



Emissions Test Report

Facility: American Rack, Grand Rapids, MI
Test Date: February 2, 2017

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Prepared for:

Prism Analytical Technologies, Inc.

Prism Analytical Technologies, Inc
2625 Dension Drive
Mt. Pleasant, MI 48858

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Project No. 17-4982.00
February 22, 2017

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



EXECUTIVE SUMMARY

BT Environmental Consulting, Inc. (BTEC) was retained by Prism Analytical Technologies, Inc. to evaluate oxygen (O₂) and flowrate for a burn off oven at American Rack in Grand Rapids, Michigan. The emissions test program was conducted on February 2, 2017.

Testing of the burn off oven consisted of an 8 hour test run with flow rates being measure each hour. The emissions test program was required by MDEQ Air Quality Permit to Install No. 151-12. The results of the emission test program are summarized by Table 1.

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1. Introduction

American Rack Company operates a batch type nature gas fired burn-off oven (EU-BURNOFF) at its plant in Grand Rapids, Michigan (EPA Facility ID # MIK137993224). The oven is used to remove Plastisol coating with polyvinyl chloride (PVC) resin from metal parts. The oven is equipped with an 800,000 BTU/hr afterburner control system.

BT Environmental Consulting, Inc. (BTEC) was retained by Prism Analytical Technologies, Inc. (PATI) to conduct emissions testing at the Associated Rack Company facility in Grand Rapids, Michigan. The emissions test program will include measurement of HCL emission rates from the burn-off oven exhaust stack. The emissions test program took place on February 2, 2017.

1.a Identification, Location, and Dates of Test

Sampling and analysis for the emission test program was conducted on February 2, 2017 at the American Rack facility located in Grand Rapids, Michigan. The test program included evaluation of Hydrogen Chloride (HCl), Oxygen (O₂), Carbon Dioxide (CO₂) and flow rate emissions from the burn off oven.

1.b Purpose of Testing

The emissions test program was required by MDEQ Air Quality Permit to Install No. 151-12.

1.c Source Description

Associated Rack Company operates a batch type nature gas fired burn-off oven. The oven is used to remove Plastisol coating with polyvinyl chloride (PVC) resin from metal parts. The oven is equipped with an 800,000 BTU/hr afterburner control system.

1.d Test Program Contacts

The contact for the source and test report is:

Mr. Matt Zomberg
Operations Manager
American Rack Company – Grand Rapids Plant
4910 Kraft Ave
Grand Rapids, MI 49512
(616)-554-6004



Mr. Barry P. Boulianne
Senior Project Manager
BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan 48073
(313) 449-2361

Names and affiliations for personnel who were present during the testing program are summarized by Table 2.

Table 2
Test Personnel

Name and Title	Affiliation	Telephone
Mr. Matt Zomberg Operations Manager	American Rack Company – Grand Rapids Plant 4910 Kraft Ave Grand Rapids, MI 49512	(616) 554-6004
Mr. Mason Sakshaug Environmental Technician	BTEC 4949 Fernlee Royal Oak, MI 48073	(989) 323-0355
Mr. Lindsey Wells	Prism Analytical Technologies 2625 Denison Drive Mt. Pleasant, Michigan 48858	(989) 772-5088
Mr. Dakota Soule	Prism Analytical Technologies 2625 Denison Drive Mt. Pleasant, Michigan 48858	(989) 772-5088
Mr. Tom Gasloli	Air Quality Division MDEQ	(517) 284-6778

2. Summary of Results

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

2.a Operating Data

ARC has a Chart Recorder that shows the temperature of the oven and the temperature of the Afterburner throughout the 8 hours burn cycle.

2.b Applicable Permit

The applicable permit for this emissions test program is MDEQ Air Quality Permit to Install No. 151-12.

The overall results of the emission test program are summarized by Table 1. HCl emissions from burn off oven were measured with a corresponding limit of 16.33 pph.

3. Source Description

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

3.a Process Description

American Rack Company operates a batch type nature gas fired burn-off oven. The oven is used to remove Plastisol coating with polyvinyl chloride (PVC) resin from metal parts. The oven is equipped with an 800,000 BTU/hr afterburner control system.

3.b Process Flow Diagram

Due to the simplicity of the burn off oven, a process flow diagram is not necessary.

3.c Raw and Finished Materials

Burn-off oven removes Plastisol coating with polyvinyl chloride (PVC) resin from metal parts at approximately 200lb per cycle.

3.d Process Capacity

Burn-off oven has a cart load capacity of 16,000 lbs. and rated for an average fuel usage of 1,200 CFH.

3.e Process Instrumentation

ARC has a Chart Recorder that shows the temperature of the oven and the temperature of the Afterburner throughout the 8 hours burn cycle.

4. Sampling and Analytical Procedures

Sections 4.a through 4.d provide a summary of the sampling and analytical procedures used.

4.a Sampling Train and Field Procedures

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

- Method 1 - *“Sample and Velocity Traverses for Stationary Sources”* will be used to determine the velocity traverse points

- Method 2 - *“Determination of Stack Gas Velocity and Volumetric Flowrate”* will be used to determine exhaust gas velocity
- Method 3A - *“Determination of Molecular Weight of Dry Stack Gas” (O₂ analyzer)*
- Method 320 - *“Vapor Phase Organic and Inorganic Emissions by Extractive FTIR”*

The O₂ content of the gas stream was measured using an M&C O₂ gas analyzer. The gas stream was drawn through a stainless-steel probe with a heated in-line filter to remove any particulate, a heated Teflon[®] sample line, through a refrigerated Teflon[®] sample conditioner to remove the moisture from the sample before it entered the O₂ analyzer. Data was recorded on a PC equipped with data acquisition software. Recorded O₂ concentrations were averaged and reported for the duration of each test (as drift corrected per Method 7E). A drawing of the sampling train used for the testing program is presented as Figure 2.

In accordance with Method 3A, a 3-point (zero, mid, and high) bias check and calibration check was performed on the O₂ analyzer prior to initiating the test program. Following each test run, a 2-point (zero and high) calibration drift check was performed. The O₂ analyzer was operated at the 0-25% range.

Extractive Fourier transform infrared (FTIR) spectrometry following US EPA Method 320 was conducted to quantify the concentration levels of gaseous HCl emissions from the burn-off oven exhaust stack. FTIR data was collected using an MKS MultiGas 2030 FTIR spectrometer. 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 rotameter and pressure transducer. All data was collected at 0.5 cm⁻¹ resolution. Each spectrum was derived from the coaddition of 64 scans, with a new data point generated approximately every one minute. A drawing of the sampling train used for the testing program is presented as Figure 3.

Method 320 HCl and CO₂ concentrations will be measured by Prism Analytical Technologies, Inc. of Mount Pleasant, Michigan. Additional details regarding the Method 320 measurements of HCl and CO₂ concentrations will be included in the Prism Analytical Technologies, Inc. report in Appendix E.

4.b Recovery and Analytical Procedures

This test program did not include laboratory samples, consequently, sample recovery and analysis is not applicable to this test program.



4.c Sampling Ports

A diagram of the stack showing sampling ports in relation to upstream and downstream disturbances is included as Figure 1.

4.d Traverse Points

A diagram of the stack indicating traverse point locations and stack dimensions is included as Figure 1.

5. Test Results and Discussion

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

5.a Results Tabulation

The overall results of the emissions test program are summarized by Table 1.

5.b Discussion of Results

HCl emissions were averaged over one hour periods with the average being 25.6 pph. This number exceeds the permit limit of 16.33 pph.

5.c Sampling Procedure Variations

The Burn Off Oven exhaust stack has only a single sample port. Twelve sample points from the single sample port were sampled to determine the flow rate.

5.d Process or Control Device Upsets

No upset conditions occurred during testing.

5.e Control Device Maintenance

There was no control equipment maintenance performed during the emissions test program.

5.f Re-Test

The emissions test program was not a re-test.

5.g Audit Sample Analyses

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



5.h Calibration Sheets

Relevant equipment calibration documents are provided in Appendix B.

5.i Sample Calculations

Sample calculations are provided in Appendix C.

5.j Field Data Sheets

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

5.k Laboratory Data

There are no laboratory results for this test program. Raw CEM data is provided electronically in Appendix D. Prism Analytical Technologies Report is provided as Appendix E.

Table 1
Burn Off Oven Exhaust Emission Rates
American Rack
Grand Rapids, Michigan
BTEC Project No. 17-4982.00
Sampling Dates: February 2, 2017

Parameter	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Average
Test Run Date	2/2/2017	2/2/2017	2/2/2017	2/2/2017	2/2/2017	2/2/2017	2/2/2017	
Test Run Time	8:52-9:52	9:53-10:52	10:53-11:53	11:54-12:54	12:55-13:54	13:55-14:55	14:56-15:56	
Flowrate (scfm)	856	800	746	759	890	737	872	809
Oxygen Concentration (% dry)	12.42	12.42	12.42	12.42	14.45	14.45	14.45	13.29
Carbon Dioxide Concentration (% wet)	5.2	4.1	4.0	3.7	3.6	3.3	3.1	3.9
Hydrochloric Acid Concentration (ppmv, wet)	642.4	3182.4	18209.1	15860.7	2775.0	607.2	51.5	5904.0
HCl Emission Rate (lb/hr)	3.1	14.4	76.9	68.1	14.0	2.5	0.3	25.6

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 (HCl = 36.46)

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

35.31 = ft³ per m³

453600 = mg per lb

Equations

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

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