Derenzo and Associates, Inc.
Environmental Consultants

EMISSION TEST REPORT

Report Title	RESULTS OF THE RELATIVE ACCURACY TEST AUDIT OF CO AND SO_2 CONTINUOUS EMISSION RATE MONITORING SYSTEMS
Report Date	January 13, 2015
Test Dates	November 19, 2014

Facility Information	
Name	Gerdau Specialty Steel North America
Street Address	3100 Brooklyn Rd
City, County	Jackson, Jackson County

Facility Permit Information			
State Registration No.	B4306	ROP No.	MI-ROP-B4306-2009

Testing Contractor	
Company Mailing Address	Derenzo and Associates, Inc. 4990 Northwind Drive, Suite 120 East Lansing, MI 48823
Phone	(517) 324-1880
Project No.	1408010

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

RENEWABLE OPERATING PERMIT REPORT CERTIFICATION

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

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 Gerdau Specialty Steel North America County Jackson

Source Address 3100 Brooklyn Rd. City Jackson

AQD Source ID (SRN) M4306 ROP No. MI-ROP-B4306-2009 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 11/19/14 To 11/19/14

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

Certification of the Results of the Relative Accuracy Test Audit of CO and SO2 Continuous Emission Rate Monitoring Systems as specifed by Renewable Operating Permit No. MI-ROP-B4306-2009. Testing was performed November 19, 2014.

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

Andre Wollmann	Plant Manager	(517) 764-0311
Name of Responsible Official (print or type)	Title	Phone Number

Signature of Responsible Official — Date: 1/14/15

* Photocopy this form as needed.

EQP 5736 (Rev 11-04)

Derenzo and Associates, Inc.
Environmental Consultants

RESULTS OF THE RELATIVE ACCURACY TEST AUDIT OF CO AND SO_2 CONTINUOUS EMISSION RATE MONITORING SYSTEMS

GERDAU SPECIALTY STEEL NORTH AMERICA
JACKSON, MICHIGAN

1.0 INTRODUCTION

Gerdau Specialty Steel North America (Gerdau) operates electric arc furnaces (EAF), a ladle metallurgy furnace (LMF), and a vacuum arc degasser (VAD) at its Jackson, Michigan facility that is identified as flexible group FG-EAF/LMF/VAD in the State of Michigan Renewable Operating Permit MI-ROP-B4306-2009 issued to the facility.

Conditions of the operating permit require Gerdau to operate a carbon monoxide (CO) and sulfur dioxide (SO_2) continuous emission rate monitoring system (CERMS) for FG-EAF/LMF/VAD. This test report presents the results of the relative accuracy test audit (RATA) for the existing CO and SO_2 CERMS.

The CO and SO_2 CERMS RATA determination testing was performed November 19, 2014 by Derenzo and Associates, Inc. representatives Jason Logan, Daniel Wilson and Andrew Rusnak. The project was coordinated by Gerdau representative Mr. Ross Bradley.

Mr. David Patterson of the Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) was on-site to observe portions of the compliance demonstration. The exhaust gas sampling and analysis was performed using procedures specified in the Test Plan submitted to MDEQ-AQD dated October 2, 2014 and approved by the regulatory agency.

Appendix 1 provides a copy of the test plan approval letter issued by the MDEQ-AQD.

Questions regarding this emission test report should be directed to:

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Report Certification

This test report was prepared by Derenzo, Associates, Inc. based on field sampling data collected by Derenzo and Associates, Inc. Facility process data were collected and provided by Gerdau employees or representatives. This test report has been reviewed by Gerdau representatives and approved for submittal to the Michigan Department of Environmental Quality (MDEQ).

I certify that the testing was conducted in accordance with the approved test plan unless otherwise specified in this report. I believe the information provided in this report and its attachments are true, accurate, and complete.

Report Prepared By:

Andy Rusnak, QSTI
Technical Manager
Derenzo and Associates, Inc.

Reviewed By:

Robert L. Harvey, P.E.
General Manager
Derenzo and Associates, Inc.

Based on information and belief formed after reasonable inquiry, I believe the statements and information in this report are true, accurate and complete. The testing was performed in accordance with the approved test plan and the facility was operated in compliance with the permit conditions, at or near maximum routine operating conditions, during the test periods.

Facility Certification By:

Andre Wollmann
Plant Manager
Gerdau Specialty Steel North America

2.0 SUMMARY OF RESULTS

The CERMS RATA conducted on the FG-EAF/LMF/VAD exhaust and associated CEM systems, verified that the unit operated in compliance with the emission limits specified in ROP No. MI-ROP-B4306-2009.

The following table presents a summary of the CERMS RATA. Detailed results are presented in Tables 6.1 – 6.3 of this report.

Table 2.1 Summary of CERMS RATA results

RATA Parameter	Relative Accuracy Result	Allowable Limit
SO_2 (lb/hr)[1,2]	0.5%	10%
CO (lb/hr)[3]	3.4%	5%
Total Flow (scfm)[4]	13%	20%

1. SO2 CEMS RA result was 0.2 ppmv. Reference Performance Specification 4A, Section 13.2 allows RA to be within 5 ppmv.
2. CERMS RA result was calculated using the emission standard because actual emissions were less than 50% of the emission standard. MI-ROP-B4306-2009 specifies an allowable emission limit of 1.0 lb SO_2/ton and a material use limit for the EAF of 1,920 ton/day, which is equivalent to 80 lb SO_2/hr.
3. CERMS RA result was calculated using the emission standard because actual emissions were less than 50% of the emission standard. MI-ROP-B4306-2009 specifies an allowable emission limit of 5.0 lb CO/ton and a material use limit for the EAF of 1,920 ton/day, which is equivalent to 400 lb CO/hr.
4. CERMS RA result was calculated using the mean of the reference method results.

3.0 SOURCE DESCRIPTION

3.1 Metal Furnaces

Gerdau produces steel bar using two electric arc furnaces (EAF), a ladle metallurgy furnace (LMF), and a vacuum arc degasser (VAD) at the Jackson, Michigan facility. Exhaust gases from the processes (Identified as flexible group FG-EAF/LMF/VAD) are controlled by a positive pressure, fabric filter baghouse. Typical production at the facility is 50 tons per hour. The fume collection system has a maximum rated capacity of 618,000 actual cubic feet per minute (ACFM) @ 275°F (not including reverse air). The rated efficiency of the fabric filter baghouse is 99.9%.

3.2 Type of Raw Materials Used

The primary raw material is steel scrap. When in a molten state, approximately one percent by weight of carbon, manganese, silicon, and a fraction of a percent of aluminum are added as alloys. Nominal quantity of steel produced is 54 tons per hour through the caster. The furnace vessel itself is lined with a consumable material, earthen in nature.

3.3 Emission Control System Description

The EAFs are directly connected to side draft hoods, then to a spark-arrestor. Canopy hoods above each EAF are also directly connected to a spark arrestor. The outlet of the spark arrestor connects to fans (three separate fans) that exhaust to a positive pressure, reverse air-cleaned baghouse with polyester filter tubes.

The LMF is equipped with a hood that is fitted over a hot metal ladle. The hood is connected through ductwork to the same baghouse as the EAF. The VAD has a hood outside the vacuum chamber which collects fugitive emissions emitted when the vacuum chamber is opened after a ladle is degassed. This hood is also connected by ductwork to the baghouse. The baghouse was designed and supplied by Brandt Filtration Group of Norcross, Georgia.

Three separate process air ducts combine prior to being introduced to the baghouse. FLOWSIC100 PR volume flow measuring devices are installed in the ducts to continuously monitor airflow.

3.4 Process Operating Conditions During the Compliance Testing

During the compliance test program, Gerdau was running at normal, full load conditions, the average production rate for the day was 48.25 tons per hour. Gerdau representatives provided 1-minute averaged CERM data (combined flowrate, SO_2 and CO mass emission rates) for each test period.

Appendix 2 provides CERM system response data.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

A test plan for the compliance testing prepared by Gerdau and Derenzo and Associates and was reviewed by the MDEQ-AQD. This section provides a summary of the sampling and analytical procedures that were used during the test and presented in the test plan.

4.1 Summary of USEPA Test Methods

Derenzo and Associates, Inc. performed the exhaust gas and pollutant measurements in accordance with the following USEPA reference test methods:

Parameter / Analyte	Sampling Methodology	Analytical Methodology
Velocity traverses	USEPA Method 1	Selection of sample and velocity traverse locations by physical stack measurements
Volumetric flow rate	USEPA Method 2	Measurement of velocity head using a Type-S Pitot tube and inclined manometer
Oxygen and Carbon dioxide	USEPA Method 3A	IR & Paramagnetic instrumental analyzers
Moisture	USEPA Method 4	Wet bulb / dry bulb temperature measurements
Sulfur dioxide	USEPA Method 6C	Ultraviolet (UV) fluorescence instrumental analyzer
Carbon monoxide	USEPA Method 10	Non-dispersive infrared (NDIR) instrumental analyzer

In addition to the measurement methods specified in the previous table:

- USEPA Method 205; *Verification of Dilution Systems for Field Instrument Calibrations,* was used to verify linearity of the calibration gas dilution system.
- USEPA Performance Specification (PS) 2, *Specifications for SO_2 and NO_X Continuous Emission Monitoring Systems in Stationary Sources;* was used to evaluate the acceptability the analyzer used to monitor the SO_2 content of the gases exhausted from FG-EAF/LMF/VAD.

- USEPA PS 4, *Specifications and Test Procedures for Carbon Monoxide Continuous Emission Monitoring Systems in Stationary Sources;* was used to evaluate the acceptability the analyzer used to monitor the CO content of the gases exhausted from FG-EAF/LMF/VAD.

- USEPA PS 6, *Specifications and Test Procedures for Continuous Emission Rate Monitoring Systems in Stationary Sources;* was used to evaluate the acceptability the flowrate monitors and the CO and SO_2 analyzers used to monitor the gases exhausted from FG-EAF/LMF/VAD.

4.2 Sampling Locations and Velocity Measurements (USEPA Method 1 and 2)

The locations of the velocity measurement ports meet the USEPA Method 1 criteria for a representative measurement location. The inner diameter of the ducts is 108.625 inches. Each duct is equipped with two (2) 4.0-inch sample ports, opposed 90°, that provided a sampling location 5 duct diameter downstream and 1 duct diameters upstream from any flow disturbance.

Velocity pressure traverse locations for the sampling points were determined in accordance with USEPA Method 1.

Exhaust gas velocity pressure and temperature were measured at each sampling location in accordance with USEPA Method 2 using an S-type Pitot tube connected to a red-oil manometer. A K-type thermocouple mounted to the Pitot tube was used for temperature measurements. The pitot tube and connective tubing were leak-checked prior to each set of velocity measurements to verify the integrity of the measurement system. Upon conclusion of each velocity traverse, the pitot was cleared of any particulate deposits by using a small acetone rinse and blown out with compressed air.

The absence of cyclonic flow for each sampling location was verified using the S-type pitot tube and oil manometer. The pitot tube was positioned at several representative velocity traverse points with the planes of the face openings of the pitot tube perpendicular to the stack cross-sectional plane. The pitot tube was then rotated to determine the null angle (rotational angle as measured from the perpendicular, or reference, position at which the differential pressure is equal to zero).

Appendix 3 provides diagrams of the test sampling locations.

Appendix 4 provides flowrate calculations and data sheets.

4.3 Exhaust Gas Molecular Weight Determination (USEPA Method 3A)

CO_2 and O_2 content in the exhaust gas stream were measured continuously throughout each test period in accordance with USEPA Method 3A. The CO_2 content of the gas stream was monitored using a Servomex Model 4900 infrared (IR) gas analyzer. The O_2 content of the gas stream was monitored using a Servomex Model 4900 paramagnetic gas analyzer.

Prior to, and at the conclusion of each test, the instruments were calibrated using upscale calibration and zero gas to determine analyzer calibration error and system bias (described in Section 5.0 of this document). Sampling times were recorded on field data sheets.

Appendix 5 provides O_2 and CO_2 calculation sheets. Raw instrument response data are provided in Appendix 6.

4.4 Determination of moisture content in stack gases (USEPA Method 4)

Moisture determinations for the gas stream was determined using the USEPA Method 4 approximation technique consisting of wet bulb-dry bulb temperature measurements using a type-K thermocouple and calibrated digital pyrometer in conjunction with a psychometric chart.

4.5 SO_2 and CO Concentration Measurements (USEPA Method 6C and 10)

SO_2 and CO pollutant concentrations in the exhaust gas stream were determined using a Teledyne Advanced Pollution Instrumentation (T-API) Model 100AH ultraviolet fluorescence SO_2 analyzer and a Fuji ZRF NDIR CO analyzer.

Prior to, and at the conclusion of each test, the instruments were calibrated using upscale calibration and zero gas to determine analyzer calibration error and system bias (described in Section 5.0 of this document). Sampling times were recorded on field data sheets.

Appendix 5 provides CO and SO_2 calculation sheets. Raw instrument response data are provided in Appendix 6.

4.6 Extractive gas sampling system

A "rake-type" sampling probe is installed in the baghouse exhaust for sampling gaseous pollutants. The test team used this sampling probe to obtain a sample of the baghouse exhaust gas for the reference analyzers. Samples of the baghouse exhaust gas were continuously delivered to the instrument analyzers using a heated Teflon® line and filtered using a heated 10-micron stainless steel filter. The heated Teflon® line and heated filter were equipped with a temperature controller which maintained the temperature of the sample line between 250°F to 300 °F in order to prevent moisture condensation.

The exhaust gas samples for the Method 3A (CO_2, O_2), Method 6C (SO_2) and Method 10 (CO) instruments were conditioned (i.e., dried using a sample gas condenser) prior to being introduced

to the instrument analyzer. Therefore, these measurements correspond to standard conditions with moisture correction (dry basis).

4.7 Relative Accuracy Performance Specification (USEPA PS2, PS4 and PS6)

Performance of the relative accuracy testing included performing nine (9) separate tests where concentrations of SO_2 and CO were measured for at least 21 minutes.

The RA was calculated for each measurement system using the equations in Performance Specifications 2, 4 and 6. Performance of the CERMS was considered acceptable when compared against the following performance specifications:

- Calculated SO_2 and flowrate RA is no greater than 20% or 10% if using the emission standard in the denominator of the RA calculation (i.e., when measured emissions are less than 50% of the standard).

- Calculated CO RA is no greater than 10% or 5% if using the emission standard in the denominator of the RA calculation (i.e., when measured emissions are less than 50% of the standard).

- Calculated total flowrate RA is no greater than 20% or 10% if using the emission standard in the denominator of the RA calculation.

The SO_2 and CO CERMS RA results were calculated using the emission standard because actual emissions were less than 50% of the emission standard. To determine the emission standard the pound per ton emission limits and allowable material use rate specified in MI-ROP-B4306-2009 were used to calculate a pound per hour emission standard. MI-ROP-B4306-2009 specifies an allowable emission limit of 1.0 lb SO_2/ton and a material use limit for the EAF of 1,920 ton/day, which is equivalent to 80 lb SO_2/hr. MI-ROP-B4306-2009 specifies an allowable emission limit of 5.0 lb CO/ton and a material use limit for the EAF of 1,920 ton/day, which is equivalent to 400 lb CO/hr.

5.0 INTERNAL QA/QC ACTIVITIES

5.1 Sampling System Response Time Determination

The response time of the sampling system was determined prior to the compliance test program by introducing upscale gas and zero gas, in series, into the sampling system using a tee connection at the base of the sample probe. The elapsed time for the analyzer to display a reading of 95% of the expected concentration was determined using a stopwatch.

The API Model 100 AH SO_2 analyzer exhibited the longest system response time at 6 minutes 10 seconds. Results of the response time determinations were recorded on field data sheets. For each test period, test data were collected once the sample probe was in position for at least twice the maximum system response time.

The response time of the CEM system was approximately three (3) minutes greater than the reference monitor analyzers, therefore, appropriate adjustments were made to the sampling times (i.e., if the reference monitor test time began at 8:30 am, CEM data for comparison would begin at 8:33 am).

5.2 Gas Divider Certification (USEPA Method 205)

A STEC Model SGD-710C 10-step gas divider was used to obtain appropriate calibration span gases. The ten-step STEC gas divider was NIST certified (within the previous 12 months) with a primary flow standard in accordance with Method 205. When cut with an appropriate zero gas, the ten-step STEC gas divider delivered calibration gas values ranging from 0% to 100% (in 10% step increments) of the USEPA Protocol 1 calibration gas that was introduced into the system. The field evaluation procedures presented in Section 3.2 of Method 205 were followed prior to use of gas divider. The field evaluation yielded no errors greater than 2% of the triplicate measured average and no errors greater than 2% from the expected values.

5.3 Instrumental Analyzer Interference Check

The instrumental analyzers used to measure NO_X, CO, O_2 and CO_2 have had an interference response test preformed prior to their use in the field (July 26, 2006 and July 3, 2007), pursuant to the interference response test procedures specified in USEPA Method 7E. The appropriate interference test gases (i.e., gases that would be encountered in the exhaust gas stream) were introduced into each analyzer, separately and as a mixture with the analyte that each analyzer is designed to measure. All of analyzers exhibited a composite deviation of less than 3.0% of the span for all measured interferent gases. No major analytical components of the analyzers have been replaced since performing the original interference tests.

5.4 Instrument Calibration and System Bias Checks

At the beginning of each day of the testing program, initial three-point instrument calibrations were performed for the SO_2, CO, CO_2 and O_2 analyzers by injecting calibration gas directly into the inlet sample port for each instrument. System bias checks were performed prior to and at the conclusion of each sampling period by introducing the upscale calibration gas and zero gas into the sampling system (at the base of the stainless steel sampling probe prior to the particulate filter and Teflon® heated sample line) and determining the instrument response against the initial instrument calibration readings.

The instruments were calibrated with USEPA Protocol 1 certified concentrations of CO_2, O_2, SO_2, and CO in nitrogen and zeroed using hydrocarbon free nitrogen. A STEC Model SGD-710C ten-step gas divider was used to obtain intermediate calibration gas concentrations as needed.

Appendix 7 provides information and quality assurance data for the equipment and instrumental analyzers used for the RA test periods (calibration data, copies of calibration gas certificates, gas divider certification, Pitot tube integrity inspection sheets, and interference study records).

6.0 TEST RESULTS AND DISCUSSION

6.1 Test Results and Allowable Emission Limits

Air pollutant emission measurement results for each CERMS RATA are presented in Tables 6.1 through 6.3.

ROP No. MI-ROP-B4306-2009 requires Gerdau to install and operate each CERMS in accordance with the requirements detailed in Appendix 3 and to use the CERMS data for determining compliance with Special Condition Nos. I.5, I.6, I.9 and I.10 of the ROP. S.C. I.5, I.6, I.9 and I.10 of the ROP present emission rate limits for the FG-EAF/LMF/VAD. The compliance demonstration performed on November 19, 2014 demonstrated:

- The relative accuracy for the total exhaust flowrate monitor was 13% (allowable relative accuracy limit is 20%);
- The relative accuracy for the SO_2 emission rate monitor was 0.5% (allowable relative accuracy limit is 10%); and
- The relative accuracy for the CO emission rate monitor was 3.4% (allowable relative accuracy limit is 5%).

The test results confirmed that the CO, SO_2 and exhaust flowrate monitors are operated in compliance with the allowable relative accuracy limits specified in the respective performance specifications.

6.2 Variations from Normal Sampling Procedures or Operating Conditions

The testing was performed in accordance with the Test Plan dated October 2, 2014 and specified USEPA test methods. All instrument calibrations and sampling period results satisfied the quality assurance verifications required by USEPA. No variations from the normal operating conditions occurred during the testing program.

Table 6.1 - SO_2 Emission Rate RATA for Gerdau - Jackson Baghouse Exhaust

Run Number	Test Date	Begin	End	Ref. Method Result (lb SO_2/hr)	CERMS Data[1] (lb SO_2/hr)	Difference [d]
1	11/19/14	8:30	8:51	0.00	0.94	-0.9
2	11/19/14	9:29	9:50	0.00	0.34	-0.3
3	11/19/14	10:26	10:47	0.00	0.31	-0.3
4	11/19/14	11:28	11:49	0.35	0.04	0.3
5	11/19/14	12:24	12:45	0.40	0.04	0.4
6	11/19/14	13:19	13:40	0.42	0.01	0.4
7	11/19/14	14:11	14:32	0.00	0.10	-0.1
8	11/19/14	15:05	15:26	0.74	0.09	0.7
9	11/19/14	15:56	16:17	0.00	0.04	0.0

Number of tests periods:	$[n]$	9
Arithmetic Mean Difference:	$[d']$	0.00
Standard Deviation:	$[S_d]$	0.491
97.5% Confidence T-Value:	$[t_{0.975}]$	2.306
Confidence Coefficient:	$[CC]$	0.38
Arithmetic Mean RM Values[2]:	$[RM']$	80.0
Relative Accuracy[3]:	$[RA]$	**0.47%**
Allowable Limit:		**10%**

[1] Appendix 2 provides CERMS data provided by Gerdau.

[2] If actual measured emissions are less than 50% of applicable standard, use the emission standard for RM'

[3] Relative accuracy for the CEMS must be no greater than 20% (10% if the emission standard is used for RM').

Table 6.2 - CO Emission Rate RATA for Gerdau - Jackson Baghouse Exhaust

Run Number	Test Date	Begin	End	Ref. Method Result (lb CO/hr)	CERMS Data	Difference [d]
1	11/19/14	8:30	8:51	184.1	206.7	-22.6
2	11/19/14	9:29	9:50	55.4	74.5	-19.1
3	11/19/14	10:26	10:47	70.2	82.1	-11.9
4	11/19/14	11:28	11:49	81.1	87.3	-6.2
5	11/19/14	12:24	12:45	216.0	203.0	13.0
6	11/19/14	13:19	13:40	138.3	134.3	4.0
7	11/19/14	14:11	14:32	85.3	83.5	1.9
8	11/19/14	15:05	15:26	462.9	431.5	31.4
9	11/19/14	15:56	16:17	89.8	86.6	3.1

Number of tests periods:	$[n]$	9
Arithmetic Mean Difference:	$[d']$	-0.72
Standard Deviation:	$[S_d]$	16.715
97.5% Confidence T-Value:	$[t_{0.975}]$	2.306
Confidence Coefficient:	$[CC]$	12.85
Arithmetic Mean RM Values[2]:	$[RM']$	400.0
Relative Accuracy[3]:	$[RA]$	**3.4%**
Allowable Limit:		**10%**

[1] Appendix 2 provides CERMS data provided by Gerdau.

[2] If actual measured emissions are less than 50% of applicable standard, use the emission standard for RM'

[3] Relative accuracy for the CEMS must be no greater than 10% (5% if the emission standard is used for RM').

Table 6.3 - Combined Flow RATA for Gerdau - Jackson Baghouse Exhaust

Run Number	Test Date	Begin	End	Ref. Method Result (scfm)	CERMS Data[1]	Difference [d]
1	11/19/14	8:30	8:51	698,815	618,185	80,629
2	11/19/14	9:29	9:50	730,572	639,891	90,682
3	11/19/14	10:26	10:47	713,320	615,336	97,984
4	11/19/14	11:28	11:49	662,601	593,787	68,814
5	11/19/14	12:24	12:45	710,603	622,556	88,047
6	11/19/14	13:19	13:40	682,461	598,448	84,014
7	11/19/14	14:11	14:32	704,141	615,773	88,368
8	11/19/14	15:05	15:26	707,744	621,519	86,224
9	11/19/14	15:56	16:17	696,713	599,967	96,746

Number of tests periods:	$[n]$	9
Arithmetic Mean Difference:	$[d']$	86834
Standard Deviation:	$[S_d]$	8752
97.5% Confidence T-Value:	$[t_{0.975}]$	2.306
Confidence Coefficient:	$[CC]$	6727
Arithmetic Mean RM Values:	$[RM']$	700774
Relative Accuracy[2]:	$[RA]$	**13%**
Allowable Limit:		**20%**

[1] Appendix 2 provides CERMS data provided by Gerdau.

[2] Relative accuracy for the CEMS must be no greater than 20%.