

**AIR EMISSION TEST REPORT
FOR THE VERIFICATION OF
VOC CONTROL EFFICIENCY**

**Prepared for:
INTERTAPE POLYMER GROUP
SRN A6220**

**ICT Project No.: 2200079
June 28, 2022**



Report Certification

AIR EMISSION TEST REPORT FOR THE VERIFICATION OF VOC CONTROL EFFICIENCY

INTERTAPE POLYMER GROUP Marysville, Michigan

This report has been reviewed by Intertape Polymer Group representatives and approved for submittal to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Air Quality Division (AQD). A Renewable Operating Permit Report Certification form signed by a Responsible Official for the source accompanies this report.

I certify that the testing was conducted in accordance with the reference test methods and submitted test plan unless otherwise specified in this report. I believe the information provided in this report and its attachments are true, accurate, and complete.

IMPACT COMPLIANCE & TESTING, INC.



Robert L. Harvey, P.E.
Services Director

Executive Summary

INTERTAPE POLYMER GROUP EMISSION TEST RESULTS

Intertape Polymer Group (IPG) contracted Impact Compliance & Testing, Inc. (ICT) to determine the volatile organic compound (VOC) destruction efficiency, capture efficiency of the regenerative thermal oxidizer (RTO) and coating lines associated with the tape manufacturing processes operated at its facility located in Marysville, St. Clare County, Michigan.

VOC destruction efficiency testing was performed for the RTO. VOC capture efficiency was evaluated for the three (3) large coating lines (EUCOATINGLINE1, EUCOATINGLINE3, EUCOATINGLINE4).

The following tables present the results of the VOC destruction efficiency evaluation and VOC capture efficiency evaluation.

Measured Parameter	Three-Hour Average
Average RTO Combustion Temperature (°F)	1,558
Min. RTO Combustion Chamber (°F)	1,483
VOC/HAP Destruction Efficiency (%wt)	98.3%
Permit Requirement (%wt)	>95%

Measured Parameter	Line 1	Line 3	Line 4
VOC Captured to SRS (%wt)	3.4 %	[1]	5.4 %
VOC Captured to RTO (%wt)	94.4 %	[1]	95.6 %
VOC Overall Capture Effic (%wt)	97.8 %	[1]	101.0 %
Permit Requirement	>95%	>95%	>95%

[1] Results exceed 105% capture efficiency

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1.0 Introduction

Intertape Polymer Group (IPG) manufactures pressure sensitive tape products at the facility located in Marysville, St. Clair County, Michigan (State Registration No. A6220). The facility is classified as a major source of volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions and has been issued a Renewable Operating Permit (ROP) MI-ROP-A6220-2021 by the Michigan Department of Environment, Great Lakes, and Energy (EGLE-AQD).

As a major source of HAP emissions, certain processes are subject to the NESHAP for Paper and Other Web Coating (POWC MACT, 40 CFR Part 63 Subpart JJJJ).

IPG produces tape by applying liquid adhesive to a paper-based tape substrate in web coating lines. The volatile portion of the adhesive applied on the coating lines is primarily toluene, a VOC and listed HAP. Solvent laden air from the adhesive web coating lines is captured and directed to a regenerative thermal oxidizer (RTO) and/or solvent recovery system (SRS) for emission reduction.

This test report presents the results of VOC/HAP control efficiency testing that was performed April 19 through April 28, 2022 to determine the VOC/HAP:

- Destruction efficiency associated with the RTO,
- Capture efficiency associated with three (3) large coating lines (EUCOATINGLINE1, EUCOATINGLINE3, EUCOATINGLINE4) that are connected to the RTO and SRS, and

IPG contracted Impact Compliance & Testing, Inc. (ICT) to perform the VOC destruction efficiency, capture efficiency testing required by MI-ROP-A6220-2021. This test report has been prepared by ICT to present a description of test methods and results for the testing performed in April 2022. This test report document generally follows the EGLE guidance document *Format for Submittal of Source Emission Test Plans and Reports*.

The gas sampling and analysis was performed using procedures specified in the Test Plan dated February 16, 2022 that was reviewed and approved by the Michigan EGLE-AQD.

A copy of the EGLE-AQD test plan approval letter is provided in Attachment 1 along with sampling location diagrams that were submitted with the test plan.

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1.1 Project Contacts

Questions regarding this test event should be directed to the individuals below.

Test Consultant Manager	Robert Harvey, P.E. Services Director Impact Compliance & Testing, Inc. 4180 Keller Rd, Ste B Holt MI 48842 (517) 481-3170 rob.harvey@ImpactCandT.com
Environmental Compliance Coordinator	Stephanie Phillips Corporate Environmental Engineer Intertape Polymer Group sphillip@itape.com
Responsible Official	Brian Newman Operations Manager Intertape Polymer Group 317 Kendall Street Marysville, MI 48040 bnewman@itape.com

EGLE AQD representatives Lindsey Wells and Jeremy Howe observed portions of the testing.

IPG material use and process data were primarily collected by John Fortsch and Mark St. Pierre.

The testing was performed by Andy Rusnak, Clay Gaffey, Blake Beddow, Andrew Eisenberg, Max Fierro, and Robert Harvey from ICT and Amanda Nilles from Prism Analytical Technologies.

2.0 Summary of Test Results and Operating Conditions

2.1 Purpose and Objective of the Tests

Conditions of MI-ROP-A6220-2021 specify that:

Within five years since the last performance tests, the permittee shall verify the VOC capture efficiencies of the capture systems for the RTO and SRS control systems, the destruction efficiency of the RTO and overall control efficiency of the control system ...

During the performance test, the permittee shall monitor and set ranges for static pressures of the work stations, cure zone oven vents and dryer vents to show continued compliance of the capture efficiencies of RTO Control System and SRS Control System.

Testing was performed to determine RTO destruction efficiency, capture efficiency for each coating line, and the proportion of VOC/HAP directed from each coating line to each control device. The test results will be used with facility material use records to demonstrate on-going compliance with VOC and HAP emission standards specified in the ROP and POWC MACT.

2.2 Summary of Air Pollutant Sampling Results

Tables 2.1 and 2.2 present a summary of the RTO destruction efficiency and coating line capture efficiency evaluation (average of the three test periods).

Test results for each sampling period are presented in Section 6.0 of this report.

The test results verify that the:

- VOC destruction efficiency determined for the RTO are greater than (in compliance with) minimum required destruction efficiency of 95% by weight.
- VOC capture efficiency determined for EUCOATINGLINE1 and EUCOATINGLINE4 are greater than (in compliance with) the minimum required capture efficiency of 95% by weight.

The results from the VOC capture efficiency evaluation for EUCOATINGLINE3 exceed 105%, which is considered invalid. IPG and ICT are reviewing the test results and assessing methods to be used to test this emission unit.

2.3 Operating Conditions During the Compliance Tests

The emission testing was performed while the processes operated normally, as close to maximum throughput as possible. Certain control device and air collection system operating parameters were monitored and recorded during the test periods.

Operating data recorded by IPG and ICT for the RTO and coating lines air collection systems are provided in Attachments 2 and 3. According to the conditions of MI-ROP-A6220-2021, the static pressures shall be kept at a value greater than 75% of the static pressure established during the most recent capture efficiency performance test.

Table 2.1 Summary of RTO VOC/HAP destruction efficiency evaluation

Measured Parameter	Three-Hour Average
Average RTO Combustion Temperature ¹ (°F)	1,558
Min. RTO Combustion Chamber (°F)	1,483
VOC/HAP Destruction Efficiency (%wt)	98.3%
Permit Requirement (%wt)	>95%

Table 2.2 Summary of EUCOATINGLINE1, EUCOATINGLINE3, and EUCOATINGLINE4 capture efficiency evaluation

Measured Parameter	Line 1	Line 3	Line 4
VOC Captured to SRS (%wt)	3.4 %	[Note 2]	5.4 %
VOC Captured to RTO (%wt)	94.4 %	[Note 2]	95.6 %
VOC Overall Capture Effic (%wt)	97.8 %	[Note 2]	101.0 %
Permit Requirement	>95%	>95%	>95%

1. According to 40 CFR §63.3360(e)(3)(i), the three-hour average combustion chamber temperature must be maintained no more than 50°F lower than the three-hour average combustion temperature observed during the compliance test (i.e., no lower than 1508°F)
2. Results exceed 105% capture efficiency

3.0 Source and Sampling Location Description

3.1 Coating Line Processes

The emission sources included in this test event consist of three (3) large web coating lines (identified as EUCOATINGLINE1, EUCOATINGLINE3, EUCOATINGLINE4). The emission units are part of flexible emission group FG-COATINGPROCESS.

In each large coating line, paper mill rolls are unwound and travel roll-to-roll through the coating line where layers of liquid adhesive are applied using roll coaters. The coated tape is dried between adhesive applications. At the end of the line the coated tape is rewound.

3.2 Emission Control System Description

The coating line air collection systems consist of multiple supply and exhaust fans for drying applied adhesive coatings and collecting SLA for emission control. The air supply or air collection flowrate for each fan is controlled using a mechanical damper on the fan discharge duct or by variable frequency drive (VFD) on the fan motor. The static pressure in each work station, cure zone, and dryer vent is monitored according to the facility's operating and monitoring plan.

Collected air from the three large coating lines is directed to the RTO and SRS for emission reduction.

3.2.1 Regenerative Thermal Oxidizer

In the RTO, toluene (and any other VOC) is oxidized at high temperature to form carbon dioxide. Solvent laden air (SLA) from the following points is collected and directed to the RTO for emission reduction:

- A and C ovens on Coating Line 1 (EUCOATINGLINE1)
- Dryer 5 on Coating Line 3 (EUCOATINGLINE3)
- A and C ovens on Coating Line 4 (EUCOATINGLINE4)
- The coater hood and both ovens on the Pilot Line (EUPILOT-LINE).

The RTO system consists of energy recovery chambers, a high-temperature combustion chamber containing natural gas-fired burners, and two VFD fans connect to the exhaust stack. The VFD controllers modulate fan speed to maintain an appropriate vacuum within the process air collection system and to draw the SLA through the RTO. Heated ambient air is added to the inlet gas stream to increase the temperature prior to the RTO unit. The inlet air is further preheated by the RTO heat exchange media and is then heated to the final oxidation temperature in the RTO combustion chamber. The heated air flows through the outlet energy recovery chamber and is cooled (which raises the temperature of the heat exchange media) prior to being discharged to the ambient air through the vertical exhaust stack. At a predetermined interval, the air flow through the unit is reversed such that the heated heat exchange media (which was used to cool the exiting gas stream) becomes the preheating heat exchange media that is used to preheat the incoming SLA.

3.2.2 Solvent Recovery System

The SRS consists of four (4) horizontal activated carbon vessels. Collected SLA is divided among the vessels and the toluene is captured in the granulated carbon by pore adsorption. At predetermined intervals (or based on stack monitoring) a single vessel is taken off-line and the adsorbed toluene is desorbed by forcing stream through the carbon bed. The steam and desorbed toluene vapor are condensed in a chilled water condenser and separated. The recovered toluene is pumped to above ground storage tanks where it is used (recycled) on-site to formulate new adhesive.

The recovery efficiency of the SRS is determined on a rolling 30-day period based on facility records of solvent use and recovery.

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4.0 Sampling and Analytical Procedures

A test protocol for the testing project was reviewed and approved by the EGLE-AQD. This section provides a summary of the sampling and analytical procedures that were used during the testing periods.

4.1 RTO; VOC Destruction Efficiency Determination

The inlet and outlet gas of the RTO were sampled and analyzed to determine the VOC destruction efficiency.

Parameter / Analyte	Sampling Methodology	Analytical Methodology
Velocity Traverses	Method 1	Selection of velocity traverse and sample locations based on physical measurements
Volumetric Flowrate	Method 2	Measurement of velocity head using a Type-S Pitot tube and inclined manometer
Molecular Weight (RTO outlet)	Method 3A	Exhaust gas O ₂ and CO ₂ content using instrumental analyzers
Moisture (RTO outlet)	Method 4	Moisture determination by chilled impinger method
THC Concentration (RTO inlet / outlet)	Method 25A	Determination of gaseous THC concentration using a flame ionization analyzer (FIA)

USEPA Method 25A, *Determination of Total Gaseous Organic Concentration Using A Flame Ionization Detector*, was used to measure the THC concentration, relative to a propane standard, for the RTO inlet and exhaust gas streams. Throughout each test period, a sample of the gas from the RTO inlet and exhaust measurement locations was delivered to the instrument trailer using independent heated Teflon® sample lines to maintain the temperature of the gas sample to 250 to 300°F.

The RTO inlet gas sample was introduced directly to a Thermo Environmental Instruments, Inc. (TEI) 51-series THC flame ionization analyzers.

The RTO exhaust gas sample was divided between a:

1. TEI 51-series THC flame ionization analyzer (direct injection with no moisture removal), and
2. Instrumental analyzer containing a Non-Dispersive Infrared (NDIR) cell to measure carbon dioxide (CO₂) and zirconia ion sensor to measure oxygen (O₂) content in accordance with USEPA Method 3A. The CO₂ / O₂ instrument was preceded by a refrigerant-based condenser that removes moisture prior to analysis (dry gas sample).

The instruments were calibrated as described in Section 5.0 of this report. Instrument response for each analyzer was recorded on an ESC Model 8816 data logging system that monitored the analog output of the instrumental analyzers continuously and logged data as one-minute averages.

Air flowrate measurements were performed near the beginning and end of each one-hour test period in accordance with USEPA Method 2. An S-type Pitot tube connected to a red-oil manometer was used to determine velocity pressure and a K-type thermocouple mounted to the Pitot tube was used for temperature measurements. Velocity traverse locations were determined in accordance with USEPA Method 1 based on the stack diameter and distance to upstream and downstream flow disturbances.

Diagrams of the sampling locations are provided in Attachment 1.

Moisture content for the RTO exhaust gas was determined using a chilled impinger train and the procedures of USEPA Method 4.

The measured THC concentration was used with the measured volumetric air flowrate to calculate THC mass flow rate (pounds per hour as propane) for each gas stream using the following equation:

$$M_{\text{THC}} = Q [C_{\text{THC}}] (MW_{\text{C}_3}) (60 \text{ min/hr}) / V_M / 1\text{E}+06$$

Where:

M_{THC}	=	Mass flowrate VOC (lb/hr)
Q	=	Volumetric flowrate (scfm)
C_{THC}	=	THC concentration (ppmv C ₃)
MW_{C_3}	=	Molecular weight of propane (44.1 lb/lb-mol)
V_M	=	Molar volume of ideal gas at standard condition (385 scf/lb-mol)

The THC destruction efficiency of the RTO emission control system was determined for each test period using the following equation:

$$DE = [1 - (M_{VOC\ in} / M_{VOC\ out})] * 100\%$$

Where: DE = Destruction efficiency (%wt)
 $M_{THC\ in}$ = THC mass flowrate into the RTO (lb/hr)
 $M_{THC\ out}$ = THC mass flowrate exhausted from the RTO (lb/hr)

4.2 Coating Line Processes; Captured VOC Determination

VOC capture efficiency for the coating lines was determined using the following test methods.

Parameter / Analyte	Sampling Methodology	Analytical Methodology
Velocity Traverses	Method 1	Selection of velocity traverse and sample locations based on physical measurements
Volumetric Flowrate	Method 2	Measurement of velocity head using a Type-S Pitot tube and inclined manometer
Molecular Weight (Captured air)	Method 2	All captured gas streams are predominately ambient air
Toluene Concentration (Captured gas)	Method 320 ASTM D6348-12	Fourier transform infrared spectroscopy (FTIR spectrometer)

The capture efficiency for Coating Lines 1, 3 and 4 was determined based on the amount of toluene:

1. Captured by the RTO air collection system
2. Captured by the SRS air collection system
3. Contained in the adhesive that was applied during the test period.

Each coating line was tested individually since the captured SLA from each line cannot be adequately isolated from one another (i.e., for each demonstration, one line was operated for testing while the other two were off).

The concentration of toluene in the RTO and SRS captured gas streams was measured by Extractive Fourier Transform Infrared (FTIR) using two MKS Multi-Gas 2030 FTIR spectrometers (one of which was operated by Prism Analytical Technologies) in accordance with USEPA Method 320 and ASTM D6348-12.

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Air flowrate measurements were performed once per hour of each two-hour test period in accordance with USEPA Methods 1 and 2.

Diagrams of the sampling locations are provided in Attachment 1.

The captured gas streams are primarily building air captured by the coating line air collection systems. Oxygen was considered to be consistent with ambient air. CO₂ and moisture content were minimal and verified using the FTIR instruments.

The toluene mass flowrate (lb/hr) in each captured gas stream was calculated based on the measured air flowrate, measured toluene concentration (average ppmv for test period), and molecular weight of toluene (92.1).

$$M_{Tol} = Q [C_{Tol}] (MW_{Tol}) (60 \text{ min/hr}) / V_M / 1E+06$$

Where:

M_{Tol}	=	Mass flowrate toluene (lb/hr)
Q	=	Volumetric flowrate (scfm)
C_{Tol}	=	Toluene concentration (ppmv)
MW_{Tol}	=	Molecular weight of toluene (92.1 lb/lb-mol)
V_M	=	Molar volume of ideal gas at standard condition (385 scf/lb-mol)

4.3 Coating Line Processes; VOC Use Determination

The amount of adhesive used during each test period was based on initial and ending tote weights using calibrated floor scales.

IPG formulates its adhesives on-site. Each adhesive tote has a specific lot number that is recorded and tracked throughout the production process. During coating operations, IPG personnel sample and analyze each tote (lot) during the production run to measure the solids content using a laboratory procedure similar to USEPA Method 24 where wet adhesive is weighed before and after a controlled dry down procedure. The analytical data (solids content, %weight) was provided to ICT to calculate the toluene use rate for each test period. Additionally, IPG/ICT obtained samples of the adhesives that were analyzed by a third-party laboratory.

Ultimately, the based on the average of all available data from:

- Formulation data for each batch produced by IPG
- Coating solids (volatile content) analysis performed by IPG's on-site QA laboratory
- Coating solids (volatile content) analysis performed by Element Laboratory (Warren, Michigan) referencing ASTM D2369

This method (averaging all available coating data) resulted in the most consistent capture efficiency results and minimized test-to-test variations that were observed in the analytical data. A summary of the data used to determine coating VOC content is presented in Table 6.2 of this report.

Toluene use for each capture efficiency test period was calculated using the following equation:

$$U_{Tol} = \Sigma [(W_{Ti} - W_{Tf}) \times (1-\%S)]$$

Where: U_{Tol} = Mass of toluene used during the test period (lbs)
 W_{Ti} = Adhesive tote weight, initial (lbs)
 W_{Tf} = Adhesive tote weight, final (lbs)
 $\%S$ = Weight % solids based on formulation data and analyses

Attachment 4 provides test run coating use data and analytical reports for VOC content.

4.4 Coating Line Processes; Capture Efficiency Calculation

The VOC/HAP capture efficiency for each coating line (CE) was calculated based on the amount of toluene used at the coating line for the test period and measured toluene mass flowrate in the two captured gas streams:

$$CE_{Tot} = (M_{Tol,RTO} + M_{Tol,SRS}) \times Hrs / U_{Tol} \times 100 \%$$

Additionally, the proportion of toluene captured to each control device (CE_{RTO} and CE_{SRS}) was calculated for use in IPG's monthly emission recordkeeping.

$$CE_{RTO} = (M_{Tol,RTO}) \times Hrs / U_{Tol} \times 100 \%$$

$$CE_{SRS} = (M_{Tol,SRS}) \times Hrs / U_{Tol} \times 100 \%$$

Where: CE = VOC/HAP capture efficiency for coating line (% weight)
 CE_{RTO} = Percentage of toluene used on coating line captured to RTO (% wt)
 CE_{SRS} = Percentage of toluene used on coating line captured to SRS (% wt)
 $M_{Tol,RTO}$ = Toluene mass flowrate in RTO captured stream (lb/hr)
 $M_{Tol,SRS}$ = Toluene mass flowrate in SRS captured stream (lb/hr)
 U_{Tol} = Total amount of toluene used during test period (lbs)
Hrs = Length of test period (hours)

5.0 QA/QC Activities

5.1 Flow Measurement Equipment (Methods 1 and 2)

Prior to arriving onsite, the instruments used during the source test to measure exhaust gas properties and velocity (barometer and Pitot tube) were calibrated to specifications in the sampling methods.

The absence of cyclonic flow for each sampling location was verified using an S-type Pitot tube and oil manometer. The Pitot tube was positioned at each of the velocity traverse points with the planes of the face openings of the Pitot tube perpendicular to the stack cross-sectional plane. The Pitot tube was then rotated to determine the null angle (rotational angle as measured from the perpendicular, or reference, position at which the differential pressure is equal to zero).

5.2 Instrument Calibration and System Bias Checks (Method 3A and 25A)

At the beginning of each day of the testing program, initial three-point instrument calibrations were performed for the CO₂ and O₂ analyzers by injecting calibration gas directly into the inlet sample port for each instrument. System bias checks were performed prior to and at the conclusion of each sampling period by introducing the upscale calibration gas and zero gas into the sampling system (at the base of the stainless steel sampling probe prior to the particulate filter and Teflon® heated sample line) and determining the instrument response against the initial instrument calibration readings.

The instruments were calibrated with USEPA Protocol 1 certified concentrations of CO₂ and O₂ in nitrogen and zeroed using hydrocarbon free nitrogen. The THC instruments were calibrated with USEPA Protocol 1 certified concentrations of propane in air and zeroed using hydrocarbon-free air. A STEC Model SGD-710C ten-step gas divider was used to obtain intermediate calibration gas concentrations as needed.

5.3 Dry Gas Meter Calibration (Method 4)

The dry gas metering console, which was used for exhaust gas moisture content sampling, was calibrated prior to and after the testing program. This calibration uses the critical orifice calibration technique presented in USEPA Method 5. The metering console calibration exhibited no data outside the acceptable ranges presented in USEPA Method 5.

The digital pyrometer in the Nutech metering console was calibrated using a NIST traceable Omega® Model CL 23A temperature calibrator.

5.4 Gas Divider Certification (USEPA Method 205)

A STEC Model SGD-710C 10-step gas divider and a STEC Model SGD-SC-5L five-step gas divider were used to obtain appropriate calibration span gases. The STEC gas dividers were NIST certified (within the last 12 months) with a primary flow standard in accordance with Method 205. When cut with an appropriate zero gas, the STEC gas dividers deliver calibration gas values ranging from 0% to 100% of the USEPA Protocol 1 calibration gas that was introduced into the system. The field evaluation procedures presented in Section 3.2 of Method 205 were followed prior to use of gas dividers. The field evaluation yielded no errors greater than 2% of the triplicate measured average and no errors greater than 2% from the expected values.

5.5 FTIR Quality Assurance

The FTIR spectrometers were operated in accordance with the quality assurance and quality control procedures of USEPA Method 320 and as requested in the EGLE AQD test plan approval letter.

Information is presented in the ICT results in Attachment 7 and the Prism Analytical Technologies report in Attachment 8.

6.0 Results

6.1 Test Results; RTO VOC Destruction Efficiency

Table 6.1 presents measured gas conditions and results for each destruction efficiency test period.

RTO VOC/HAP destruction efficiency was determined for three (3) one-hour test periods by simultaneously measuring the THC mass flowrate entering and exiting the RTO emission control device. The average measured VOC/HAP destruction efficiency for the three test periods is 98.3% by weight, which is greater than (in compliance with) the minimum required destruction efficiency of 95%.

The RTO combustion chamber temperature was recorded throughout each test period and the three-hour average combustion chamber for the test event is 1,558°F. Provisions of the POWC MACT specify that the average combustion temperature for any 3-hour period must be maintained no more than 50°F lower than the three-hour average combustion temperature observed during the compliance test (i.e., no lower than 1508°F)

Attachment 5 provides RTO inlet/outlet concentration data and calculations for the RTO destruction efficiency test periods performed April 22, 2022.

6.2 Test Results; Coating Line Capture Efficiency

Table 6.2 presents a summary of adhesive coating VOC content and use rates for each capture efficiency test period.

Tables 6.2 through 6.5 present measured gas conditions and results for each capture efficiency test period for coating line Nos. 1, 3 and 4.

VOC/HAP capture efficiency for each coating line was determined by simultaneously measuring the captured toluene mass flowrate to the SRS and RTO and comparing the amount of toluene captured during the test period to the mass of toluene applied during the test period.

At least three (3) two-hour (120 minute) test periods were performed for each coating line unless noted in the tables. Certain test periods were extended beyond 120 minutes to collect two hours of coating run data when the process was interrupted due to shutdowns such as web breaks. Additional tests were performed on Lines 3 and 4 in attempts to satisfy the Data Quality Objective (DQO) criteria.

Attachment 6 provides summary capture efficiency calculations for Line Nos. 1, 3 and 4.

Attachment 7 provides toluene concentration data recorded by FTIR for the RTO inlet sampling location.

Attachment 8 provides toluene concentration data recorded by FTIR for the solvent recovery sampling location (Prism Analytical Technologies report).

Attachment 9 provides test equipment QA/QC records

6.3 Test Project Exceptions

The testing was performed as required by the referenced test methods and/or test protocol submitted by ICT unless specified in this section.

A total of six (6) capture efficiency tests were performed for coating line Nos. 3 and 4. These additional tests were performed to (1) obtain at least three valid test runs, and (2) satisfy the capture efficiency DQO criteria. The test data for Line No. 3 did not result in three valid test runs. For Line No. 4, five (5) valid capture efficiency test runs were performed that satisfy the DQO criteria. The only exception is that the tests were not performed within a 36-hour window; the test runs were performed on April 20 and April 27, 2022.

As presented in Section 4.3 of this report, the adhesive coating VOC content was based on the average of all available data from IPG's batch formulation data and analyses performed by IPG's on-site QA laboratory and a third-party laboratory. This is slight deviation from the method presented in the approved test plan, which proposed to rely only on the results from IPG's on-site laboratory. The method used (averaging all available coating formulation and analytical data) resulted in the most consistent capture efficiency results and minimized test-to-test variations that were observed in the analytical data.

Table 6.1 Measured gas conditions and destruction efficiency for the thermal oxidizer; Intertape Polymer Group

Test No.	1	2	3	Three Test
Test date	4/22/22	4/22/22	4/22/22	Average
Avg. Combustion Temp ¹ (°F)	1,537	1,546	1,592	1,558
Min. Combustion Temp ² (°F)	1,524	1,483	1,588	1,483
RTO Inlet				
Avg. THC Conc. ³ (ppmv C ₃)	2,154	2,382	2,650	2,395
Flowrate (scfm)	29,299	29,466	25,368	28,044
THC Mass Flow (lb/hr)	434	482	462	459
RTO Exhaust				
Avg. THC Conc. ³ (ppmv C ₃)	26.3	29.0	24.8	26.7
Flowrate (scfm)	42,061	42,992	40,721	41,925
THC Mass Flow (lb/hr)	7.59	8.57	6.95	7.71
Destruction Efficiency ⁴ (%Wt)	98.2	98.2	98.5	98.3

3. According to 40 CFR §63.3360(e)(3)(i), the three-hour average combustion chamber temperature must be maintained no more than 50°F lower than the three-hour average combustion temperature observed during the compliance test (i.e., no lower than 1508°F)
4. Minimum RTO combustion chamber temperature recorded during the one-hour test period
5. Total hydrocarbons (THC) measured as propane
6. $\text{THC Destruction Efficiency} = 1 - [\text{VOC out} / \text{VOC in}] \times 100\%$

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JUN 29 2022