings failed to adhere to glass". AQMD staff discussed the UV coatings with the facility in detail. The facility recognized that the first round of testing showed promise that the UV coatings had potential to work for their operation. However, after the second round of testing, the facility found that two out of the three UV coated glass plate samples did not pass ASTM test method D3359-97. AQMD staff observed these glass plate samples and noted that the scribe lines showed coating fragmentation. The facility informed AQMD staff that they were alarmed with this because for their manufacturing process, any portion of the coating that comes off on the tape pull off constitutes a failure. Therefore, AQMD's proposed amendment for a refrigerated glass door coating is reasonable. AQMD staff reviewed the Nazdar coating line and did not find any specification of heavy metals in the material safety data sheets with the exception of one color, red, which contains 18-27% lead. Lead is considered a toxic metal in contrast to heavy metals which can include iron, cobalt, copper, manganese, molybdenum, and zinc, and are found in living organisms.*

**11. COMMENT:** We wish to express our continued support for Proposed Amended Rule 1145 titled: Plastic, Rubber, Leather and Glass Coatings ("the Proposed Rule"), and strongly urge the South Coast Air Quality Management District ("SCAQMD") Governing Board to adopt the Proposed Rule at its September 11, 2009 meeting. We have a niche operation that has been ongoing since 1990 but without adoption of the proposed rule, we will be unable to comply with applicable SCAQMD rules. The adoption of the proposed rule is crucial to our continued existence in this region.

***STAFF RESPONSE:*** *AQMD staff appreciates your support of this rule amendment. AQMD staff believes that the proposal is needed to allow the facility to continue to operate while still looking for a low VOC technology that can be used in this niche operation for refrigerated glass door manufacturing.*

# REFERENCES

1. Helmy Sultan, Ph.D., Air Quality Specialist, Ricardo Rivera, Air Quality Specialist: "Draft Staff Report for Proposed Amended Rule 1145 – Plastic, Rubber, Leather and Glass Coatings", SCAQMD Document, November 2, 2004.

2 Nazdar coating system hyperlinks:

Nazdar ADE Series Epoxy Screen Ink, Opaque Black link:
http://www.nazdar.com/wv/private/document.aspx?prd=ADE52%7E%7EPDF%7E%7EMTR%7E%7ENAM%7E%7EEN%7E%7E12/08/2008%7E%7EOpaque%20Black&language=d__EN&productID=ade

Nazdar ADE677 Catalyst MSDS link:
http://www.nazdar.com/wv/private/document.aspx?prd=ADE677%7E%7EPDF%7E%7EMTR%7E%7ENAM%7E%7EEN%7E%7E12/08/2008%7E%7ECatalyst&language=d__EN&productID=ade677

Nazdar RE-190 Thinner MSDS link:
http://www.nazdar.com/wv/private/document.aspx?prd=RE190%7E%7EPDF%7E%7EMTR%7E%7ENAM%7E%7EEN%7E%7E11/18/2008%7E%7EThinner&language=d__EN&productID=re190

3 Enthone coating system hyperlinks:
http://enthonedata.cooksonelectronics.com/PWBChemistry/dsinforeq.nsf/InfoReq2?OpenForm

(Must inquire for links)

4. Environmental Protection Agency, Hazardous Air Pollutants (NESHAP), for plastic parts, http://www.deq.state.mi.us/documents/deq-ess-caap-fedregister-plasticsfinalrule.pdf

5. South Coast AQMD Hearing Board, Case No. 4797-1, Petitioner granted on December 19, 2007

6. Standard Industrial Classification Manual, 1987, Executive Office of the President, Office of Management and Budget, National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161, Order no. 87-100012, *pg 165, Industry Group No. 323, Industry No. 3231 – Glass Products, Made of Purchased Glass.*

7. North American Industrial Classification System, United States, 2007, Executive Office of the President of the United States, ISBN 978-1-59888-082-3 (NTIS Order Number: PB2007-100002),Published 2007 by Bernan, a division of The Kraus Organization Limited, 4611-F Assembly Drive, Lanham, MD 20706, (800) 274-4447, www.bernan.com, National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161, (800) 553-6847, info@ntis.gov, *Pg 344, Subsector 327215 – Glass Product Manufacturing Made of Purchased Glass.*