40 CFR 63 Subpart FFFF
National Emission Standards for Hazardous Air Pollutants Emissions Miscellaneous Organic Chemicals (MON)
Compliance Test Report

Reinforced Resin Polymer (602 Building) Process Condenser DV23967 and Carbon Totes

Sample Date August 29, 2019

DOW SILICONES CORPORATION
Midland, Michigan

**** Please note the process unit is the final copy holder and owner of this document. A temporary electronic copy will be retained by internal stack testing group for a short period of time.***

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1.0 INTRODUCTION

1.1 Summary of Test Program

Dow Silicones Corporation (DSC) operates a chemical manufacturing facility in Midland, Michigan. The facility uses a glycol condenser followed by a carbon tote to control emissions in its Reinforced Resin Polymer (RRP) Process. The purpose of this compliance test was to demonstrate compliance with the option to reduce emissions of total organic HAP by ≥98% for Group 1 continuous process vents subject to MON, 40 CFR 63 Subpart FFFF.

Please note the test was originally completed on June 25th, 2019. The data could not be used to demonstrate compliance due to analytical QA issues. Results for both sample events had similar results.

The following table summarizes the pertinent data for this compliance test:

Responsible Groups	• Dow Silicones Corporation • Michigan Department of Environment, Great Lakes, and Energy (EGLE) • Environmental Protection Agency (EPA)
Applicable Regulations	• Michigan Rule 290 • 40 CFR Part 63 Subpart FFFF
Industry / Plant	• Silicone Manufacturing Reinforced Resin Polymer (RRP) (602 Building)
Plant Location	• Dow Silicones Corporation Midland, Michigan 48686
Air Pollution Control Equipment	• Condenser DV23967 and 2 carbon totes
Emission Points	• NA - Operates under a Rule 290 exemption (EU602-01)
Pollutants/Diluent Measured	• ≥98% Reduction efficiency
Test Date Scheduled	• August 29th, 2019

1.2 Key Personnel

The key personnel who coordinated the test program are:

- Sara Gibson provided support as a Process Focal Point. The Process Focal Point is responsible for coordinating the plant operation during the test and ensuring the unit is operating at the agreed upon conditions in the test plan. They also serve as the key contact for collecting any process data required and providing all technical support related to process operation.

- Leah Olsen-Perry provided support as the Environmental Focal Point for this unit. The Environmental Focal Point is responsible for ensuring that all regulatory requirements and citations are reviewed and considered for the testing. All agency communication will be completed through this role.

- Chuck Glenn provided support as the Test Plan Coordinator. The Test Plan Coordinator is responsible for the overall leadership of the sampling program, developing the overall testing plan and determining the correct sample methods.

- Spencer Hurley provided support as the back-up for the Test Plan Coordinator and serves in a technical review role of the test data.

- Michael Abel provided support as a technical review of the test data.

- James Edmister provided support as the Sample Team Leader. The Sample Team Leader is responsible for ensuring the data generated meets the quality assurance objectives of the plan.

2.0 PLANT AND SAMPLING LOCATION DESCRIPTION

2.1 Facility Description

The Reinforced Resin Polymer (RRP) Process is a continuous process that operates under EU602-01. Condenser DV23967 removes organic HAPs and is a control device for the RRP Vacuum Pump Separator Tank (DV23964). Other equipment such as the DV6600 / DV6603 surge control vessels (not subject to control) also vent to the DV23967 condenser.

2.2 Control Equipment Description

DV23967 is a glycol condenser that operates with an operational parameter of 90°F (32°C) (maximum) on the exit gas temperature. The condenser is followed by a carbon system consisting of two carbon totes in series. Both totes are on scales with the weights continuously monitored. The second tote (last before atmosphere) has a secured process alarm at 140 lbs. to ensure it is changed out before saturation.

2.3 Flue Gas Sampling Locations

Sampling was completed on both the inlet of the condenser DV23967 and the outlet of the carbon tote. All points are installed meeting the EPA Method 1 location requirements.

3.0 SUMMARY AND DISCUSSION OF TEST RESULTS

3.1 Objectives and Test Matrix

The purpose of this test was to demonstrate compliance with the MON, 40 CFR 63 Subpart FFFF. The specific objectives of the test were:

- Measure TOC inlet feed rate and control system outlet emissions.

3.2 Facility Operations

Sampling was conducted when RRP was running product 6-3445 at a 90% feed rate. This feed rate represents the maximum representative operating conditions for the process as required by 63.997(e)(1)(i). Feed rates of 6-3444 and SFD-117 (raw materials) from Mix tanks TK6603 and TK6600 will be set at 90% output on the pump, P1-6603, speed controller SC-363.

3.3 Comments/Exceptions

- Jeremey Howe of the Michigan Department of Environment, Great Lakes, and Energy (EGLE) was present during the Performance Test sampling.
- Please note the inlet flow data for Run #2 appeared to be three times higher than Run #1. The technician compared the flow increase with outlet readings. The outlet was comparable to Run #1. The pitot tube was pulled from the inlet and liquid was confirmed to have built up in pitot. Only flow readings collected after clearing the plug was used for flow rate during Run #2.
- Condenser DV23967 was previously tested on June 25, 2019. QA issues with outlet results due to improper calibration span gas use. Data from the previous test can be found in Section 9 of this report.

Emission Results

SAMPLE TYPE	TEST METHOD	SAMPLING TIME (MINUTES)	Actual Emission Rate	ALLOWABLE EMISSION
TOC's	EPA Method 25A	60	>99% Reduction Efficiency	≥98% Reduction Efficiency

Field Sample Data

PARAMETER	RUN 1	RUN 2	RUN 3	AVERAGE
Run Date	08/29/19	08/29/19	08/29/19	n/a
Run Times	1135/1235	1320/1420	1500/1600	n/a
Outlet THC as Propane (ppmvw)	95.6	99.1	103.2	99.3
Outlet THC Corr Prop (ppmvw)	95.5	99.6	103.7	99.6
Outlet Flow (scfh)	258	329	356	314
Outlet TOC Emissions (lb/hr)	**0.003**	**0.004**	**0.004**	**0.004**
Cond In THC as Prop (ppmvw)	1399	1482	1543	1475
Cond In THC for Dilution (ppmvw)	32188	34082	35482	33917
Cond In THC Corr (ppmvw)	32622	34439	35965	34342
Cond In Flow (scfh)	182	207	221	203
Cond In TOC Feed (lb/hr)	**0.680**	**0.817**	**0.911**	**0.803**
SRE over System (%)	**99.6**	**99.5**	**99.5**	**99.5**

Process Data Summary

Process Tag	Description	Operating Rate Over Sample Period
WT-46565	Carbon tote weight	1.94 lbs
TC-27084	Condenser DV23967 exit gas temperature	8.0 °C
FQ-23726*	SFD-117 Feed meter totalizer	Confidential Process Data
FQ-1735*	6-3444 Feed meter totalizer	Confidential Process Data
SC-363	P1-6603 Speed controller	90 %

* This information is considered confidential pursuant to Section 324.5516 of Act 451. Disclosure of this information would jeopardize the competitive position of the Dow Silicones Corporation. Therefore, this information will be submitted under separate cover letter.

Operational Process Rate

Parameter	Design Maximum Operating Rate	Proposed Operating Rate	Normal Operating Rate	Actual Operating Rate
P1-6603 Speed controller**	100%	90%	90%	90%

** The pump output of 90% during the duration of the test is the "maximum operating rate" condition the unit can control. The feed rate does not directly determine the rate going through the condenser and carbon totes.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

4.1 Test Methods

The TOC emissions were determined using the following methods:

- Methods 1-4 of 40 CFR Part 60, Appendix A, as appropriate for selection of sampling sites, gas volumetric flow rate, gas molecular weight, and moisture content of stack gas;
- Method 25A for THC as Propane

4.2 Procedures

The above methods were performed using mobile continuous emission monitors provided by AECOMs internal testing team. Gas was withdrawn from the stack and transported to monitors located at ground level. A stainless-steel probe was inserted into the stack and used to collect sample gas. A Teflon sample line heated to 250°F was used to transport sample gas from the probe to the analyzers. The analyzers were kept at a constant temperature inside the mobile laboratory. Sample gas was collected continuously from the stack for a period of 60 minutes per run.

EPA Method 1 (Sample Point Determination)
The number and location of traverse points in the stack is determined according to the procedures outlined in EPA Method 1. Since the duct was two inch in diameter, flow readings were collected from a single point.

EPA Method 2 (Flue Gas Velocity and Volumetric Flow Rate)
The flue gas velocity and volumetric flow rate was determined according to the procedures outline in 40 CFR 60, Appendix A, EPA Method 2. Velocity measurements are made using S-type pitot tubes conforming to the geometric specifications outlined in EPA Method 2. Differential pressures were measured with a manometer. Flue gas temperature, velocity, and volumetric flow rate data are recorded.

EPA Method 3A (Flue Gas Composition and Molecular Weight)
EPA Method 3A (Instrumental Method) is utilized to determine the diluent during each run on the outlet.

An analyzer measures O_2 content on the basis of the strong paramagnetic properties of O_2 relative to other compounds present in combustion gases. In the presence of a magnetic field, O_2 molecules become temporary magnets. The analyzer determines the sample gas O_2 concentration by detecting the displacement torque of the sample test body in the presence of a magnetic field.

An analyzer measures CO_2 based on its absorption of infrared radiation. The infrared unit uses a single beam, single wavelength technique, with wavelength selection being achieved by a carefully specified narrow band optical filter making it highly selective for CO_2 measurement in the presence of other infrared-absorbing gases.

Please note the stream make-up was N2. Therefore, all O2 and CO2 results were 0.0. The molecular weight of nitrogen was used for emission calculations.

EPA Method 4 (Moisture)
A calibrated Method 5 console pulled stack gas samples through a Method 5 probe to determine percent moisture of the stack gas. Stack gas was bubbled through two impingers containing water, one empty impinger, and one impinger containing silica gel. All of the impingers were weighed prior to sampling. The impinger train was kept iced in order to knock out all moisture in the stack gas. After the final leak check following each run, the exterior of the impingers are dried off and the impingers are weighed to determine percent moisture.

EPA Method 25A (Total VOC Sampling and Analysis)
EPA Method 25A was utilized to determine total THC as propane concentrations during each run on the outlet. EPA M25A data calculations are used to determine TOC by multiplying the number of carbons (3) by the actual readings. Propane is selected as the best standard since it is has a good response when compared to xylenes and ethylbenzene (the predominate HAPs).

A gas sample was extracted from the source through a heated line to a flame ionization analyzer (FIA). Results are reported as volume concentration equivalent to propane.

FIGURE 4.1: SAMPLING TRAIN USED FOR CO_2 & O_2 (M3A)

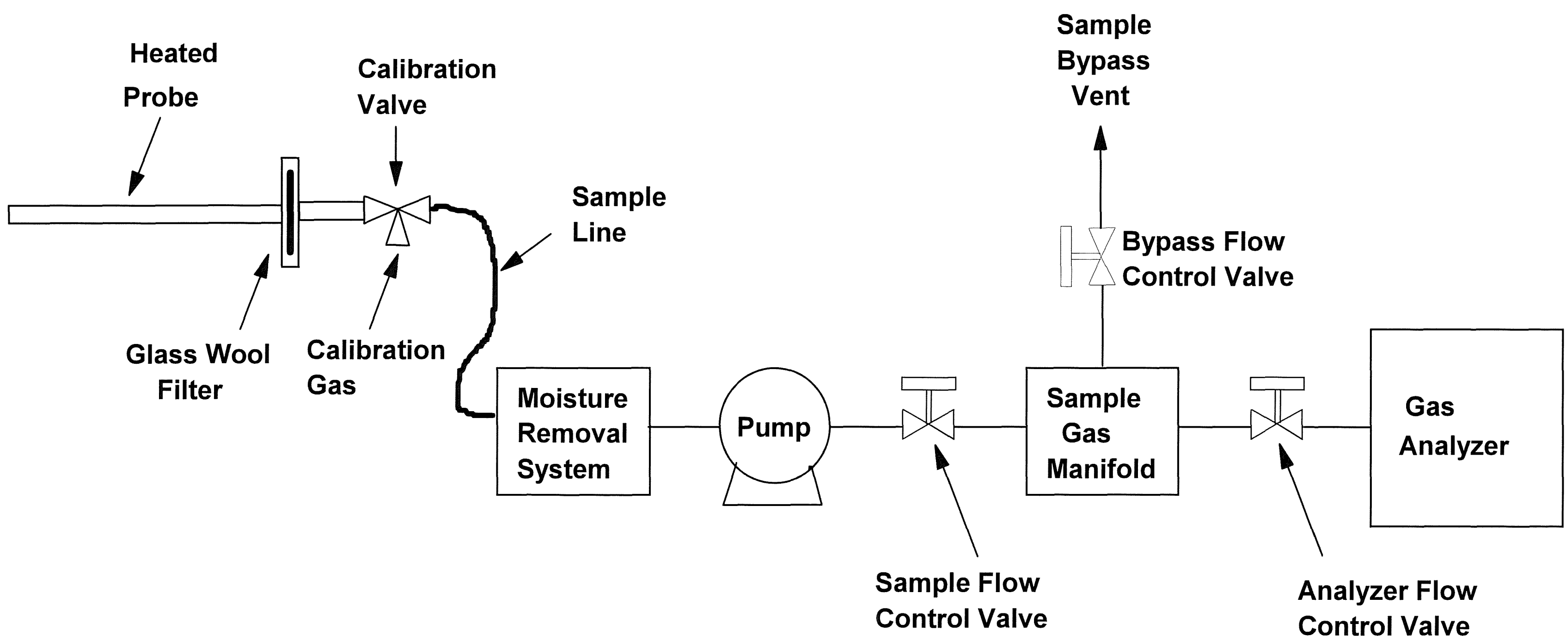
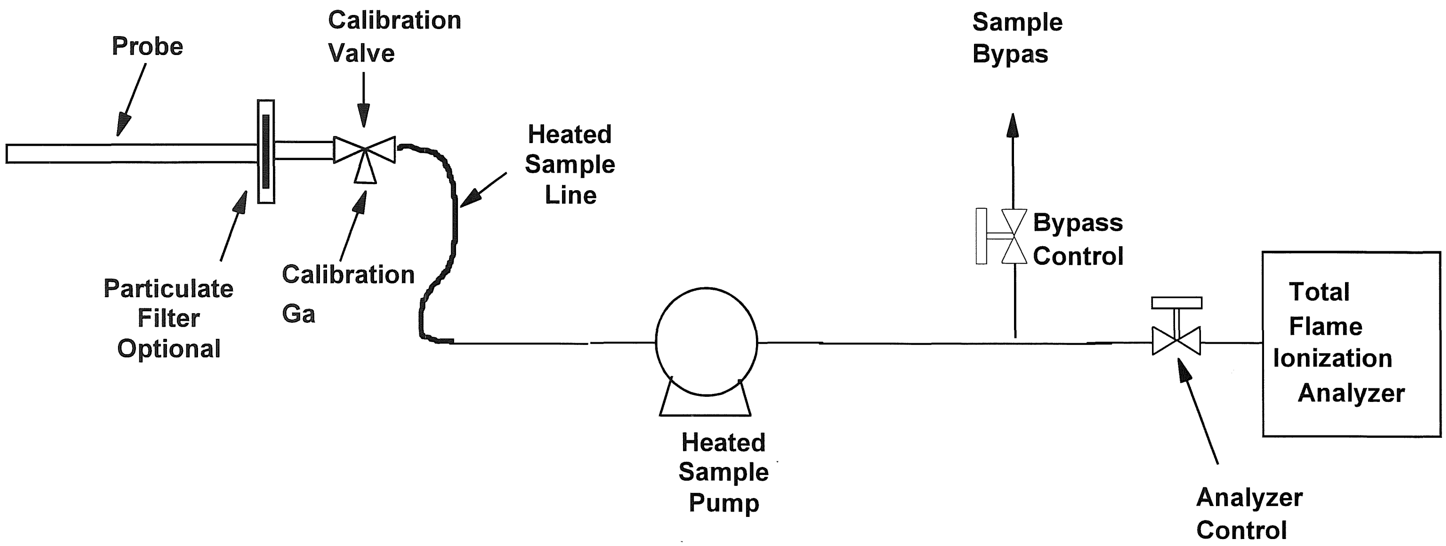


FIGURE 4.2: SAMPLING TRAIN FOR VOC (M25A) - Glass Wool Filter not used



5.0 CALCULATIONS