BTEC Inc.

Building 324 Methanol Emissions Test Report

Prepared for:

Dow Corning Corporation

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

Project No. 14-4502.00
May 23, 2014

BT Environmental Consulting, Inc.
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Royal Oak, Michigan 48073
(248) 548-8070

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1. Introduction

BT Environmental Consulting, Inc. (BTEC) was retained by Dow Corning Corporation (Dow) to measure methanol concentrations and emission rates from the inlet and outlet of the scrubber DV25169 in Building 324 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 April 1, 2014. The purpose of this report is to document the results of the test program.

AQD has published a guidance document entitled "Format for Submittal of Source Emission Test Plans and Reports" (December 2013). The following is a summary of the emissions test program and results in the format suggested by the aforementioned document.

1.a Identification, Location, and Dates of Test

Field sampling for this emission test program was conducted on April 1, 2014 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 methanol concentrations and emission rates from the scrubber of the Building 324.

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

324 Building:

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

5660 Kettle – Performing a methanol reflux cleanout, EG324-12
5609 Kettle – Performing a methanol reflux cleanout, EG324-13
5600 Kettle – Making product 4-7042, EG324-14

Note: the above processes will be running at maximum rates during MON testing of 25169 scrubber.

EXECUTIVE SUMMARY

BT Environmental Consulting, Inc. (BTEC) was retained by Dow Corning Corporation (Dow) to measure methanol concentrations and emission rates from the inlet and outlet of the scrubber in Building 324 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 April 1, 2014. 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

Source	Methanol Concentration (ppmv, wet)	Methanol Emission Rate (lb/hr)	Methanol Removal Efficiency (%)
324 Scrubber Inlet	31,216	11.0	99.95
324 Scrubber Exhaust	14.8	0.005	

The stack testing will start right when 5600 kettle starts its vacuum strip phase for 4-7042 production. At that time, 5609 kettle will be loaded and the inert phase will start. As soon as 5609 is finished loading, 5660 will be loaded.

If testing under the above operating conditions demonstrates compliance with the MON then operational controls will be installed so that both 5609 and 5660 cannot inert at the same time so as soon as 5609 is finished inerting, 5660 will then start its inert phase. In addition, if testing under the above described operating conditions demonstrates compliance with the MON then operational controls will be installed that control the vent rate of kettles 5660, 5609, and 5600 by dropping the kettle pressure at a constant rate. The kettles will be operated manually during the stack test in a manner that mimic how they would operate if the operational controls were already installed and operating. Operating the kettles in this manner will prevent the scrubber from being overloaded with high vapor flow.

1.d Test Program Contacts

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

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

Table 1
Test Personnel

Name and Title	Affiliation	Telephone
Mr. Michael Gruber, II Environmental Manager	Dow Corning Corporation P.O. Box 995, Mail#065 Midland, Michigan 48686	(989) 496-5539
Mr. Ken Lievense Project Manager	BTEC 4949 Fernlee Royal Oak, MI 48073	(248) 548-8070
Mr. Kenny Felder Environmental Technician	BTEC 4949 Fernlee Royal Oak, MI 48073	(248) 548-8070
Mr. Phillip J. Kauppi Chemist / FTIR Specialist	Prism Analytical Technologies, Inc. 2625 Denison Drive Mount Pleasant, MI 48858	(989) 772-5088

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(s) being made during the test are listed as follows:

5660 Kettle – Performing a methanol reflux cleanout, EG324-12
5609 Kettle – Performing a methanol reflux cleanout, EG324-13
5600 Kettle – Making product 4-7042, EG324-14

2.b Applicable Permit

Emissions testing was done to comply with Miscellaneous Organic NESHAP requirements.

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, Tables 1 and 2 require an OHAP removal efficiency of 98% or a outlet concentration of equal to or less than 20 PPM OHAP. The scrubber 25169 achieved the required 98% OHAP removal efficiency.

3. Source Description

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

3.a Process Description

324 Building:

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

5660 Kettle – Performing a methanol reflux cleanout, EG324-12
5609 Kettle – Performing a methanol reflux cleanout, EG324-13
5600 Kettle – Making product 4-7042, EG324-14

Note: the above processes were run at maximum rates during MON testing of 25169 scrubber.

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

The water flow rate to 25169 scrubber was monitored during the stack test and averaged 13 gpm throughout the stack test. The water flow rate was monitored using a Rosemount model 3051S flowmeter.

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 1" H2O pressure transmitter and datalogger assembly.

The molecular weight was calculated assuming the exhaust gas stream is almost all nitrogen with a molecular weight of 28 lb/lb-mol.

FTIR data was collected using an MKS MultiGas 2030 FTIR spectrometer. 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 0.1µ 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-1 resolution. Each spectrum was derived from the coaddition of 32 scans, with a new data point generated

approximately every thirty seconds. 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 at the exhaust, and for sample extraction at the inlet and exhaust sampling locations.

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, Tables 1 and 2 require an OHAP removal efficiency of 98% or a outlet concentration of equal to or less than 20 PPM OHAP. The scrubber 25169 achieved the required 98% OHAP removal efficiency.

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.

During Test Run 3, sampling was paused for 18 minutes due to condensate forming at the Inlet sampling collection port. Testing continued once the port was cleared.

Flow rate measurements could not be measured at the inlet due to lack of sampling port.

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 2
Building 324 Methanol Emission Rates
Dow Corning
Midland, Michigan
BTEC Project No. 14-4502.00
Sampling Dates: April 1, 2014

Parameter	Run 1	Run 2	Run 3	Average
Test Run Date Test Run Time	4/1/2014 13:35-14:35	4/1/2014 14:36-15:36	4/1/2014 15:37-15:50 16:18-17:05	
Outlet Flowrate (scfm)	65.7	73.3	75.5	**71.5**
Inlet Methanol (ppmv, wet)	36,664	29,157	27,828	**31,216**
Inlet Methanol Emission Rate (lb/hr)	**12.0**	**10.6**	**10.4**	**11.0**
Outlet Methanol (ppmv, wet)	13.6	21.9	< 9.0	**14.8**
Outlet Methanol Emission Rate (lb/hr)	**0.004**	**0.008**	< **0.003**	**0.005**
Methanol Removal Efficiency (%)	**99.96**	**99.92**	> **99.97**	**99.95**

Note: Outlet Run 3 - For average calculation, values below the detection limit (5 ppmv) have been replaced with the detection limit concentration

scfm = standard cubic feet per minute
ppmv = parts per million on a volume-to-volume basis
lb/hr = pounds per hour
MW = molecular weight (methanol = 32.04)
24.14 = molar volume of air at standard conditions (70°F, 29.92" Hg)
35.31 = ft^3 per m^3
453600 = mg per lb

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

Figures

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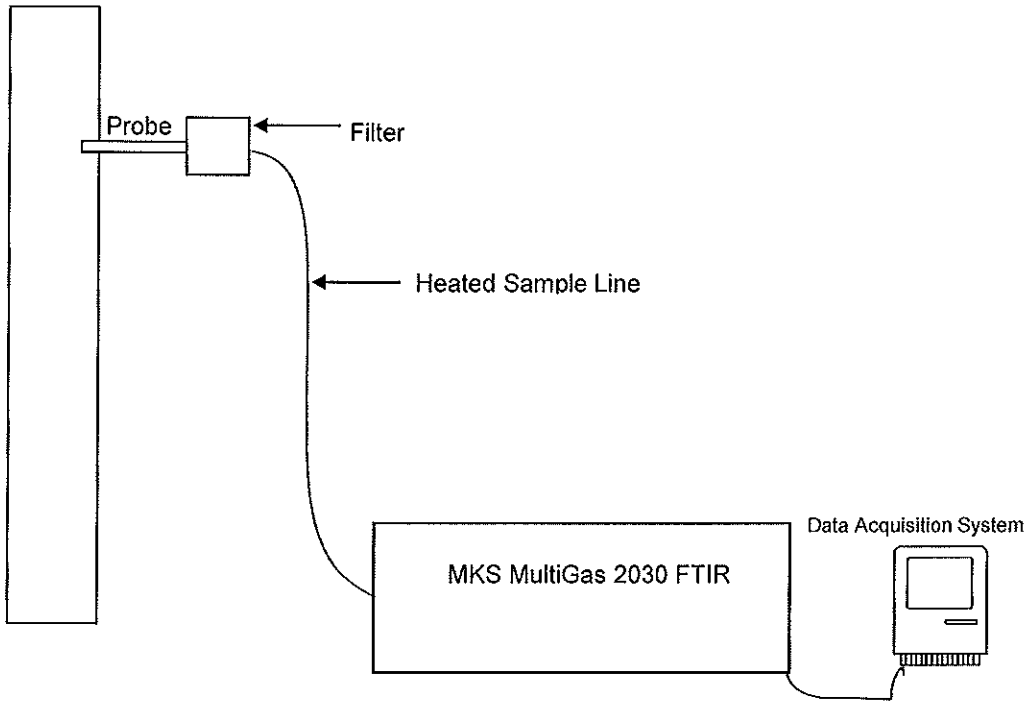

Figure No. 1

Site: **USEPA Method 320** **Dow Corning** **Midland, Michigan**	**Sampling Date:** **April 1, 2014**	**BT Environmental Consulting, Inc.** **4949 Fernlee Avenue** **Royal Oak, Michigan 48073**

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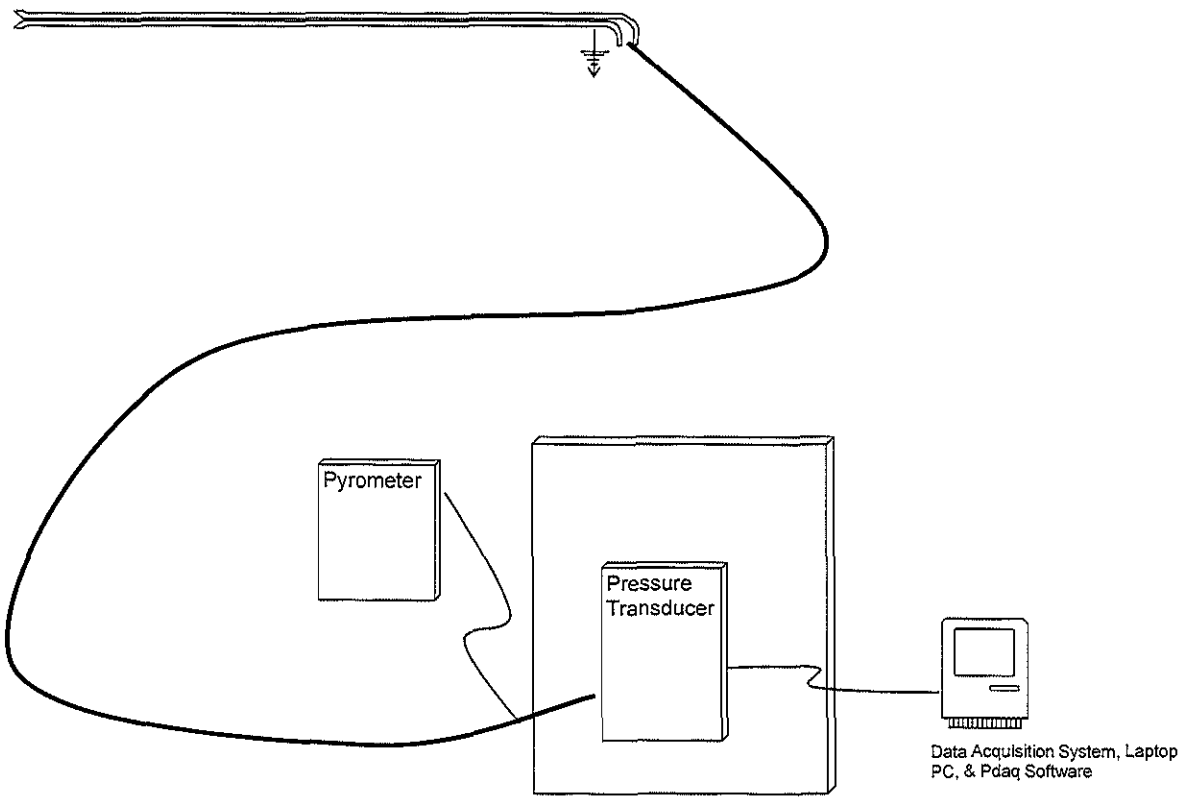

Figure No. 2

Site: USEPA Method 2 Dow Corning Midland, Michigan	Sampling Date: April 1, 2014	BT Environmental Consulting, Inc. 4949 Fernlee Avenue Royal Oak, Michigan 48073