AIR EMISSION TEST REPORT
FOR THE VERIFICATION OF
VOC CONTROL EFFICIENCY

Prepared for:

INTERTAPE POLYMER GROUP
SRN A6220

ICT Project No.: 2200079
October 10, 2022

IMPACT
COMPLIANCE & TESTING

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.

For Andrew Eisenberg
Project Manager

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 of the regenerative thermal oxidizer (RTO) and capture efficiency of the Pilot Line (EUPILOT-LINE) associated with the tape manufacturing processes operated at its facility located in Marysville, St. Clair County, Michigan.

Verification of RTO VOC destruction efficiency was originally performed April 22, 2022. However, the unit ran at an unusually high temperature due to specific product mix on that day and was repeated during this test event to demonstrate performance at a lower combustion chamber temperature. Testing for EUPILOT-LINE was postponed from earlier this year due to delays experienced during the previously scheduled test event.

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

Measured Parameter	Three-Hour Average	Requirement
RTO Average Combustion Temperature (°F)	1,464	
RTO VOC/HAP Destruction Efficiency (%wt)	97.1%	> 95%
EUPILOT-LINE VOC Capture Efficiency (%wt)	95.5%	

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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 August 17 and August 18, 2022, to determine the VOC/HAP:

- Destruction efficiency associated with the RTO,
- Capture efficiency associated with a small pilot coating line (EUPILOT-LINE) that is connected to the RTO.

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.

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

IPG material use and process data collection were coordinated by John Fortsch, Don Hall, and Mark St. Pierre.

The testing was performed by Andrew Eisenberg and Robert Harvey from ICT. EGLE-AQD representatives were notified of the test event but did not attend the testing.

2.0 Summary of Test Results and Operating Conditions

2.1 Purpose and Objective of the Tests

Testing was performed to determine RTO destruction efficiency, capture efficiency for the Pilot Line connected tot eh RTO. 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 Pilot 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 at an average operating temperature of 1,464°F.

- VOC capture efficiency determined for EUPILOT-LINE was 95.5% by weight.

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 EUPILOT-LINE are provided in Attachments 2 and 3, respectively.

Table 2.1 Summary of RTO VOC/HAP destruction efficiency evaluation

Measured Parameter	Three-Hour Average
Average RTO Combustion Temperature (°F)	1,464
Required RTO Combustion Chamber[1] (°F)	1,414
VOC/HAP Destruction Efficiency (%wt)	97.1%
Permit Requirement (%wt)	>95%

Table 2.2 Summary of EUPILOT-LINE VOC capture efficiency evaluation

Measured Parameter	Three-Hour Average
Measured captured VOC to RTO (lb/hr)	7.30
Measured uncaptured VOC in building exhausts (lb/hr)	0.34
Calculated VOC capture efficiency (%wt)	95.5%

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 1414°F)

3.0 Source and Sampling Location Description

3.1 Regenerative Thermal Oxidizer

Solvent laden air from several processes, including the Pilot Line, is collected and directed to the RTO where VOC (primarily toluene) is oxidized at high temperature to form carbon dioxide. 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 Pilot Line

The Pilot Line (EUPILOT-LINE), also called the Arrow Coater, is small research and development process located in a building that is separate from the other production coating lines at IPG. It is used for much smaller runs and smaller substrate as compared to the primary coating lines (Lines 1, 3, and 4) and is typically used to apply a batch of test adhesive for product evaluation. Solvent-based adhesives are applied to paper substrate in a continuous roll-type applicator. Solvent laden air collected by the coater hood and overhead oven and directed to the RTO system for emission control.

The emission unit is part of flexible emission group FG-COATINGPROCESS.

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 analyzer.

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 (CO_2) and zirconia ion sensor to measure oxygen (O_2) content in accordance with USEPA Method 3A. The CO_2 / O_2 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 during 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:

$$M_{THC} = Q\,[C_{THC}]\,(MW_{C3})\,(60\ min/hr) / V_M / 1E{+}06$$

Where:
- M_{THC} = Mass flowrate VOC (lb/hr)
- Q = Volumetric flowrate (scfm)
- C_{THC} = THC concentration (ppmv C_3)
- MW_{C3} = 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 Pilot Line Processes; Captured VOC Determination

VOC capture efficiency for the Pilot Line 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	Method 2	All captured and uncaptured gas streams are predominately ambient air
THC Concentration	Method 25A	Determination of gaseous THC concentration using a flame ionization analyzer (FIA)

The building in which the Pilot Line is installed satisfies the criteria for a building enclosure (a permanent total enclosure with a minimum number of uncontrolled atmospheric exhausts). The VOC/HAP capture efficiency for the Pilot Line was determined by a gas/gas capture efficiency protocol using the pilot building as an enclosure. USEPA Method 25A was used to measure THC concentration in the captured and uncaptured gas streams. Multiple flame ionization analyzers were used to monitor the THC concentration in the:

- Captured gas stream to the RTO.
- Atmospheric exhaust from the lab hood/paint booth
- Atmospheric exhaust from the saturator room;
- Atmospheric exhaust general room ventilation

The THC concentration measurements were performed using two TEI Model 51 THC flame ionization analyzers and a California Analytical Instruments, Inc. (CAI) Model 600 HFID THC analyzer. The instruments were calibrated as described in the following section of this report. The captured gas stream to the RTO and general room ventilation exhaust were

monitored continuously for each one-hour test period. The lab hood/paint booth exhaust and saturator room exhaust were each monitored for 30 minutes during each one hour test period.

A velocity traverse for each of the four (4) exhausts was performed once during each one-hour test period in accordance with USEPA Methods 1 and 2.

The direction of airflow into the Pilot Building was checked once per test period using airflow current smoke tubes for the door leading to the warehouse area and the windows on the north side of the building (these were determined to be natural draft openings for the building).

Attachment 3 provides diagrams of the sampling locations.

The gas streams are primarily collected building air. Therefore, the O_2 and CO_2 content was consistent with ambient air. Moisture content was determined by wet bulb / dry bulb temperature measurements.

The THC mass flowrate was calculated for each gas stream using the equation presented previously in this report in Section 4.1. The percentage of VOC captured (and directed to the RTO emissions control device) was determined using the following equation:

$$\text{Capture Efficiency (\%)} = \frac{M_{THC} \text{ captured to RTO (lb/hr)}}{M_{THC} \text{ captured to RTO (lb/hr)} + \Sigma\, M_{THC} \text{ uncaptured streams (lb/hr)}}$$

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 CO_2 and O_2 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 CO_2 and O_2 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.

6.0 Results

6.1 Test Results; RTO VOC Destruction Efficiency

Table 6.1 presents measured gas conditions and results for each VOC 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 97.1% 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 1,464°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 1,414°F)

Attachment 4 provides RTO inlet/outlet concentration data and calculations for the RTO destruction efficiency test periods performed August 18, 2022.

6.2 Test Results; Pilot Line Capture Efficiency

Table 6.2 presents measured gas conditions and results for each capture efficiency test period for the Pilot Line.

For the Pilot Line (EU-PILOT-LINE), capture efficiency was determined by simultaneously measuring the THC mass flowrate in the captured gas stream to the RTO emission control system and uncaptured gas streams (exhausts from the Pilot Line building that are not captured to an emission control device). The test plan identified a total of four (4) gas streams that would be monitored with three (3) FID instruments; the captured gas to the RTO and three (3) uncontrolled exhausts. Normally, only one or two of the uncontrolled exhausts operate simultaneously with the pilot coating line. However, since it's possible that all three uncontrolled exhausts could be active while the pilot coating line is operating, the capture efficiency tests were performed with all three atmospheric exhausts in operation to present a minimum (or worst-case) capture efficiency evaluation. Therefore, the one (1) of the FID instruments was rotated between two (2) of the three (3) uncontrolled exhaust stacks during each one-hour test period.

Attachment 5 provides field data, and calculations for the Pilot Line capture efficiency test periods performed August 17, 2022.

6.3 Test Project Exceptions

The testing was performed as required by the referenced test methods and as presented in the submitted test protocol. There are no test protocol deviations or exceptions to report for this test event.

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

Test No. Test date	1 8/18/22	2 8/18/22	3 8/18/22	Three Test Average
Avg. Combustion Temp[1] (°F)	1,445	1,473	1,475	1,464
Min. Combustion Temp[2] (°F)	1,431	1,462	1,457	1,431
RTO Inlet				
Avg. THC Conc.[3] (ppmv C_3)	530	1,013	956	833
Flowrate (scfm)	18,076	27,846	27,074	24,332
THC Mass Flow (lb/hr)	66	194	178	146
RTO Exhaust				
Avg. THC Conc.[3] (ppmv C_3)	11.3	20.0	19.3	16.9
Flowrate (scfm)	26,178	39,534	38,158	34,623
THC Mass Flow (lb/hr)	2.02	5.44	5.06	4.17
Destruction Efficiency[4] (%Wt)	96.9	97.2	97.2	97.1

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 1414°F)
2. Minimum RTO combustion chamber temperature recorded during the one-hour test period
3. Total hydrocarbons (THC) measured as propane
4. THC Destruction Efficiency = 1 - [VOC out / VOC in] x 100%

Table 6.3 Capture efficiency test results for Pilot Line (EU-PILOT-LINE)

Test No.	1	2	3	Three Test
Test date	8/17/22	8/17/22	8/17/22	Average
Captured to RTO				
Flowrate (scfm)	2,922	2,795	2,853	2,857
Avg. THC Conc. (ppmv C_3)	375	379	363	372
THC Mass Flow (lb/hr)	7.52	7.28	7.11	7.30
Uncaptured Roof Exhaust				
Flowrate (scfm)	4,959	4,985	4,821	4,921
Avg. THC Conc. (ppmv C_3)	4.22	5.61	5.57	5.13
THC Mass Flow (lb/hr)	0.14	0.19	0.18	0.17
Uncaptured Paint Booth Exhaust				
Flowrate (scfm)	2,356	2,391	2,303	2,350
Avg. THC Conc. (ppmv C_3)	6.80	7.58	6.59	6.99
THC Mass Flow (lb/hr)	0.11	0.12	0.10	0.11
Uncaptured Saturator Exhaust				
Flowrate (scfm)	2,074	1,988	2,019	2,027
Avg. THC Conc. (ppmv C_3)	5.27	2.84	4.35	4.15
THC Mass Flow (lb/hr)	0.08	0.04	0.06	0.06
Capture Efficiency				
Captured VOC (lb/hr)	7.52	7.28	7.11	7.30
Total Uncaptured VOC (lb/hr)	0.33	0.36	0.35	0.34
Capture Efficiency (%wt)	95.8%	95.3%	95.3%	95.5%

ATTACHMENT 1

Test Plan Approval Letter
Sampling Diagrams

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
LANSING

GRETCHEN WHITMER
GOVERNOR

LIESL EICHLER CLARK
DIRECTOR

April 11, 2022

Brian Newman
Intertape Polymer Group
317 Kendall Avenue
Marysville, Michigan 48040

SRN: A6220; St. Clair County

Dear Brian:

SUBJECT: FG-COATINGPROCESS, Capture Efficiency Testing, Regenerative Thermal Oxidizer (RTO) Destruction Efficiency Testing, Permit: MI-ROP-A6220-2021; SRN: A6220

The Department of Environment, Great Lakes, and Energy (EGLE), Air Quality Division (AQD) has reviewed the protocol for testing at the Intertape Polymer Group facility located in Marysville. FG-COATINGPROCESS will be tested for volatile organic compound (VOC) capture efficiency (CE). The RTO that controls emissions from FG-COATINGPROCESS will be tested for VOC destruction efficiency (DE). This testing is required by Permit No. MI-ROP-A6220-2021. Testing will be performed in accordance with the United States Environmental Protection Agency (USEPA) Office of Air Quality Planning and Standards site specific approval dated October 26, 2005. CE and DE will be determined on a mass basis.

Capture Efficiency: EUCOATINGLINE1, EUCOATINGLINE3, EUCOATINGLINE4
Capture efficiency will be determined for each individual line with no other lines operating concurrently. Testing will be performed in accordance with Title 40 of the Code of Federal Regulations, Part 60 and Part 63, Appendix A, Methods 1, 2, 3, 4, and 320:

- Three 120-minute runs will be performed. Gas velocity will be measured at least once per test run at each location;
- The inlet to the RTO and the inlet to the SRS will be sampled concurrently;
- The RTO inlet and SRS inlet may be assumed to be ambient air; and
- Pre-test and post-test toluene spiking will be performed at both sampling locations. Ambient air spiking is acceptable if necessary due to high matrix concentrations.

Capture Efficiency: EUPILOTLINE
Sampling will be performed in accordance with Methods 1, 2, 3, 4, 25A/Alt-096, 204B, 204E, and 205:

- The pilot line to the RTO and the general room exhaust (captured) will be monitored continuously and concurrently;
- The paint booth/lab hood and saturator room exhausts (uncaptured) will each be monitored for half of the test period;

- Three 60-minute runs will be performed. Gas velocity will be measured at each location at least once per sampling run; and
- Inward airflow through each natural draft opening (NDO) will be verified using smoke tubes or streamers.

Destruction Efficiency: FG-COATINGPROCESS
Sampling will be performed in accordance with Methods 1, 2, 3A, 4, 25A/Alt-096, and 205:

- Methane subtraction is acceptable with the caveat that it be performed at both the inlet and outlet locations unless submitted data supports that the inlet contains no methane emissions;
- Three 60-minute runs will be performed. Gas velocity measurements will be performed at each location at least once per sampling run; and
- The RTO inlet and RTO outlet will be sampled concurrently.

All requirements and specifications of the above methods apply; any modifications of the test methods on-site must be approved by the AQD.

Iranna Konanahalli of the Warren District Office will coordinate the collection of process parameters during testing. Please direct process questions to 586-596-7630 or e-mail at Konanahallil@Michigan.gov.

FG-COATINGPROCESS will operate at routine normal load during testing. Sufficient process data will be provided to demonstrate that the coatings applied during testing represent worst-case VOC emissions. The weight of coating applied during the testing will be determined by pre-tote and post-tote weight for each test run.

The following process data will be recorded during testing:

- RTO combustion chamber temperature every 15 minutes during a test run;
- Tare weight of each tote used during testing;
- Initial and final weight of the tote for each test run;
- Weight of any material added to a coating during a test run;
- Inlet header fan vacuum;
- Fan VFD controller output; and
- Coating line exhaust fan static pressures.

The test report will include:

- Pitot tube calibration;
- Field data sheets;
- The gas analyzer calibration error, system bias, zero and calibration drift data;
- Run data and run averages, all in tabular format;

- Method 320 pre-test diagnostics, static sample pressure within 0.005 atm of local barometric; post-test spectral validation, calibration curve wavelength and concentration range; and
- The process data listed above.

All aborted or failed runs must be included in the report. A complete copy of the test report should be sent to the following locations:

Iranna Konanahalli
EGLE, Air Quality Division
27700 Donald Court
Warren, Michigan 48092

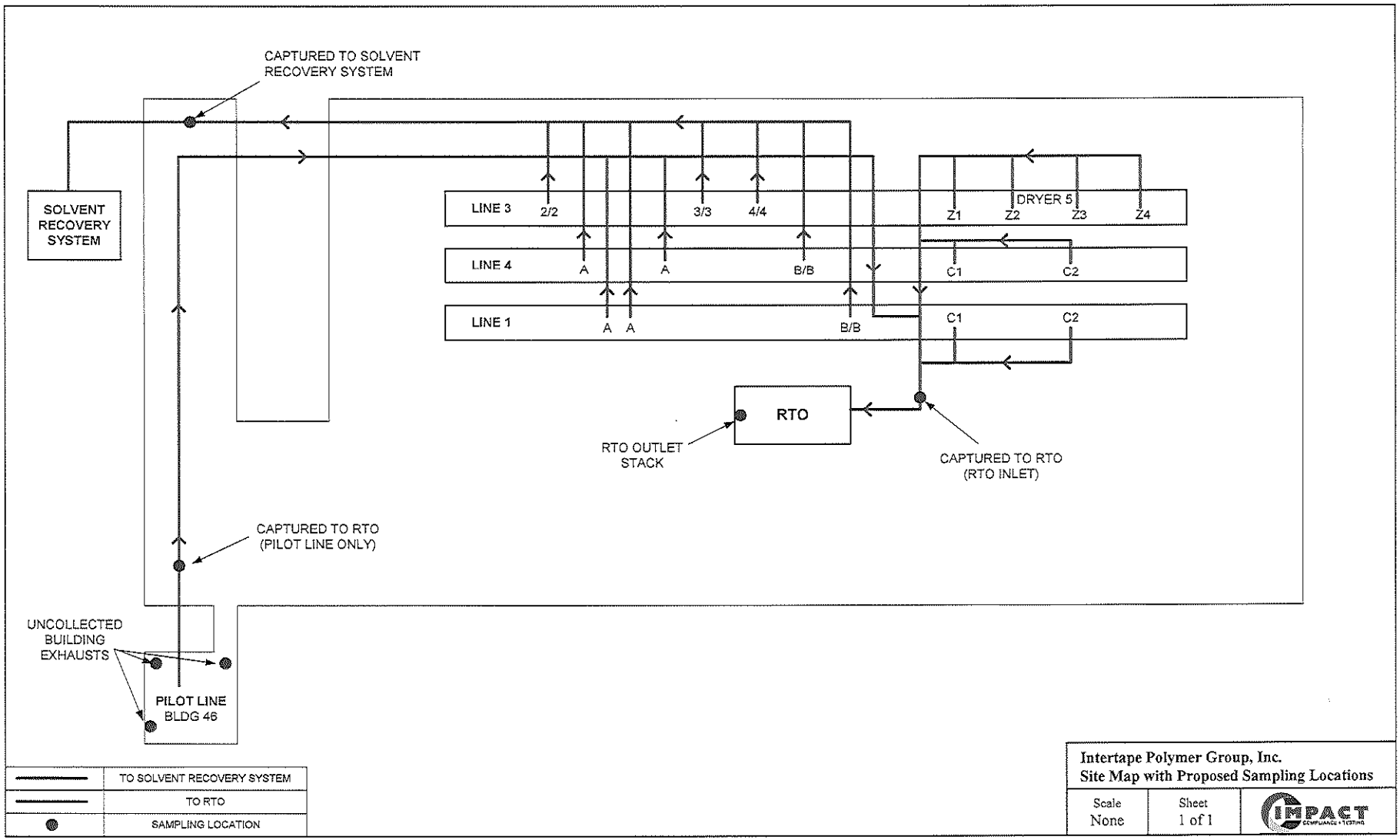
Tammy Bell
EGLE, Air Quality Division
Constitution Hall, 2nd Floor South
525 West Allegan Street
Lansing, Michigan 48933

Testing is scheduled for April 19, 2022. Please provide notification of any change in the test date to Iranna Konanahalli, and to me. If you have any questions regarding this letter, please contact me by telephone or e-mail at WellsL8@Michigan.gov.

Sincerely,

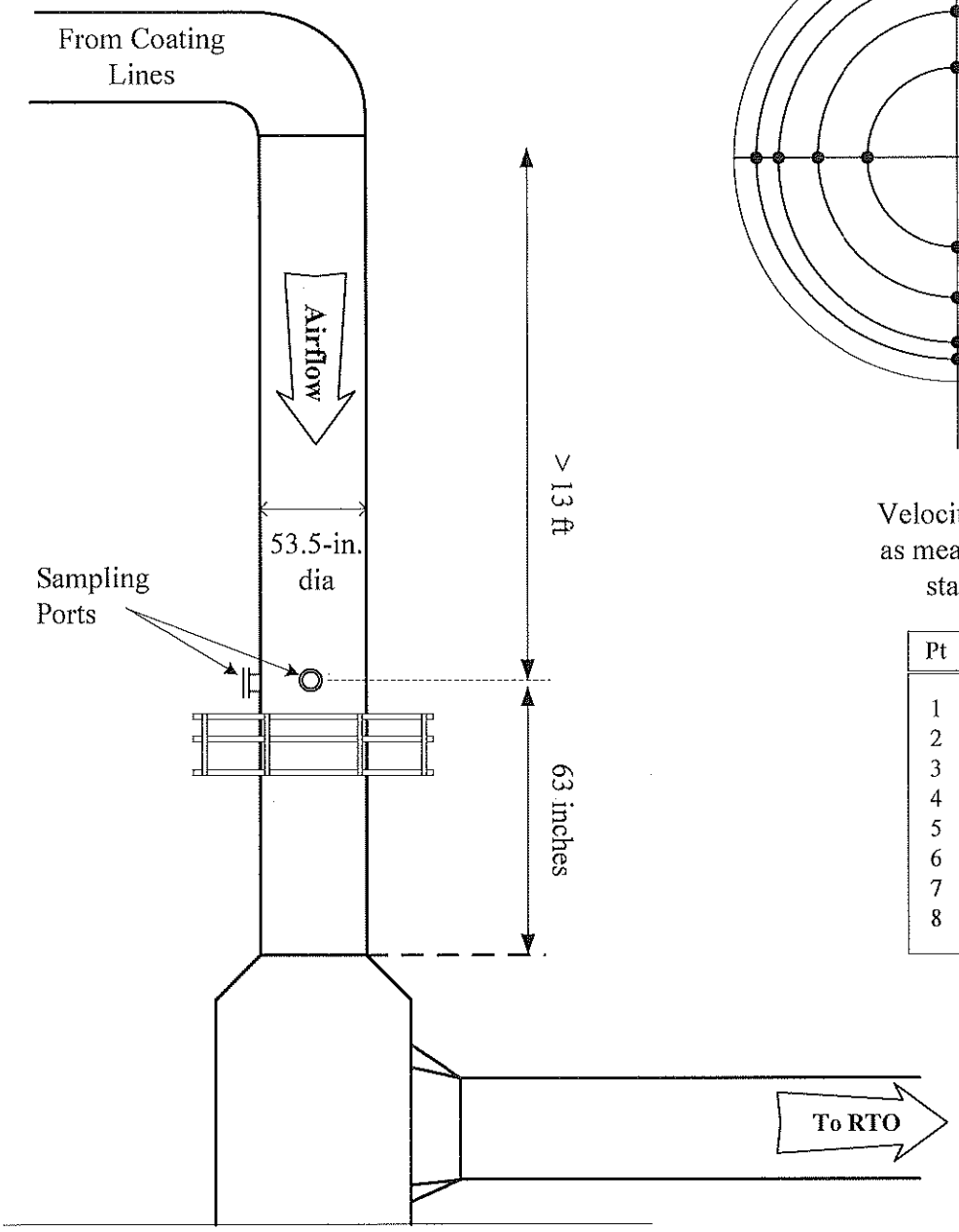
Lindsey Wells
Technical Programs Unit
Field Operations Section
Air Quality Division
517-282-2345

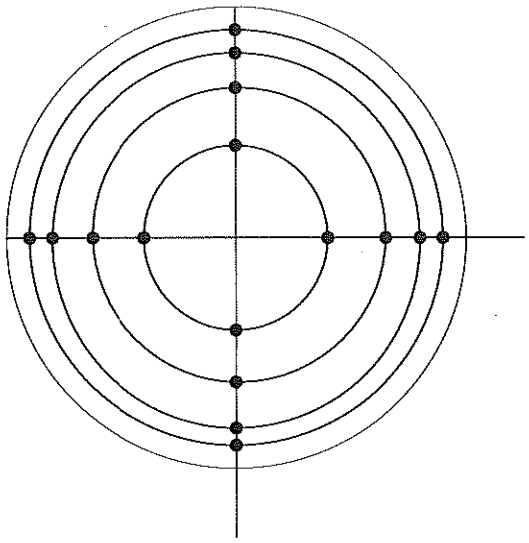
cc: Rob Harvey, Impact Compliance & Testing
Aili Wilen, Intertape Polymer Group
Tammy Bell, EGLE
Joyce Zhu, EGLE
Iranna Konanahalli, EGLE



Intertape Polymer Group, Inc.
Site Map with Proposed Sampling Locations

Scale	Sheet
None	1 of 1





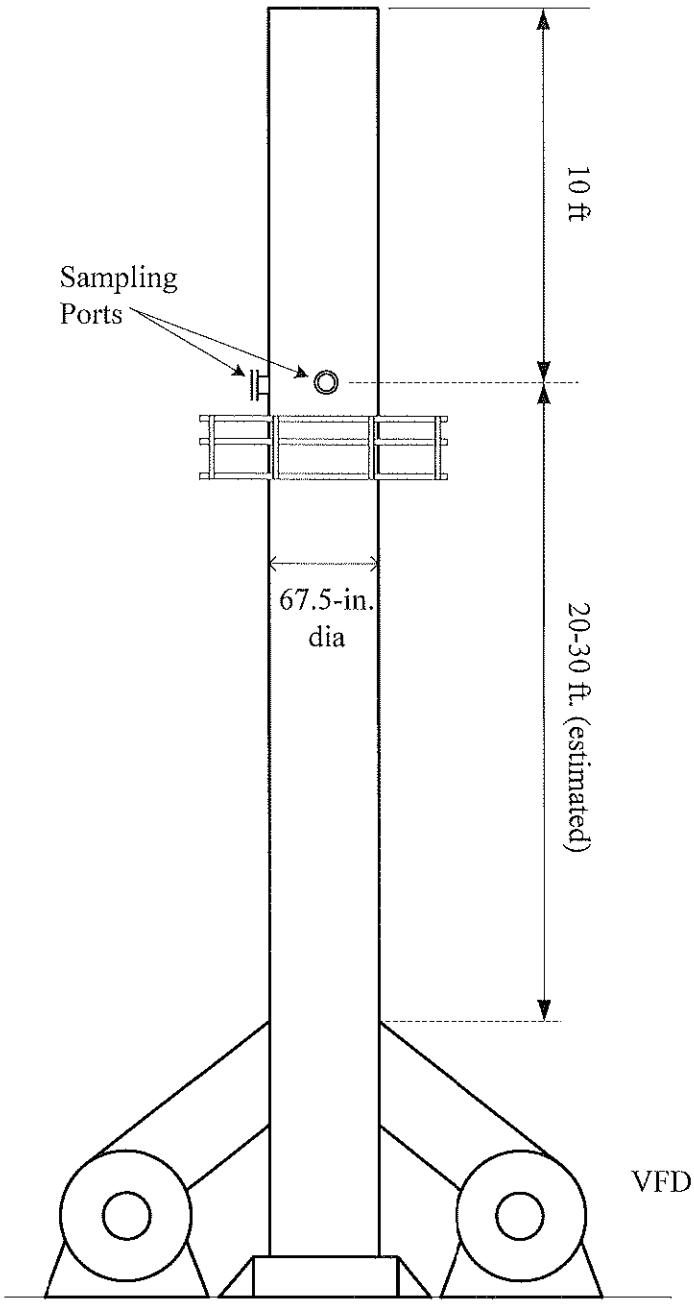
Velocity locations as measured from stack wall

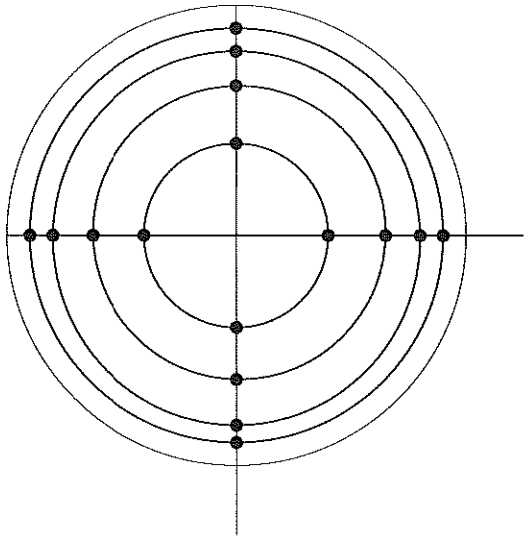
Pt	inch
1	1.71
2	5.62
3	10.38
4	17.28
5	36.22
6	43.12
7	47.88
8	51.79

Intertape Polymer Group
RTO Inlet Sampling Diagram

Scale	Sheet
None	1 of 1

IMPACT COMPLIANCE & TESTING





Velocity locations
as measured from
stack wall

Pt	inch
1	2.16
2	7.09
3	13.10
4	21.80
5	45.70
6	54.41
7	60.41
8	65.34

Intertape Polymer Group
RTO Stack Sampling Diagram

Scale	Sheet	
None	1 of 1	IMPACT COMPLIANCE & TESTING

ATTACHMENT 2

Thermal Oxidizer Operating Records

		Avg °F	Min °F
DE Test 1	10:30-11:30	1445	1431
DE Test 2	13:30-14:30	1473	1462
DE Test 3	15:12-16:12	1475	1457
		1464	**1431**

DATE	TIME	RTO Retention Chamber Temp (F˚)	
08/18/22	10:15	1463	
08/18/22	10:30	1457	**Test 1**
08/18/22	10:45	1445	
08/18/22	11:00	1431	
08/18/22	11:15	1432	
08/18/22	11:30	1462	
08/18/22	11:45	1460	
08/18/22	12:00	1454	
08/18/22	12:15	1468	
08/18/22	12:30	1448	
08/18/22	12:45	1458	
08/18/22	13:00	1454	
08/18/22	13:15	1467	
08/18/22	13:30	1462	**Test 2**
08/18/22	13:45	1469	
08/18/22	14:00	1482	
08/18/22	14:15	1477	
08/18/22	14:30	1477	
08/18/22	14:45	1471	
08/18/22	15:00	1477	
08/18/22	15:15	1473	**Test 3**
08/18/22	15:30	1485	
08/18/22	15:45	1484	
08/18/22	16:00	1474	
08/18/22	16:15	1457	
08/18/22	16:30	1454	

Field Data Sheet

Facility: IPG

Source: RTO

Description:

Test No. 01-

Date: 8/18/22

Operator: RH

Time	RTO #1 °F	RTO #2 °F	ID FAN #1 RPM	ID FAN #2 RPM	Vacuum "WC	Lines Run
1030	START 1					
1055	1459	1453	823	826	-1.92	1/3
1145	1465	1448	823	823	-1.91	1/3
1215	1470	1450	788	793	-1.86	1/3
1130	START	2				
1335	1467	1468	1160	1159	-1.85	1/3/4
1420	1484	1468	1092	1096	-1.96	
1445	1481	1471	1072	1073	-2.04	1/3/4
1512	Start 3					
1545	1486	1465	1097	1100	-2.13	134
1621	1472	1451	1091	1083	-1.91	134

ATTACHMENT 3

Pilot Line Operating Data and Diagrams

2022 Arrow Coater Stack Testing
Arrow coater Set-up

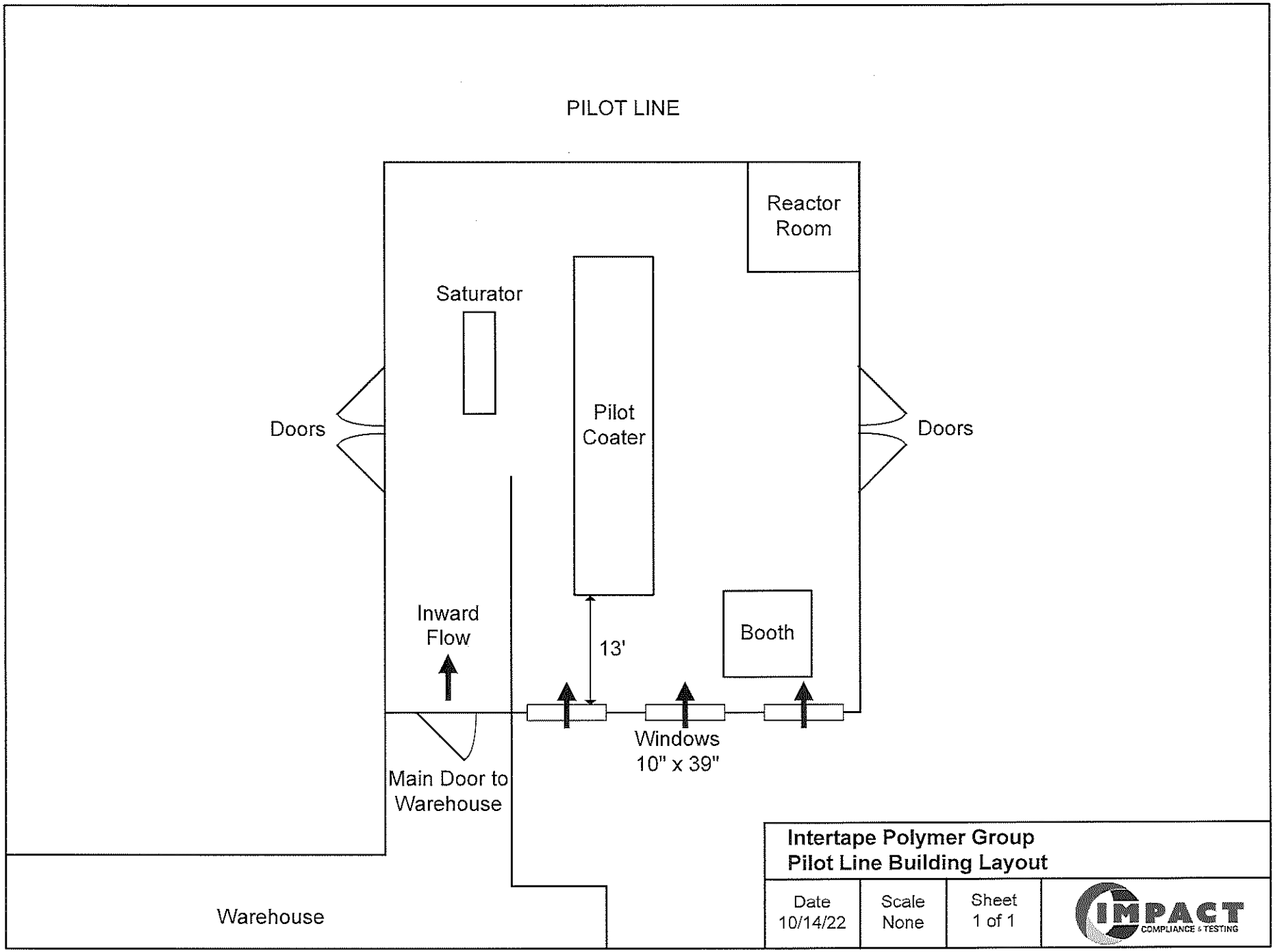
Oven Zones	1	2	3	4	5	6	7
Degrees F	150	170	220	260	280	290	N/A

Arrow Coater line speed for all testing. Pot speed 3.0 or 10ft./minute.
Adhesive formula 1752D solids measured at 40.0%
Adhesive spread width 8"
Adhesive dry coat weight. 30#/ream
Adhesive wet coat weight. 75#/ream
Theoretical Solvent #/ream 45#/ream
1 ream = 3000sq/ft. or 12"x 3000 ft.
Spread width 8"/12" = 0.666 3000 ft./ 0.666 = 4500 ft.

Each test produced 630 ft of material or 14% of a ream. 630ft./4500ft. = 0.14
Table below shows adhesive consumption broken out by dry weight, wet weight, and theoretical solvent emission based on test times.

	Dry Weight #/ream	Wet Weight	Solvent Emission
Test 1; 1320 – 1425	4.2 lb's	10.5 lb's	6.3 lb's
Test 2; 1520 – 1625	4.2 lb's	10.5 lb's	6.3 lb's
Test 3; 1725 – 1830	4.2 lb's	10.5 lb's	6.3 lb's

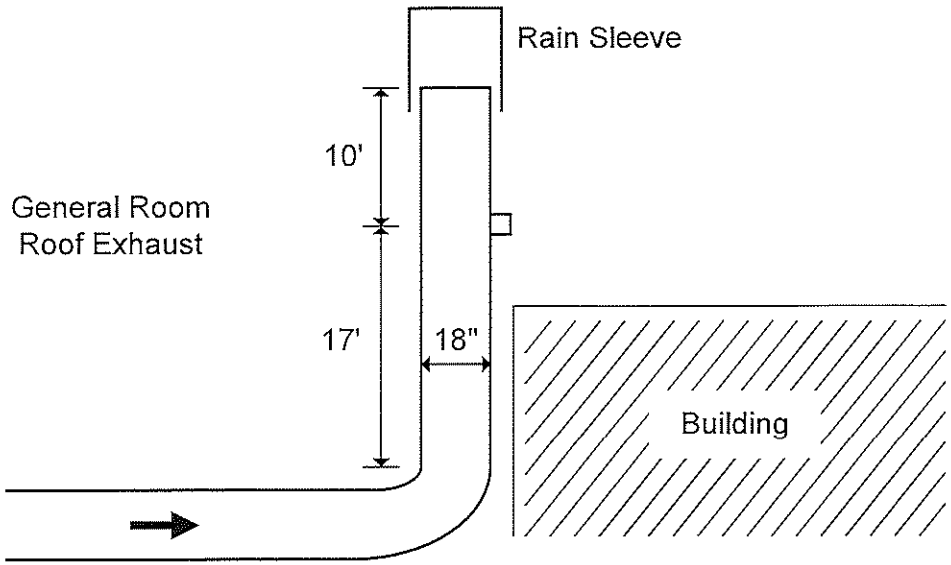
PILOT LINE

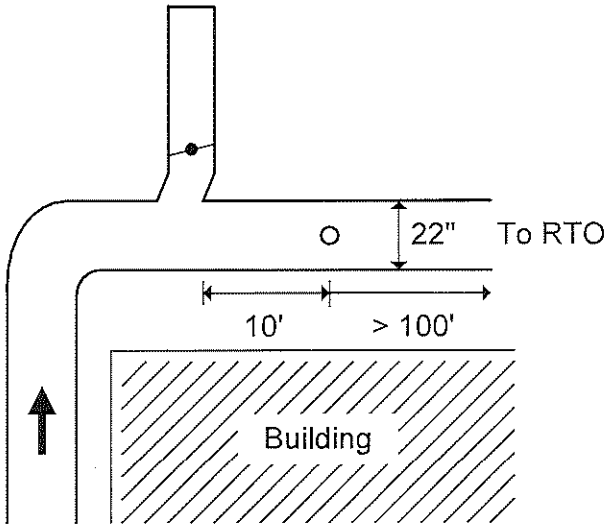


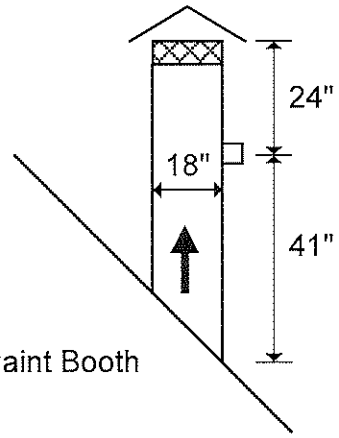
Intertape Polymer Group
Pilot Line Building Layout

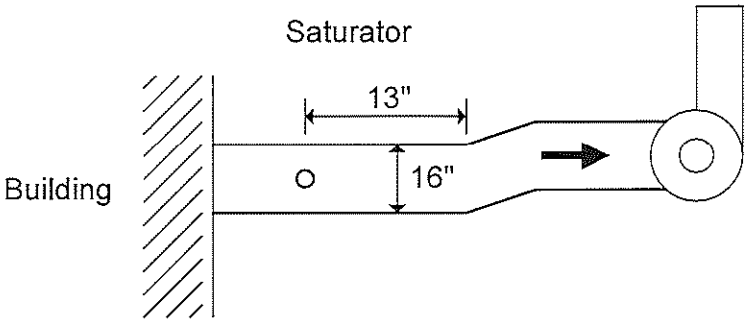
Date	Scale	Sheet
10/14/22	None	1 of 1

IMPACT COMPLIANCE & TESTING









Intertape Polymer Group
Pilot Line Stacks

Date	Scale	Sheet
10/14/22	None	1 of 1

IMPACT COMPLIANCE & TESTING