

**DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION  
ACTIVITY REPORT: Stack Test Observation**

N270272899

<b>FACILITY:</b> Orafol Automotive Graphics	<b>SRN / ID:</b> N2702
<b>LOCATION:</b> 57 Kay Industrial Dr., LAKE ORION	<b>DISTRICT:</b> Warren
<b>CITY:</b> LAKE ORION	<b>COUNTY:</b> OAKLAND
<b>CONTACT:</b> Michael Kozik , EHS Compliance Administrator	<b>ACTIVITY DATE:</b> 07/25/2024
<b>STAFF:</b> Jillian Cellini	<b>COMPLIANCE STATUS:</b> Compliance
<b>SUBJECT:</b> VOC emission destruction test observation and smoke tube test observation on EU-LINE2 and associated RTO and NFE	
<b>RESOLVED COMPLAINTS:</b>	

On July 25, 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 observe a VOC destruction test on a newly installed Regenerative Thermal Oxidizer (RTO) on EU-LINE2, their newest coating line. EU-LINE2 also has a non-fugitive enclosure (NFE) associated with the line. This facility has two Permits to Install (PTIs): 46-13A and 305-05J. EU-LINE2 and its associated RTO (RTO No. 2) and NFE are included in PTI number 46-13A. EU-LINE3 (also included in PTI number 46-13A) is currently under construction, but will also eventually be associated with RTO No. 2 when it becomes fully operational.

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. 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. 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 VOC destruction test conducted on 7/25/2024 occurred at Orafol.

The test protocol detailing the methods used for analysis was received by EGLE-AQD on April 30, 2024. According to PTI 46-13A, units in FG-2022 (EU-LINE2, EU-LINE3, and EU-COLDCLEANER) must verify: the direction of air flow at each natural draft opening (NDO) is into the non-fugitive enclosure, using a smoke test (i.e., smoke bomb, smoke tube) (SC V.2) and the VOC destruction efficiency of RTO No. 2 for FG-2022 by testing at owner's expense, in accordance with EGLE-AQD requirements (SC V.3). The VOC destruction test consists of three 1-hour runs. The direction of air flow test was determined by smoke tube at the start of each one-hour VOC destruction test. Both tests must be conducted within 180 days of trial operation. The direction of air flow at each NDO must also be verified semi-annually after the initial test. Two smoke tests and two complete runs of the of the three 1-hour long VOC destruction tests were both observed at the time of this test observation.

This facility has another RTO (RTO No. 1) and NFE that are associated with EU-LINE1 (formerly EUCoatingLn). The last VOC destruction test occurred at this facility on this line on 6/04/2015 and was observed by Samuel Liveson (AQD) and Tom Gasloli (AQD).

I arrived at the facility at around 8:40 AM. I met Amy Kemp (Orafol, Environmental Health and Safety Compliance Administrator) and Andrew Riley and Amy showed us to the building containing EU-LINE2 where testing was occurring. On the way to EU-LINE2, Amy explained that initially, the stack test was scheduled to start at 8:30 AM, but they had a problem when they started up EU-LINE2 earlier that morning and were running behind. The test was now planned to be delayed for around an hour. She explained there was an issue with one of the fans, so they had to restart the line. By the time I arrived, the line was up and running, but they were waiting for it to be fully restarted and completely warmed up before the test. Once we entered the building where EU-LINE2 is housed, we met with Josh Flood (Orafol, Facilities & Environmental Health and Safety Manager), Michael Kozik (Orafol, Environmental Health and Safety Compliance Administrator), and Bruce Connell (Environmental Partners Inc.) to talk about the schedule and testing plan for the day. Bruce and Michael explained that the smoke tube test would be occurring at the start of each 1-hour VOC destruction efficiency run, and that pressure differential readings would be taken along EU-LINE2 every 15 minutes. Michael also explained that EU-LINE2 would be running at a speed of 65.8 ft<sup>2</sup>/min, as this is as fast as the facility can apply adhesive and ink without ruining their product.

The first run of the test started at 9:45 AM and smoke tube testing was completed at 9:55 AM. I did not observe the first smoke tube test, but I did observe that all pressure differential readings on the NFE throughout the testing time all had negative pressure differentials, indicating that air was flowing into the NFE. At around 10:00 AM, Andrew and I went outside and observed the outlet of the RTO. There, we talked to Ben Byczynski (Air Quality Specialist, Stack Test Group Inc.), one of the stack testers at the facility. We observed him taking moisture flow readings and he explained some of the method that they were using for VOC destruction efficiency. During this, Mark Dziadosz (EGLE – AQD) arrived at the facility and joined us near the outlet.

After observing this, we went back inside and met with Bill Byczynski (President, Stack Test Group) in the testing trailer at around 10:15 AM. Bill explained that a Flame Ionization Detector (FID) was being used to make VOC measurements at the inlet and the outlet. According to Bill, the FID is calibrated with propane gas, and then takes 1-minute readings at the inlet and outlet which are then averaged to get the % destruction efficiency (DE). During this time, I observed the inlet VOC concentration to be 2042 ppm and the outlet VOC concentration to be 3.6 ppm. This is an approximate VOC DE of 99.8%, which is below the required DE of 98% stated in PTI 46-13A.

Shortly after we exited the testing trailer, EU-LINE2 experienced a malfunction and went down for about 1 minute at around 10:38 AM. Michael informed us that one of the motors started to overheat, causing the line lost some speed. He mentioned this was the first time this had happened since the line became fully operational in March. Additionally, the roll they were coating with adhesive ran out during this test, so they had to change it out, further delaying the test by a total of 7 minutes. Bill explained that any points taken during these 7 minutes would not be included in the official calculations but would be available in the metadata in the testing report. The first test ended at 10:52 AM.

The second test started at 11:35 AM. At the start of the test, (~11:40 AM) we observed Michael perform the smoke tube test at all the NDOs on the NFE. The smoke from the smoke tube test went inside the NFE at every NDO, indicating that air is flowing into the

NFE. I also observed all pressure differential readings on the NFE throughout the time of the second test all had negative pressure differentials, indicating that air was flowing into the NFE as well. During the time of the smoke tube test, we also watched adhesive being applied to the product.

At around ~11:54 AM, I observed the temperature of the RTO to be 1669°F. Michael explained that the low set point of this RTO was 1600°F, and that natural gas will be used to ensure the temperature does not go below this set point. Both the observed temperature and set point temperature are above the required minimum combustion temperature set forth in PTI 46-13A of 1550°F. Michael also mentioned that the high set point is 1950°F. He explained that the high set point ensures that the internal components of the equipment do not get too hot, which could damage them. According to Michael, if either set point is exceeded (too hot or too cold), the line will automatically put into a hard stop. He also stated that this RTO has a retention time of 1 second, which is longer than the minimum retention time of 0.5 seconds required by PTI 46-13A.

The second test ended at 12:35 PM.

The third test began at 1:05 PM. We observed the smoke test performed by Amy at all the NDOs on the NFE from 1:07 PM until 1:12 PM. Again, the smoke from the smoke tube test went inside the NFE at every NDO, indicating that air is flowing into the NFE. I also observed all pressure differential readings on the NFE throughout the time of the third test all had negative pressure differentials, indicating that air was flowing into the NFE as well.

A summary of VOC destruction test observations throughout all three tests is below:

Test #	Time	Inlet VOC Concentration (ppm)	Outlet VOC Concentration (ppm)	Approximate DE (%)	RTO Temp (°F)
1	10:15 AM	2042	3.6	99.8%	Not observed
2	12:07 PM	2274	3.8	99.8%	1660°F (12:03 PM)
3	1:27 PM	2366	5.0	99.8%	1626°F (1:20 PM)

After noticing the inlet VOC concentrations were ~300 ppm higher in the second and third tests vs. the first test, I asked if the facility had run the first test differently. Michael stated that everything between all three tests were the same, but after the roll ran out of the first time they began to use rolls that had been spliced together. The area where the rolls had been spliced (about 10-12 ft) was slightly thicker, which could cause an increase in VOC emissions.

All approximate DEs were below the required DE of 98% stated in PTI 46-13A. All observed temperatures for the RTO were above the 1550°F threshold required in PTI 46-13A.

Bill provided the final averaged DE calculations for test one and two:

Test 1 – 99.73%

Test 2 – 99.72%.

These DEs were below the required DE of 98% stated in PTI 46-13A.

We left the facility at ~1:39 PM.

Compliance with the smoke test and VOC destruction testing requirements in PTI 46-13A will be evaluated during review of the stack test report.

### Conclusion

Orafol appears to be monitoring parameters required in PTI 46-13A during testing and operation of EU-LINE2 and its associated RTO (RTO No. 2) and NFE.

NAME Jillian Collins DATE 8/7/2024 SUPERVISOR K. Kelly