

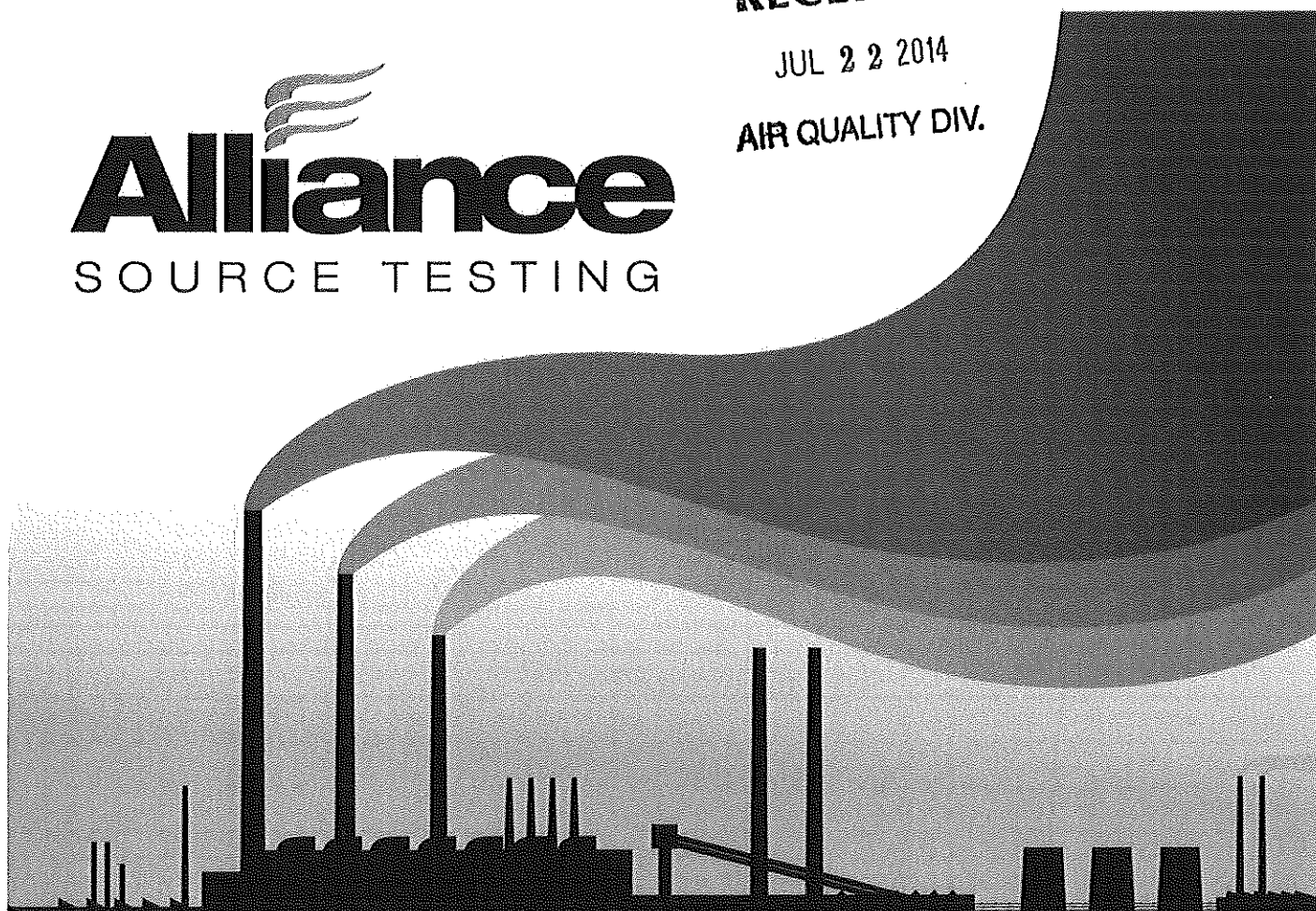


**Alliance**  
SOURCE TESTING

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## Source Test Report

Continental Aluminum  
29201 Milford Road  
New Hudson, MI 48165

Test Dates: June 12-13, 2014




AST Project No. 2014-0192  
Submittal Date: July 17, 2014

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

July 17, 2014

Date

## 1.0 Introduction

Alliance Source Testing, LLC (AST) was retained by Continental Aluminum (Continental) to conduct compliance demonstration testing at New Hudson, Michigan facility. This facility is subject to Michigan Department of Environmental Quality (MDEQ) Permit No. PTI 504-96F.

As an area source, the Continental facility is only subject to the dioxin/furan (D/F) emission requirements of the Secondary Aluminum NESHAP. The RV-1 baghouse currently meets the regulatory standard through furnace and control system operations established during the initial performance test (IPT) in September 2013. The purpose of the furnace flue stack is to demonstrate compliance with permitted emission rates under similar operating conditions.

Testing was conducted to determine the emission rates of filterable particulate matter (FPM), condensable particulate matter (CPM), hydrogen chloride (HCl) and hydrogen fluoride (HF) from the RV-1 De-Ox Reverberatory Furnace Flue.

## 1.1 Facility Description and Source Description

The Continental facility located in New Hudson, Michigan consists of secondary aluminum melting operations. The secondary melting operation contains two (2) reverberatory furnace processing units and a rotary furnace. The secondary aluminum melting process is initiated by placing scrap into the sidewell of the furnace. The scrap is melted in the sidewell using natural gas-fired burners to heat the aluminum to its melting point (approximately 1,250 °F). The exhaust from the sidewell is vented through a hood into the lime-injected baghouse. The hearth (heating input only) is separated from the sidewell physically with underflow weirs and vented through a separate stack to the atmosphere. The molten metal is continuously transferred from the sidewell (via a pump) to the hearth of the furnace and then is cast into shaped products for sale.

The reverberatory furnace (RV-1 De-Ox) is a continuous melting operation which consists of melting scrap and removing dross from the sidewell every 2-6 hours depending on scrape type. The exhaust from the sidewell hood is routed to a lime-injected baghouse, which is used to control particulate matter (PM) and hydrogen chloride (HCl) emissions from RV-1 for state permitting requirements. Lime is injected into the exhaust gas before the air stream enters the baghouse. Used lime and dust is collected for off-site disposal. Ambient air is introduced into the exhaust gas to reduce the temperature of the gas prior to entering the baghouse.

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## 2.0 Summary of Results

AST conducted compliance demonstration testing at the Continental facility in New Hudson, MI on June 12-13, 2014. Testing consisted of determining the emission rates of PM/PM10, HCl and HF from the Rv-1 De-Ox Reverberatory Furnace Flue.

Table 2-1 provides a summary of the emission testing results with comparisons to the applicable limits. This table also provides 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 2	Run 3	Average
Date	6/12/14	6/12/14	6/13/14	--
<b>PM/PM10 Data *</b>				
Emission Rate, lb/hr	1.2	1.4	0.87	1.1
Emission Limit, lb/hr	--	--	--	2.0
Percent of Limit, %	--	--	--	57
Emission Factor, lb/ton	0.16	0.18	0.12	0.15
<b>Hydrogen Chloride Data</b>				
Emission Rate, lb/hr	0.12	0.099	0.056	0.092
Emission Limit, lb/hr	--	--	--	1.95
Percent of Limit, %	--	--	--	5
Emission Factor, lb/ton	0.016	0.013	0.0075	0.012
<b>Hydrogen Fluoride Data</b>				
Emission Rate, lb/hr	0.032	0.046	0.031	0.036
Emission Factor, lb/ton	4.4E-03	6.1E-03	4.2E-03	4.9E-03
Process Operating / Control System Data				
Run Number	Run 1	Run 2	Run 3	Average
Date	6/12/14	6/12/14	6/13/14	--
Total Scrap Charge, lb (3hr cycle)	47,179	47,062	46,969	47,070
Feed Rate, lb/hr	14,517	14,940	14,911	14,789
Flux Addition, lb	3,630	4,310	4,730	4,223
Lime Injection Rate, lb/hr	42	42	46	43
Baghouse Inlet Temperature, °F	183	172	182	179

\* The PM/PM10 data presented is the sum of the FPM and CPM data.

**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	Test Methods	Notes/Remarks
Volumetric Flow Rate	1 & 2	Full Velocity Traverses
Oxygen/Carbon Dioxide	3/3A	Integrated Bag / Analyzer
Moisture Content	4	Volumetric / Gravimetric Analysis
Particulate Matter	5/202	Isokinetic Sampling
Hydrogen Chloride/Hydrogen Fluoride	26	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 and Carbon Dioxide**

The oxygen and carbon dioxide concentrations were determined in accordance with U.S. EPA Reference Test Method 3/3A. One (1) integrated Tedlar bag sample was collected during each test run. The bag samples were analyzed on site with an analyzer. The remaining stack gas constituent was assumed to be nitrogen for the stack gas molecular weight determination. The quality assurance/quality control measures are described in Section 3.6.

**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. The impinger contents were pre and post-measured to determine the amount of moisture condensed during each test run.

**3.4 U.S. EPA Reference Test Methods 5/202 – Particulate Matter**

The particulate matter testing was conducted in accordance with U.S. EPA Reference Test Methods 5 and 202. The complete sampling system consisted of a quartz nozzle, heated glass-lined probe, pre-weighed quartz filter, gas conditioning train, pump and calibrated dry gas meter. The gas conditioning train consisted of five (5) chilled impingers. The first, second and fourth impingers were initially empty, the third contained 100 milliliters (mL) of de-ionized water and the last impinger contained approximately 200-300 grams of silica gel. An un-weighed 90 mm Teflon filter was placed between the second and third impingers.

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. A 60-minute nitrogen purge of the CPM portion of the sampling system was conducted immediately following the posttest leak check.

The contents of the impingers were measured gravimetrically to determine the moisture gain. The contents of impinger 1 and 2 were recovered in Container 1. Impingers 1 and 2, the coil condenser and all connecting glassware were rinsed with water and then rinsed with acetone and hexane. The water rinses were added to Container 1 while the solvent rinses were recovered in Container 2. The un-heated Teflon filter was removed from the filter holder and placed in Container 3. The front half of the 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. All containers were sealed, labeled and liquid levels marked for transport to the identified laboratory

The pre-weighed quartz filter was carefully removed and placed in Container 4. The probe, nozzle and front half of the filter holder were rinsed three (3) times with acetone to remove any adhering particulate matter, and these rinses were recovered in Container 5. All containers were sealed, labeled and liquid levels marked for transport to the identified laboratory.

The mass of filterable particulate matter collected in the probe and nozzle was determined by evaporating the water rinse in a pre-weighed glass beaker and then weighing the residue until a constant weight was obtained. The filter loading was determined by subtracting the initial constant filter weight from the final constant weight. The filterable particulate loading was determined by adding these two (2) weights. All weight measurements were performed on the same balance (accurate to 0.1 mg). The total particulate loading was determined by adding the filterable particulate mass and the condensable particulate mass.

### **3.5 U.S. EPA Reference Test Method 26 – Hydrogen Chloride/Hydrogen Fluoride**

The hydrogen chloride and hydrogen fluoride concentrations were determined in accordance with U.S. EPA Reference Test Method 26. The complete sampling system consisted of a 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<sub>2</sub>SO<sub>4</sub>, the third was empty and the fourth 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 the identified laboratory.

### **3.6 Quality Assurance/Quality Control – U.S. EPA Reference Test Method 3A**

EPA Protocol 1 Calibration Gases – Cylinder calibration gases were supplied by a certified supplier which meet Protocol 1 (+/- 2%) standards. Copies of all calibration gas certificates can be found in the Quality Assurance/Quality Control Appendix.

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.

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