



Foam Expansion Oven Emissions Test Report

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AIR QUALITY DIV.

Prepared for:

Sekisui Voltek, LLC

Coldwater, Michigan

Sekisui Voltek, LLC
17 Allen Avenue
Coldwater, Michigan

Project No. 14-4621.00
February 4, 2015

BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan 48073
(248) 548-8070



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

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RENEWABLE OPERATING PERMIT
REPORT CERTIFICATION

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

AIR QUALITY DIV.

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 Sekisui Voltek, LLC County Branch

Source Address 17 Allen Avenue City Coldwater

AQD Source ID (SRN) B8786 ROP No. MI-ROP-B8786-2014 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 12/17/2014 To 12/17/2014

Additional monitoring reports or other applicable documents required by the ROP are attached as described:

Enclosed is the Foam Expansion Oven 12 Emissions Test Report dated February 4, 2015.

The testing was conducted in accordance with the approved test plan and the

facility operating conditions were in compliance with permit requirements.

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

<u>William Odisher</u>	<u>Plant Manager</u>	<u>517-279-3599</u>
Name of Responsible Official (print or type)	Title	Phone Number
		<u>2/6/15</u>
Signature of Responsible Official		Date

* Photocopy this form as needed.



EXECUTIVE SUMMARY

BT Environmental Consulting, Inc. (BTEC) was retained by Sekisui Voltek, LLC (SV) to evaluate ammonia (NH₃) emission rates from a horizontal foam expansion oven (FGOVEN12) located at the SV facility in Coldwater, Michigan. SV is located at 17 Allen Avenue in Coldwater, Michigan.

Testing consisted of triplicate 60-minute test runs with emission rates simultaneously measured in two exhaust stacks (SVOVEN12 and SVBELTBURN12). Michigan Department of Environmental Quality Air Quality Division Permit No. MI-ROP-B8786-2014 limits ammonia emissions from the two stacks combined to not more than 3.54 pounds per hour. Ammonia emission test results for FGOVEN12 are summarized by Table E-I.

**Table E-I
Sekisui Voltek, LLC
FGOVEN12
Compliance Test Program Results Summary**

Exhaust Stack	Average Ammonia Emission Rate (lbs/hr)
SVOVEN12	0.07
SVBELTBURN12	0.70
Total:	0.77



1. Introduction

BT Environmental Consulting, Inc. (BTEC) was retained by Sekisui Voltek, LLC (SV) to evaluate ammonia (NH₃) emission rates from a horizontal foam expansion oven (FGOVEN12) located at the SV facility in Coldwater, Michigan. SV is located at 17 Allen Avenue in Coldwater, Michigan.

The Air Quality Division (AQD) of Michigan's Department of Environmental Quality has published a guidance document entitled "Format for Submittal of Source Emission Test Plans and Reports" (December 2013, 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 December 17, 2014 at 17 Allen Avenue in Coldwater, Michigan. The purpose of this report is to document the results of the emissions test program.

1.b Purpose of Testing

The purpose of the emissions test program was to demonstrate compliance with the ammonia emission limitation included in AQD Permit No. MI-ROP-B8786-2014.

1.c Test Program Contact

The contact for the test program is:

Mr. Donald Ostrander
Maintenance Department Manager
Sekisui Voltek, LLC
17 Allen Avenue
Coldwater, Michigan 49036
(517) 279-8562

1.d Test Personnel

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. Donald Ostrander Maintenance Department Manager	Sekisui Voltek, LLC 17 Allen Avenue Coldwater, Michigan 49036	(517) 279-8562
Mr. David Patterson Technical Programs Unit	MDEQ Technical Programs Unit Air Quality Division	(517) 284-6782
Mr. Ken Felder Environmental Technician	BTEC 4949 Fernlee Avenue Royal Oak, MI 48073	(248) 548-8070
Mr. Paul Draper Environmental Technician	BTEC 4949 Fernlee Avenue Royal Oak, MI 48073	(248) 548-8070
Ms. Stephanie Jarrett Senior Environmental Engineer	Fishbeck, Thompson, Carr, & Huber	(248) 324-2146

2. Summary of Results

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

2.a Operating Data

Operating data recorded during the emissions test program is included in Appendix B.

2.b Applicable Permit

The foam expansion oven is included in AQD Permit No. MI-ROP-B8786-2014.

2.c Results

The overall results of the emissions compliance test program are summarized by Table 2. (see Section 5.a).

2.d Emission Regulation Comparison

AQD Permit No. MI-ROP-B8786-2014 limits ammonia emissions from FGOVEN12 to not more than 3.54 pounds per hour. The average ammonia emission rate from FGOVEN12 during the emissions test program was 0.77 pounds per hour.



3. Source Description

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

3.a Process Description

The emission unit is one horizontal foam expansion oven fueled with natural gas with a heat input rating from the four burners of 3.9 MMBtu per hour. Belt burners are used to remove foam build up on the belt, one for each side of the stainless steel mesh conveyer belt, for a total heat input of 0.8 MMBtu per hour. The horizontal foam expansion oven exhausts through stack SVOVEN12 and the belt burners exhaust is tied into the hood at the outlet of the oven.

3.b Raw and Finished Materials

Azodicarbonamide (AZO) is used as a blowing agent to expand polymer foam. In the oven, the AZO thermally decomposes into nitrogen, carbon monoxide, carbon dioxide, and NH_3 . Permit No. MI-ROP-B8786-2014 limits annual AZO usage to 478 tons per year. The production rate of the oven during the testing was 400 lb/hr of foam containing 15.995% AZO which results in an hourly AZO rate of 63.98 lb/hr.

3.c Process Capacity

Permit No. MI-ROP-B8786-2014 limits annual AZO usage to 478 tons per year.

3.d Process Instrumentation

Process instrumentation includes the data listed in the process data provided in Appendix B.

4. Sampling and Analytical Procedures

Sections 4.a through 4.d provide a summary of the sampling and analytical procedures used to verify emissions from the foam expansion oven.

4.a Sampling Train and Field Procedures

Sampling and analysis procedures followed the methodologies of the following emissions test methods codified at Title 40, Part 60, Appendix A of the Code of Federal Regulations (40 CFR 60, Appendix A) and 40 CFR 63, Appendix A:

- Method 1 - *“Sample and Velocity Traverses for Stationary Sources”* will be used to determine the sampling locations and velocity traverse points
- Method 2 - *“Determination of Stack Gas Velocity and Volumetric Flowrate”* will be used to determine exhaust gas velocity and volumetric flowrate
- Method 3 - *“Gas Analysis for the Determination of Dry Molecular Weight”* was used to evaluate exhaust gas molecular weight
- Method 320 - *“Measurement of Vapor Phase Organic and Inorganic Emissions by Extractive Fourier Transform Infrared Spectroscopy”* will be used to measure exhaust gas NH₃ concentrations. In addition, exhaust gas carbon dioxide and moisture content will be monitored using FTIR.

Stack gas velocity traverses were conducted in accordance with the procedures outlined in Methods 1 and 2. An S-type pitot tube and thermocouple assembly calibrated in accordance with Method 2, Section 4.1.1 will be used to measure exhaust gas velocity pressures and temperatures during testing of the generator engine. Consistent with the provisions of Method 3, Section 1.3, an assumed exhaust gas dry molecular weight of 30.0 was assigned.

Exhaust gas NH₃ concentrations were measured by Fourier Transform Infrared (FTIR) spectroscopy. Methodologies associated with the FTIR measurements are summarized by the Prism Analytical Technologies, Inc. report included in Appendix C.

Exhaust gas NH₃ concentrations were monitored simultaneously for both stacks and exhaust gas flowrate was measured during each test run.



4.b Recovery and Analytical Procedures

The emissions test program did not include the collection of samples for laboratory analysis.

4.c Sampling Ports

Sampling ports were located at 90° apart on the two round exhaust stacks (12" and 24" diameter) and approximately 4 feet prior to the exhaust stack exit point.

4.d Traverse Points

Consistent with Method 1, the exhaust ducts were traversed at a total of sixteen points (eight in each direction).

5. Test Results and Discussion

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

5.a Results Tabulation

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

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Table 2
Sekisui Voltek, LLC
FGOVEN12
Compliance Test Program Results Summary

Exhaust Stack	Average Ammonia Emission Rate (lbs/hr)
SVOVEN12	0.07
SVBELTBURN12	0.70
Total:	0.77

Detailed emissions test results for the two exhaust stacks are summarized by Tables 3 and 4.

5.b Discussion of Results

AQD Permit No. MI-ROP-B8786-2014 limits ammonia emissions from FGOVEN12 to not more than 3.54 pounds per hour. The average ammonia emission rate from FGOVEN12 during the emissions test program was 0.77 pounds per hour.

5.c Sampling Procedure Variations

Because exhaust gas samples were not evaluated for oxygen content, consistent with the provisions of Method 3, Section 1.3, an assumed exhaust gas dry molecular weight of 30.0 was assigned.

5.d Process or Control Device Upsets

No upset conditions occurred during testing.

5.e Control Device Maintenance

The exhaust stacks are not equipped with emissions control.

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 as Appendix D.

5.h Sample Calculations

Sample calculations are provided in Appendix E.

5.i Field Data Sheets

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

5.j Laboratory Data

All analysis was done live through the use of online Analyzers and as such there is no laboratory data.

TABLES

Table 3
Oven Ammonia Emission Rates
Sekisui Voltek
Coldwater, Michigan
BTEC Project No. 14-4621.00
Sampling Date: December 17, 2014

Parameter	Run 1	Run 2	Run 3	Average
Test Run Date	12/17/2014	12/17/2014	12/17/2014	
Test Run Time	10:15-11:15	11:45-12:45	13:18-14:19	
Outlet Flowrate (scfm)	1,594	1,582	1,547	1,574
Outlet Ammonia Concentration (ppmv)	16.3	17.9	19.4	17.9
Ammonia Emission Rate (lb/hr)	0.07	0.08	0.08	0.07

scfm = standard cubic feet per minute

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

lb/hr = pounds per hour

Equations

$$\text{lb/hr} = \text{ppmv}/1,000,000 * 17.031/385.5 * \text{scfm} * 60$$

Table 4
Belt Burner Ammonia Emission Rates
Sekisui Voltek
Coldwater, Michigan
BTEC Project No. 14-4621.00
Sampling Date: December 17, 2014

Parameter	Run 1	Run 2	Run 3	Average
Test Run Date	12/17/2014	12/17/2014	12/17/2014	
Test Run Time	10:15-11:15	11:45-12:45	13:18-14:19	
Outlet Flowrate (scfm)	10,295	10,249	10,084	10,209
Outlet Ammonia Concentration (ppmv)	25.7	25.9	26.0	25.9
Ammonia Emission Rate (lb/hr)	0.70	0.70	0.70	0.70

scfm = standard cubic feet per minute

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

lb/hr = pounds per hour

Equations

$$\text{lb/hr} = \text{ppmv}/1,000,000 * 17.031/385.5 * \text{scfm} * 60$$