Alliance
SOURCE TESTING

Compliance Test Report

The Alliance Advantage 2-2-2

Real Alloy Specification, Inc.
268 West Garfield Avenue
Coldwater, MI 49036
(North)

Test Date: November 10-11, 2015

AST Project No. 2015-0479
Submitted Date: December 30, 2015

Regulatory Information

Permit No.'s	MDEQ Title V Permit No. MI-ROP-N5957-2012A MDEQ PTI-110-15
State Registration Number	N5957

Source Information

Source Name	*Source ID*	*Target Parameter(s)*
Flue No. 7	SVALFURN7	PM, PM10, HCl

Contact Information

Test Location
Real Alloy Recycling, Inc.
368 West Garfield Avenue
Coldwater, MI 49036

Greg Hall
gregory.hall@realalloy.com
(517) 269-4037

Jeff Ferg
jeff.ferg@realalloy.com
(216) 755-8822

Brady Myers
brady.myers@realalloy.com
(517) 279-4036

Test Company
Alliance Source Testing, LLC
214 Central Circle SW
Decatur, AL 35603

Project Manager
Chris LeMay
chris.lemay@stacktest.com
(256) 260-3973

Field Team Leader
Pete Merranko
pete.merranko@stacktest.com
(724) 640-0568

Report Coordinator
Laura Aymett
laura.aymett@stacktest.com
(256) 260-3981

QA/QC Manager
Brandy Hughes
brandy.hughes@stacktest.com
(615) 476-0559

Analytical Laboratories
Alliance Source Testing, LLC
214 Central Circle SW
Decatur, AL 35603
Heather Morgan
heather.morgan@stacktest.com
(256) 260-3972

Maxxam Analytics, Inc.
5555 N. Service Rd.
Mississauga, Ontario L5N 2L8
Clayton Johnson
clayton.johnson@maxxamanalytics.com
(905) 817-5769

ERA
16341 Table Mountain Parkway
Golden, CO 80403
Eric Love
elove@eraqc.com
(800) 372-0122

Alliance Source Testing, LLC (AST) has completed the source testing as described in this report. Results apply only to the source(s) tested and operating condition(s) for the specific test date(s) and time(s) identified within this report. All results are intended to be considered in their entirety, and AST is not responsible for use of less than the complete test report without written consent. This report shall not be reproduced in full or in part without written approval from the customer.

To the best of my knowledge and abilities, all information, facts and test data are correct. Data presented in this report has been checked for completeness and is accurate, error-free and legible. Onsite testing was conducted in accordance with approved internal Standard Operating Procedures. Any deviations or problems are detailed in the relevant sections on the test report.

This document was prepared in portable document format (.pdf) and contains pages as identified in the bottom footer of this document.

Chris LeMay, QSTI
Alliance Source Testing, LLC

12/28/15
Date

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

1.0 Introduction

Alliance Source Testing, LLC (AST) was retained by Real Alloy Recycling, Inc. (RAR) to conduct compliance demonstration testing at the Coldwater (N), MI facility. This facility is subject to the provisions of the Michigan Department of Environment Quality (MDEQ) Title V Permit No. M1-ROP-N5957-2012A, MDEQ Permit To Install (PTI) Permit No. 110-15 and portions of the facility are subject to provisions of the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Secondary Aluminum Production facilities as detailed in 40 CFR 63, Subpart RRR. This test program was conducted to satisfy provisions detailed in the MDEQ PTI and Consent Order 35-2014.

Testing was conducted to determine emission rates and emission factors of filterable particulate matter (PM), PM less than 10 microns (PM10) and hydrogen chloride (HCl) from the Reverberatory Furnace No. 7 Flue (Reverb No. 7 Flue). The furnace was operated at or near maximum production capacity for the selected test materials.

1.1 Facility Description

RAR is a secondary aluminum production facility (SIC 3341) which produces molten aluminum and specification ingot from the melting and recovery of aluminum from aluminum scrap, sow and pig. The recovery of aluminum from aluminum scrap and aluminum dross and the subsequent production of aluminum ingot have been defined by EPA as secondary aluminum production processes.

1.2 Source and Control System Descriptions

The three (3) reverberatory furnaces – #1, #7, and #8 – are designed as sidewell melter/holder units. The reverberatory furnaces are used to melt aluminum scrap that has been processed by the aluminum shredder, thermal chip dryer or directly charged. The main scrap types consumed include turnings, cast, extrusions, twitch, clips and alloying materials. The scrap is charged to the sidewell of the furnace along with solid flux material, alloying agents and gaseous Cl_2 that are required for the production order. Clean charge consumed includes sow, ingot and molten metal. Once the materials are molten, the metal flows through a submerged opening to the hearth. Once properly alloyed, the furnace is tapped and the molten aluminum is either transferred to a holding furnace, refractory lined crucibles or cast into ingot.

To capture process emissions, the reverberatory furnaces were built with hooding systems over the side wells. To control process emissions, the exhausts from the capture hoods are ducted to lime-injected baghouse systems. In addition, the Reverb No. 7 and Reverb No. 8 flue stacks are now ducted to separate lime-injection baghouse systems for control of PM and HCl. Both baghouse systems exhaust through a common stack to the atmosphere.

1.3 Project Team

Personnel involved in this project are identified in the following table.

Table 1-1
Project Team

RAR Personnel	Jeff Ferg
AST Personnel	Pete Merranko Mike Belfoure Jared Wansor

1.4 Site Specific Test Plan & Notification

Testing was conducted in accordance with the Site Specific Test Plan (SSTP) submitted to the MDEQ on October 19, 2015. Testing for filterable PM was added to the test program on November 4, 2015 to demonstrate compliance with the consent order.

1.5 Test Program Events

Testing on the Reverberatory Furnace No. 8 Flue (Reverb No. 8 Flue) was scheduled during this test program. However, this testing was postponed due to unsafe test conditions caused by high winds in the area.

Test Run 2 on November 10, 2015 for Reverb No. 7 Flue was voided due to non-representative control system operating conditions. The voided test data is provided in Appendix G.

2.0 Summary of Results

AST conducted compliance demonstration testing at the RAR facility in Coldwater (N), MI on November 10-11, 2015. Testing consisted of determining the emission rates of PM, PM10 and HCl from the Reverb No. 7 Flue.

Table 2-1 provides a summary of the testing results along with a summary of the process operating and control system data collected during testing. Any difference between the summary results listed in the following table and the detailed results contained in Appendix B is due to rounding for presentation.

Table 2-1
Summary of Results

Emissions Data				
Run Number	**Run 1**	**Run 3**	**Run 4**	**Average ***
Date	**11/10/15**	**11/11/15**	**11/11/15**	**--**
Particulate Matter Data				
PM Emission Rate, lb/hr	0.020	0.016	0.016	0.017
PM Emission Factor, lb/ton	0.0046	0.0040	0.0037	0.0041
Permit Limit, lb/ton	--	--	--	0.580
Percent of Limit, %	--	--	--	1
PM10 Emission Rate, lb/hr	2.8	2.0	0.38	1.7
PM10 Emission Factor, lb/ton	0.67	0.49	0.090	0.42
Permit Limit, lb/ton	--	--	--	0.489
Percent of Limit, %	--	--	--	**85**
Hydrogen Chloride Data				
Emission Rate, lb/hr	1.3	0.92	0.39	0.85
Emission Factor, lb/ton	0.30	0.22	0.092	0.20
Permit Limit, lb/ton	--	--	--	1.181
Percent of Limit, %	--	--	--	17
Process Operating / Control System Data				
Run Number	**Run 1**	**Run 3**	**Run 4**	**Average ***
Date	**11/10/15**	**11/11/15**	**11/11/15**	**--**
Feed Rate, lb/hr	8,424	8,232	8,469	8,375
Flux Percent, %	2.3	3.6	2.3	2.7
Chlorine Weight, lb	432	322	281	345
Lime Injection Rate, lb/hr	19.9	32.9	32.9	28.6

* Run 2 was voided – see Section 1.5.

3.0 Testing Methodology

The emission testing program was conducted in accordance with the U.S. EPA Reference Test Methods listed in Table 3-1. Method descriptions are provided below while quality assurance/quality control data is provided in Appendix D.

Table 3-1
Source Testing Methodology

Parameter	U.S. EPA Reference Test Methods	Notes/Remarks
Volumetric Flow Rate	1 & 2	Full Velocity Traverses
Oxygen/Carbon Dioxide	3/3A	Instrumental Analysis
Moisture Content	4	Volumetric / Gravimetric Analysis
Particulate Matter	5	Isokinetic Testing
Hydrogen Chloride	26A	Isokinetic Testing
Particulate Matter less than 10 microns	201A/202	Constant Rate Sampling

3.1 U.S. EPA Reference Test Methods 1 & 2 – Volumetric Flow Rate

The sampling location and number of traverse (sampling) points were selected in accordance with U.S. EPA Reference Test Method 1. A full velocity traverse was conducted in accordance with U.S. EPA Reference Test Method 2 to determine the average stack gas velocity pressure, static pressure and temperature. The velocity and static pressure measurement system consisted of an S-type pitot tube and inclined manometer while the stack gas temperature was measured with a K-type thermocouple and pyrometer.

3.2 U.S. EPA Reference Test Method 3/3A – Oxygen/Carbon Dioxide

The oxygen and carbon dioxide concentrations were determined in accordance with U.S. EPA Reference Test Method 3. One (1) integrated Tedlar bag sample will be collected during each test run. The bag samples will be analyzed on site with a paramagnetic O_2 analyzer and infrared CO_2 analyzer. Analyzer calibrations will be conducted in accordance with U.S. EPA Reference Test Method 3A. The remaining stack gas constituent will be assumed to be nitrogen for the stack gas molecular weight determination. The quality control measures are described in Section 3.7.

3.3 U.S. EPA Reference Test Method 4 – Moisture Content

The stack gas moisture content was determined in accordance with U.S. EPA Reference Test Method 4. The gas conditioning train consisted of a series of chilled impingers. Prior to testing, each impinger was filled with a known quantity of water or silica gel. Post testing, the quantities of water and silica gel were measured to determine the amount of moisture condensed during the test run. Alternatively, each impinger was analyzed gravimetrically before and after each test run on the same analytical balance to determine the amount of moisture condensed.

3.4 U.S. EPA Reference Test Method 5 – Particulate Matter

The particulate matter testing was conducted in accordance with U.S. EPA Reference Test Method 5. The complete sampling system consisted of a glass nozzle, heated glass-lined probe, pre-weighed Teflon filter, gas conditioning train, pump and calibrated dry gas meter. The gas conditioning train consisted of four (4) chilled impingers – the first and second containing 100 mL of H_2O, an empty third impinger and the fourth containing approximately 200 grams of silica gel.

Following the completion of each test run, the sampling train was leak checked at a vacuum pressure greater than or equal to the highest vacuum pressure observed during the run. The probe and nozzle were rinsed three (3) or six (6) times with acetone to remove any adhering particulate matter. The front half of the filter holder was rinsed three (3) times with acetone, and these rinses were added to the probe/nozzle rinse. The pre-weighed filter was carefully removed and placed in its sample container. All containers were sealed, labeled and liquid levels marked for transport to the identified laboratory.

3.5 U. U.S. EPA Reference Test Method 26A – Hydrogen Chloride

The hydrogen chloride concentration was determined in accordance with U.S. EPA Reference Test Method 26A. The complete sampling system consisted of a Teflon-coated or glass nozzle, heated glass-lined probe, Teflon filter, gas conditioning train, pump and calibrated dry gas meter. The gas conditioning train consisted of four (4) impingers contained in an ice/water bath. The first and second impingers contained 100 mL of 0.1 N H_2SO_4, the third was empty and the last impinger contained approximately 200 grams of silica gel. The probe and filter box temperatures were maintained above 250°F, and the impinger temperature was maintained below 68°F throughout the testing.

Following the completion of the test run, the sampling train was leak checked at a vacuum pressure greater than or equal to the highest vacuum pressure observed during the run. After determining the amount of condensed moisture in each impinger, the contents of the first, second and third impingers were placed into a sample container. The back-half of the filter holder, first, second and third impingers and all glassware leading to the outlet of the third impinger were triple-rinsed with DI water, and these rinses were recovered in the sample container. The samples were sealed, labeled and liquid levels marked for transport to identified laboratory.

3.6 U.S. EPA Reference Test Methods 201A/202 – PM10 & PM2.5

The PM10 and PM2.5 testing was conducted in accordance with U.S. EPA Reference Test Methods 201A and 202. The complete sampling system consisted of a stainless nozzle; in-stack 10 um and 2.5 um cyclones and pre-weighed quartz filter; heated stainless-lined probe; gas conditioning train; pump and calibrated dry gas meter. The gas conditioning train will consist of four (4) impingers. The first and second impingers were initially empty, the third contained 100 milliliters (mL) of de-ionized water and the fourth impinger contained approximately 200 grams of silica gel. An un-weighed 90 mm Teflon filter was placed between the second and third impinger.

Following the completion of each test run, the sampling train was leak checked at a vacuum pressure greater than or equal to the highest vacuum pressure observed during the run. The contents of impingers 1 and 2 were recovered in Container 1. Impingers 1 and 2, the coil condenser and all connecting glassware was rinsed with water and then with acetone and hexane. The water rinses were added to Container 1 while the solvent rinses were recovered in Container 2. The filter was removed from the filter holder and placed in Container 3. The front half of the

condensable filter holder was rinsed with water and then with acetone and hexane. The water rinse was added to Container 1 while the solvent rinses were added to Container 2.

The pre-weighed filter was removed and placed in Container 4. The back-half of the PM10 cyclone, front half of the PM2.5 cyclone and the connecting stainless tubing was rinsed three (3) times with acetone, and recovered in Container 5. The back-half of the PM2.5 cyclone and front half of the filter holder was rinsed three (3) times with acetone to remove any adhering particulate matter and recovered in Container 6. All containers were sealed, labeled and liquid levels marked for transport to the laboratory for analysis.

3.7 Quality Assurance/Quality Control – U.S. EPA Reference Test Method 3A

Cylinder calibration gases used met Protocol 1 (+/- 2%) standards.

Low Level gases were introduced directly to analyzer. After adjusting the analyzer to the Low Level gas concentration and once the analyzer reading was stable, the analyzer reading was recorded. This process was repeated for the High Level gas. Next, Mid Level gases were introduced directly to analyzer and reading was recorded. All recording readings were within +/- 2 percent of the Calibration Span.

All data was reviewed by the Field Team Leader before leaving the facility. Once arriving at AST's office, all written and electronic data was relinquished to the report coordinator and then a final review was performed by the Project Manager.