



P L Y F O R M S

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March 6, 2019

Mr. David Morgan
Senior Environmental Quality Analyst
Michigan Department of Environmental Quality
Air Quality Division, Grand Rapids District
State Office Building
350 Ottawa NW Unit 10
Grand Rapids, MI 49503

Re: Davidson Plyforms, Inc. PTI No. 28-09B, Violation Notice Response

Dear Mr. Morgan:

Davidson Plyforms, Inc. (Davidson) operates a wood furniture manufacturing facility in Grand Rapids, Michigan. This facility operates under the authority of air Permit to Install Number 28-09B, which was issued on November 20, 2014. The Michigan Department of Environmental Quality issued a Violation Notice on February 13, 2019. This Violation Notice involves the Volatile Organic Compounds (VOC) content of certain materials being greater than the permit limits. The permit limits are site-specific Reasonably Achievable Control Technology (RACT) limits, which are expressed on a less water and exempt solvent basis. These materials which exceed these limits are environmentally responsible materials. That is, they have low VOC contents on an as applied basis, mainly due to the use of water and exempt solvents in their formulation.

This letter provides the required response to the Violation Notice. This letter is organized in the following manner:

1. Background
2. Cause of Violation
3. Corrective Actions
4. Actions to Prevent Reoccurrence
5. Duration
6. Additional Information
7. Closing

Background

Davidson uses a custom in-house Microsoft AccessTM system to maintain compliance with the majority of the monitoring and recordkeeping provisions of air permit, especially as they pertain to the various VOC containing materials. These materials include coatings (e.g., paints and stains), glues, and solvents.

The various physical properties for materials are stored in this database. These properties are entered based on information from the manufacturer. The sources of these data differ by each manufacturer, and are typically contained either on Safety Data Sheets (SDS) or Certified Product Data Sheets (CPDS). Davidson relies upon the material manufacturer to provide accurate, complete, and unambiguous information. Davidson performs periodic spot checks on the data contained in the database system from a quality assurance and quality control (QA/QC) perspective.

The DEQ performed a site inspection at Davidson on January 9, 2019. As part of this inspection, the DEQ requested supporting information (e.g., SDS or CPDS) to cross check the entries in the database reports. Supporting information was provided to the DEQ on January 18, 2019.

However, this initial information submittal identified issues with the data for several materials. For example, the CPDS and MSDS for Rollie Williams (supplier) Carmel Bamboo Coating, dated August 25, 2017 and October 25, 2012, respectively, state the following somewhat conflicting information:

1. CPDS
 - a. VOC Actual (lb/gal) = 2.19;
 - b. VOC Regulatory (lb/gal) = 2.20;
 - c. VOC less H₂O and exempts (lb/gal) = 7.06;

2. MSDS

a. VOC Regulatory (lb/gal) = 6.93

This material is classified as a solvent based stain (SS) for the purposes of the site specific RACT limits. The associated VOC content limit for this material is 6.9 lb/gal on a less water and exempt solvent basis. The 6.93 lb/gal value listed on the MSDS is considered compliant, as the limit is expressed to one decimal place. Per United States Environmental Protection Agency (U.S. EPA) guidance, values of up to 6.949 lb/gal would be considered compliant with the 6.9 lb/gal limit.

Refocusing our attention on the four values listed above for this product, we notice the following discrepancies. The MSDS VOC Regulatory value (lb/gal) was historically the value listed by Rollie Williams for the VOC content on a less water and exempt solvent basis. This listed value of 6.93 lb/gal meets the 6.9 lb/gal RACT limit for this material.

The August 25, 2017 CPDS for this material has a few items of concern that were noticed by the DEQ, and confirmed in conversations with Rollie Williams. The first item of concern is the VOC Regulatory value of 2.20 lb/gal. As discussed previously, this value was historically used by Rollie Williams as the VOC less water and exempt solvents. This value was used (erroneously) in the Davidson database. The appropriate value to use is listed on the CPDS as the VOC less H₂O and exempts (lb/gal) of 7.06 lb/gal. The VOC Regulatory value is no longer used by Rollie Williams on the CPDS to avoid confusion (as related by Rollie Williams¹). The VOC content as applied is 2.19 lb/gal.

This particular item of inconsistent data on CPDS and the Davidson database was discussed with the DEQ on January 23, 2019². As part of these discussions, it was agreed that Davidson Plyforms would review the top 25 percent of materials based on total volume to confirm that consistent and accurate data are used in the database. The top 25 percent of materials equates to 79 percent of the total VOC emissions from the site. It also corresponds to a use threshold of 50 gallons per year (i.e., less than 5 gallons per month per material).

A total of 34 materials comprised this quality assurance / quality control (QA/QC) check. These materials were provided by six different paint manufacturers. The non-Rollie Williams materials had a few minor updates to physical properties used in the Davidson database. For all but one material, these updates did not affect compliance with permit limits. The one material which affect compliance is Davidson Product Number 1216, Akva Line 401 Precat WB Clear 45 Gloss, supplied by Sherwin Williams. This material is a water based top coat (WBTC), which has a VOC content limit of 2.1 pounds per gallon, less water and exempt solvents. This material has a VOC content of 2.23 pounds per gallon, less water and exempt solvents. This value is from the

¹ Telephone conversation between Mr. David Fuller, Rollie Williams, and Dr. Mitchell Hait (consultant to Davidson), January 29, 2019.

² Telephone conversation between Mr. David Morgan, DEQ, and Dr. Mitchell Hait (consultant to Davidson).

CPDS dated May 31, 2018. The historical value used for this material was 2.09 pound per gallon, less water and exempt solvents. This historical value was within permit limits; however, the updated value from CPDS is not. Davidson is currently working with the material supplier to reformulate this material.

The data for the 25 materials provided by Rollie Williams were reviewed, and as appropriate, updated in the database. A total of 10 materials were identified that exceeded the VOC RACT content limits on a less water and exempt solvent basis.

The information regarding the QA/QC check and these 10 materials was provided to the DEQ by e-mail on February 5, 2019³. This e-mail also indicated that Davidson was working with Rollie Williams to reformulate 9 of those materials, with a meeting scheduled for February 7, 2019.

Cause of Violation

In review of this violation, three main root causes were identified. The first root cause involved obtaining documentation from the paint supplier Rollie Williams that had conflicting and confusing information. The second root cause was data entry for the database. The appropriate checks on CPDS were not performed to assure that the information for VOC content on a less water and exempt solvent basis was consistent with the formulation of the material. For the example of the Carmel Bamboo Coating discussed previously, this material has an acetone (exempt solvent) content of 60 to 73 percent (per the MSDS). Hence, the actual VOC content of 2.19 lb/gal and the Regulatory VOC content (taken to be less water and exempt) of 2.20 lb/gal does not appear valid. That is, if approximately 70 percent of the material is exempt solvent, then the VOC content on a less water and exempt solvent basis should be considerably greater than the actual VOC content.

The third root cause involved changing information regarding the material property for the water-based topcoat (Davidson Product Number 1216). The updated CPDS had a value that was greater than the prior value and the corresponding permit limit.

Corrective Actions

The main corrective action involves working with the paint supplier Rollie Williams to reformulate the coatings that exceed the VOC RACT content limits. A meeting was held between Davidson and Rollie Williams on February 7, 2019 to initiate this effort. This reformation was complete on February 21, 2019 for the eight materials that comprise the solvent based stain RACT category. The updated physical properties for these reformulated solvent based stain materials are summarized in Table 1 following, and CPDS for these materials are enclosed in Attachment 1.

Table 1: Updated Physical Properties for Reformulated Materials

³ E-mail to Mr. David Morgan, DEQ, from Ms. Lisa Wiedemann (consultant to Davidson).

Product Name	Davidson SDS #	Vendor Product #	RACT Category	RACT Limit (lb/gal)	Prior VOC Content (lb/gal)	Reformulated VOC Content (lb/gal)
Red Birch	1034	58096.603 (515771)	SS	6.9	7.01	6.85
Medium Cherry on Maple	1186	52182.603 (515772)	SS	6.9	7.00	6.81
Haps Stain Fast	1203	50001 (50009)	SS	6.9	7.07	6.84
Hawthorn Med Cherry Gigit	1276	511165.603 (515773)	SS	6.9	6.97	6.79
Carmel Bamboo	1292	511309.603 (515774)	SS	6.9	7.06	6.84
Biltmore Cherry (Cognac 10% stronger)	1411	513306.603 (515775)	SS	6.9	7.04	6.79
Pinnacle #3	1450	513308.x.603 (515776)	SS	6.9	6.97	6.78
Dark Brown Cherry Wal on Maple	1471	514201.x.603 (515777.x.603)	SS	6.9	7.18	6.82

The VOC contents listed above are on a less water and exempt solvent basis.

Davidson is continuing to work with Rollie Williams to reformulate one additional material that slightly exceeds the category limit. This material is Davidson Number 1436; Airguard Solv 10 SH, which is in the RACT category Acrylic/Lacquer Top Coat (LTC). The LTC VOC limit is 5.6 pounds per gallon, less water and exempt solvents. This material has a VOC content of 5.66 pounds per gallon, less water and exempt solvents per the CPDS dated March 5, 2019. This material was requested to be reformulated to meet the appropriate limit; however, the data recently provided does not indicate this material was reformulated. Davidson is working with Rollie Williams to reformulate this material. Similarly, Davidson is working with the material supplier to reformulate Davidson Product Number 1216, Akva Line 401 Precat WB Clear 45 Gloss.

Two actions were taken to resolve the database quality related issues. The first action was to obtain updated, correct, and consistent CPDS from Rollie Williams for their coatings in the top 25 percent list. These values were reviewed and entered into the Davidson database.

The second item involved training between Dr. Mitchell Hait and Ms. Lisa Wiedemann, consultants to Davidson. This training involved a refresher course on which values to use for the database entry. This training also identified methods for cross checking data provided for consistency. This training also covered the various formats of information provided by different material suppliers.

The third root cause involves updates to supporting documentation that may cause the materials to no longer comply with the RACT category limits. Davidson has reached out to their main material suppliers to reinforce the importance of maintaining compliance with the RACT limits. Davidson will continue to address these issues, as they may arise, on a case-by-case basis.

Actions to Prevent Reoccurrence

The actions to prevent reoccurrence are in addition to the corrective actions already taken. Note that the training provided in the corrective actions section also serves to prevent reoccurrence.

The first action was to remind Rollie Williams (the main Davidson surface coating material supplier) of the site specific VOC content RACT limits contained in the Davidson permit. The materials provided to Davidson are required to meet these limits, including any reformulation or CPDS updates.

Additional periodic QA/QC activities on the database reports will be performed on a regular basis. These activities may involve repeating the analysis performed of the top 25 of the materials for the next 25 percent of materials used (i.e., the second quartile), or spot checking of supporting data for possibly erroneous information contained on the database reports.

Duration

The start date of this violation can be reported in different manners. The first manner is to use the date (January 9, 2019) of the DEQ compliance inspection as the start date.

The second manner is to go back to when data may have been incorrectly entered. For the example of the Carmel Bamboo stain, this date may be taken as the date of the revised CPDS from Rollie Williams (August 25, 2017). There are some challenges with attributing this date, as it is unknown when Davidson obtained the revised CPDS.

Hence, we suggest using the January 9, 2019 as the start date. The violation is ended for the majority of the materials identified by the DEQ and Davidson. The end date is February 21, 2019 for the 8 solvent stain materials provided by Rollie Williams. This date is when the product reformulation was complete for these materials.

There are two materials for which the product reformulation is still ongoing. These materials are:

1. Davidson Number 1216, WBTC, Akva Line 401 Precat WB Clear 45 Gloss; and,
2. Davidson Number 1436, LTC, Airguard Solv 10 SH.

Davidson is waiting on their suppliers to reformulate these materials, and has emphasized the time sensitive nature of this request. Davidson intends to provide updates to the DEQ as these materials are reformulated. Should the reformulation not be complete by April 15, Davidson will update the DEQ on the status, along with the reasons for the delays in reformulation.

Additional Information

The materials exceed the RACT VOC content limits by 0.07 to 0.28 lb/gal, which is between 1 and 4 percent greater than the corresponding RACT content limit. The majority of these materials have actual VOC contents (as applied) between 1.4 and 2.2 pounds per gallon. Hence, these materials would be considered environmentally responsible as they have relatively low VOC contents as applied. The main issue is the quantity of the exempt solvent or water that used in the formulation of these materials.

A VOC content on a less water and exempt solvent basis is used from a regulatory perspective to avoid regulated entities from coming into compliance with VOC content limits by diluting a material with exempt compounds. The following discussion is from the California Air Quality Management District (AQMD)⁴:

There is sometimes confusion over the terms VOC of coating/colorant/adhesive and VOC of material. The VOC of coating/colorant/adhesive is the same as the term "regulatory VOC," which is equivalent to the term "VOC, less water and exempts." The VOC of material is the same as the term "actual VOC," which is equivalent to the term "VOC, including water and exempts."

The regulatory VOC calculates the VOC less exempts and water, which is a more complicated calculation than the actual VOC, in that it subtracts the volume of water and the volume of exempt compounds from the volume of material, in the denominator. The calculation was derived to express the VOC emitted per volume of coating solids to eliminate the effect of dilution. Dilution with water or exempt solvents would reduce the VOC-to-paint-volume ratio while maintaining a constant VOC-to-paint/adhesive-solids ratio. This is important because those materials are applied at a certain film thickness so dilution would result in a larger volume of the material being applied to achieve the same film thickness. For conventional solvent based products with no exempt compounds, the two values are always the same.

For waterborne coatings and coatings containing exempt compounds, the VOC of coating is always the higher of the two values. The VOC limits listed in the Table of Standards (PDF, 35kb) refer to the VOC of coating. The only exception is for low solids coatings where the purpose of the coating is not to build film thickness. Low solids coatings, which are defined as coatings containing less than one pound of solids per gallon of coating, are regulated by the VOC of material. VOC emissions, including the emissions fee in Rule 314, are also calculated based on the VOC of material.

The emphasis on the low solids coatings is added. The previously used example of Carmel Bamboo solvent stain has a solids content of 0.08 pounds solids per gallon. This material is clearly a low solids coating. Per the California AQMD, this material would be regulated by the actual VOC content, and not the content on a less water and exempt solvent basis. The solids content of these nine materials is summarized in Table 2 following:

⁴ From <http://www.aqmd.gov/home/rules-compliance/compliance/vocs/calculations>

Table 2: Material Solids Content

Product Name	Davidson SDS #	Vendor Product #	RACT Category	Solids Content (lb/gal)	Low Solids Material (yes/no)
Red Birch	1034	58096.603 (515771.x.603)	Solvent Based Stain	0.29	Yes
Medium Cherry on Maple	1186	52182.603 (515772.x.603)	Solvent Based Stain	0.23	Yes
Haps Stain Fast	1203	50001 (50009.x.603)	Solvent Based Stain	0.19	Yes
Akva Line 401 Precoat WB Clear 45 Gloss	1216	EM5954045	Water Based Top Coat	3.18	No
Hawthorn Med Cherry Gigit	1276	511165.603 (515773.x.603)	Solvent Based Stain	0.24	Yes
Carmel Bamboo	1292	511309.603 (515774.x.603)	Solvent Based Stain	0.19	Yes
Biltmore Chery (Cognac 10% stronger)	1411	513306.603 (515775.x.603)	Solvent Based Stain	0.27	Yes
Airguard Solv 10 SH	1436	27560.603	Acrylic/Lacquer Topcoat	1.86	No
Pinnacle #3	1450	513308.x.603 (515776.x.603)	Solvent Based Stain	0.24	Yes
Dark Brown Cherry Wal on Maple	1471	514201.x.603 (515777.x.603)	Solvent Based Stain	0.21	Yes

The eight materials that comprise the solvent based stain RACT category are each considered low solids coatings. The other two materials that are either a Water Based Topcoat or an Acrylic/Lacquer Topcoat are not considered low solids coatings.

Davidson may consider a permit amendment to seek relief on the RACT VOC content limits for the low solids materials. This amendment would be to switch from a less water and exempt solvent basis to an actual, as applied basis. This switch is consistent with the California AQMD guidance. Davidson would approach the DEQ to discuss possible options prior to submitting such an amendment application.

Closing

We appreciate your review of this information regarding the recent air quality related issue at our facility. We are working with our material suppliers to complete the reformulation of the two remaining materials, and anticipate this reformulation to be completed in the near term (i.e., within the next month). Davidson will provide updates regarding these pending reformulation activities to the DEQ as these activities are complete. Should the reformulation not be complete

by April 15, Davidson will update the DEQ on the status, along with the reasons for the delays in reformulation.

Should you have any questions regarding this submittal, please contact Mr. Dean Huizenga of my staff by telephone at (616) 956-0033 or by e-mail at Dean.Huizenga@plyforms.com.

Sincerely,



Mr. Paul Haverkate
Vice President of Operations

Attachments:

1. Reformulated Materials CPDS

Copies:

1. Ms. Jenine Camilleri, Enforcement Unit Supervisor, Michigan DEQ, AQD, P.O. Box 30260, Lansing, Michigan 48909-7760
2. Ms. Theresa Block, Leggett & Platt, Senior Corporate Environmental Specialist.
3. Mr. Dean Huizenga, Davidson, Manufacturing Engineer/Maintenance Supervisor.
4. Ms. Lisa Wiedemann, Wiedemann & Associates, LLC, consultant to Davidson.
5. Dr. Mitchell Hait, Mitchell J. Hait, Ph.D., P.E., Inc., consultant to Davidson.