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# Xylene and Ethylbenzene Emissions Test Report

*Prepared for:*

**Dow Corning Corporation**

Dow Corning Corporation  
3901 S. Saginaw Rd.  
Midland, MI 48640

Project No. 13-4426.02  
December 13, 2013

BT Environmental Consulting, Inc.  
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Royal Oak, Michigan 48073  
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**EXECUTIVE SUMMARY**

BT Environmental Consulting, Inc. (BTEC) was retained by Dow Corning Corporation (Dow) to measure xylene and ethylbenzene emission rates from TSE Vent # EG 2901-16 in Building 2901 at the Dow facility in Midland, Michigan. The emissions test program included triplicate test runs. Field sampling for this emission test program was conducted on September 13, 2013. The purpose of this report is to document the results of the emissions compliance test program.

The purpose the emissions test program was to demonstrate compliance with the emission limitations for continuous process vents codified at Title 40, Part 63, Subpart FFFF of the Code of Federal Regulations.

**Table E-1**

<b>Source</b>	<b>Total Xylene Emission Rate (lb/hr)</b>	<b>Ethylbenzene Emission Rate (lb/hr)</b>
TSE Vent # EG 2901-16	1.0	0.2

**TABLE OF CONTENTS**

**1. INTRODUCTION..... 1**

1.A IDENTIFICATION, LOCATION, AND DATES OF TEST ..... 1

1.B PURPOSE OF TESTING..... 1

1.C SOURCE DESCRIPTION ..... 1

1.D TEST PROGRAM CONTACT ..... 2

1.E TESTING PERSONNEL ..... 2

**2. SUMMARY OF RESULTS..... 2**

2.A OPERATING DATA ..... 2

2.B APPLICABLE PERMIT ..... 2

2.C RESULTS..... 2

2.D EMISSION REGULATION COMPARISON ..... 2

**3. SOURCE DESCRIPTION ..... 2**

3.A PROCESS DESCRIPTION ..... 3

3.B RAW AND FINISHED MATERIALS ..... 3

3.C PROCESS CAPACITY ..... 3

3.D PROCESS INSTRUMENTATION..... 3

**4. SAMPLING AND ANALYTICAL PROCEDURES ..... 3**

4.A SAMPLING TRAIN AND FIELD PROCEDURES ..... 3

4.B RECOVERY AND ANALYTICAL PROCEDURES..... 4

4.C SAMPLING PORTS..... 4

**5. TEST RESULTS AND DISCUSSION ..... 4**

5.A RESULTS TABULATION ..... 4

5.B DISCUSSION OF RESULTS ..... 4

5.C SAMPLING PROCEDURE VARIATIONS ..... 5

5.D PROCESS OR CONTROL DEVICE UPSETS ..... 5

5.E CONTROL DEVICE MAINTENANCE..... 5

5.F AUDIT SAMPLE ANALYSES ..... 5

5.G CALIBRATION SHEETS ..... 5

5.H SAMPLE CALCULATIONS..... 5

5.I FIELD DATA SHEETS ..... 5

5.J LABORATORY DATA ..... 5

## TABLE OF CONTENTS (continued)

### SUMMARY TABLES

- 1 Test Personnel Summary
- 2 TSE Vent # EG 2901-16 Xylene and Ethylbenzene Emission Rates

### FIGURES

- 1 USEPA Method 320 Sampling Diagram
- 2 USEPA Method 2 Sampling Diagram

### APPENDIX

- Appendix A AQD Test Plan/Report Format Guideline
- Appendix B Equipment Calibration Documents
- Appendix C Example Calculations
- Appendix D Field and Computer Generated Raw Data and Field Notes
- Appendix E Prism FTIR Report

## **1. Introduction**

BT Environmental Consulting, Inc. (BTEC) was retained by Dow Corning Corporation (Dow) to measure xylene and ethylbenzene emission rates from TSE Vent # EG 2901-16 in Building 2901 at the Dow facility in Midland, Michigan. The emissions test program included triplicate test runs. Field sampling for this emission test program was conducted on September 13, 2013. The purpose of this report is to document the results of the emissions compliance test program.

The Air Quality Division (AQD) of Michigan's Department of Natural Resources and Environment has published a guidance document entitled "Format for Submittal of Source Emission Test Plans and Reports" (February 2008, see Appendix A). The following is a summary of the emissions test program and results in the format outlined by the AQD document.

### **1.a Identification, Location, and Dates of Test**

Field sampling for this emission test program was conducted on September 13, 2013 at the Dow facility in Midland, Michigan. The purpose of this report is to document the results of the emissions determined during compliance test program.

The emissions test program included the evaluation of xylene and ethylbenzene emission rates from the TSE knockout of the Building 2901.

### **1.b Purpose of Testing**

The purpose the emissions test program was to demonstrate compliance with the emission limitations codified at Title 40, Part 63, Subpart FFFF of the Code of Federal Regulations (40 CFR 63, Subpart FFFF).

### **1.c Source Description**

#### **2901 Building:**

The equipment being tested and the product being made during the test are listed as follows:

24455 Extruder and 24684 Vacuum Pump while making product MQ-1600

Note: the above processes will be running at maximum rates during MON testing will done prior to air pollution control to demonstrate this process is a MON Group 2 process and does not require MON group 1 MACT control.



## **1.d Test Program Contact**

The contact for the source and test report is:

Mr. Michael Gruber, II  
Environmental Manager  
Dow Corning Corporation  
P.O. Box 995, Mail#065  
Midland, Michigan 48686  
(989) 496-5539

## **1.e Testing Personnel**

Names and affiliations for personnel who were present during the test program are summarized by Table 1.

## **2. Summary of Results**

Sections 2.a through 2.d summarize the results of the emissions compliance test program.

### **2.a Operating Data**

The equipment being tested and the product being made during the test are listed as follows:

24455 Extruder and 24684 Vacuum Pump while making product MQ-1600  
The equipment listed above is in the Site's TOP as EG2901-16.

Note: the above processes will be running at maximum rates during MON testing will done prior to air pollution control to demonstrate this process is a MON Group 2 process and does not require MON group 1 MACT control.

### **2.b Applicable Permit**

The applicable permit for this emissions test program is MI-ROP-A4043-2008.

### **2.c Results**

The overall results of the emissions compliance test program are summarized by Table 2.

### **2.d Emission Regulation Comparison**

40 CFR 63, Subpart FFFF, requires that MON continuous process vents that do not have MACT level control equipment have a TRE greater than 1.9. This test was done to confirm that this source has a TRE greater than 1.9 and is therefore group 2 not requiring MACT level control.

### 3. Source Description

Sections 3.a through 3.e provide a detailed description of the process.

#### 3.a Process Description

##### 2901 Building:

The equipment being tested and the product being made during the test are listed as follows:

24455 Extruder and 24684 Vacuum Pump while making product MQ-1600

Note: the above processes will be running at maximum rates during MON testing will done prior to air pollution control to demonstrate this process is a MON Group 2 process and does not require MON group 1 MACT control.

#### 3.b Raw and Finished Materials

The raw and finished materials for the emissions test program were consistent with the process operating at its maximum production rate.

#### 3.c Process Capacity

The process was operating at its maximum production rate during the emissions test program.

#### 3.d Process Instrumentation

Not applicable because test was done prior to air pollution control equipment.

### 4. Sampling and Analytical Procedures

Sections 4.a through 4.d provide a summary of the sampling and analytical procedures used to verify inlet and outlet emission rates.

#### 4.a Sampling Train and Field Procedures

Exhaust gas velocity pressure was measured and recorded at 10-second intervals throughout the emissions test program using small stationary, S-type pitot tubes located in the center of the pipe at the scrubber outlet sampling location. Exhaust gas velocity pressure was measured using a 0 to 0.25" H<sub>2</sub>O pressure transmitter and datalogger assembly.

The molecular weight was calculated using 1.5% xylene/ethylbenzene with a molecular weight of 106.16 lb/lb-mol, and assumed the balance (98.5%) to nitrogen with a molecular weight of 28 lb/lb-mol.

Oxygen concentration was measured by filling Tedlar bags from the exhaust of the FTIR. The bag samples were then injected into an M&C oxygen analyzer. Measured oxygen values were between 0% and 1%. After discussion with Dow personnel it was decided that the oxygen concentration should be 0%. The 1% oxygen concentration was most likely due to ambient air leaking into either the bag or the analyzer during sample transfer. An oxygen concentration of 0% has been assumed for all calculations.

FTIR data was collected using an MKS MultiGas 2030 FTIR spectrometer, serial # 016630515. A heated, 3 ft., 3/8 inch diameter, stainless steel probe, maintained at 191°C, will be used to direct effluent gas from the exhaust vent to the FTIR. A heated filter box (191°C) contains the connection from the probe to the filter assembly to a 100 ft., heated, 3/8 inch, Teflon transfer line. A 0.1 $\mu$  glass filter was used for particulate matter removal.

The heated transfer line(s), held at 191°C, connect the probe/filter assembly to the FTIR. The FTIR was equipped with a temperature-controlled, 5.11 meter multipass gas cell maintained at 191°C. Gas flows and sampling system pressures were monitored using a rotometer and pressure transducer. All data was collected at 0.5cm<sup>-1</sup> resolution. Each spectrum was derived from the coaddition of 64 scans, with a new data point generated approximately every one minute. A more detailed write up of the FTIR sampling train can be found in Prism's FTIR report included as Appendix E.

#### **4.b Recovery and Analytical Procedures**

Recovery and analytical procedures were described in Section 4.a.

#### **4.c Sampling Ports**

Single point sampling was used for flowrate measurements and for sample extraction at the sampling location.

### **5. Test Results and Discussion**

Sections 5.a through 5.k provide a summary of the test results.

#### **5.a Results Tabulation**

The results of the emissions test program are summarized by Table 2.

#### **5.b Discussion of Results**

40 CFR 63, Subpart FFFF, requires that MON continuous process vents that do not have MACT level control equipment have a TRE greater than 1.9. This test was done to confirm that this source has a TRE greater than 1.9 and is therefore group 2 not requiring MACT level control.



**5.c Sampling Procedure Variations**

Exhaust gas velocity pressure data was measured using a pitot tube, pressure transmitter, and datalogger assembly and monitoring velocity pressure values at 10-second intervals throughout the test program.

**5.d Process or Control Device Upsets**

No process or control device upset conditions occurred during the emissions test program.

**5.e Control Device Maintenance**

Control device maintenance is conducted in accordance with the standard plant preventive maintenance schedule.

**5.f Audit Sample Analyses**

No audit samples were collected as part of the test program.

**5.g Calibration Sheets**

All relevant equipment calibration documents are provided in Appendix B.

**5.h Sample Calculations**

Sample calculations are provided in Appendix C.

**5.i Field Data Sheets**

Field documents relevant to the emissions test program are presented in Appendix D.

**5.j Laboratory Data**

There are no laboratory results for this test program. Prism FTIR results are available in Appendix E.

**Table 1**  
**Test Personnel**

<b>Name and Title</b>	<b>Affiliation</b>	<b>Telephone</b>
Mr. Michael Gruber, II Environmental Manager	Dow Corning Corporation P.O. Box 995, Mail#065 Midland, Michigan 48686	(989) 496-5539
Mr. Jeffrey Peitzsch Project Manager	BTEC 4949 Fernlee Royal Oak, MI 48073	(248) 548-8070
Ms. Lindsey A. Wells Chemist / FTIR Specialist	Prism Analytical Technologies 2625 Denison Drive Mount Pleasant, MI 48858	(989) 772-5088

**Table 2**  
**Building 2901 - TSE Vent # EG 2901-16 Xylene and Ethylbenzen Emission Rates**  
**Dow Corning**  
**Midland, Michigan**  
**BTEC Project No. 13-4426.02**  
**Sampling Dates: September 13, 2013**

Parameter	Run 1	Run 2	Run 3	Average
Test Run Date	9/13/2013	9/13/2013	9/13/2013	
Test Run Time	9:51-10:51	10:51-11:51	11:51-12:51	
Outlet Flowrate (scfm)	4.8	4.8	4.8	4.8
o-Xylene (ppmv, wet)	1,497	1,740	1,660	1,632
m-Xylene (ppmv, wet)	6,276	6,970	6,783	6,676
p-Xylene (ppmv, wet)	3,721	4,062	3,907	3,897
Total Xylene (ppmv, wet)	11,494	12,771	12,350	12,205
<b>Total Xylene Emission Rate (lb/hr)</b>	<b>0.9</b>	<b>1.0</b>	<b>1.0</b>	<b>1.0</b>
Ethylbenzene (ppmv, wet)	2,890	3,028	2,923	2,947
<b>Ethylbenzene Emission Rate (lb/hr)</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>

scfm = standard cubic feet per minute

dscfm = dry standard cubic feet per minute

ppmv = parts per million on a volume-to-volume basis

lb/hr = pounds per hour

MW = molecular weight (xylene, ethylbenzene = 106.16)

24.14 = molar volume of air at standard conditions (70°F, 29.92" Hg)

35.31 = ft<sup>3</sup> per m<sup>3</sup>

453600 = mg per lb

**Equations**

lb/hr = ppmv \* MW/24.14 \* 1/35.31 \* 1/453,600 \* scfm \* 60

# Figures

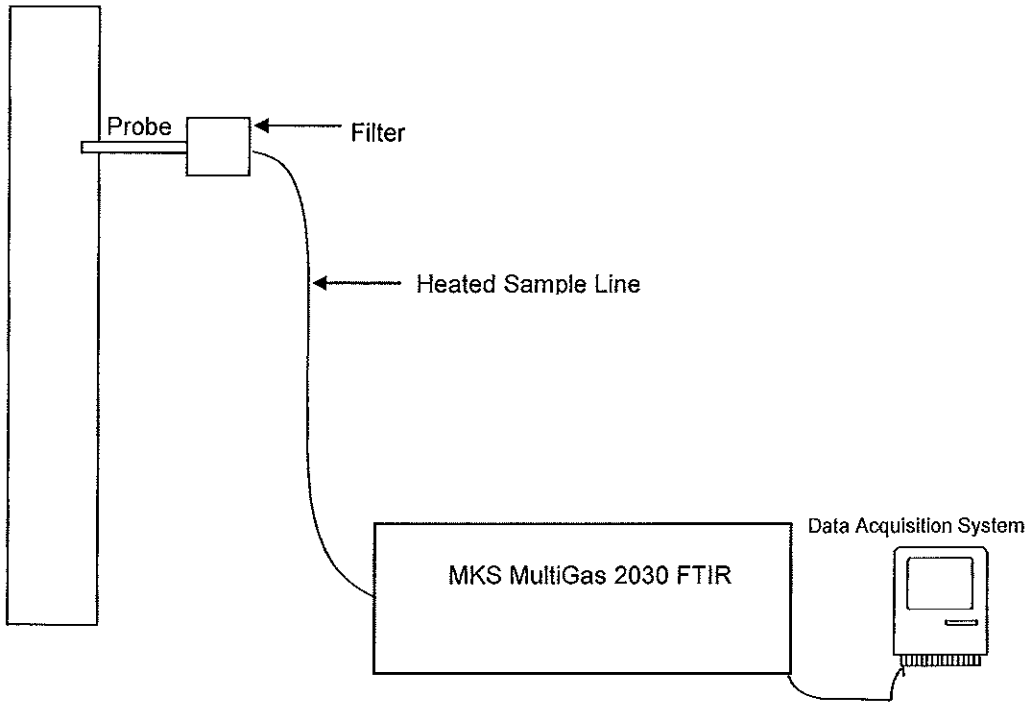
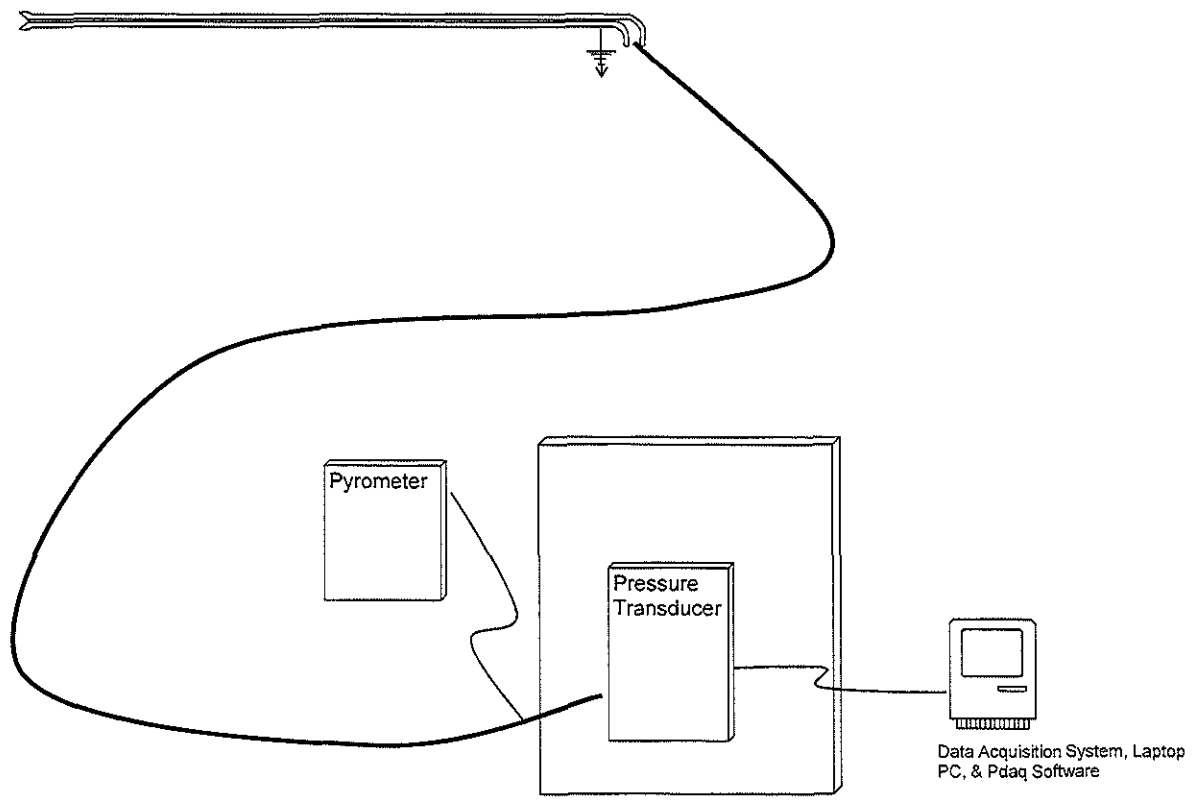


Figure No. 1

Site:  
USEPA Method 320  
Dow Corning  
Midland, Michigan

Sampling Date:  
September 13, 2013

BT Environmental Consulting, Inc.  
4949 Ferlee Avenue  
Royal Oak, Michigan 48073



**Figure No. 2**

Site:  
USEPA Method 2  
Dow Corning  
Midland, Michigan

Sampling Date:  
September 13, 2013

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