

**DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: On-site Inspection**

N270272486

FACILITY: Orafol Automotive Graphics	SRN / ID: N2702
LOCATION: 57 Kay Industrial Dr., LAKE ORION	DISTRICT: Warren
CITY: LAKE ORION	COUNTY: OAKLAND
CONTACT: Michael Kozik , EHS Compliance Administrator	ACTIVITY DATE: 06/18/2024
STAFF: Jillian Cellini	COMPLIANCE STATUS: Non Compliance
SUBJECT: Evaluate Orafol and Orafol Automotive Graphics's compliance with PTI 305-05J, PTI 46-13A, and State and Federal air quality rules and regulations.	SOURCE CLASS: SM OPT OUT
RESOLVED COMPLAINTS:	

On June 18, 2024, I (Jillian Cellini, EGLE-AQD), Mark Dziadosz (EGLE – AQD), and Andrew Riley (EGLE – AQD) conducted an inspection of Orafol and Orafol Automotive Graphics at 57 Kay Industrial Drive and 67 Kay Industrial Drive in Lake Orion Michigan. The purpose of the inspection was to determine the facility's compliance status with the requirements of the federal Clean Air Act; Article II, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 Public Act 451, as amended (Act 451), the AQD administrative rules, and Permit to Install (PTI) Numbers 46-13A and 305-05J.

We arrived at Orafol at about 9:30 AM. Before entering the facility, I did not observe any odors or opacity from the stacks outside. At the facility, we met with Michael Kozik (Environmental Health and Safety Compliance Administrator) and Amy Kemp (Environmental Health and Safety Compliance Administrator). We introduced ourselves and stated the purpose of the inspection. Michael and Amy answered some initial questions about the site (general operations, etc.) before the facility walk-through. Joshua Flood (Facilities & Environmental Health and Safety Manager) met with us briefly before the site walk through as well. Joshua also met with us at varying points throughout the inspection. Michael and Amy accompanied us for the entirety of the inspection.

Michael and Amy sent the requested records to determine compliance via email before and after the inspection. The digital records are in the AQD Warren shared drive at: S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024.

Orafol and Orafol Automotive Graphics are considered one stationary source with state registration number (SRN) N2702. The facilities are housed in two separate buildings that are adjacent to each other. Orafol Automotive Graphics (located at 57 Kay Industrial Drive) operates 24 hours a day, Monday through Friday and has around 350 employees. This facility manufactures original equipment manufacturer (OEM) decals for automobiles. Orafol (located at 67 Kay Industrial drive) operates Monday through Friday from around 5:00 AM - 9:00 PM and has around 45-50 employees. Joshua stated that both facilities will also run weekends (usually only Saturdays) if needed. At Orafol, coating applicators are used to manufacture plastic film (PVC or urethane) and subsequently apply adhesive or urethane topcoat to the plastic film. Automotive decals are printed on plastic that is manufactured by Orafol as they sell some of the plastic film rolls to themselves as well as to other companies. The decals are printed on screen presses equipped with electric dryers. These facilities are in Oakland County, Michigan and are immediately surrounded by other commercial/industrial properties. The closest residential area is approximately 0.15 miles northeast of the facilities. Heron Springs Park, which contains a lake, is located about 0.25 miles northeast of the facilities and Bald Mountain State Recreation Area is located about 1.15 miles north of these facilities.

The site walkthrough started in the Orafol Automotive Graphics facility and then proceeded to the Orafol facility next door.

Product/Ink development

The first place we examined on the walk through was the product development laboratory. According to Michael and Amy, Orafol Automotive graphics develops their own ink formulations in house. Ink is developed and tested before it is mixed at a larger scale in their ink room. Equipment and processes used to develop these inks are exempt from the requirement in Rule 201 to have a PTI per R 336.1283(2)(b), but any VOC or HAP emissions from this room are documented and added to the total emissions for FG-FACILITY (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\Emissions Summaries). There was a cold cleaner present in this room as well. Michael and Amy explained that the cold cleaner was used to wash smaller laboratory implements (mixers, spatulas, etc.). The lid of the cold cleaner was closed, and the instructions were conspicuously posted in compliance with R 336.1707. The opening of the cold cleaner is less than 10 ft², so this equipment and process is exempt under R336.1281.

Lines/Ovens

After observing where the inks were developed, Michael and Amy showed us to the main printing floor. Orafol Automotive Graphics runs 12 screen printing lines, 8 of which are stationary (EU-PRINT001-008, EU-PRINT012) and three of which are mobile (EU-MOBILPRINT). Each of the printing presses are equipped with an infrared electric dryer, except EU-PRINT004 and EU-PRINT012 which share a dryer. Michael explained via email on 7/11/2024 that EU-PRINT012 has not been operated at this facility since 2017 and EU-PRINT004 was shipped to Mexico in 2021, so they could not have been operated at the same time at any point within the last 5 years. He also provided documentation that supported this (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 305-05JFG - Lines & Ovens). Michael explained that due to this, no printing pressing occurs on the same print lines anymore. Pre-2017, sometimes metallic ink was printed on EU-PRINT012 and EU-PRINT004 acted as a magnet before the freshly inked print passed through their shared dryer.

I observed that one printing line was operating in a “clean” area (surrounded by plastic). Michael explained that the clearcoat used on the lines takes much longer to dry than the colored ink. To reduce imperfections on this line, the facility tries to keep the area as dust free as possible. All lines at this facility have the capability to print ink and clear coat, but two printers (EU-PRINT006 and EU-PRINT008) run at a higher speed than the others. Michael explained that as the clear coat dries much slower than the ink and these printers run relatively quickly, clear coat is not generally used on these lines. Any print that has been clear coated is partially dried by the infrared dryer and then fully dried by one of two natural gas fired ovens (EU-OVENLARGE and EU-OVENSMALL).

Michael explained that the smaller mobile printers do not have their own dryers, they are operated next to one of the stationary printers so they can use and adjacent printer’s dryer. He also explained that these mobile printers are mainly used for jobs that are smaller in physical size as it is easier to screen print some smaller sized decals on a smaller printer.

The screens used on the print lines are sometimes washed on the line as well. Excess ink is scraped from the screen and then a rag saturated with screen wash solution is used to remove the rest of the ink from the screen. Michael explained that screen wash solution used on the print lines is stored in closed containers and are only open while in use. Rags saturated with screen wash solution are then stored in closed buckets until they can be centrifuged to reclaim the screen wash solution. Michael explained that any waste materials were stored similarly (stored in closed containers) until they can be disposed of properly. I did not observe any open containers or buckets containing waste, screen wash solution, or saturated screen wash rags in this area of the facility.

The print lines and ovens are this facility's largest source of emissions, as they release uncontrolled emissions to the air. The amount of coatings consumed by these lines, the chemical makeup of these coatings, and the calculations of the VOC content of the ink and clear coat were provided by the facility (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 305-05J\FG - Lines & Ovens). Emission and material limits pertaining to FG-LINES/OVENS and ink and clearcoat usage are included in the "Emission Limits" and "Material Limits" section of this report.

All printers and ovens are properly labelled with the type of unit and it's identifying number, meeting the labeling requirement described in PTI 305-05J (FG-LINES/OVENS, SC IX.1).

Ink Room

Michael explained that after a colored ink has been developed, the inks are then made and mixed in the ink room at the facility. The inks are batched out and all components that go into the ink are accounted for. Each batch has a number and report generated for it to keep track of materials for the company and consumer, as well as VOC emissions. As all the inks are made in house, VOC content can be determined by the formulation. This facility submitted a request to use formulation data on 3/13/2023 in lieu of EPA Method 24 for the emission units identified in PTI 305-05J and that the request was approved by EGLE-AQD. Michael indicated via email on 7/16/2024 that they conducted an EPA Method 24 verification in 2014 using 6 of the facility's most used ink and clear coat materials where it was found that the Ink ERP system at the facility over-estimates the VOC content (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 305-05J\FG - Lines & Ovens). He also indicated via email on 7/18/2024 that after the first approval letter was issued, correspondence between Usama Amer (the former AQD inspector) and the facility determined that since calculations for VOC content for all coatings produced/used by Kay (now ORAFOL Automotive Graphics) are overestimated, they are allowed to continue to use those calculations (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 305-05J\FG - Lines & Ovens). Since the facility is overestimating the VOC content of the clear coats and inks and they are still under the emission limits set by PTI 305-05J, the facility is in compliance (see "Emission Limits" section for more details). All ink and clearcoat containers were observed to be closed when not in use. Several mixers were observed in this room as well. These mixers are exempt from the requirement to obtain a permit to install per R 336.1287(2)(k).

Screen Wash Room

After examining the ink room, Michael and Amy showed us to the screen wash room. If screens are not washed on the printing line, then they are brought back here to be washed. The same procedure for washing print screens occurs here as on the printing line. Michael

explained that any screen wash solution is stored in closed containers and are only open while in use, and rags saturated with screen wash solution are stored in closed buckets until they can be centrifuged to reclaim the screen wash solution in this room. Michael also explained that any waste materials were stored similarly (stored in closed containers) until they can be disposed of properly. I did not observe any open containers or buckets containing waste, screen wash solution, or saturated screen wash rags in the screen wash room.

After being washed, some screens are cut out of their frame so the mesh can be reused to make new screens for printing. The facility provided a list of cold cleaners, their facility code, and their vapor pressure (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 305-05J\FG - Screenwash\PI-002043_121715.docx).

According to Michael, the screen wash solution is primarily a mixture of -55% propylene glycol monomethyl ether acetate (PM acetate) and -45% acetone. This was confirmed by the records request (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 305-05J\FG - Screenwash\Screenwash Chemical Make up.pdf).

Michael explained that the main function of this room was for reclamation of screen washing solution. All screen wash solution laden rags are collected in closed containers throughout the day and are eventually sent back to this room where they are centrifuged to collect the remaining screen wash solution for reclamation. The “dirty” screen wash fluid is distilled in a 30-gallon distillation unit to remove any ink or impurities from the solution. This distillation unit is exempt from the requirement in Rule 201 to have a PTI per R 336.1285(2)(u). Once the distillation is complete, the distillate’s % of acetone to PM acetate is confirmed by density analysis using a hydrometer. According to Michael, as acetone is more volatile than PM acetate, usually they then add more acetone to the solution to make their usually 55% PM acetate to 45% acetone mixture.

Michael said that the amount of screen wash solution that is used on a day is measured by the height of the liquid level in the bulk screen wash solvent container at the beginning and end of the day. The amount of solvent reclaimed is subtracted from this total. I observed the notebook these measurements were being recorded in. Amy indicated that these paper records were digitized on a scheduled basis. These records were provided by the facility to confirm compliance (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 305-05J\FG – Screenwash). Emission and material limits pertaining to the screen wash room and screen washing solution are included in the “Emission Limits” and “Material Limits” section of this report.

Make Ready, Die Cutting, and Mold Making

Michael explained that all of the screens that are used in this facility are made on site. In the make ready room, screens of different mesh sizes are custom cut and glued to wooden frames. Any adhesive used in this process is monitored and included in calculations in FG-FACILITY. One of the employees working in this room estimated that their adhesive use for this process is around 7-15 gallons a month. Based on this, this process is exempt from the requirement in Rule 201 to have a PTI per R 336.1287(2)(c).

This facility makes wood dies to texturize decals and sometimes makes molds to make 3-D decals. Glue is used to make repairs to the wood dies. An employee in this room stated that he goes through 1 or 2 tubes of glue a year for this purpose, estimated at under a gallon for both tubes. Based on this, this process is exempt from the requirement in Rule 201 to have

a PTI per R 336.1287(2)(c). Michael explained that the mold making process was rarely used anymore as 3-D decals are rarely ordered, but a mold release and solvent is used when they do have to make a new mold. These liquids are tracked by the gallon and accounted for in FG-FACILITY. According to Michael they use about 2 gallons a month. Based on this, this process is exempt from the requirement in Rule 201 to have a PTI per R 336.1286(2)(b).

Digital Printing

The last units that we observed before heading to the adjacent facility was their digital printing room. This room contained 6 digital printers, including one small CAD plotter. All of the inks for these printers are also made at the facility and have a base of PM acetate according to Michael. Any exhaust from the printers goes to the room. According to Michael, emissions from these units are accounted for in FG-FACILITY. The determined HAP content for any material used in FG-FACILITY was also provided by the facility (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 305-05J\FG - Facility).

EU-LINE1

After seeing the digital printing room, Michael and Amy showed us to the facility next door where the plastic film rolls are casted. EU-LINE1 was in operation when we arrived. Michael explained that this line was mainly used to make various kinds of liquid vinyl and can also apply ink, topcoat, and adhesive. Michael explained that there are a few methods to cast the film roll including reverse roll, rotary screen, knife over roller, or slot die depending on the desired thickness of the final product. He also explained that there is no "typical" operating temperature on the line and that the formula and temperatures used are based on the formula of the material that they are casting, though it never operates over 400° C. They can also adjust the fans inside the line depending on the volatility of the plastic film being cast as part of the casting process.

The VOC emissions from this line are controlled by non-fugitive enclosure (NFE) and a regenerative thermal oxidizer (RTO No. 1). The NFE, which has negative pressure compared to the surrounding room, ensures that most of the VOCs created by the casting process are being sucked into the RTO where they can be destroyed before entering the atmosphere. The NFE on this line has pressure sensors at all the main doors (3) that open to a smaller room. The doors close behind anyone in the smaller room and then air is blown into the small room to ensure negative pressure in the room housing EU-LINE1. Pressure is measured in real time, but it is not logged. At the time of inspection, the pressure was about -0.017" H₂O. Michael explained that they do not log the pressures for the NFE, but the facility conducts smoke tube testing on a semi-annual basis in accordance with PTI 46-13A. If the pressure is ever not negative, the green light inside the casting line turns off and the operators must alert maintenance. If the room is not returned to negative pressure, casting and coating processes stop on this line. According to the observation report for the stack test conducted on June 4, 2015, there was no way to smoke tube test the NFE at that time. Instead, the pressure drop was read on the enclosure. During the test, the pressure drop was between -0.01" H₂O to -0.02" H₂O. This line is also equipped with instrumentation to measure the lower flammability level (LFL) for fire safety reasons. If the LFL gets too high, the line will automatically stop production.

The RTO on this line is required to be 1550° F that a minimum overall destruction efficiency of 98% as required by PTI 46-13A. According to the report for the stack test conducted on June 4, 2015, the minimum temperature during stack testing was 1560° F and the average destruction efficiency was 99.85% between 3 tests. At the time of inspection, I observed the RTO to be operating at a temperature of 1638° F, which is higher than the required temperature for a 98% destruction efficiency. Michael explained that the set point of this RTO is 1580° F, meaning that if the RTO drops below that an alarm will sound, and the line stops production. PTI 46-13A requires that the temperature in the combustion chamber of the RTO be monitored continuously while the line and RTO are in use. The temperature measurements should also be made at equally spaced intervals, not to exceed 15 minutes per interval. The facility provided records of these temperature measurements from the last 5 years (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 46-13A\EU-Line1 (formerly EUCoatingLine)\4). These records indicate temperature readings are recorded every two minutes. Based on the temperature records of RTO, the RTO was operating above the minimum temperature while EU-LINE1 was operating over the last 5 years and that temperatures are recorded at least once every 15 minutes. Therefore, this facility is in compliance with those stipulations described in PTI 46-13A. A malfunction abatement plan (MAP) was also submitted for RTO No. 1. Michael explained that regular maintenance according to the MAP is performed on the RTO, including regular thermocouple replacement to ensure temperature readings. Michael mentioned there have been no malfunctions with the RTO in the last 5 years.

The amount of coatings consumed by this line, the composition of the materials used on the line, and the calculations of the VOC content of the materials were provided by the facility (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 46-13A\EU-Line1 (formerly EUCoatingLine)\1 and S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 46-13A\EU-Line1 (formerly EUCoatingLine)\2 and S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 46-13A\EU-Line1 (formerly EUCoatingLine)\3). Michael explained that dozens of chemicals are used on the product line, so only the most used materials SDS sheets were included. This facility submitted a request on 8/27/2020 to use formulation data in lieu of EPA Method 24 for the emission units identified in PTI 46-13. The request was approved by EGLE-AQD under the condition that at least one adhesive and one other solvent-based material are tested once per calendar year. The records for Method 24 testing did not include testing for 2019 and 2023 (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 46-13A\EU-Line1 (formerly EUCoatingLine)\1). Therefore, this facility is noncompliant with PTI 46-13A (EU-LINE1, SC V.1). Michael stated via emails on 7/11/2024 and 7/12/2024 these samples were not sent out due to issues with their internal database (testing was either not scheduled or was accidentally deleted from their schedule). He explained that upon noticing the mistake, the facility sent out two samples in 2020. They also sent out samples in early 2024 and plan on sending out another sample by December 15, 2024. To prevent similar issues in the future, Michael stated that with their new system, there is an automatic scheduling feature which the old system did not include. He has also created reminders on his work calendars for these analyses. As the facility eventually conducted the Method 24 testing and took steps to prevent this issue in the future, a VN will not be issued at AQD discretion. Discussion of emission and material limits pertaining to this unit are included in the "Emission Limits" and "Material Limits" section of this report.

EU-LINE2

After observing EU-LINE1, Michael and Amy showed us to EU-LINE2. This casting line was also in production when we arrived. EU-LINE2 began production March 11, 2024. Michael explained that this line has the same capabilities as EU-LINE1 (casting of vinyl and can also apply ink and topcoat), but the facility is planning on using it mostly to apply adhesive. Like EU-LINE1, this line is also equipped with a NFE and RTO (RTO No. 2) to control VOC emissions. Eventually, EU-LINE2 and EU-LINE3 will share the same RTO, but EU-LINE3 was not operational at the time of the inspection. The NFE on this line has pressure sensors at all the main doors that open to a smaller room. Similar to EU-LINE1, the doors close behind anyone in the smaller room and then air is blown into the small room to ensure negative pressure in the room housing EU-LINE2. Pressure is measured in real time at both the first and second set of doors, but it is not logged. At the time of inspection, the pressure was about -6 Pa (-0.0241" H₂O) at the first door and -17 Pa (-0.0682" H₂O) at the door leading to the actual line.

The RTO on this line is required to be 1550° F for a minimum overall destruction efficiency of 98% as required by PTI 46-13A. At the time of inspection, I observed the RTO to be operating at a temperature of 1614° F, which is higher than the required temperature for a 98% destruction efficiency. Stack testing for this unit has not yet been done but is scheduled for July 25, 2024. Michael explained that the set point of this RTO is also at 1580° F, meaning that if the RTO drops below that an alarm will sound, and the line stops production. PTI 46-13A requires that the temperature in the combustion chamber of the RTO be monitored continuously over while the line and RTO are in use. The temperature measurements should also be made at equally spaced intervals, not to exceed 15 minutes per interval. The facility provided records of these temperature measurements from the start of production on the line (about 3 months) (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 46-13A\FG-2022\5). These records indicate temperature readings are recorded every two minutes. Based on the temperature records of RTO, the RTO was operating above the minimum temperature while EU-LINE2 was operating and that temperatures are recorded at least once every 15 minutes. Therefore, this facility is in compliance with those stipulations described in PTI 46-13A. A malfunction abatement plan (MAP) was also submitted for RTO No. 2. Michael explained that regular maintenance according to the MAP is scheduled and performed on the RTO and provided records of maintenance (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 46-13A\FG-2022\5). He also explained via email that the equipment was added to the database June 1, 2024 because the facility was waiting for manufacturer guidance as to what scheduled maintenance tasks were required.

This line also has the capability to run solvent based as well as water-based products. However, only the VOCs from the solvent based materials must be run through the RTO. According to Joshua Flood, when the water-based materials are being used, a damper is switched by key so emissions are vented directly to the atmosphere.

The amount of coatings consumed by this line, the composition of the materials used on the line, and the calculations of the VOC content of the materials were provided by the facility (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 46-13A\FG-2022\1 and S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 46-13A\FG-2022\2 and S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 46-13A\FG-2022\3). According to Michael, materials used on this line will be similar to or the same as the ones used on EU-LINE1. This facility submitted a request on 8/27/2020 to use formulation data in lieu of EPA Method 24 for the emission units identified in PTI 46-13. The request was approved by EGLE-AQD

under the condition that at least one adhesive and one other solvent-based material are tested once per calendar year.

EU-LINE3 and EU-COLDCLEANER

These units have not been installed yet. Joshua Flood indicated that EU-LINE3 should be ready to start production in the second quarter of 2025. It will be housed in the same room as EU-LINE2, and space for building it has already been cleared. Michael explained that they were still in talks with a company to custom-make the containment for EU-COLDCLEANER as well.

Emission Limits

All emissions summaries provided by the facility can be found digitally at: <S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\Emissions Summaries>.

**305-05J
FG-LINES/OVENS**

FG-LINES/OVENS includes the following emissions units: EU-PRINT001, EU-PRINT002, EU-PRINT003, EU-PRINT004, EU-PRINT005, EU-PRINT006, EU-PRINT007, EU-PRINT008, EU-PRINT012, EU-MOBILPRINT, EU-OVENLARGE, and EU-OVENSMALL. The emissions limit for VOCs for FG-LINES/OVENS as described in PTI 305-05J are as follows:

Pollutant	Limit	Time Period/Operating Scenario
VOCs	47.5 tpy	12-month rolling time period as determined at the end of each calendar month
VOCs	6.5 lb/gal (minus water), as applied	Calendar day (when using ink)
VOCs	4.8 lb/gal (minus water), as applied	Calendar day (when using clear coat)

Orafol provided records of 12-month rolling sums for VOC emissions for FG-LINES/OVENS from January 2019 through May 2024. A summary of the 12-month rolling sum for VOC emissions from FG-LINES/OVENS is below:

12-month rolling sum of VOC emissions from FG-LINES/OVENS (tpy)						
	Year					
	2019	2020	2021	2022	2023	2024
Jan	22.4	18.3	13.8	20.2	21.7	23.4
Feb	22.6	17.8	14.0	20.5	22.2	22.9
Mar	22.0	17.2	14.9	20.8	22.3	22.1

Apr	22.2	15.5	16.1	21.1	22.6	22.1
May	21.2	14.8	14.8	22.1	23.1	21.9
Jun	20.7	14.4	16.9	22.0	23.5	N/A
Jul	20.0	13.9	17.6	21.8	24.0	N/A
Aug	19.1	14.3	18.0	21.6	24.5	N/A
Sep	18.4	14.0	18.6	21.7	24.5	N/A
Oct	18.3	13.5	19.4	21.4	24.9	N/A
Nov	18.2	13.6	20.0	21.2	24.1	N/A
Dec	18.5	13.7	20.1	21.4	23.7	N/A

Orafol also provided examples of clear coat and ink max VOC content records (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\PTI 305-05J\FG - Lines & Ovens). Michael explained via email on 7/16/2024 that these records are in their database and can be viewed for any day. These show the max VOC content for all coatings used were less than calendar day average permit limit and therefore, the volume weighted average will be less than the limit each day, except for one day, 1/21/2020. On 1/21/2020, 2020, data was provided to Kerry Kelly (EGLE-AQD) by email on 9/29/20 indicating the facility did not exceed the daily limit as usage of other inks brought their volume-weighted average of VOC content down for that day so the calendar day average limit was not exceeded (S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024 \PTI 305-05J\FG - Lines & Ovens).

The emissions of VOCs for FG-LINES/OVENS are under the emission limits set forth in PTI 305-05J, therefore, Orafol is in compliance with the emission limits for FGLINES/OVENS in PTI 305-05J.

FG-SCREENWASH

FG-SCREENWASH includes the following emissions units: EU-PRINT001, EU-PRINT002, EU-PRINT003, EU-PRINT004, EU-PRINT005, EU-PRINT006, EU-PRINT007, EU-PRINT008, EU-PRINT012, EU-MOBILPRINT, and EU-SWROOM. The emissions limit for VOCs for FG-SCREENWASH as described in PTI 305-05J are as follows:

Pollutant	Limit (tpy)	Time Period/Operating Scenario
VOCs	18.0	12-month rolling time period as determined at the end of each calendar month

Orafol provided records of 12-month rolling sums for VOC emissions for FG-SCREENWASH from January 2019 through May 2024. A summary of the 12-month rolling sum for VOC emissions from FG-SCREENWASH is below:

12-month rolling sum of VOC emissions from FG-SCREENWASH (tpy)						
	Year					
	2019	2020	2021	2022	2023	2024
Jan	6.49	4.80	3.12	4.16	3.87	4.68

Feb	6.48	4.73	3.05	4.13	3.89	4.74
Mar	6.29	4.51	3.18	4.09	4.08	4.58
Apr	6.13	4.12	3.49	4.11	4.15	4.59
May	5.98	3.88	3.88	4.12	4.21	4.65
Jun	5.56	3.60	3.73	4.10	4.32	N/A
Jul	5.44	3.48	3.86	3.99	4.55	N/A
Aug	5.26	3.40	3.93	4.00	4.57	N/A
Sep	5.14	3.40	3.93	4.10	4.52	N/A
Oct	4.97	3.35	4.12	3.89	4.56	N/A
Nov	4.89	3.33	4.10	3.90	4.58	N/A
Dec	4.85	3.28	4.13	3.81	4.69	N/A

The emissions of VOCs for FG-SCREENWASH are under the emission limits set forth in PTI 305-05J, therefore, Orafol is in compliance with the emission limits for FG-SCREENWASH in PTI 305-05J.

FG-FACILITY

FG-FACILITY includes all process equipment at the stationary source including equipment covered by other permits, grandfathered equipment and exempt equipment. The emissions limit for VOCs for FG-FACILITY as described in PTI 305-05J are as follows:

Pollutant	Limit (tpy)	Time Period/Operating Scenario
Individual HAP	8.9	12-month rolling time period as determined at the end of each calendar month for FG-FACILITY
Aggregate HAPs	22.4	12-month rolling time period as determined at the end of each calendar month for FG-FACILITY
VOCs	89.9	12-month rolling time period as determined at the end of each calendar month for FG-FACILITY
VOCs	7.7	12-month rolling time period as determined at the end of each calendar month for all exempt equipment

Orafol provided records of 12-month rolling sums for VOC emissions for FG-FACILITY and for all exempt equipment from January 2019 through May 2024. A summary of the 12-month rolling sums for VOC emissions from FG-FACILITY and all exempt equipment are below:

12-month rolling sums of VOC emissions from FG- FACILITY (tpy)						
	Year					
	2019	2020	2021	2022	2023	2024
Jan	35.91	31.13	22.95	31.99	34.10	36.35
Feb	36.36	30.52	21.90	32.12	34.84	35.69

Mar	35.78	29.31	23.05	32.72	35.19	34.59
Apr	35.90	26.44	24.95	33.32	35.53	34.72
May	34.78	25.09	25.09	34.55	35.83	34.73
Jun	34.04	24.00	26.42	34.57	36.25	N/A
Jul	33.37	23.15	27.26	34.46	37.19	N/A
Aug	32.24	23.05	28.36	34.13	37.56	N/A
Sep	31.43	22.70	29.11	34.35	37.47	N/A
Oct	31.28	21.91	30.38	33.92	37.69	N/A
Nov	31.08	21.88	31.14	33.86	37.20	N/A
Dec	31.34	21.99	31.28	33.94	36.56	N/A

12-month rolling sum of VOC emissions from all exempt equipment (tpy)						
	Year					
	2019	2020	2021	2022	2023	2024
Jan	1.35	3.11	3.11	3.98	4.03	3.78
Feb	1.50	3.10	2.12	4.00	4.07	3.64
Mar	1.63	2.99	2.29	4.01	4.03	3.55
Apr	1.74	2.74	2.56	4.02	3.97	3.61
May	1.83	2.64	2.64	3.92	3.85	3.58
Jun	1.97	2.53	2.79	3.94	3.83	N/A
Jul	2.14	2.51	2.85	3.96	3.91	N/A
Aug	2.31	2.41	3.00	3.97	3.81	N/A
Sep	2.51	2.35	3.12	4.00	3.81	N/A
Oct	2.75	2.20	3.27	4.02	3.73	N/A
Nov	2.87	2.17	3.50	4.04	3.75	N/A
Dec	3.08	2.17	3.54	4.06	3.76	N/A

The emissions of VOCs for FG-FACILITY and all exempt equipment are under the emission limits set forth in PTI 305-05J, therefore, Orafol is in compliance with the VOC emission limits for FG-FACILITY and all exempt equipment in PTI 305-05J.

Orafol provided records of 12-month rolling sums for both individual and aggregate HAP emissions for FG-FACILITY and for all exempt equipment from January 2019 through May 2024. The highest reported rolling 12-month sum of individual HAPs was 5.25 tons of ethylene glycol monobutyl ether acetate (EB acetate) in May 2019.

A summary of the 12-month rolling sums for aggregate HAP emissions from FG-FACILITY and all exempt equipment are below:

12-month rolling sum of aggregate HAP emissions from FG- FACILITY (tpy)						
	Year					

	2019	2020	2021	2022	2023	2024
Jan	7.74	7.15	5.00	7.49	6.57	6.87
Feb	7.88	7.00	4.95	7.58	6.67	6.72
Mar	7.77	6.73	5.17	7.72	6.59	6.56
Apr	7.67	6.24	5.57	7.76	6.74	6.56
May	7.38	5.97	5.84	7.86	6.82	6.56
Jun	7.20	5.96	6.03	7.84	6.94	N/A
Jul	7.07	5.70	6.22	7.75	7.16	N/A
Aug	6.81	5.79	6.23	7.61	7.27	N/A
Sep	7.07	5.42	6.28	7.58	7.18	N/A
Oct	7.27	5.11	6.52	7.42	7.17	N/A
Nov	7.17	5.15	6.84	7.14	7.07	N/A
Dec	7.30	5.02	7.33	6.69	6.92	N/A

The highest reported 12-month rolling sum for aggregate HAPs is 7.86 tons, which occurred in May 2022. The emissions of individual and aggregate HAPs for FG-FACILITY and all exempt equipment are under the emission limits set forth in PTI 305-05J, therefore, Orafol is in compliance with the individual and aggregate emission limits for FG-FACILITY and all exempt equipment in PTI 305-05J.

46-13A EU-LINE1

The emissions limit for VOCs for EU-LINE1 as described in PTI 46-13A are as follows:

Pollutant	Limit (tpy)	Time Period/Operating Scenario
VOCs	16.7	12-month rolling time period as determined at the end of each calendar month

Orafol provided records of 12-month rolling sums for VOC emissions for EU-LINE1 from January 2019 through May 2024. The destruction efficiency for RTO No. 1 used for these calculations was 98%. A summary of the 12-month rolling sums for VOC emissions from EU - LINE1 is below:

12-month rolling sums of VOC emissions from EU-LINE1 (tpy)						
	Year					
	2019	2020	2021	2022	2023	2024
Jan	5.69	4.95	2.88	3.63	4.49	4.49
Feb	5.81	4.86	2.78	3.53	4.68	4.42
Mar	5.84	4.57	2.68	3.78	4.80	4.37
Apr	5.84	4.12	2.77	4.10	4.82	4.37
May	5.77	3.77	3.77	4.45	4.67	4.45
Jun	5.81	3.47	2.99	4.56	4.64	N/A
Jul	5.79	3.22	2.96	4.72	4.71	N/A
Aug	5.56	2.92	3.43	4.52	4.69	N/A

Sep	5.42	2.90	3.47	4.56	4.66	N/A
Oct	5.25	2.81	3.56	4.59	4.54	N/A
Nov	5.14	2.75	3.59	4.73	4.73	N/A
Dec	4.91	2.85	3.54	4.68	4.45	N/A

The emissions of VOCs for EU-LINE1 are under the emission limits set forth in PTI46-13A, therefore, Orafol is in compliance with the emission limits for EU-LINE1 in PTI 46-13A.

FG-2022

FG-2022 includes EU-LINE2 and 3 and EU-COLDCLEANER. According to Michael, EU-LINE2 was operational starting on March 11, 2024. Amy notified EGLE-AQD of the wet commissioning of this line on March 19, 2024, which is within the 30-day notification limit described in PTI 46-13A (FG-2022, SC VII.1). EU-LINE3 and EU-COLDCLEANER are both not installed yet. As construction of this project has been continuous and they began installation within 18 months of PTI issuance, the facility is in compliance with the conditions described in PTI 46-13A (GC 2). The emission limits for FG-2022 as described in PTI 46-13A are as follows:

Pollutant	Limit (tpy)	Time Period/Operating Scenario
VOCs	51.4	12-month rolling time period as determined at the end of each calendar month
Dimethylethanolamine (CAS No. 108-01-0)	8.0	12-month rolling time period as determined at the end of each calendar month
Cumene (CAS No. 98-82-8)	0.1	12-month rolling time period as determined at the end of each calendar month

Orafol provided records of 12-month rolling sums for VOC, dimethylethanolamine, and cumene emissions for FG-2022 from January 2023 through May 2024. The destruction efficiency for RTO No. 2 used for these calculations was 98%. A summary of the 12-month rolling sums for these emissions from FG-2022 is below:

12-month rolling sum of emissions from FG-2022 (tpy)			
	VOCs	dimethylethanolamine	Cumene
Jan 23	0.00	0.000	0.002
Feb 23	0.00	0.000	0.002
Mar 23	0.00	0.000	0.002
Apr 23	0.00	0.000	0.002
May 23	0.00	0.000	0.002
Jun 23	0.00	0.000	0.002
Jul 23	0.00	0.000	0.002
Aug 23	0.00	0.000	0.002
Sep 23	0.00	0.000	0.000
Oct 23	0.00	0.000	0.000

Nov 23	0.00	0.000	0.015
Dec 23	0.00	0.000	0.015
Jan 24	0.00	0.000	0.002
Feb 24	0.00	0.000	0.014
Mar 24	0.02	0.000	0.015
Apr 24	0.05	0.000	0.015
May 24	0.13	0.000	0.015

Michael indicated in the records that were sent over that the facility does not currently use chemicals containing cumene or dimethylethanolamine in emission units in FG-2022. EU-COLDCLEANER was intended to have Aromatic 100 Solvent in it which contains cumene, but it has not yet been installed and dimethylethanolamine is not currently found in any of the facility’s formulations. The emissions of VOCs, dimethylethanolamine, and cumene for FG-2022 are under the emission limits set forth in PTI 46-13A, therefore, Orafol is in compliance with the emission limits for FG-2022 in PTI 46-13A.

Material Limits

All material usage summaries provided by the facility can be found digitally at: S:\Air Quality Division\STAFF\Jillian Cellini\Inspection Documents\Orafol 2024\Emissions Summaries.

**305-05J
FG-LINES/OVENS**

Material limits for FG-LINES/OVENS along with record keeping requirements for these material limits are explained in PTI 305-05J.

The following material limits are described in PTI 305-05J for FG-LINES/OVENS:

Pollutant	Max VOC Content (lbs/gal)	Limit (gal/year)	Time Period/Operating Scenario
Clearcoat	4.8	8,791	12-month rolling time period as determined at the end of each calendar month
Ink	6.5	8,115	12-month rolling time period as determined at the end of each calendar month

Orafol provided records of 12-month rolling sums for clearcoat and ink usage from January 2019 through May 2024. A summary of the 12-month rolling sums for clear coat and ink use for FG-LINES/OVENS is below:

	12-month rolling sum of clearcoat usage (gal)					
	Year					
	2019	2020	2021	2022	2023	2024
Jan	5983.3	5256.8	4255.3	4884.2	5886.9	6269.7

Feb	6034.1	5172.2	4197.8	4974.7	6026.8	6217.5
Mar	5939.0	5009.7	4418.8	5075.6	6092.4	5973.8
Apr	5981.0	4534.3	4728.7	5116.6	6222.8	6007.2
May	5713.4	4365.9	4365.9	5382.9	6324.6	6054.5
Jun	5640.6	4210.3	4865.3	5483.7	6340.7	N/A
Jul	5448.6	4247.3	4833.6	5503.4	6508.9	N/A
Aug	5431.3	4112.0	4794.4	5586.4	6620.8	N/A
Sep	5311.8	4256.6	4742.0	5680.0	6559.4	N/A
Oct	5297.1	4297.7	4680.3	5746.1	6438.6	N/A
Nov	5237.2	4313.6	4800.0	5732.8	6355.8	N/A
Dec	5314.0	4250.0	4848.8	5841.9	6233.6	N/A

12-month rolling sum of ink usage (gal)						
	Year					
	2019	2020	2021	2022	2023	2024
Jan	3468.2	2705.1	2407.3	3845.9	3774.3	4205.3
Feb	3392.8	2639.7	2501.9	3893.2	3868.2	4073.2
Mar	3324.2	2561.0	2690.1	3950.9	3864.3	3977.6
Apr	3318.0	2284.4	2903.9	4028.3	3901.8	3984.2
May	3227.6	2177.0	2177.0	4171.9	4034.4	3837.4
Jun	3108.3	2154.0	3113.9	4074.9	4138.1	N/A
Jul	3030.4	2047.3	3286.1	4009.3	4227.5	N/A
Aug	2863.2	2155.1	3398.3	3892.3	4307.9	N/A
Sep	2706.3	2236.5	3489.7	3856.5	4360.9	N/A
Oct	2685.6	2230.9	3681.8	3697.3	4461.3	N/A
Nov	2663.7	2278.3	3790.6	3624.3	4449.3	N/A
Dec	2731.0	2355.0	3810.9	3647.5	4328.6	N/A

Orafol also provided records of daily max VOC emissions for ink and clearcoat for FG-LINES/OVENS for from January 2019 through May 2024. A summary of these VOC emissions from FG-LINES/OVENS is below:

Daily max ink VOC emissions from FG-LINES/OVENS (lb/gal)						
	Year					
	2019	2020	2021	2022	2023	2024
Jan	6.5	6.574	6.2	6.2	6.2	6.2
Feb	6.5	6.2	6.2	6.2	6.2	6.2
Mar	6.5	6.2	6.2	6.2	6.2	6.2
Apr	6.5	6.1	6.2	6.2	6.2	6.2
May	6.5	6.2	6.2	6.2	6.4	6.2
Jun	6.5	6.2	6.2	6.2	6.2	N/A
Jul	6.3	6.2	6.2	6.2	6.2	N/A

Aug	6.2	6.3	6.3	6.2	6.2	N/A
Sep	6.5	6.5	6.1	6.2	6.2	N/A
Oct	6.5	6.2	6.2	6.1	6.2	N/A
Nov	6.2	6.2	6.2	6.2	6.2	N/A
Dec	6.4	6.3	6.2	6.2	6.2	N/A

Daily max clear coat VOC emissions from FG-LINES/OVENS (lb/gal)						
	Year					
	2019	2020	2021	2022	2023	2024
Jan	4.6	4.6	4.6	4.6	4.6	4.6
Feb	4.6	4.6	4.6	4.6	4.6	4.6
Mar	4.6	4.6	4.6	4.6	4.6	4.6
Apr	4.6	4.6	4.6	4.6	4.6	4.6
May	4.6	4.6	4.6	4.6	4.6	4.6
Jun	4.6	4.6	4.6	4.6	4.6	N/A
Jul	4.6	4.6	4.6	4.6	4.6	N/A
Aug	4.6	4.6	4.6	4.6	4.6	N/A
Sep	4.6	4.6	4.6	4.6	4.6	N/A
Oct	4.6	4.6	4.6	4.6	4.6	N/A
Nov	4.6	4.6	4.6	4.6	4.6	N/A
Dec	4.6	4.6	4.6	4.6	4.6	N/A

In January 2020, the VOC content limit for ink was exceeded as an old ink formulation was used. This was reported to EGLE-AQD on 8/23/2020 by Amy. Amy noted that the max ink VOC content used was 6.574 lb/gal, which can be rounded up to 6.6 lb/gal and that that ink had been removed from the system and is no longer available for use on any more jobs. On 9/30/2020, Kerry Kelly sent a compliance determination to the facility, noting that considering the underlying applicable requirement (Rule 205(1)(a)) indicates the throughput and lb/gallon limits in SC II.1 and II.2 were established to restrict the operating capacity of the equipment to meet the 47.5 tpy VOC limit in SC I.1, not as a maximum allowable emission rate listed by the department on its own initiative or based upon the application of the best available control technology. Kerry decided not to issue a notice of violation of SC II.2, for the facility using an ink with VOC content of 6.574 lb/gal because the annual emission data provided to Kerry on 9/29/20 indicated the facility did not exceed the 47.5 tpy VOC limit. Kerry noted the highest 12-month rolling VOC emissions (18.5 tons) and ink usage (2731 gallons) between Sept. 2019 and August 2020 were less than half the limits in SC I.1 and SC II.2 respectively. Clearcoat and ink usage at this facility is under the material limits set forth in PTI 305-05J, therefore, Orafol is in compliance with the material limits for FG-LINES/OVENS in PTI 305-05J.

FG-SCREENWASH

Material limits for FG-SCREENWASH along with record keeping requirements for these material limits are explained in PTI 305-05J.

The following material limits are described in PTI 305-05J for FG-SCREENWASH:

Pollutant	Max VOC Content (lbs/gal)	Limit (gal/year)	Time Period/Operating Scenario
Screen Wash Solvent	4.03	8,950	12-month rolling time period as determined at the end of each calendar month

Orafol provided records of 12-month rolling sums for screen wash solvent usage from January 2019 through May 2024. A summary of the 12-month rolling sums for screen wash solvent use for FG-SCREENWASH is below:

12-month rolling sum of screen wash solvent usage (gal)						
	Year					
	2019	2020	2021	2022	2023	2024
Jan	3219	2384	1540	2065	1919	2145
Feb	3218	2346	1508	2048	1931	2354
Mar	3119	2242	1573	2028	2026	2271
Apr	3406	2043	1722	2041	2058	2280
May	2968	1930	1930	2073	2088	2309
Jun	2762	1810	1845	2043	2142	N/A
Jul	2701	1725	1908	1978	2257	N/A
Aug	2609	1689	1943	1986	2266	N/A
Sep	2552	1681	1952	2035	2241	N/A
Oct	2464	1657	2045	1929	2262	N/A
Nov	2427	1645	2035	1935	2272	N/A
Dec	2408	1618	2051	1891	2329	N/A

Screen wash solvent usage at this facility is under the emission limits set forth in PTI 305-05J, therefore, Orafol is in compliance with the material limits for FG-SCREENWASH in PTI 305-05J.

**46-13A
FG-2022**

Material limits for FG-2022 along with record keeping requirements for these material limits are explained in PTI 46-13A.

The following material limits are described in PTI 46-13A for FG-2022:

Pollutant	Limit	Time Period/Operating Scenario
VOC content of water based prime	0.3 lb/gal (minus water) as applied	Instantaneous for the uncontrolled portion of EU-LINE2

Orafol provided records of monthly maximums of VOC content of water based prime on the uncontrolled portion of EU-LINE2 from January until May 2024 (the line was not in full operation until March 2024). When running on water based prime, there is a bypass that is used so the exhaust does not go to the RTO and instead goes to the open air. According to Michael and Joshua, the water based prime will likely be used less than the solvent based primes. The LFL (lower flammability limit) is also tracked in the stack attached to EU-LINE2 for all processes. If the LFL gets too high, which Michael explained would occur almost immediately if the process was running uncontrolled for anything solvent-based, the system goes into a hard stop. A summary of the VOC content of water based prime from EU-LINE2 is below:

Monthly max VOC content from water based prime from the uncontrolled portion of EU-LINE2 (lbs/gal)	
	Year
	2024
Jan	0.00
Feb	0.00
Mar	0.00
Apr	0.00
May	0.00
Jun	N/A
Jul	N/A
Aug	N/A
Sep	N/A
Oct	N/A
Nov	N/A
Dec	N/A

The max VOC content for the uncontrolled portion of EU-LINE2 is under the emission limits set forth in PTI 46-13A, therefore, Orafol is in compliance with the material limits for FG-2022 in PTI 46-13A.

2023 Emission Report

This facility submitted their annual emissions report form on time to MiEnviro for the 2023 calendar year. Their Criteria Air Pollutant emissions are as follows:

Pollutant	Total Emissions (tons)
CO	0.06984
NO _x	0.00831
PM ₁₀ (filt + cond)	0.09174
PM ₁₀ (filt)	0.06988
PM _{2.5} Primary (filt + cond)	0.07234
PM _{2.5} (filt)	0.06319

SO ₂	0.00633
VOC	32.56873

On their emissions report, this facility removed the emissions from exempt equipment from their VOC emissions totals.

Conclusion

This facility is non-compliant with PTI 46-13A (EU-LINE1, SC V.1) as they failed to conduct Method 24 testing for VOC content on both an adhesive and a solvent containing material as part of the conditions included in their permission to use manufacturer data for VOC content. As the facility eventually conducted the Method 24 testing and took steps to prevent this issue in the future, a VN will not be issued at AQD discretion.

Observations made during the inspection and record review indicate that Orafol and Orafol Automotive Graphics in Lake Orion, MI is operating in compliance with all other requirements of the federal Clean Air Act; Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451); Michigan Department of Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD) Administrative Rules, and PTI Numbers 46-13A and 305-05J.

Name: Jillian Cellini

Date: 07/29/2024

Supervisor:

K. Kelly