

**RECEIVED**  
JUN 28 2017  
AIR QUALITY DIV.

**AIR EMISSION TEST REPORT**

Report Title: AIR EMISSION TEST REPORT FOR THE VERIFICATION OF  
VOC/HAP CAPTURE AND DESTRUCTION EFFICIENCY  
FOR ADHESIVE COATING LINES

Report Date: June 20, 2017

Test Dates: April 25-27 and May 1-3, 2017

<b>Facility Information</b>	
Name	Intertape Polymer Group
Street Address	317 Kendall Ave.
City, County	Marysville, St. Clair
SRN	A6220

<b>Facility Permit Information</b>	
Operating Permit No.:	MI-ROP-A6220-2015a
Emission Units:	EUCOATINGLINE1, EUCOATINGLINE3 EUCOATINGLINE4, EUPILOT-LINE

<b>Testing Contractor</b>	
Company	Derenzo Environmental Services
Mailing Address	4180 Keller Rd, Ste B Holt MI 48842
Phone	(517) 268-0043
Project No.	1611005



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION

**RENEWABLE OPERATING PERMIT  
REPORT CERTIFICATION**

Authorized by 1994 P.A. 451, as amended. Failure to provide this information may result in civil and/or criminal penalties.

Reports submitted pursuant to R 336.1213 (Rule 213), subrules (3)(c) and/or (4)(c), of Michigan's Renewable Operating Permit (ROP) program must be certified by a responsible official. Additional information regarding the reports and documentation listed below must be kept on file for at least 5 years, as specified in Rule 213(3)(b)(ii), and be made available to the Department of Environmental Quality, Air Quality Division upon request.

Source Name Intertape Polymer Group County St Clair  
Source Address 317 Kendall Ave City Marysville  
AQD Source ID (SRN) A6220 ROP No. A6220-2015a ROP Section No. \_\_\_\_\_

Please check the appropriate box(es):

**Annual Compliance Certification (Pursuant to Rule 213(4)(c))**

Reporting period (provide inclusive dates): From \_\_\_\_\_ To \_\_\_\_\_

1. During the entire reporting period, this source was in compliance with ALL terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the ROP.

2. During the entire reporting period this source was in compliance with all terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference, EXCEPT for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the ROP, unless otherwise indicated and described on the enclosed deviation report(s).

**Semi-Annual (or More Frequent) Report Certification (Pursuant to Rule 213(3)(c))**

Reporting period (provide inclusive dates): From \_\_\_\_\_ To \_\_\_\_\_

1. During the entire reporting period, ALL monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred.

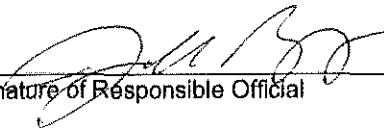
2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred, EXCEPT for the deviations identified on the enclosed deviation report(s).

**Other Report Certification**

Reporting period (provide inclusive dates): From \_\_\_\_\_ To \_\_\_\_\_

Additional monitoring reports or other applicable documents required by the ROP are attached as described:  
Test Report for VOC/HAP control efficiency testing for EU COATING LINE 1, 3, 4 and  
EU PILOT-LINE. Testing performed April 25-27 and May 1-3, 2017.

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this report and the supporting enclosures are true, accurate and complete

Jeff Bacholzky Operations Manager II (810) 941-6450  
Name of Responsible Official (print or type) Title Phone Number  
 Date 6/20/2017  
Signature of Responsible Official

AIR EMISSION TEST REPORT  
FOR THE VERIFICATION OF  
VOC/HAP CAPTURE AND DESTRUCTION EFFICIENCY FOR  
ADHESIVE COATING LINES

INTERTAPE POLYMER GROUP  
MARYSVILLE, ST. CLAIR COUNTY

## **1.0 INTRODUCTION**

Intertape Polymer Group (IPG) manufactures pressure sensitive tape products at its 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 (RO) Permit by the Michigan Department of Environmental Quality, Air Quality Division (MDEQ-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 25-27 and May 1-3, 2017 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
- Capture efficiency associated with a smaller pilot coating line (EUPILOT-LINE) that is connected to the RTO.

The control efficiency evaluation and exhaust gas sampling and analysis was performed using procedures specified in the test plan dated February 16, 2017 that was submitted to the MDEQ-AQD for review and approval.

Appendix A provides a copy of the MDEQ-AQD test plan approval letter.

## **Derenzo Environmental Services**

Intertape Polymer Group  
VOC/HAP Control Efficiency Test Report

June 20, 2017  
Page 2

### **1.1 Contact Information**

The VOC/HAP destruction and capture efficiency testing was performed by Derenzo Environmental Services (DES) representatives Robert Harvey, Andy Rusnak, Tyler Wilson, Daniel Wilson, Blake Beddow, and Tom Andrews. Prism Analytical Technologies (Lindsey Wells and Blake Ericson) was contracted to perform specific test procedures and analyses.

The project was coordinated by Ms. Melissa Oakley, IPG EH&S Manager. Several MDEQ-AQD representatives were on-site at various times to observe portions of the compliance testing, including Tom Gasloli, Mark Dziadosz, Remilando Pinga, and Sebastian Kallumkal.

Questions regarding this emission test report should be directed to:

Testing Procedures      Robert Harvey  
                                    General Manager  
                                    Derenzo Environmental Services  
                                    4180 Keller Rd, Ste B  
                                    Holt MI 48842  
                                    517-268-0043  
                                    rharvey@derenzo.com

Facility Compliance      Melissa Oakley  
Manager                      EH&S Manager  
                                    Intertape Polymer Group  
                                    317 Kendal Street  
                                    Marysville, MI 48040  
                                    810-941-6382  
                                    moakley@itape.com

Responsible Official      Jeff Bacholzky  
                                    Operations Manager II  
                                    Intertape Polymer Group  
                                    317 Kendal Street  
                                    Marysville, MI 48040  
                                    810-941-6450  
                                    jbacholzky@itape.com

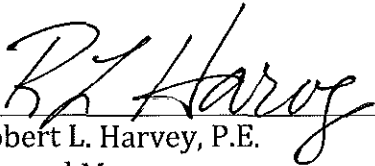
**1.2 Report Certification**

This test report was prepared by Derenzo Environmental Services based on field sampling data collected by DES, or as contracted by DES. Facility process data were collected and provided by Intertape Polymer Group employees or representatives. This report has been reviewed by IPG representatives and approved for submittal to the MDEQ-AQD.

A Renewable Operating Permit Report Certification form signed by the IPG Responsible Official 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.

Report Prepared By:



---

Robert L. Harvey, P.E.  
General Manager  
Derenzo Environmental Services

## **2.0 SUMMARY OF RESULTS**

### **2.1 Results for RTO Destruction Efficiency**

RTO VOC/HAP destruction efficiency was determined for three (3) one-hour test periods by simultaneously measuring the mass flowrate of total hydrocarbons (THC) entering and exiting the RTO emission control device.

The average measured VOC/HAP destruction efficiency for the three test periods is 98.1% 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 1,444°F. Provisions of the POWC MACT specify that the average combustion temperature for any 3-hour period must not fall below the average combustion temperature established during the most recent compliance test.

The RTO VOC/HAP destruction efficiency test results are summarized in Table 2.1. Data and information for each test period are presented in Section 6.0 and the tables at the end of this report.

### **2.2 Results for Coating Line Capture Efficiency**

VOC/HAP capture efficiency for each large coating line (EUCOATINGLINE1, EUCOATINGLINE3, EUCOATINGLINE4) was determined by simultaneously measuring the captured toluene mass flowrate to the SRS and RTO, and comparing the measured toluene mass flowrates to the mass of toluene applied during each two-hour test period.

For the pilot line (EUPILOT-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 (atmospheric exhausts from the pilot line building).

A summary of the coating line capture efficiency test results is presented in Table 2.2. The results presented in Table 2.2 for each emission unit are the average of all test periods performed for that unit. Data and information for each test period are presented in Section 6.0 and the tables at the end of this report.

Based on a review of the test results, a problem was discovered with the Pilot Line exhaust damper, which has since been corrected by IPG. However, there are no specific permit requirements for coating line capture efficiency performance. The test results will be used with the facility's material use records to calculate VOC/HAP emissions and are expected to demonstrate compliance with applicable provisions of the permit and POWC MACT.

Table 2.1 Summary of RTO VOC/HAP destruction efficiency test results

Control System Parameter	Test 1	Test 2	Test 3	Three-Hour Average
Avg. RTO Combustion Temperature (°F)	1,447	1,441	1,444	1,444
Min. RTO Combustion Temperature (°F)	1,430	1,441	1,435	--
VOC/HAP Destruction Efficiency (%wt)	98.1%	98.1%	98.0%	98.1%
Permit Requirement	--	--	--	>95.0%

Table 2.2 Summary of coating line VOC/HAP capture efficiency test results

Emission Unit	Captured to SRS (%wt)	Captured to RTO (%wt)	Overall Capture Efficiency (%wt)
EU COATING LINE 1	95.9%	3.0%	98.9%
EU COATING LINE 3 †	99.4%	3.0%	102.4%
EU COATING LINE 4	80.2%	15.9%	96.0%
EU PILOT-LINE ††	NA	10.2%	10.2%

† The average measured capture efficiency for coating line No. 3 is greater than 100%. The data set satisfies the DQO, therefore, the demonstration is acceptable and an overall capture efficiency of 100% will be used in the facility's emission recordkeeping.

†† Average of the three test periods. The pilot line capture efficiency data set does not satisfy the DQO, therefore, the lower confidence limit (LCL) was calculated for the data set. A problem with the exhaust damper was discovered after the test, which has since been corrected. See Section 6.0 for more information.

### **3.0 SOURCE 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) and a smaller pilot coating line (EUPILOT-LINE). 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.

The pilot line (EUPILOT-LINE) 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.

#### **3.2 Type of Raw Materials Used**

IPG formulates its adhesives on-site using rubber, polymer resins and solvent (toluene). The adhesive mix is stored in 300-gallon totes and pumped to the coating lines from a central storage location. For some products, a release coat is first applied to the backside of the substrate. The release coat is waterbased and does not contain toluene, though it may contain a small amount of isopropanol (IPA). Any VOC contained in the release coat is assumed to be released as an air emission and is not included as part of the capture efficiency calculations.

Coatings for the pilot line are stored in much smaller containers such as 5-gallon pails or smaller stored within the pilot building.

#### **3.3 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. The pilot line is only connected to the RTO.



### 3.3.1 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.

### 3.3.2 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.

#### **4.0 SAMPLING AND ANALYTICAL PROCEDURES**

A description of the sampling and analytical procedures is provided in the test plan dated February 16, 2017, which was approved by the MDEQ-AQD. This section provides a summary of those procedures.

##### **4.1 Reference Test Methods**

The following USEPA reference test methods were used as part of this project:

- Method 1      Velocity and sampling locations based on physical stack measurements in accordance with USEPA Method 1.
- Method 2      Gas flowrate determined using a type S Pitot tube in accordance with USEPA Method 2.
- Method 3A     RTO exhaust gas O<sub>2</sub> and CO<sub>2</sub> content determined using instrumental analyzers.
- Method 4      RTO inlet and exhaust gas moisture content determined based on the water weight gain in chilled impingers. All other sampling locations determined by wet bulb/dry bulb temperature measurements.
- Method 25A    Total hydrocarbon concentration using a flame ionization analyzer (FIA) compared to a propane standard.
- Method 320    Toluene concentration in captured gas streams determined by Fourier transform infrared spectroscopy (FTIR spectrometer)

##### **4.2 RTO Destruction Efficiency Test Procedures**

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) Model 51c THC flame ionization analyzer.

The RTO exhaust gas sample was divided between a:

1. TEI 51c 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<sub>2</sub>) and zirconia ion sensor to measure oxygen (O<sub>2</sub>) content in accordance with USEPA Method 3A. The CO<sub>2</sub> / O<sub>2</sub> 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.

Attachment 2 provides diagrams of the sampling locations.

Moisture content for the RTO exhaust gas was determined using a chilled impinger train and the procedures of USEPA Method 4; moisture from the RTO inlet gas stream (which is primarily building air captured by the coating line air collection systems) was determined by wet bulb / dry bulb temperature measurements.

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:

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

Where:

- $M_{\text{THC}}$  = Mass flowrate VOC (lb/hr)
- $Q$  = Volumetric flowrate (scfm)
- $C_{\text{THC}}$  = THC concentration (ppmv C<sub>3</sub>)
- $MW_{\text{C}_3}$  = 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<sub>THC in</sub> = THC mass flowrate into the RTO (lb/hr)  
M<sub>THC out</sub> = THC mass flowrate exhausted from the RTO (lb/hr)

### **4.3 Line 1, 3, 4 Capture Efficiency Test Procedures**

The capture efficiency for 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).

#### **4.3.1 Toluene Captured**

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 operated by Prism Analytical Technologies, Inc. (PATI) in accordance with USEPA Method 320 and ASTM D6348-12.

Air flowrate measurements were performed near the beginning and end of each two-hour test period in accordance with USEPA Methods 1 and 2.

Attachment 2 provides diagrams of the sampling locations.

The captured gas streams are primarily building air captured by the coating line air collection systems. Oxygen and CO<sub>2</sub> content was consistent with ambient air and verified with a Fyrite® combustion gas analyzer. Moisture content for the RTO inlet gas was determined using a chilled impinger train using the procedures of USEPA Method 4; moisture for the captured SRS gas stream was determined by wet bulb / dry bulb temperature measurements. Moisture content was also verified using the FTIR instrument.

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)

#### 4.3.2 Toluene Used

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

- At the beginning of the test period.
- Periodically throughout the test period.
- Whenever a tote went empty and the process feed was switched to a new tote (the ending tote weight and beginning tote weight were recorded).
- At the end of the test period.

Each adhesive tote has a specific lot number that was recorded during the test period. 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 DES to calculate the toluene use rate for each test period.

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

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 analysis

#### 4.3.3 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)

#### 4.4 Pilot Line Capture Efficiency Test Procedures

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.
- Exhaust from the lab hood/booth (uncaptured);
- Exhaust from the saturator room (uncaptured);
- General room exhaust (uncaptured).

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.

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.

Attachment 2 provides diagrams of the sampling locations.

The gas streams are primarily collected building air. Therefore, the O<sub>2</sub> and CO<sub>2</sub> content was consistent with ambient air and verified with a Fyrite® combustion gas analyzer. 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 4.2. The percentage of VOC captured (and directed to the RTO emissions control device) was determined using the following equation:

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

## **5.0 QUALITY ASSURANCE PROCEDURES**

Attachment 10 provides quality assurance and calibration records for the sampling equipment used during the test periods, including gas divider and instrumental analyzer calibration records, calibration gas certificates, and calibration information for the dry gas meter, barometer, pyrometers, and weigh scales.

### **5.1 Exhaust Gas Flow Measurements (Methods 1 and 2)**

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

The physical design and condition of the Pitot tubes used for velocity pressure measurements satisfied USEPA Method 2 criteria. The Pitot tubes used for measuring flow to the RTO and SRS were calibrated by a third-party prior to the test event for low velocity and high velocity applications (wind tunnel Pitot tube coefficient C<sub>p</sub> determination using a wind tunnel). The gas velocity measurement train (Pitot tube, connecting tubing and incline manometer) was leak-checked prior to the field measurements and periodically throughout the test event.

The absence of cyclonic flow for each sampling location was verified using the gas velocity measurement train (S-type Pitot tube connected to an oil manometer). The Pitot tube was positioned at each velocity traverse point 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). The measured null angle for each traverse location was recorded on a data sheet. Cyclonic flow at each sampling location is minimal.

## **5.2 Instrument Calibration and System Bias Checks (Methods 3A and 25A)**

Accuracy of the instrumental analyzers used to measure THC, O<sub>2</sub>, and CO<sub>2</sub> concentration was verified prior to and at the conclusion of each test period using the calibration procedures in Methods 25A, 3A and 7E.

At the beginning of each day, initial three-point instrument calibrations were performed for the CO<sub>2</sub> and O<sub>2</sub> 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.

At the beginning of each test day, appropriate high-range, mid-range, and low-range span gases followed by a zero gas were introduced to the THC analyzers, in series at a tee connection, which is installed between the sample probe and the particulate filter, through a poppet check valve. After each one-hour test period, mid-range and zero gases were re-introduced in series at the tee connection in the sampling system to check against the method's performance specifications for calibration drift and zero drift error.

The instruments were calibrated with USEPA Protocol 1 certified concentrations of CO<sub>2</sub> and O<sub>2</sub> 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 and a STEC Model SGD-SC-5L five-step gas divider were used to obtain intermediate calibration gas concentrations as needed.

The response time of each sampling system was determined each day prior to beginning the first test period by introducing upscale gas and zero gas, in series, into the sampling system using a tee connection at the base of the sample probe. The elapsed time for the analyzer to display a reading of 95% of the expected concentration was determined using a stopwatch. Results of the response time determinations were recorded on field data sheets. For each test period, test data were collected once the sample probe was in position for at least twice the maximum system response time.



### **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 (USEPA Method 320)**

The FTIR spectrometers were operated in accordance with the quality assurance and quality control procedures of USEPA Method 320. Information is presented in the Prism Analytical Technologies report in Attachment 8.

### **5.6 Material Use**

Approximately one month prior to the test event, IPG contracted a third-party to verify the accuracy of, and calibrate if necessary, its floor scales. The Certificate of Calibration for each floor scale used to weigh adhesive totes for this test event is provided in Attachment 10.

## **6.0 TEST RESULTS AND DISCUSSION**

### **6.1 Control Device Operating Data**

Control device operating data were recorded during each test period including:

- RTO combustion chamber temperature,
- RTO inlet header vacuum
- RTO fan VFD controller output
- Coating line exhaust fan static pressures

Attachment 3 provides RTO and collection system operating records for the test event.

### **6.2 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 98.1% 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 1,444°F. Provisions of the POWC MACT specify that the average combustion temperature for any 3-hour period must not fall below the average combustion temperature established during the most recent compliance test.

Attachment 4 provides RTO inlet/outlet concentration graphs, field data, and calculations for the RTO destruction efficiency test periods performed May 1, 2017.

The RTO testing was scheduled for April 28, 2017 but was postponed to May 1, 2017 due to difficulties with maintaining consistent run speeds on two of the three coating lines. Instrument calibrations and setup information is provided in Attachment 4 for both April 28 and May 1.

### **6.3 Coating Line 1, 3 and 4 Capture Efficiency**

Tables 6.2 through 6.4 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. The average capture efficiency for the three coating lines ranges from 96.0% to 102.4%.

Three (3) two-hour (120 minute) test periods were performed for each coating line with the following exceptions.

Test No. 1 for EUCOATNGLINE1 ended a few minutes short of two hours due to a web break on the coating line. The capture efficiency for this test period was based on 113 minutes of data, which corresponds to the time the tote weights were recorded shortly before the web break occurred.

Four (4) two-hour test periods were performed for EUCOATINGLINE3 to satisfy the Data Quality Objective (DQO) criteria as explained in Section 6.5 of this report.

Attachment 5 provides RTO and SRS toluene concentration graphs, field data, and calculations for the Line 1 capture efficiency test periods performed April 27, 2017.

Attachment 6 provides RTO and SRS toluene concentration graphs, field data, and calculations for the Line 3 capture efficiency test periods performed April 26, 2017.

Attachment 7 provides RTO and SRS toluene concentration graphs, field data, and calculations for the Line 4 capture efficiency test periods performed April 25, 2017.

Attachment 8 provides the test report by PATI for the exhaust gas toluene concentration measurements performed by FTIR in accordance with USEPA Method 320.

### **6.4 Pilot Line VOC Capture Efficiency**

Table 6.5 presents measured gas conditions and results for each capture efficiency test period for the pilot coating line.

For the pilot line (EUPILOT-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 three (3) gas streams that would be monitored with three FID instruments; the captured gas to the RTO and two uncontrolled exhausts. However, after reviewing the process, a third uncontrolled exhaust was identified.

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 three FID instruments were rotated between the four uncontrolled exhaust stacks during each one hour test period. However, during the second test period, one of the heated sample lines failed, which reduced the number of functional sampling trains to two. For the second and third test periods, the two FID instruments were rotated between the four measurement points.

These test procedure variations were discussed with, and approved by, the on-site MDEQ representative Mark Dziadosz

Attachment 9 provides RTO and SRS toluene concentration graphs, field data, and calculations for the pilot line capture efficiency test periods performed May 3, 2017.

## **6.5 Capture Efficiency Data Quality Objective (DQO) Criteria**

The capture efficiency testing requirements in the POWC MACT [§63.3360(f)] specify that:

*(2) You may determine capture efficiency according to the protocols for testing with temporary total enclosures that are specified in Methods 204 and 204A through F ...*  
(or)

*(3) You may use any capture efficiency protocol and test methods that satisfy the criteria of either the Data Quality Objective or the Lower Confidence Limit approach as described in appendix A of subpart KK of this part ...*

The use of an alternate analytical method (USEPA Method 320 for toluene as opposed to Method 25A as specified in the 204-series test methods) and shorter test periods (less than three hours as specified in the 204-series test methods) requires that the capture efficiency test results satisfy the DQO or Lower Confidence Limit (LCL) approach. When the DQO criterion are satisfied, the average CE from the data set is used to determine compliance. If the DQO criterion are not satisfied, the average CE of the data set may be reduced to the 80% confidence level (LCL) for determining compliance.

The three-test capture efficiency data set for EUCOATNGLINE1 and EUCOATNGLINE4 satisfy the DQO criteria. Therefore, the three-test average will be used in IPG's monthly emission calculations.

For EUCOATNGLINE3, a fourth test period was performed to satisfy the DQO criteria. The mean capture efficiency (average of the four test periods) for EUCOATNGLINE3 is 102.4% and none of the individual capture efficiency results exceed 105%. Therefore, the tests results are valid provided the data set satisfies the DQO. The LCL approach cannot be used if the mean capture efficiency exceeds 100%. A capture efficiency of 100% will be used for EUCOATNGLINE3 in IPG's monthly emission calculations.

The three-test capture efficiency data set for EUPILOT-LINE does not satisfy the DQO criterion. Additional test periods were not performed for the purpose of meeting the DQO. The capture efficiency result based on the LCL approach was calculated and will be used for EUPILOT-LINE in IPG's monthly emission calculations, which reduces the capture efficiency from the mean of 10.2% to the LCL of 6.9%.

Table 6.6 presents a summary of the DQO / LCL calculations for the capture efficiency test results.

## **6.6 Discussion of Results and Compliance**

The conditions of MI-ROP-A6220-2015a and the POWC MACT require the combined emissions from the coating lines (FGCOATINGLINES) to meet certain emission limits. For example, the combined VOC emissions must be less than 4.79 pounds per gallon of coating solids applied and organic HAP emissions must not exceed either:

- 4% of the mass of coating materials applied, or
- 20% of the mass of coating solids applied.

There are no specific requirements for coating line capture efficiency performance. The test results (coating line emissions capture and RTO destruction efficiency) will be used with the facility's material use records to calculate VOC/HAP emissions and demonstrate compliance with applicable provisions of the facility's permit and POWC MACT.

The measured VOC capture efficiency for the pilot line was lower than expected. Based on a review of the results, the measured captured gas flowrate from the pilot line to the RTO was relatively low (less than 2,000 scfm) indicating that there may be a mechanical issue with the capture system. After reviewing the test results, IPG discovered that one of the fire dampers on the pilot line exhaust to the RTO had closed due to a loose support chain. This explains the low exhaust flowrate and low capture efficiency. IPG has since corrected the issue and expects that the pilot line exhaust flowrate and capture efficiency is now significantly higher than the emission test results from May 3.

In addition to being a part of the FGCOATINGLINES emission standards, the pilot line (EUPILOT-LINE) has specific VOC emission limits of 32.87 pounds per hour (lb/hr) and 65.74 tons per year. The material use rate and annual material use for the pilot line are almost negligible in comparison to that of coating line Nos. 1, 3 and 4. Based on the test results, the total measured VOC exhaust rate for the pilot line is less than 7 lb/hr (see Table 6.5). It is likely that the pilot line can operate with no emission controls whatsoever and demonstrate compliance with its specific VOC limits and the FGCOATINGLINES emission limits. At this time, IPG plans to use the May 3 capture efficiency test results in its emission calculations and will perform a retest in the future if it becomes necessary to do so.

The capture and control efficiency results presented in this report are expected to result in continued compliance with the permit and POWC MACT emission limits.

#### **6.7 Variations from Normal Sampling Procedures or Operating Conditions**

During the test periods the coating lines and emission control systems were operated at normal operating conditions, at or near maximum capacity, and satisfied the parameters specified in the MDEQ-AQD test plan approval letter.

Coating line and control device operating data are provided in Attachment 3.

The testing was performed in accordance with the reference test methods, test plan dated February 16, 2017, and test plan approval unless otherwise noted in this report. Any exceptions to the planned test procedures are presented in Sections 6.2 through 6.6 above.

Table 6.1 Measured gas conditions and destruction efficiency test results for the RTO

	<b>Test 1</b>	<b>Test 2</b>	<b>Test 3</b>	<b>3-Hour Avg</b>
Date	5/1/17	5/1/17	5/1/17	
Test Times	1148-1248	1554-1654	1925-2025	
Avg. Combustion Temp (°F)	1,447	1,441	1,444	1,444
Min. Combustion Temp <sup>1</sup> (°F)	1,430	1,441	1,435	--
<b>RTO Inlet</b>				
Flowrate (scfm)	27,245	26,691	26,212	26,716
Average THC Conc. (ppmv C <sub>3</sub> )	1,075	791	811	892
THC Mass Flow (lb/hr)	201	145	146	164
<b>RTO Exhaust</b>				
Flowrate (scfm)	36,503	36,362	37,094	36,653
Average THC Conc. (ppmv C <sub>3</sub> )	15.1	11.2	11.3	12.5
THC Mass Flow (lb/hr)	3.79	2.79	2.88	3.15
<b>Destruction Efficiency<sup>2</sup> (%wt)</b>	<b>98.1%</b>	<b>98.1%</b>	<b>98.0%</b>	<b>98.1%</b>

1. Minimum RTO combustion chamber temperature recorded during the one-hour test period
2.  $\text{THC Destruction Efficiency} = 1 - [\text{VOC out} / \text{VOC in}] \times 100\%$

Table 6.2 Capture efficiency test results for Line 1 (EUCOATINGLINE1)

	<b>Test 1</b>	<b>Test 2</b>	<b>Test 3</b>	<b>Average</b>
Date	4/27/17	4/27/17	4/27/17	
Test Start Time	0830	1122	1332	
Test End Time <sup>[1]</sup>	1023	1322	1532	
Duration (hours)	1.88	2.0	2.0	
<b>Captured to SRS</b>				
Flowrate (scfm)	55,107	55,170	56,116	55,464
Toluene conc. (ppmv)	748	819	799	789
Toluene mass flow (lb/hr)	591	649	643	628
Toluene captured (lbs)	1,114	1,298	1,286	1,233
<b>Captured to RTO</b>				
Flowrate (scfm)	8,098	6,684	6,824	7,202
Toluene conc. (ppmv)	182	196	196	191
Toluene mass flow (lb/hr)	21.2	18.8	19.2	19.7
Toluene captured (lbs)	39.8	37.6	38.3	38.6
<b>Toluene Used</b>				
Total coatings used (lbs)	2,132	2,430	2,413	2,325
Toluene content (%wt)	55.1%	55.5%	55.2%	55.3%
Toluene used (lbs)	1,175	1,348	1,333	1,285
<b>Capture Efficiency</b>				
Captured to SRS (%wt)	94.8%	96.3%	96.5%	<b>95.9%</b>
Captured to RTO (%wt)	3.4%	2.8%	2.9%	<b>3.0%</b>
Overall Capture (%wt)	98.2%	99.1%	99.4%	<b>98.9%</b>

1. Test 1 ended 7 minutes early due to a process shutdown (web break)



**Derenzo Environmental Services**

Intertape Polymer Group  
 VOC/HAP Control Efficiency Test Report

June 20, 2017  
 Page 23

Table 6.3 Capture efficiency test results for Line 3 (EUCOATINGLINE3)

	<b>Test 1</b>	<b>Test 2</b>	<b>Test 3</b>	<b>Test 4</b>	<b>Average</b>
Date	4/26/17	4/26/17	4/26/17	4/26/17	
Test Start Time	0915	1135	1345	1555	
Test End Time	1115	1335	1545	1755	
Duration (hours)	2.0	2.0	2.0	2.0	
<b>Captured to SRS</b>					
Flowrate (scfm)	92,298	92,657	92,438	93,264	92,664
Toluene conc. (ppmv)	583	705	707	730	681
Toluene mass flow (lb/hr)	773	937	937	977	906
Toluene captured (lbs)	1,545	1,875	1,875	1,953	1,812
<b>Captured to RTO</b>					
Flowrate (scfm)	11,574	11,517	11,427	11,562	11,520
Toluene conc. (ppmv)	111	219	183	159	168
Toluene mass flow (lb/hr)	18.5	36.2	30.1	26.4	27.8
Toluene captured (lbs)	36.9	72.4	60.1	52.8	55.6
<b>Toluene Used</b>					
Total coatings used (lbs)	2,663	3,345	3,290	3,315	3,153
Toluene content (%wt)	56.7%	57.9%	59.2%	57.7%	57.9%
Toluene used (lbs)	1,509	1,935	1,948	1,912	1,826
<b>Capture Efficiency</b>					
Captured to SRS (%wt)	102.4%	96.9%	96.2%	102.2%	<b>99.4%</b>
Captured to RTO (%wt)	2.4%	3.7%	3.1%	2.8%	<b>3.0%</b>
Overall Capture (%wt)	104.8%	100.6%	99.3%	104.9%	<b>102.4%</b>

**Derenzo Environmental Services**

Intertape Polymer Group  
 VOC/HAP Control Efficiency Test Report

June 20, 2017  
 Page 24

Table 6.4 Capture efficiency test results for Line 4 (EUCOATINGLINE4)

	<b>Test 1</b>	<b>Test 2</b>	<b>Test 3</b>	<b>Average</b>
Date	4/25/2017	4/25/2017	4/25/2017	
Test Start Time	0852	1115	1340	
Test End Time	1052	1315	1540	
Duration (hours)	2.0	2.0	2.0	
<b>Captured to SRS</b>				
Flowrate (scfm)	69,151	68,698	69,578	69,143
Toluene conc. (ppmv)	1,007	1,050	1,038	1,032
Toluene mass flow (lb/hr)	1,000	1,035	1,037	1,024
Toluene captured (lbs)	1,999	2,070	2,074	2,048
<b>Captured to RTO</b>				
Flowrate (scfm)	14,793	13,862	13,818	14,157
Toluene conc. (ppmv)	1,025	1,017	946	996
Toluene mass flow (lb/hr)	217.7	202.4	187.6	203
Toluene captured (lbs)	435	405	375	405
<b>Toluene Used</b>				
Total coatings used (lbs)	4,090	4,146	4,035	4,090
Toluene content (%wt)	62.8%	61.8%	62.8%	62.5%
Toluene used (lbs)	2,567	2,564	2,533	2,554
<b>Capture Efficiency</b>				
Captured to SRS (%wt)	77.9%	80.7%	81.9%	<b>80.2%</b>
Captured to RTO (%wt)	17.0%	15.8%	14.8%	<b>15.9%</b>
Overall Capture (%wt)	94.9%	96.5%	96.7%	<b>96.0%</b>

Table 6.5 Capture efficiency test results for the pilot line (EUPILOT-LINE)

	<b>Test 1</b>	<b>Test 2</b>	<b>Test 3</b>	<b>Average</b>
Date	5/3/17	5/3/17	5/3/17	
Test Times	1105-1234	1335-1519	1542-1658	
<b>Captured to RTO</b>				
Flowrate (scfm)	1,084	1,535	1,774	1,464
Average THC Conc. (ppmv C <sub>3</sub> )	41.3	66.9	58.1	55.4
THC Mass Flow (lb/hr)	0.31	0.71	0.71	0.57
<b>Roof Exhaust to Atm</b>				
Flowrate (scfm)	4,175	4,197	4,202	4,191
Average THC Conc. (ppmv C <sub>3</sub> )	84.8	94.8	114.6	98.1
THC Mass Flow (lb/hr)	2.43	2.74	3.31	2.83
<b>Paint Booth Exhaust</b>				
Flowrate (scfm)	1,360	1,464	1,172	1,332
Average THC Conc. (ppmv C <sub>3</sub> )	129.7	131.5	105.7	122.3
THC Mass Flow (lb/hr)	1.21	1.32	0.85	1.13
<b>Saturator Exhaust</b>				
Flowrate (scfm)	2,141	2,207	2,264	2,204
Average THC Conc. (ppmv C <sub>3</sub> )	41.8	54.5	88.0	61.5
THC Mass Flow (lb/hr)	0.62	0.83	1.37	0.94
<b>Capture Efficiency</b>				
Captured VOC (lb/hr)	0.31	0.71	0.71	0.57
Total Uncaptured VOC (lb/hr)	4.26	4.89	5.53	4.89
Capture Efficiency (%wt)	6.7%	12.6%	11.4%	<b>10.2%</b>
Calculated LCL (%wt)				<b>6.9%</b>

Table 6.6 Summary of DQO / LCL calculations for capture efficiency results

	Coating Line 1	Coating Line 3	Coating Line 4	Pilot Line
<b><u>CE Data Set</u></b>				
Test 1 measured CE	98.2	104.8	94.9	6.7
Test 2 measured CE	99.1	100.6	96.5	12.6
Test 3 measured CE	99.4	99.3	96.7	11.4
Test 4 measured CE	--	104.9	--	--
<b><u>DQO Calculation</u></b> <sup>[1]</sup>				
n (number tests)	3	4	3	3
t <sub>0.975</sub> (t-value at 95% confidence)	4.303	3.182	4.303	4.303
X <sub>avg</sub> (mean)	98.9	102.4	96.0	10.2
S <sub>n</sub> (sample std. deviation)	0.006	0.029	0.010	0.031
P value (DQO indicator)	1.58%	4.49%	2.64%	75.2%
Is P < 5% <sup>[2]</sup>	Yes	Yes	Yes	No
<b><u>LCL Calculation</u></b> <sup>[1]</sup>				
n (number tests)	--	--	--	3
t <sub>0.90</sub> (t-value at 80% confidence)	--	--	--	1.886
X <sub>avg</sub> (mean)	--	--	--	10.2
S <sub>n</sub> (sample std. deviation)	--	--	--	0.031
Calculated LC <sub>1</sub> <sup>[3]</sup>	--	--	--	6.9%

1. See Appendix A to 40 CFR Part 63 Subpart KK for specific DQO and LCL equations
2. If the DQO indicator statistic (P value) is less than 5%, the average CE of the data set may be used for determining compliance. No further evaluation is required.
3. When the DQO is not satisfied, the average CE result may be reduced to the 80% confidence level (LCL) for determining compliance with an applicable standard.