Source Test Report for 2024 Compliance Testing
General Purpose Packed Bed Wet Scrubber SC02
Chemetall US, Inc.
Jackson, Michigan

State Registration No.: P0359
Permit No.: 88-12E
Control Device ID: SC02
Flexible Group ID: FGGENMIX, FGFACILITY

Prepared For:

Chemetall US, Inc.
1100 Technology Drive
Jackson, MI 49201

Prepared By:

Montrose Air Quality Services, LLC
252 Brodhead Road, Suite 500
Bethlehem, PA 18017

For Submission To:

Michigan Department of the Environment, Great Lakes, and Energy
525 W Allegan St
Lansing, MI 48933

Document Number: NE016AS-039252-RT-1859
Test Date: May 1, 2024
Submittal Date: June 18, 2024

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ACCREDITED
TO ASTM D7036 ONLY
CERT #3925.01

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June 18, 2024

Subject: **Compliance Test Report, Scrubber SC02**
Facility Name: **Chemetall US, Inc.**
Facility Location: **Jackson, Michigan**
State Registration No.: **P0359**
Permit No.: **88-12E**
Test Plan Reviewer: **Andrew Riley (4/19/2024)**
Montrose Document No.: **NE016AS-039252-RT-1859**

Enclosed please find the compliance test report for the above-referenced facility and source. The report documents the results of the testing performed by Montrose Air Quality Services, LLC (Montrose) at Chemetall US, Inc. on May 1, 2024.

The following distribution was provided for this project.

Name	Company/Agency	No. of copies	Electronic Copy
Wally Wojtala, Brian Sauer	Chemetall US, Inc. 1100 Technology Drive Jackson, MI 49201	NA	Emailed PDF, 6/18/2024
Jeremy Howe	EGLE, Air Quality Division Constitution Hall, 2nd Floor South 525 West Allegan Street Lansing, MI 48933	1	Emailed PDF (HoweJ1@michigan.gov), 6/18/2024
Stephanie Weems	EGLE, Air Quality Division Jackson District Office 301 East Louis Glick Hwy, Suite 4 Jackson, MI 49201	1	Emailed PDF (weems@michigan.gov), 6/18/2024

Please do not hesitate to contact our office at 610-559-8776 if you have any questions.

Sincerely,

Montrose Air Quality Services, LLC

Laurie Snyder

Laurie Snyder
Reporting Hub Manager, NE Region

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Review and Certification

All work, calculations, and other activities and tasks performed and presented in this document were carried out by me or under my direction and supervision. I hereby certify that, to the best of my knowledge, Montrose operated in conformance with the requirements of the Montrose Quality Management System and ASTM D7036-04 during this test project.

Signature:	Zachary Addis	**Date:**	06 / 04 / 2024
Name:	Zachary Addis	**Title:**	Field Project Manager

I have reviewed, technically and editorially, details, calculations, results, conclusions, and other appropriate written materials contained herein. I hereby certify that, to the best of my knowledge, the presented material is authentic, accurate, and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature:	Henry M. Taylor	**Date:**	06 / 04 / 2024
Name:	Henry Taylor	**Title:**	Senior Reporting QC Specialist

Facility Certification

I have reviewed this document and agree that the information contained herein is true, accurate, and complete, to the best of my knowledge.

Signature:	Wally Wojtala	**Date:**	06 / 17 / 2024
Name:	Wally Wojtala	**Title:**	Site Manager

Table of Contents

Section **Page**

List of Appendices

Table of Contents

Section **Page**

List of Appendices (continued)

List of Tables

List of Figures

1.0 Introduction

1.1 Summary of Test Program

Chemetall US, Inc. (Chemetall) contracted Montrose Air Quality Services, LLC (Montrose) to perform a compliance emissions test program on the general purpose packed bed wet scrubber (SC02) at the facility located in Jackson, Michigan.

The tests were conducted to determine compliance with the emission limits listed in permit number 88-12E issued by the Michigan Department of the Environment, Great Lakes, and Energy (EGLE).

The specific objectives were to:

- Measure emissions of nickel (Ni) at the outlet of the scrubber
- Conduct the test program with a focus on safety

Montrose performed the tests to measure the emission parameters listed in Table 1-1.

Table 1-1
Summary of Test Program

Test Date	Unit ID/ Source Name	Activity/Parameters	Test Methods	No. of Runs	Duration (Minutes)
5/1/2024	SC02 / Wet Scrubber	Velocity/Volumetric Flow Rate	EPA 1 & 2	3	60
		Moisture	EPA 4	3	60
		Nickel	EPA 29	3	60
		Post-test meter calibration check	EPA ALT-009	--	--
		Post-test thermocouple calibration check	EPA ALT-011	--	--

To simplify this report, a list of Units and Abbreviations is included in Appendix D.1. Throughout this report, chemical nomenclature, acronyms, and reporting units are not defined. Please refer to the list for specific details.

This report presents the test results and supporting data, descriptions of the testing procedures, descriptions of the facility and sampling location, and a summary of the quality assurance procedures used by Montrose. The average emission test results are summarized and compared to their respective permit limits in Table 1-2. Detailed results for individual test runs can be found in Section 4.0. All supporting data can be found in the appendices.

The testing was conducted by the Montrose personnel listed in Table 1-3. The tests were conducted according to the test plan (protocol) dated March 25, 2024 that was submitted to and approved by the EGLE.

Table 1-2
Summary of Compliance Test Results – Scrubber SC02

May 1, 2024

Parameter/Units	Results
Nickel (Ni)	
total lb Ni input	784.8
total lb Ni output	1.47E-06
resultant ratio (output/input)	1.87E-09

1.2 Key Personnel

A list of project participants is included below:

Facility Information

Source Location:	Chemetall US, Inc. 1100 Technology Drive Jackson, MI 49201	
Project Contact:	Wally Wojtala	Brian Sauer
Role:	Site Manager	Regional EHS Manager
Company:	Chemetall US, Inc.	Chemetall US, Inc.
Telephone:	734-552-2353	517-817-4514
Email:	wally.wojtala@basf.com	brian.sauer@basf.com

Agency Information

Regulatory Agency:	Michigan Department of Environmental Quality
Agency Contact:	Scott Miller
Telephone:	517-285-4797
Email:	MillerS@Michigan.gov

Testing Company Information

Testing Firm:	Montrose Air Quality Services, LLC	
Contact:	Zachary Addis	Thomas Weber
Title:	Field Project Manager	Hub District Manager-Northeast
Telephone:	484-548-8478	610-559-8776 x11601
Email:	zaddis@montrose-env.com	tweber@montrose-env.com

Laboratory Information

Laboratory:	Enthalpy Analytical, LLC
City, State:	Durham, NC
Method:	EPA 29

Test personnel and observers are summarized in Table 1-3.

Table 1-3
Test Personnel and Observers

Name	Affiliation	Role/Responsibility
Zachary Addis	Montrose	Project Manager/Field Team Leader/Qualified Individual (QI)/Sample recovery
Craig Blohm	Montrose	Sample train operator
Mark Banner	Montrose	Sample train operator
Laurie Snyder	Montrose	Calculations and report preparation
Wally Wojtola	BASF	Client Observer/Test Coordinator
Stephanie Weems	EGLE	Observer

2.0 Plant and Sampling Location Descriptions

2.1 Process Description, Operation, and Control Equipment

Chemetall US, Inc. is a liquid chemical manufacturing site focusing primarily on blending various materials for the pre-paint, surface preparation, and treatment of metal surfaces. Scrubber SC02 controls emissions from Flexible Group ID FGGENMIX consisting of one sulfuric acid storage tank, one nitric acid storage tank, and multiple mixing tanks associated with the blending of acid, alkaline, and other aqueous liquid products.

During the test program, the site was producing a zinc phosphate surface treatment product which contains nickel.

2.2 Flue Gas Sampling Location

Information regarding the sampling location is presented in Table 2-1.

Table 2-1
Sampling Location

Sampling Location	Stack Inside Diameter (in.)	Distance from Nearest Disturbance		Number of Traverse Points
		Downstream EPA "B" (in./dia.)	Upstream EPA "A" (in./dia.)	
SC02 Outlet	28	141/5.04	48/1.71	Isokinetic: 20 (10/port)

The sample location was verified in the field to conform to EPA Method 1. Acceptable cyclonic flow conditions were confirmed prior to testing using EPA Method 1, Section 11.4. See Appendix A.1 for more information.

2.3 Operating Conditions and Process Data

Emission tests were performed while the source and air pollution control devices were operating at the conditions required by the permit. The units are tested when operating at maximum routine operating conditions (MROC).

Plant personnel were responsible for establishing the test conditions and collecting all applicable unit-operating data. The process data that was provided is presented in Appendix B. Data collected includes the following parameters:

- Scrubbing liquid pH
- Scrubber liquid flow rate, gal/min
- Pressure drop across scrubber, in. H_2O
- Nickel content caught in scrubber water, %

3.0 Sampling and Analytical Procedures

3.1 Test Methods

The test methods for this test program have been presented in Table 1-1. Additional information regarding specific applications or modifications to standard procedures is presented below.

3.1.1 EPA Method 1, Sample and Velocity Traverses for Stationary Sources

EPA Method 1 is used to assure that representative samples or measurements of volumetric flow rate are obtained by dividing the cross-section of the stack or duct into equal areas, and then locating a traverse point within each of the equal areas. Acceptable sample locations must be located at least two stack or duct equivalent diameters downstream from a flow disturbance and one-half equivalent diameter upstream from a flow disturbance.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - None
- Method Exceptions:
  - None

The sample port and traverse point locations are detailed in Appendix A.1.

3.1.2 EPA Method 2, Determination of Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)

EPA Method 2 is used to measure the gas velocity using an S-type pitot tube connected to a pressure measurement device, and to measure the gas temperature using a calibrated thermocouple connected to a thermocouple indicator. Typically, Type S (Stausscheibe) pitot tubes conforming to the geometric specifications in the test method are used, along with an inclined manometer. The measurements are made at traverse points specified by EPA Method 1. The molecular weight of the gas stream is determined from independent measurements of O_2, CO_2, and moisture. The stack gas volumetric flow rate is calculated using the measured average velocity head, the area of the duct at the measurement plane, the measured average temperature, the measured duct static pressure, the molecular weight of the gas stream, and the measured moisture.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - S-type pitot tube coefficient is 0.84
  - A dry molecular weight of 29.0 lb/lb-mol is utilized in flow rate calculations for processes that emit essentially air

- Method Exceptions:
  - Stack gas temperatures thermocouples are checked using EPA Alternate Method 011 (ALT-011). A single-point calibration is performed using a NIST-traceable thermometer.

The typical sampling system is detailed in Figure 3-1.

3.1.3 EPA Method 4, Determination of Moisture Content in Stack Gas

EPA Method 4 is a manual, non-isokinetic method used to measure the moisture content of gas streams. Gas is sampled at a constant sampling rate through a probe and impinger train. Moisture is removed using a series of pre-weighed impingers containing methodology-specific liquids and silica gel immersed in an ice water bath. The impingers are weighed after each run to determine the percent moisture.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - The reference method is used to measure moisture
  - Moisture sampling is performed as part of the pollutant sample trains
  - Since it is theoretically impossible for measured moisture to be higher than psychrometric moisture, the psychrometric moisture is also calculated, and the lower moisture value is used in the calculations
- Method Exceptions:
  - None
- Target and/or Minimum Required Sample Duration: 60 minutes
- Target and/or Minimum Required Sample Volume: 30 scf

The typical sampling system is detailed in Figure 3-1.

3.1.4 EPA Method 29, Determination of Metals Emissions from Stationary Sources

EPA Method 29 is a manual, isokinetic test method to measure a variety of metals using inductively coupled argon plasma emission spectroscopy (ICAP) and cold vapor atomic absorption (CVAA) spectroscopy. This method is performed in conjunction with EPA Methods 1-4. A stack sample is withdrawn isokinetically from the source, filterable emissions are collected in the probe and on a heated filter, and condensable emissions are collected in an aqueous acidic solution of hydrogen peroxide (analyzed for all target analytes) and an optional aqueous acidic solution of potassium permanganate (required only when Hg is a target analyte). The recovered samples are digested, and appropriate fractions are analyzed for the target analytes which may include Hg by CVAAS and for Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Ni, P, Se, Ag, Tl, and Zn by ICAP or atomic absorption spectroscopy (AAS).

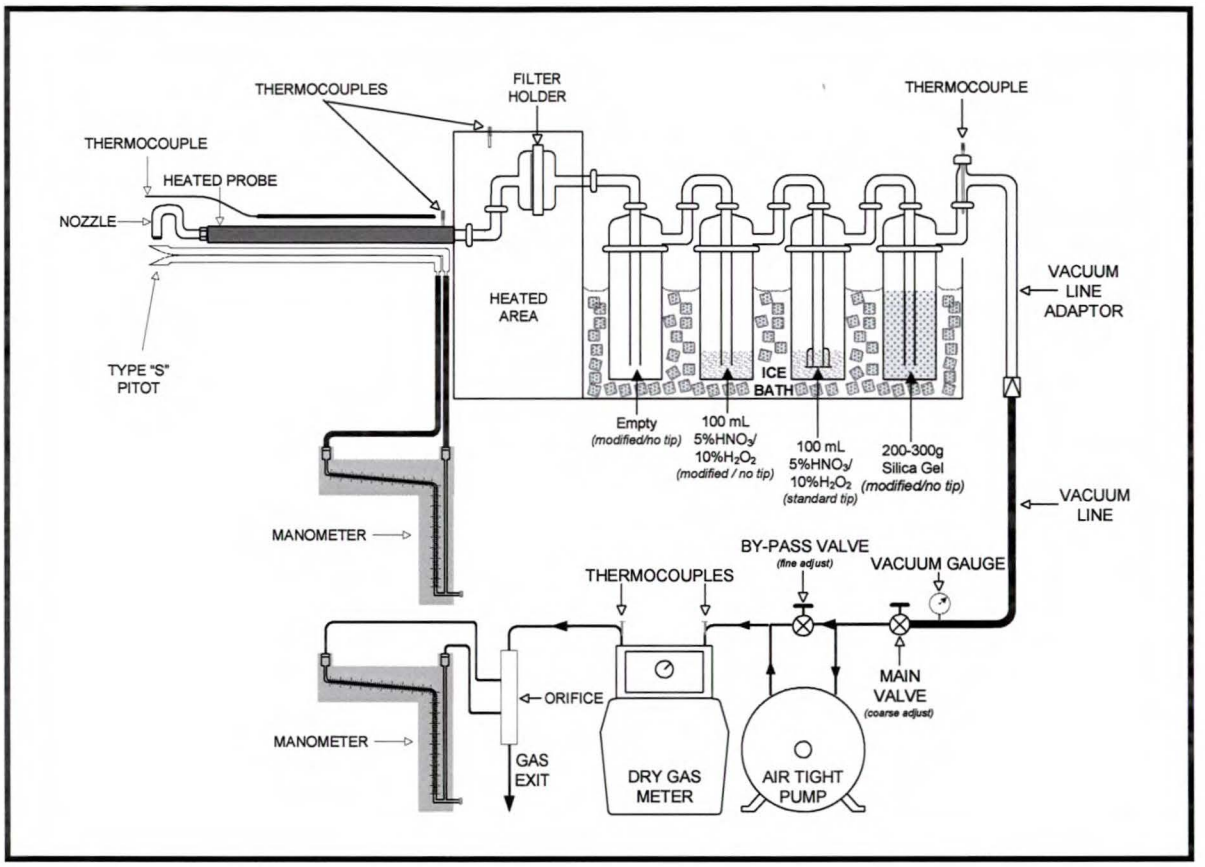
Graphite furnace atomic absorption spectroscopy (GFAAS) is used for analysis of Sb, As, Cd, Co, Pb, Se, and Tl if these elements require greater analytical sensitivity than can be obtained using ICAP. AAS may be used for analysis of all target analytes if the resulting in-stack method detection limits meet the goal of the testing program. Similarly, inductively coupled plasma-mass spectroscopy (ICP-MS) may be used for analysis of Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Ni, Ag, Tl and Zn. The results from analysis of individual fractions of the sample train are summed to obtain the total concentration of each metal per sample train.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - Filterable particulate matter is not recovered
  - Since mercury is not a target analyte, the fourth, fifth, and sixth impingers of the sample train are eliminated
- Method Exceptions:
  - None
- Target Analyte: Nickel (Ni)
- Target and/or Minimum Required Sample Duration: 60 minutes
- Target and/or Minimum Required Sample Volume: 30 scf
- Analytical Laboratory: Enthalpy Analytical, Durham, NC

The typical sampling system is detailed in Figure 3-1.

Figure 3-1
EPA Method 29 Sampling Train



3.1.5 EPA Method ALT-009, Alternative Method 5 Post-Test Calibration

EPA Approved Alternative Method 009 (ALT-009) is used as an alternative to a two-point post-test meter box calibration. This procedure uses a calculation to check the meter box calibration factor rather than requiring a physical post-test meter box calibration using a standard dry gas meter.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - If the percent error exceeds the allowable criterion, a full calibration is performed, and the results are presented using the Y factor that gives the lower value of total sample volume (yields the highest emissions)

- Method Exceptions:
  - None

3.1.6 EPA Method ALT-011, Alternative Method 2 Thermocouple Calibration

EPA Approved Alternative Method 011 (ALT-011) is used as an alternative to the EPA Method 2 two-point thermocouple calibration. This procedure involves a single-point in-field check using a reference thermometer to confirm that the thermocouple system is operating properly.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
  - None
- Method Exceptions:
  - None

3.2 Process Test Methods

The test plan did not require that process samples be collected during this test program; therefore, no process sample data are presented in this test report.

4.0 Test Discussion and Results

4.1 Field Test Deviations and Exceptions

No field deviations or exceptions from the test plan or test methods occurred during this test program.

4.2 Presentation of Results

The summary of compliance test results is presented in Table 1-2. The results of individual test runs performed are presented in Table 4-1. The total input and output results are presented in Table 4-2. Emissions are reported in units consistent with those in the applicable regulations or requirements. Additional information is included in the appendices as presented in the Table of Contents.

It should be noted that the nickel results for run 2 are not anomalous and are representative of actual emissions. The timing of run 2 aligned with the timing of the addition of the nickel carbonate raw material, a low-density powder, to the Gardobond R 2600 E29 production batch. It was expected that the packed bet wet scrubber would capture more of that material at that time.

Table 4-1
Nickel Emissions Results

Parameter/Units	Run 1	Run 2	Run 3	Average
Date	5/1/2024	5/1/2024	5/1/2024	--
Time	0925-1033	1155-1303	1335-1443	--
Process Data				
scrubbing liquid pH	7.69	7.89	7.20	7.59
scrubber liquid flow rate, gal/min	50	50	50	50
pressure drop across scrubber, in. H_2O	3.3	3.3	3.2	3.3
nickel content caught in scrubber water, %	1.96	1.55	1.55	1.69
Sampling & Flue Gas Parameters				
sample duration, minutes	60	60	60	60
sample volume, dscf	40.847	41.120	40.514	40.827
isokinetic rate, %	96.52	99.36	98.53	98.14
flue gas temperature, °F	63.6	67.4	67.0	66.0
moisture content, % volume	2.05	2.34	2.31	2.23
volumetric flow rate, dscfm	8,777	8,584	8,528	8,630
Nickel (Ni)				
µg	6.99	652	7.95	222
lb/hr*	0.0002	0.018	0.0002	0.0061

* lb/hr values are calculated for individual test runs and are not applicable to the EGLE-specified calculations presented in Table 4-2.

Table 4-2
Nickel Input/Output Results

Raw Material	Kilograms	Pounds	Percent Ni	Pounds Ni	Total Pounds Ni
Input Production Data – Amount of nickel containing raw materials used during batch production run*					
nickel carbonate (Gardobond R 2600 E 29)	525.0	1155.0	46	531.3	784.8
nickel nitrate (Gardobond R 2219)	823.2	1811.0	14	253.5	
Parameter/Units		**Run 1**	**Run 2**	**Run 3**	**Total**
Output Data					
nickel, lb		1.54E-08	1.44E-06	1.75E-08	1.47E-06
Parameter/Units	**Total**				
Resultant Ratio (Output/Input)					
ratio	1.87E-09				

* The three compliance test runs performed encompassed the batch production run from beginning to end.

5.0 Internal QA/QC Activities

5.1 QA/QC Audits

The meter box and sampling trains used during sampling performed within the requirements of their respective methods. All post-test leak checks, minimum metered volumes, minimum sample durations, and percent isokinetics met the applicable QA/QC criteria.

EPA Method 29 analytical QA/QC results are included in the laboratory report. The method QA/QC criteria were met.

5.2 QA/QC Discussion

All QA/QC criteria were met during this test program.

5.3 Quality Statement

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is included in the report appendices. The content of this report is modeled after the EPA Emission Measurement Center Guideline Document (GD-043).