performed for

Uniband USA
2500 Turner Avenue NW
Walker, MI 49544
Contact: Jason Moy
Telephone: (616) 676-6011
Cell: (616) 250-0190
e-mail: jason@unibandusa.com

performed by

Network Environmental, Inc.
2629 Remico Street, Suite B
Grand Rapids, MI 49519
Contact: Scott Cargill
Telephone: (616) 530-6330
Fax: (616) 530-0001
e-mail: netenviro@aol.com

TABLE OF CONTENTS

		Page
I.	Introduction	1
II.	Presentation of Results	2-4
	II.1 Table 1 – Total Filterable Particulate Emission Results Summary	2
	II.2 Table 2 – PM-10 and PM-2.5 Emission Results Summary	3
	II.3 Table 3 - Total Gaseous Organic Emission Results Summary	4
III.	Discussion of Results	5
IV.	Source Description	6
V.	Sampling and Analytical Protocol	6-8
	Figure 1 – Particulate Sampling Train	9
	Figure 2 – Total VOC Sampling Train	10

Appendices

Particulate Emission Results & Exhaust Gas Parameters	A
Data Acquisition & Calibration Data	B
Analyzer & Calibration Gas Specifications	C
Source Operating Data	D
Field Data	E
Analytical Data	F
Calculations	G
Raw Data	H

I. INTRODUCTION

Network Environmental, Inc. was retained by Uniband USA of Grand Rapids, Michigan, to conduct emission sampling at their facility. The purpose of this project was to conduct total particulate (front half filterable and back half condensable) and total gaseous organic (TGO) emission sampling from the exhaust of the Electrostatic Precipitator (ESP) servicing the curing ovens which are used in the manufacture of conveyor belts. The purpose of the testing was to document compliance with the PM and Total TGO emission limits established by Michigan Department of Great Lakes and Environment (EGLE) Permit to Install number 31-23 dated February 21, 2023. The emission limits are as follows:

Pollutant	Emission Factor
TGO's	0.000661 Lbs/Lb
PM	
PM-10	
PM-2.5	

Three (3) test runs were conducted on the exhaust for PM and TGO's. Each test run was sixty-four (64) minutes in duration. Each PM test run had minimum sample volumes of thirty (30) dry standard cubic feet. The total particulate (front half filterable and back half condensable) emissions were determined by adding the condensable particulate to the filterable particulate.

The following reference test methods were employed to conduct the emission sampling:

- Particulate – U.S. EPA Methods 17 & 202
- Total TGO's – U.S. EPA Method 25A
- Exhaust Gas Parameters (air flow rate, temperature, moisture & density) – U.S. EPA Reference Methods 1 through 4.

The sampling was conducted on November 14, 2023 by Scott Cargill, Richard D. Eerdmans and David D. Engelhardt of Network Environmental, Inc. Assisting with the sampling was Mr. Jason Moy and Mr. Paul Riha of Uniband USA. Mr Mark Horne and Mr. Mathew Weiss of Environmental Partners, Inc. were present to assist in the study. Mr. Dillon King of EGLE was present to observe the testing and source operation.

II. PRESENTATION OF RESULTS

II.1 TABLE 1
TOTAL FILTERABLE PARTICULATE EMISSION RESULTS SUMMARY
COATING LINE NO. 2 CURING OVEN ESP EXHAUST
UNIBAND USA
GRAND RAPIDS, MICHIGAN
NOVEMBER 14, 2023

Source	Sample	Date	Time	Air Flow Rate DSCFM (2)	Emission Rate Lbs/Hr (3)	Emission Rate Lbs/Lb (4)
ESP Exhaust	1	11/14/23	9:20-10:27	3,292	0.127	0.0000895
	2	11/14/23	11:09-12:16	3,293	0.093	0.0000656
	3	11/14/23	12:48-13:55	3,244	0.074	0.0000522
Average				**3,276**	**0.098**	**0.0000691**

(1) Total Filterable Particulate = Front Half Filterable Particulate
(2) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
(3) Lbs/Hr = Pounds Of Particulate Per Hour
(4) Lbs/Lb = Pounds Of Particulate Per Pound of Coating Applied

II.2 TABLE 2
TOTAL PM, PM-10 and PM-2.5 PARTICULATE EMISSION RESULTS SUMMARY
COATING LINE NO. 2 CURING OVEN ESP EXHAUST
UNIBAND USA
GRAND RAPIDS, MICHIGAN
NOVEMBER 14, 2023

Source	Sample	Date	Time	Air Flow Rate DSCFM (2)	Emission Rate Lbs/Hr (3)	Emission Rate Lbs/Lb (4)
ESP Exhaust	1	11/14/23	9:20-10:27	3,292	0.176	0.000124
	2	11/14/23	11:09-12:16	3,293	0.142	0.000100
	3	11/14/23	12:48-13:55	3,244	0.110	0.0000775
Average				**3,276**	**0.143**	**0.000101**

(1) Total Particulate = Front Half Filterable Particulate Plus Back Half Condensable Particulate
(2) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
(3) Lbs/Hr = Pounds Of Particulate Per Hour
(4) Lbs/Lb = Pounds Of Particulate Per Pound of Coating Applied

II.3 TABLE 3
TOTAL GASEOUS ORGANIC (TGO) EMISSION RESULTS SUMMARY
COATING LINE NO. 2 ESP EXHAUST
UNIBAND USA
NOVEMBER 14, 2023

Source	Sample	Time	Air Flow Rate SCFM (1)	Concentration PPM (2)	Emission Rate Lbs/Hr (3)	Emission Rate Lbs/Lb (4)
ESP Exhaust	1	9:20-10:27	3,325	9.6	0.22	0.000155
	2	11:09-12:16	3,326	10.7	0.24	0.000169
	3	12:48-13:55	3,281	11.7	0.26	0.000183
Average			**3,311**	**10.7**	**0.24**	**0.000169**

(1) SCFM = Standard Cubic Feet Per Minute (STP = 68°F & 29.92 in. Hg)
(2) PPM = Parts Per Million (v/v) On An Actual (Wet) Basis As Propane
(3) Lbs/Hr = Pounds Per Hour Calculated As Propane
(4) Lbs/Lb = Pounds Of TGO Per Pound of Coating Applied

III. DISCUSSION OF RESULTS

The results of the emission sampling are summarized in Tables 1 through 3 (Section II.1, II.2 and II.3). The results are presented as follows:

III.1 Curing Ovens ESP Exhaust (Tables 1,2 and 3)

Table 1 summarizes the total filterable particulate emission results for the Curing Oven ESP Exhaust as follows:

- Sample
- Date
- Time
- Air Flow Rate (DSCFM) – Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- Particulate Mass Emission Rate (Lbs/Hr) – Pounds of Particulate Per Hour
- Particulate Mass Emission Rate (Lbs/Lb) – Pounds of Particulate Per Pound of Coating Applied

Table 2 summarizes the PM, PM-10, and PM-2.5 emission results for the Curing Oven ESP Exhaust as follows:

- Sample
- Date
- Time
- Air Flow Rate (DSCFM) – Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- Particulate Mass Emission Rate (Lbs/Hr) – Pounds of Particulate Per Hour
- Particulate Mass Emission Rate (Lbs/Lb) – Pounds of Particulate Per Pound of Coating Applied

Table 3 summarizes the total TGO emission results for the Curing Oven ESP Exhaust as follows:

- Sample
- Date
- Time
- Air Flow Rate (SCFM) – Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- Total TGO Concentration (PPM) – Parts Per Million as Propane
- Total TGO Mass Emission Rate (Lbs/Hr) – Pounds of TGO's Per Hour
- Total TGO Mass Emission Rate (Lbs/Lb) – Pounds of TGO's Per Pound of Coating Applied

IV. SOURCE DESCRIPTION

IV.1 Process Curing Ovens Exhaust – Uniband USA manufactures polyvinyl chloride (PVC) conveyor belting in which woven polyester fabric is coated with a PVC compound (plastisol). The facility consists of a web-coating line and a PVC compound mixing line. In the coating line, there are three knife-edge spreader stations used to apply varying thicknesses of plastisol to the fabric. After each spreader edge is a corresponding infrared (IR) curing oven. The coated fabric is heated in the IR oven from 120 degrees C to 190 degrees C, depending on the line speed and the type of material. All the sampling was conducted during normal operation of this process.

V. SAMPLING AND ANALYTICAL PROTOCOL

The sampling location was on the ESP Exhaust – The testing was performed on the 24 inch I.D. exhaust stack with 2 sample ports in a location approximately 6 duct diameters downstream from the nearest disturbances. Sixteen (16) sampling points were used for this source.

The sampling/traverse points for the exhaust were as follows:

Sample Point	Dimension (Inches)
1	0.77
2	2.52
3	4.66
4	7.75
5	16.25
6	19.34
7	21.48
8	23.23

V.1 Particulate – The particulate emission sampling was conducted in accordance with U.S. EPA Methods 17 and 202. Method 17 is an in-stack filtration method. Three (3) samples were collected from the exhaust. Each sample was sixty (60) minutes in duration and had minimum sample volumes of thirty

(30) dry standard cubic feet. The samples were collected isokinetically and analyzed for Particulate by gravimetric analysis.

In addition to the standard front half analysis, the back half condensable particulate matter was determined in accordance with U.S. EPA Method 202 (Dry Impinger Technique). No moisture was collected so the nitrogen purge was omitted. The back half samples were extracted and analyzed for condensable particulate in accordance with Method 202. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis. The particulate sampling train is shown in Figure 1.

V.2 Total TGO's – The TGO sampling was conducted in accordance with U.S. EPA Reference Method 25A. A J.U.M. Model 3-500 flame ionization detector (FID) analyzer was used to monitor the exhaust. A heated Teflon sample line was used to transport the gases to the analyzer. This analyzer produces instantaneous readouts of the Total Gaseous Organic concentrations (PPM).

The analyzer was calibrated by system injection (from the back of the stack probe to the analyzer) prior to the testing using propane calibration gases. A span gas of 95.0 PPM was used to establish the initial instrument calibration. Calibration gasses of 50.60 and 29.90 PPM were used to determine the calibration error of the analyzers. After each sample a system zero and system injection of 29.90 PPM propane were performed to establish system drift and system bias during the test period. All calibration gases used were EPA Protocol Calibration Gases. Each sample was sixty (60) minutes in duration.

The analyzers were calibrated to the output of the data acquisition system (DAS) used to collect the data from the sources. The analyzer averages were corrected for calibration error and drift using formula EQ.7E-5 from 40 CFR Part 60, Appendix A, Method 7E. Figure 2 is a diagram of the TGO sampling train.

V.3 Exhaust Gas Parameters – The exhaust gas parameters (air flow rate, temperature, moisture and density) were determined in conjunction with the other sampling by employing U.S. EPA Methods 1 through 4. Air flow rates, temperatures and moistures were determined using the Method 17/202 sampling train. Bag samples were collected from the Method 17/202 sampling trains and analyzed for oxygen and carbon dioxide by Orsat. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis.

This report was prepared by:

R. Scott Cargill
Project Manager

This report was reviewed by:

David D. Engelhardt
Vice President

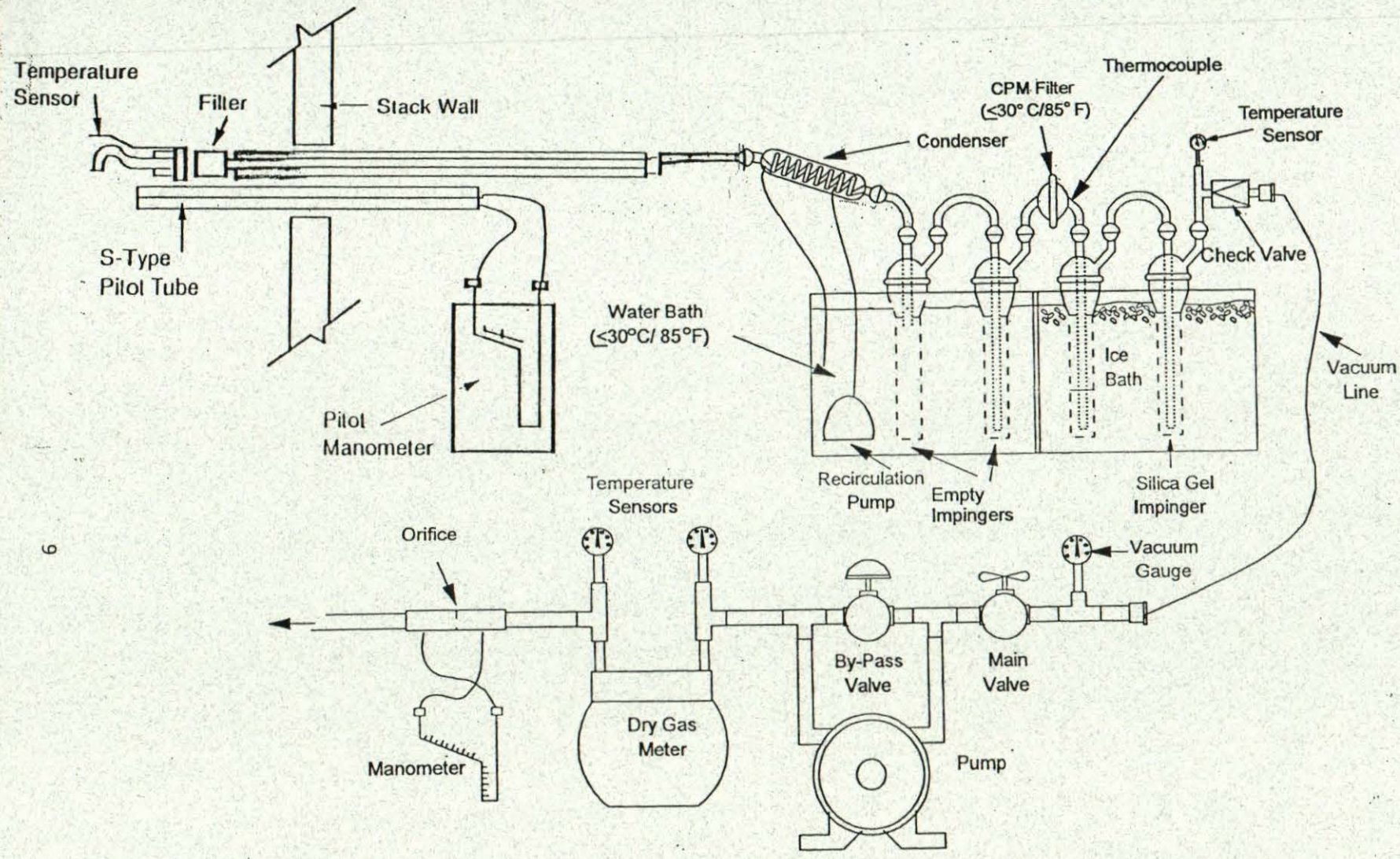

Figure 1

Particulate Sampling Train

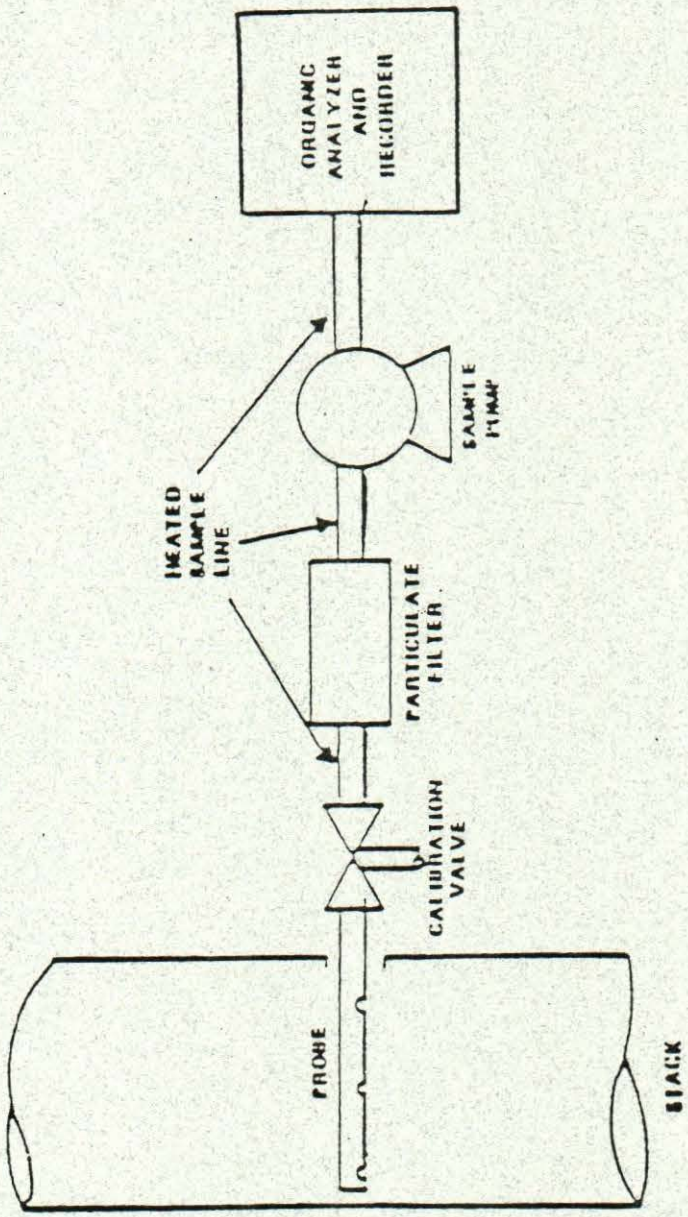

Figure 2

Total VOC Sampling Train