



09/03/2026

Jeff Stevenson
General Aluminum
5159 S. Prospect St.
Rootstown, OH 44266

RE: DRAFT AIR POLLUTION PERMIT-TO-INSTALL AND OPERATE

Facility ID: 1667070012
Permit Number: P0140906
Permit Type: Renewal
County: Portage

No	TOXIC REVIEW
No	SYNTHETIC MINOR TO AVOID MAJOR NSR
No	CEMS
Yes	MACT/GACT
No	NSPS
No	NESHAPS
No	NETTING
No	MODELING SUBMITTED
Yes	SYNTHETIC MINOR TO AVOID TITLE V
Yes	FEDERALLY ENFORCEABLE PTIO (FEPTIO)
No	SYNTHETIC MINOR TO AVOID MAJOR GHG

Dear Permit Holder:

A draft of the Ohio Administrative Code (OAC) Chapter 3745-31 Air Pollution Permit-to-Install and Operate (PTIO) for the referenced facility has been issued for the emissions unit(s) listed in the Authorization section of the enclosed draft permit. This draft action is not an authorization to begin construction or modification of your emissions unit(s). The purpose of this draft is to solicit public comments on the permit. A public notice will appear in the Ohio Environmental Protection Agency Weekly Review and Public Notices website, [Weekly Review and Public Notices](#). A copy of the public notice and the draft permit are enclosed. This permit can be accessed electronically on the Ohio EPA document search webpage: [eDocument Search | Ohio Environmental Protection Agency](#). Comments will be accepted as a marked-up copy of the draft permit or in narrative format. Any comments must be sent to the following:

Andrea Moore
Permit Review/Development Section
Ohio EPA, DAPC
50 West Town Street Suite 700
PO Box 1049
Columbus, Ohio 43216-1049

and

Akron Regional Air Quality Management
District
1867 West Market St.
Akron, OH 44313

Comments and/or a request for a public hearing will be accepted within 30 days of the date the notice appears on the Ohio EPA Weekly Review and Public Notices website, [Weekly Review and Public Notices | Ohio Environmental Protection Agency](#). You will be notified if a public hearing is scheduled. A decision on issuing a final permit-to-install will be made after consideration of comments received and oral testimony if a public hearing is conducted. Any permit fee that will be due upon issuance of a final Permit-to-Install is indicated in the Authorization section. Please do not submit any payment now. If you have any questions, please contact Akron Regional Air Quality Management District at (330)375-2480.

Sincerely,

Robert Hodanbosi
Chief, Division of Air Pollution Control

cc: U.S. EPA Region 5 Via E-Mail Notification
ARAQMD; Pennsylvania; West Virginia; Canada

PUBLIC NOTICE

The following matters are the subject of this public notice by the Ohio Environmental Protection Agency. The complete public notice, including any additional instructions for submitting comments, requesting information, a public hearing, or filing an appeal may be obtained at: [Weekly Review and Public Notices | Ohio Environmental Protection Agency](#) or Hearing Clerk, Ohio EPA, 50 W. Town St., Columbus, Ohio 43215. Ph: 614-644-3037 email: HClerk@epa.ohio.gov

Draft Air Pollution Permit-to-Install and Operate Renewal

General Aluminum
5159 S. Prospect St.
Rootstown, OH 44266

ID#: P0140906

Date of Action: 09/03/2026

Permit Desc: FEPTIO renewal and facility-initiated administrative modification to incorporate RACT standards. Pursuant to Part D of Title I of the Clean Air Act (CAA), Ohio EPA is required to establish a State Implementation Plan (SIP) for the attainment and maintenance of the NAAQS. The above-mentioned permit is a part of Ohio's SIP for attainment and maintenance of the 2015 ozone NAAQS and will be submitted to United States Environmental Protection Agency (U.S. EPA) as a modification of the SIP.

The permit and complete instructions for requesting information or submitting comments may be obtained at: <https://ohioepa.commentinput.com> - Search by entering permit #P0140906 in the "Search Projects" search box. The public comment period will run until 10/05/2026 at 11:59 PM.

Permit Strategy Write-Up

1. Check all that apply:

☐ Synthetic Minor Determination **N/A**

☐ Netting Determination **N/A**

2. Source Description:

The General Aluminum facility, located at 5159 South Prospect Street in Rootstown, Ohio, is a manufacturer of aluminum castings. Operations at the facility include melting, pouring/cooling, knockout, finishing, and heat treating. There are five natural gas-fired aluminum melting furnaces (emissions units P902, P923, P924, P925 and P926) at this facility. VOC emissions are generated by these sources primarily from incomplete combustion and fluxing agents. The seven pouring and cooling turntables (emissions units F002, F003, F004, F005, F006, F007 and F008) at this facility pour the molten aluminum into molds. VOC emissions are generated by these sources from the decomposition of binders in the cores when pouring, and the evaporation of mold release agents and residual binder components as the castings cool.

As required by the reclassification to serious nonattainment for ozone under the 2015 ozone National Ambient Air Quality Standards (NAAQS) promulgated by U.S. EPA, General Aluminum has submitted a VOC Reasonably Available Control Technology (RACT) study on March 30, 2026 (subsequently revised on April 29, 2026, June 12, 2026, and June 30, 2026) to address the feasibility of controlling VOC emissions from their aluminum casting operations. This facility does not have any prior source-specific VOC RACT established under OAC rule 3745-21-09. This permit modification includes the implementation of the proposed RACT limits in the June 30, 2026, revision of the RACT study. Section B of this permit cites the RACT limits under OAC rule 3745-21-11(B). The RACT limits are implemented under an OAC rule 3745-31-05(D) synthetic minor restriction for the affected emissions units in section C of this permit.

Pursuant to Part D of Title I of the Clean Air Act (CAA), Ohio EPA is required to establish a State Implementation Plan (SIP) for the attainment and maintenance of the NAAQS. This permit is part of Ohio's SIP for attainment and maintenance of the 2015 ozone NAAQS and will be submitted to U.S. EPA as a modification of the SIP.

3. Facility Emissions and Attainment Status:

General Aluminum operates under a synthetic minor permitting classification for VOC emissions, with an existing facility-wide emission limitation of 96.3 tons of VOC per rolling, 12-month summation and a facility-wide maximum throughput restriction of 51,190 tons of aluminum charged per rolling, 12-month summation. Portage County was designated as serious nonattainment for the 2015 ozone NAAQS but is now a maintenance county. The county is currently designated attainment for all NAAQS (criteria) pollutants which include ozone, PM_{2.5}, PM₁₀, CO, NO₂, lead, and SO₂.

4. Source Emissions:

General Aluminum's melting furnaces and pouring and cooling turntables have VOC emissions that are subject to the VOC RACT requirements. The VOC RACT determination for these emissions units includes the existing facility-wide throughput restriction of 51,190 tons of aluminum charged per rolling, 12-month summation.



Permit Number: P0140906
Facility Name: General Aluminum
Facility ID: 1667070012

Effective Date: To be entered upon final issuance

Additional emission limitations were established for emissions units F002, F003, F004, F005, F006, F007 and F008 of 2.48 pounds VOC per ton of metal processed, individually, and 63.48 tons VOC per rolling, 12-month summation, combined; and for emissions units P902, P923, P924, P925 and P926 of 1.07 pounds VOC per ton of metal processed, individually, and 27.39 tons VOC per rolling, 12-month summation, combined. Monitoring, record keeping, reporting, and testing requirements have been included to demonstrate compliance with these VOC RACT emission limitations. General Aluminum will also maintain and operate emissions units P902, P923, P924, P925 and P926 in accordance with the manufacturer's specifications and with good combustion and operating practices (GCOP) for the control of VOC emissions from the aluminum melting furnaces.

5. Conclusion:

This permit modification establishes VOC RACT limits as proposed by General Aluminum in their VOC RACT study as part of the requirements for the 2015 ozone NAAQs nonattainment and maintenance areas under the reclassification to serious nonattainment for the Cleveland area. The VOC RACT limits and GCOP established in this permit will be implemented upon final issuance of this permit.

6. Please provide additional notes or comments as necessary:

None.

7. Total Permit Allowable Emissions Summary (for informational purposes only):

<u>Pollutant</u>	<u>Tons Per Year</u>
VOC	96.3



**Environmental
Protection
Agency**

DRAFT

Division of Air Pollution Control
Permit-to-Install and Operate
for
General Aluminum

Facility ID:	1667070012
Permit Number:	P0140906
Permit Type:	Renewal
Issued:	09/03/2026
Effective:	To be entered upon final issuance
Expiration:	To be entered upon final issuance

Division of Air Pollution Control
Permit-to-Install and Operate
for
General Aluminum

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Permit Number: P0140906
Facility Name: General Aluminum
Facility ID: 1667070012

Effective Date: To be entered upon final issuance

Authorization

Facility ID: 1667070012
Application Number(s): A0082234A0082234
Permit Number: P0140906
Permit Description: FEPTIO renewal and facility-initiated administrative modification to incorporate RACT standards. Pursuant to Part D of Title I of the Clean Air Act (CAA), Ohio EPA is required to establish a State Implementation Plan (SIP) for the attainment and maintenance of the NAAQS. The above-mentioned permit is a part of Ohio's SIP for attainment and maintenance of the 2015 ozone NAAQS and will be submitted to United States Environmental Protection Agency (U.S. EPA) as a modification of the SIP.
Permit Type: Renewal
Permit Fee: \$0.00 *DO NOT send payment at this time, subject to change before final issuance*
Issue Date: 09/03/2026
Effective Date: To be entered upon final issuance
Expiration Date: To be entered upon final issuance
Permit Evaluation Report (PER) Annual Date: To be entered upon final issuance

This document constitutes issuance of a Permit-to-Install and Operate for the emissions unit(s) identified on the following page to:

General Aluminum
5159 S. Prospect St.
Rootstown, OH 44266

Ohio Environmental Protection Agency (EPA) District Office or local air agency responsible for processing and administering your permit:

Akron Regional Air Quality Management District
1867 West Market St.
Akron, OH 44313
(330)375-2480

The above-named entity is hereby granted this Permit-to-Install and Operate for the air contaminant source(s) (emissions unit(s)) listed in this section pursuant to Chapter 3745-31 of the Ohio Administrative Code. Issuance of this permit does not constitute expressed or implied approval or agreement that, if constructed or modified in accordance with the plans included in the application, the described emissions unit(s) will operate in compliance with applicable State and Federal laws and regulations.

This permit is granted subject to the conditions attached hereto.

Ohio Environmental Protection Agency

John Logue
Director



Permit Number: P0140906
Facility Name: General Aluminum
Facility ID: 1667070012
Effective Date: To be entered upon final issuance

Authorization (continued)

Permit Number:P0140906

Permit Description:FEPTIO renewal and facility-initiated administrative modification to incorporate RACT standards. Pursuant to Part D of Title I of the Clean Air Act (CAA), Ohio EPA is required to establish a State Implementation Plan (SIP) for the attainment and maintenance of the NAAQS. The above-mentioned permit is a part of Ohio's SIP for attainment and maintenance of the 2015 ozone NAAQS and will be submitted to United States Environmental Protection Agency (U.S. EPA) as a modification of the SIP.

Permits for the following Emissions Unit(s) or groups of Emissions Units are in this document as indicated below:

Emissions Unit ID:	P002
Company Equipment ID:	Heat Treat Furnace Unit #1
Superseded Permit Number:	P0128540
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	P902
Company Equipment ID:	Furnace #1
Superseded Permit Number:	P0128540
General Permit Category and Type:	Not Applicable

Group Name:Casting Pouring and Cooling Line

Emissions Unit ID:	F002
Company Equipment ID:	Pouring and Cooling Table 1A
Superseded Permit Number:	P0128540
General Permit Category and Type:	Not Applicable P0128540
Emissions Unit ID:	F003
Company Equipment ID:	Pouring and Cooling Table 2
Superseded Permit Number:	P0128540
General Permit Category and Type:	Not Applicable P0128540

Group Name:Melting Furnace Group 1

Emissions Unit ID:	P923
Company Equipment ID:	Furnace #4
Superseded Permit Number:	P0128540
General Permit Category and Type:	Not Applicable P0128540
Emissions Unit ID:	P924
Company Equipment ID:	Furnace #2
Superseded Permit Number:	P0128540
General Permit Category and Type:	Not Applicable P0128540



Permit Number: P0140906
Facility Name: General Aluminum
Facility ID: 1667070012
Effective Date: To be entered upon final issuance

Group Name:Melting Furnace Group 2

Emissions Unit ID:	P925
Company Equipment ID:	New Furnace #5
Superseded Permit Number:	P0128540
General Permit Category and Type:	Not Applicable P0128540
Emissions Unit ID:	P926
Company Equipment ID:	New Furnace #6
Superseded Permit Number:	P0128540
General Permit Category and Type:	Not Applicable P0128540

Group Name:Pouring and Cooling Turntables

Emissions Unit ID:	F004
Company Equipment ID:	Pouring and Cooling #1100 Table 4A
Superseded Permit Number:	P0128540
General Permit Category and Type:	Not Applicable P0128540
Emissions Unit ID:	F005
Company Equipment ID:	Pouring and Cooling #1500 Table 4B
Superseded Permit Number:	P0128540
General Permit Category and Type:	Not Applicable P0128540
Emissions Unit ID:	F006
Company Equipment ID:	Pouring and Cooling Table 1B
Superseded Permit Number:	P0128540
General Permit Category and Type:	Not Applicable P0128540
Emissions Unit ID:	F007
Company Equipment ID:	Pouring/Cooling New Table #5
Superseded Permit Number:	P0128540
General Permit Category and Type:	Not Applicable P0128540
Emissions Unit ID:	F008
Company Equipment ID:	Pouring/Cooling New Table #6
Superseded Permit Number:	P0128540
General Permit Category and Type:	Not Applicable P0128540

List of Commonly Used Abbreviations

AP-42 = U.S. EPA's Compilation of Air Pollution Emissions Factors	HVLP = high volume, low pressure	PER = Permit Evaluation Report
ASTM = American Society for Testing and Materials	LAER = lowest achievable emission rate	PM = particulate matter
BACT = Best Available Control Technology	lb(s)/hr = pound(s) per hour	PM ₁₀ = particulate matter with an aerodynamic diameter less than or equal to 10 microns
BAT = Best Available Technology	LDAR = leak detection and repair	PM _{2.5} = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
CAA = Clean Air Act	LPG = liquefied petroleum gas/propane	ppb = parts per billion
CAM = compliance assurance monitoring	MACT = maximum achievable control technology	ppm = parts per million
CEMS = continuous emissions monitoring system	MAGLC = maximum acceptable ground level concentration	PSD = Prevention of Significant Deterioration
CFC = chlorofluorocarbon	mg/m ³ = milligrams per cubic meter	psi = pounds per square inch
CFR = Code of Federal Regulations	MM = million	psia = pounds per square inch absolute
CH ₄ = methane	MMBtu = million British Thermal Units	PTE = potential-to-emit
CI = compression ignition	MSDS = material safety data sheet	PTI = Permit-to-Install
CO = carbon monoxide	MSW = municipal solid waste	PTIO = Permit-to-Install and Operate
CO ₂ = carbon dioxide	NAAQS = National Ambient Air Quality Standard	PTO = Permit-to-Operate
COM = continuous opacity monitor	NESHAP = National Emission Standard for Hazardous Air Pollutants	PWR = process weight rate
DAPC = Division of Air Pollution Control	NG = natural gas	RACM = reasonably available control measures
DO/LAA = District Office/Local Air Agency	ng/m ³ = nanograms per cubic meter	RACT = reasonably available control technology
dscf = dry standard cubic foot	NH ₃ = ammonia	RATA = relative accuracy test audit
EAC = emissions activity category	NMHC = non-methane hydrocarbons	RTO = regenerative thermal oxidizer
eDocs = electronic documents database	NMOC = non-methane organic compound	SB265 = Senate Bill 265
ERAC = Environmental Review Appeals Commission	NO = nitrogen oxide	scfm = standard cubic feet per minute
ESP = electrostatic precipitator	NO ₂ = nitrogen dioxide	SI = spark ignition
EU = emissions unit	NO _x = nitrogen oxides	SIP = State Implementation Plan
FEPTIO = Federally Enforceable Permit-to-Install and Operate	NSPS = New Source Performance Standard	SO ₂ = sulfur dioxide
FER = Fee Emissions Report	NSR = New Source Review	SSMP = startup, shutdown, and malfunction plan
FR = Federal Register	NTV = Non-Title V	TDS = total dissolved solids
GACT = generally achievable control technology	O&M = operation and maintenance	TLV = threshold limit value
GHG = greenhouse gases	OAC = Ohio Administrative Code	TO = thermal oxidizer
gr/dscf = grains per dry standard cubic foot	OC = organic compound	TPH = ton(s) per hour
H ₂ S = hydrogen sulfide	Ohio EPA = Ohio Environmental Protection Agency	TPY = ton(s) per year
H ₂ SO ₄ = sulfuric acid	ORC = Ohio Revised Code	TSP = total suspended particulates
HAP = hazardous air pollutant	Pb = lead	VE = visible emissions
HCl = hydrogen chloride	PBR = Permit-By-Rule	VMT = vehicle miles traveled
HF = hydrogen fluoride	PCB = polychlorinated biphenyl	VOC = volatile organic compound
Hg = mercury	PE = particulate emissions	WPP = work practice plan
hp = horsepower	PEMS = predictive emissions monitoring system	µg/m ³ = micrograms per cubic meter



**Environmental
Protection
Agency**

Permit Number: P0140906

Facility Name: General Aluminum

Facility ID: 1667070012

Effective Date: To be entered upon final issuance

A. Standard Terms and Conditions

1. What does this permit-to-install and operate (PTIO) allow me to do?

This permit allows you to install and operate the emissions unit(s) identified in this PTIO. You must install and operate the unit(s) in accordance with the application you submitted and all the terms and conditions contained in this PTIO, including emission limits and those terms that ensure compliance with the emission limits (for example, operating, recordkeeping and monitoring requirements).

2. Who is responsible for complying with this permit?

The person identified on the "Authorization" page, above, is responsible for complying with this permit until the permit is revoked, terminated, or transferred. "Person" means a person, firm, corporation, association, or partnership. The words "you," "your," or "permittee" refer to the "person" identified on the "Authorization" page above.

The permit applies only to the emissions unit(s) identified in the permit. If you install or modify any other equipment that requires an air permit, you must apply for an additional PTIO(s) for these sources.

3. What records must I keep under this permit?

You must keep all records required by this permit, including monitoring data, test results, strip-chart recordings, calibration data, maintenance records, and any other record required by this permit for five years from the date the record was created. You can keep these records electronically, provided they can be made available to Ohio EPA during an inspection at the facility. Failure to make requested records available to Ohio EPA upon request is a violation of this permit requirement.

4. What are my permit fees and when do I pay them?

There are two fees associated with permitted air contaminant sources in Ohio:

- a) PTIO fee. This one-time fee is based on a fee schedule in accordance with Ohio Revised Code (ORC) section 3745.11 or based on a time and materials charge for permit application review and permit processing if required by the Director.

You will be sent an invoice for this fee after you receive this PTIO and payment is due within 30 days of the invoice date. You are required to pay the fee for this PTIO even if you do not install or modify your operations as authorized by this permit.

- b) Annual emissions fee. Ohio EPA will assess a separate fee based on the total annual emissions from your facility. You self-report your emissions in accordance with Ohio Administrative Code (OAC) Chapter 3745-78. This fee assessed is based on a fee schedule in ORC section 3745.11 and funds Ohio EPA's permit compliance oversight activities. For facilities that are permitted as synthetic minor sources, the fee schedule is adjusted annually for inflation. Ohio EPA will notify you when it is time to report your emissions and to pay your annual emission fees.

5. When does my PTIO expire, and when do I need to submit my renewal application?

This permit expires on the date identified at the beginning of this permit document (see "Authorization" page above) and you must submit a renewal application to renew the permit. Ohio EPA will send a renewal notice to you approximately six months prior to the expiration date of this permit. However, it is very important that you submit a complete renewal permit application (either electronically through Ohio EPA's eBusiness Center: Air Services web service or postmarked prior to expiration of this permit) even if you do not receive the renewal notice.

If a complete renewal application is submitted before the expiration date, Ohio EPA considers this a timely application for purposes of ORC section 119.06, and you are authorized to continue operating the emissions unit(s) covered by this permit beyond the expiration date of this permit until final action is taken by Ohio EPA on the renewal application.

6. What happens to this permit if my project is delayed or I do not install or modify my source?

This PTIO expires 18 months after the issue date identified on the "Authorization" page above unless otherwise specified if you have not (1) started constructing the new or modified emission sources identified in this permit, or (2) entered into a binding contract to undertake such construction. This deadline can be extended once by 12 months, provided you apply to Ohio EPA for this extension within a reasonable time before the 18-month period has ended and you can show good cause for any such extension.

7. What reports must I submit under this permit?

An annual permit evaluation report (PER) is required in addition to any malfunction reporting required by OAC rule 3745-15-06 or other specific rule-based reporting requirement identified in this permit. Your PER due date is identified in the Authorization section of this permit.

8. If I am required to obtain a Title V operating permit in the future, what happens to the operating provisions and permit evaluation report (PER) obligations under this permit?

If you are required to obtain a Title V permit under OAC Chapter 3745-77 in the future, the permit-to-operate portion of this permit will be superseded by the issued Title V permit. From the effective date of the Title V permit forward, this PTIO will effectively become a PTI (permit-to-install) in accordance with OAC rule 3745-31-02(B). The following terms and conditions of this permit will no longer be applicable after issuance of the Title V permit: Section B, Term 1.b) and Section C, for each emissions unit, Term a)(2).

The PER requirements in this permit remain effective until the date the Title V permit is issued and is effective and cease to apply after the effective date of the Title V permit. The final PER obligation will cover operations up to the effective date of the Title V permit and must be submitted on or before the submission deadline identified in this permit on the last day prior to the effective date of the Title V permit.

9. What are my obligations when I perform scheduled maintenance on air pollution control equipment?

You must perform scheduled maintenance of air pollution control equipment in accordance with OAC rule 3745-15-06(A). If scheduled maintenance requires shutting down or bypassing any air pollution control equipment, you must also shut down the emissions unit(s) served by the air pollution control equipment during maintenance, unless the conditions of OAC rule 3745-15-06(A)(3) are met. Any emissions that exceed permitted amount(s) under this permit (unless specifically exempted by rule) must be reported as deviations in the annual permit evaluation report (PER), including nonexempt excess emissions that occur during approved scheduled maintenance.

10. Do I have to report malfunctions of emissions units or air pollution control equipment? If so, how must I report?

If you have a reportable malfunction of any emissions unit(s) or any associated air pollution control system, you must report this to the Akron Regional Air Quality Management District in accordance with OAC rule 3745-15-06(B). Malfunctions that must be reported are those that result in emissions that exceed permitted emission levels. It is your responsibility to evaluate control equipment breakdowns and operational upsets to determine if a reportable malfunction has occurred.

If you have a malfunction but determine that it is not a reportable malfunction under OAC rule 3745-15-06(B), it is recommended that you maintain records associated with control equipment breakdown or process upsets. Although it is not a requirement of this permit, Ohio EPA recommends that you maintain records for non-reportable malfunctions.

11. Can Ohio EPA or my local air agency inspect the facility where the emission unit(s) is/are located?

Yes. Under Ohio law, the Director or his/her authorized representative may inspect the facility, conduct tests, examine records or reports to determine compliance with air pollution laws and regulations and the terms and conditions of this permit. You must provide, within a reasonable time, any information Ohio EPA requests either verbally or in writing.

12. What happens if one or more emissions units operated under this permit is/are shut down permanently?

Ohio EPA can terminate the permit terms associated with any permanently shut down emissions unit. "Shut down" means the emissions unit has been physically removed from service or has been altered in such a way that it can no longer operate without a subsequent "modification" or "installation" as defined in OAC Chapter 3745-31.

You should notify Ohio EPA of any emissions unit that is permanently shut down by submitting a certification that identifies the date on which the emissions unit was permanently shut down. The certification must be submitted by an authorized official from the facility. You cannot continue to operate an emission unit once the certification has been submitted to Ohio EPA by the authorized official.

You must comply with all recordkeeping and reporting for any permanently shut down emissions unit in accordance with the provisions of the permit, regulations or laws that were enforceable during the period of operation, such as the requirement to submit a PER, air fee emission report, or malfunction report. You must also keep all records relating to any permanently shut down emissions unit, generated while the emissions unit was in operation, for at least five years from the date the record was generated.

Again, you cannot resume operation of any emissions unit certified by the authorized official as being permanently shut down without first applying for and obtaining a permit pursuant to OAC Chapter 3745-31.

13. Can I transfer this permit to a new owner or operator?

You can transfer this permit to a new owner or operator. If you transfer the permit, the new owner or operator must follow the procedures in OAC Chapter 3745-31-07, including notifying Ohio EPA or the local air agency of the change in ownership or operator within thirty days of the transfer date. Any transferee of this permit shall assume the responsibilities of the transferor permit holder.

14. Does compliance with this permit constitute compliance with OAC rule 3745-15-07, "air pollution nuisance"?

This permit and OAC rule 3745-15-07 prohibit operation of the air contaminant source(s) regulated under this permit in a manner that causes a nuisance. Ohio EPA can require additional controls or modification of the requirements of this permit through enforcement orders or judicial enforcement action if, upon investigation, Ohio EPA determines existing operations are causing a nuisance.

15. What happens if a portion of this permit is determined to be invalid?

If a portion of this permit is determined to be invalid, the remainder of the terms and conditions remain valid and enforceable. The exception is where the enforceability of terms and conditions are dependent on the term or condition that was declared invalid.



Permit Number: P0140906

Facility Name: General Aluminum

Facility ID: 1667070012

Effective Date: To be entered upon final issuance



**Environmental
Protection
Agency**

Permit Number: P0140906

Facility Name: General Aluminum

Facility ID: 1667070012

Effective Date: To be entered upon final issuance

B. Facility-Wide Terms and Conditions

1. This permit document constitutes a PTI issued in accordance with ORC 3704.03(F) and a PTO issued in accordance with ORC 3704.03(G).
 - a) For the purpose of a PTI document, the facility-wide T&C identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.
 - (1) None.
 - b) For the purpose of a PTO document, the facility-wide T&C identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.
 - (1) None.
2. Ohio EPA has determined this facility operates affected sources subject to the requirements of 40 CFR Part 63, Subpart ZZZZZZ, NESHAP for Area Sources: Aluminum, Copper, and Other Nonferrous Foundries. Ohio EPA is not accepting the delegation of authority to implement and enforce the area source NESHAP standard; therefore, the area source NESHAP standard is implemented and enforced by U.S. EPA, Region 5. The promulgated version of this NESHAP standard and the 40 CFR Part 63, General Provisions may be accessed via the Internet from the Electronic Code of Federal Regulations (e-CFR) website <https://www.ecfr.gov> or by contacting the appropriate Ohio EPA DO/LAA.
3. Facility-Wide Emission Limitations to avoid Title V Permitting Requirements
 - a) Applicable Emissions Limitations and/or Control Requirements
 - (1) Facility-wide VOC emissions shall not exceed the listed limitations.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rule 3745-31-05(D)	Combined annual emissions from the entire facility shall not exceed 96.3 tons of VOC per rolling, 12-month summation. See b)(1) and b)(2) below.
 - (2) Additional Terms and Conditions.
 - a. None.
 - b) Operational Restrictions
 - (1) The maximum annual aluminum throughput (input limitation) from the entire facility shall not exceed 51,190 tons of aluminum charged per rolling, 12-month summation.
 - c) Monitoring and/or Recordkeeping Requirements
 - (1) The permittee shall maintain monthly records of the following information for the entire facility:
 - a. The rolling, 12-month summation of the total VOC emissions, in pounds or tons; and
 - b. The rolling, 12-month summation of the total aluminum charged throughput, in pounds or tons.

d) Reporting Requirements

- (1) All applications, notifications, or reports required *in writing* are to be submitted through Ohio EPA's eBusiness Center: Air Services online web portal. Hardcopy submissions will be accepted on an as-needed basis if the permittee cannot submit the required documents through Air Services. In the event of a hardcopy submission, the post-marked date or the date the document is delivered in person will be recognized as the date submitted. Electronic submittal of applications, notifications, or reports to Ohio EPA fulfills the requirement to submit information to the director, the appropriate Ohio EPA DO/LAA, and/or any other individual or organization identified as a recipient unless otherwise specified in this permit. Consistent with OAC rule 3745-15-03, the application, notification, or report is considered *submitted* on the date the submittal is successful using a valid electronic signature. Signature by the signatory authority may be represented as provided through procedures established in Air Services.
- (2) The permittee shall submit quarterly deviation (excursion) reports that identify:
 - a. all deviations (excursions) of the following emission limitations, operational restrictions and/or control device operating parameter limitations that restrict the potential to emit (PTE) of any regulated air pollutant and have been detected by the monitoring, record keeping and/or testing requirements in this permit:
 - i. 96.3 tons of VOC per rolling, 12-month summation for the entire facility; and
 - ii. 51,190 tons of aluminum charged throughput per rolling, 12-month summation for the entire facility;
 - b. the probable cause of each deviation (excursion);
 - c. any corrective actions that were taken to remedy the deviations (excursions) or prevent future deviations (excursions); and
 - d. the magnitude and duration of each deviation (excursion).

If no deviations (excursions) occurred during a calendar quarter, the permittee shall submit a report that states that no deviations (excursions) occurred during the quarter.

The quarterly reports shall be submitted each year by January 31 (covering October to December), April 30 (covering January to March), July 31 (covering April to June), and October 31 (covering July to September), unless an alternative schedule has been established and approved by the Director (the appropriate Ohio EPA DO/LAA).

e) Testing Requirements

- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:
 - a. Emissions Limitation

Combined annual emissions from the entire facility shall not exceed 96.3 tons of VOC per rolling, 12-month summation.



Applicable Compliance Method

Compliance with the VOC mass emission limitation identified above shall be demonstrated by the record keeping requirements of section B.3.c)(1) and calculated in accordance with the following methodology:

Combined annual VOC emissions = $\Sigma(\text{Aluminum Furnaces} + \text{Pouring \& Cooling Lines} + \text{Heat Treat})$

Where:

Aluminum Furnace Emissions = $(1.07 \text{ pounds VOC per ton metal processed}) \times (51,190 \text{ tons maximum metal charged throughput allowable}) \div (2,000 \text{ pounds per ton}) = 27.39 \text{ tons VOC}$

Pouring & Cooling Emissions = $(2.48 \text{ pounds VOC per ton metal processed}) \times (51,190 \text{ tons maximum metal charged throughput allowable}) \div (2,000 \text{ pounds per ton}) = 63.48 \text{ tons VOC}$

Heat Treat #1 Emissions = $(5.50 \text{ pounds VOC per MMCF fuel usage}) \times (300.59 \text{ MMCF burner fuel usage}) \div (2,000 \text{ pounds per ton}) = 0.83 \text{ tons VOC}$

Heat Treat #2 Emissions = $(5.50 \text{ pounds VOC per MMCF fuel usage}) \times (49.28 \text{ MMCF burner fuel usage}) \div (2,000 \text{ pounds per ton}) = 0.14 \text{ tons VOC}$

(2) The permittee shall conduct, or have conducted, emission testing in accordance with the following requirements:

- a. The emission testing shall be conducted within six months prior to the permit expiration.
- b. The emission testing shall be conducted to demonstrate compliance with the combined annual allowable mass emission rate for VOCs, in the appropriate averaging period(s), and to verify the established VOC emission factors by testing the worst-case emissions unit for the following operations:

Operation Type	Current Worst-Case EU
Aluminum Melting Furnaces	Either P925 or P926
Pouring/Cooling	F003

- c. The following test method(s) shall be employed to demonstrate compliance with the allowable mass emission rate(s):

For VOC, Methods 1 through 4, and 18 or 25/25A, as appropriate, of 40 CFR Part 60, Appendix A.

Alternative U.S. EPA approved test methods may be used with prior approval from Ohio EPA.

- d. During the emissions testing, the EU shall be operated under operational conditions approved in advance by the appropriate Ohio DO/LAA. Operational conditions that may



need to be approved include, but are not limited to, the production rate, the type of material processed, material make-up (solvent content, etc.) or control equipment operational limitations (burner temperature, precipitator voltage, etc.). In general, testing shall be done under *worst-case* conditions expected during the life of the permit. As part of the information provided in the Intent to Test (ITT) notification form described below, the permittee shall provide a description of the EU operational conditions they will meet during the emissions testing and describe why they believe *worst-case* operating conditions will be met. Prior to conducting the test(s), the permittee shall confirm with the appropriate Ohio EPA DO/LAA that the proposed operating conditions constitute *worst-case*. Failure to test under the approved conditions may result in Ohio EPA not accepting the test results as a demonstration of compliance.

- e. Not later than 30 days prior to the proposed test date(s), the permittee shall submit an ITT notification to the appropriate Ohio EPA DO/LAA. The ITT notification shall describe in detail the proposed test methods and procedures, the EU operating parameters, the time(s) and date(s) of the test(s) and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in the Ohio EPA DO/LAA's refusal to accept the results of the emission test(s).
- f. Personnel from the appropriate Ohio EPA DO/LAA shall be permitted to witness the test(s), examine the testing equipment and acquire data and information necessary to ensure that the operation of the EU and the testing procedures provide a valid characterization of the emissions from the EU and/or the performance of the control equipment.
- g. A comprehensive written report on the results of the emissions test(s) shall be signed by the person(s) responsible for the tests and submitted to the appropriate Ohio EPA DO/LAA within 30 days following completion of the test(s). The permittee may request additional time for the submittal of the written report, where warranted, with prior approval from the appropriate Ohio EPA DO/LAA.

4. OAC rule 3745-21-11(B) VOC RACT Requirements

As required by the reclassification to serious nonattainment for ozone under the 2015 ozone National Ambient Air Quality Standards promulgated by U.S. EPA, and pursuant to OAC rule 3745-21-11(B) and the VOC Reasonable Available Control Technology (RACT) Study submitted by General Aluminum on March 30, 2026 (subsequently revised on April 29, 2026, June 12, 2026, and June 30, 2026):

- a) "General Aluminum" (facility ID: 1667070012) or any subsequent owner or operator of the "General Aluminum" facility located at 5159 South Prospect Street, Rootstown, Ohio, shall comply with the following requirements:
 - (1) The maximum annual aluminum throughput (input limitation) from the entire facility shall not exceed 51,190 tons of aluminum charged per rolling, 12-month summation.



- (2) The VOC emissions from the pouring and cooling turntables (emissions units F002, F003, F004, F005, F006, F007 and F008) shall not exceed 2.48 pounds per ton of metal processed, individually, and 63.48 tons per rolling, 12-month summation, combined.
 - (3) The VOC emissions from the aluminum melting furnaces (emissions units P902, P923, P924, P925 and P926) shall not exceed 1.07 pounds per ton of metal processed, individually, and 27.39 tons per rolling, 12-month summation, combined.
 - (4) General Aluminum shall maintain and operate the aluminum melting furnaces (emissions units P902, P923, P924, P925 and P926) in accordance with the manufacturer's specifications and with good combustion and operating practices (GCOP) for the control of VOC emissions. GCOP for these emissions units shall include the following:
 - a. conducting natural gas burner tunings as part of the facility's preventative maintenance system;
 - b. performing monthly inspections of the furnace gas mains, burners, and air intake filters;
 - c. documenting furnace clean-outs and maintenance repairs on work orders as necessary following inspections; and
 - d. complying with metal purchasing specifications to ensure that metal charged to the furnaces is free of materials (oils, plastics, etc.) that could contribute to VOC emissions and meets the "clean charge" definition in 40 CFR Part 63, Subpart RRR - NESHAP for Secondary Aluminum Production.
- b) **Monitoring and/or Recordkeeping Requirements**
- (1) The permittee shall maintain monthly records of the following information:
 - a. the rolling, 12-month summation of the facility-wide total aluminum charged throughput, in pounds or tons;
 - b. the rolling, 12-month summation of VOC emissions for emissions units F002, F003, F004, F005, F006, F007 and F008, combined, in pounds or tons; and
 - c. The rolling, 12-month summation of VOC emissions for emissions units P902, P923, P924, P925 and P926, combined.
- c) **Reporting Requirements**
- (1) The permittee shall submit quarterly reports that identify following:
 - a. any exceedance of 51,190 tons of facility-wide aluminum throughput per rolling, 12-month summation;
 - b. any exceedance of 63.48 tons VOC per rolling, 12-month summation for emissions units F002, F003, F004, F005, F006, F007 and F008, combined;
 - c. any exceedance of 27.39 tons VOC per rolling, 12-month summation for emissions units P902, P923, P924, P925 and P926, combined; and
 - d. any instance when emissions units P902, P923, P924, P925 and P926 were not maintained or operated in accordance with the GCOP for the control of VOC emissions listed in section B.4.a)(4) above.



The quarterly reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions in Section A of this permit.

d) Testing Requirements

- (1) Compliance with the emissions limitations specified in section B.4.a) of these terms and conditions shall be determined in accordance with the testing requirements in section B.3.e)(2) above.



**Environmental
Protection
Agency**

Permit Number: P0140906

Facility Name: General Aluminum

Facility ID: 1667070012

Effective Date: To be entered upon final issuance

C. Emissions Unit Terms and Conditions

1. EU Group - Casting Pouring and Cooling Lines: F002, F003

EU ID	Operations, Property and/or Equipment Description
F002	Pouring and Cooling Table 1A. Six devices with two molds each on a rotating turn table.
F003	Pouring and Cooling Table 2. Eight devices with two molds each on a rotating turn table.

a) This permit document constitutes a PTI issued in accordance with ORC 3704.03(F) and a PTO issued in accordance with ORC 3704.03(G).

(1) For the purpose of a PTI document, the EU T&C identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

a. None.

(2) For the purposes of a PTO document, the EU T&C identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

a. b)(1)b.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rule 3745-31-05(A)(3)	Requirements for emissions units F002 and F003, individually: PE shall not exceed 1.51 pounds per hour and 6.62 tons per year. SO₂ emissions shall not exceed 2.30 pounds per hour and 10.08 tons per year. CO emissions shall not exceed 6.42 pounds per hour and 28.10 tons per year. VOC emissions shall not exceed 11.16 pounds per hour and 48.88 tons per year. Phenol emissions shall not exceed 0.16 pound per hour and 0.71 ton per year. Visible PE of fugitive dust shall not exceed 5% opacity, as a 3-minute average See b)(2)a. through b)(2)c. below.



b.	OAC rule 3745-31-05(D) [Federally enforceable requirements to avoid Title V and to comply with OAC rule 3745-21-11(B)]	See Facility-Wide Terms and Conditions in sections B.3 and B.4.
c.	OAC rule 3745-17-07(B) OAC rule 3745-17-08(B)	Exempt. Not located in an area specified in Appendix A of OAC rule 3745-17-08.

(2) Additional Terms and Conditions

- a. Best available control measures that are sufficient to minimize or eliminate visible emissions of fugitive dust. These measures shall include, but not be limited to, the following:

- i. The installation and use of hoods, fans and other equipment to adequately enclose, contain, capture and vent the fugitive dust; and
- ii. The collection efficiency is sufficient to minimize or eliminate visible PE of fugitive dust at the point(s) of capture to the extent possible with good engineering design.

Nothing in this paragraph shall prohibit the permittee from employing other control measures to ensure compliance, as described below. Ohio EPA may require additional control measures at any or all operations described above if deemed necessary based on observed visible emissions.

- b. For each operation that is not adequately enclosed, the above-identified control measure(s) shall be implemented at all times during operation. If the permittee determines, as a result of the inspection conducted pursuant to the monitoring section of this permit, that additional control measures are necessary to ensure compliance with the above-mentioned applicable requirements, such additional control measures shall be implemented immediately. Any required implementation of the additional control measures shall continue during operation until further observation confirms that use of these additional control measures is unnecessary.
- c. Specific additional control measures shall be determined by the permittee. Such additional control measures may include increased water application, use of chemical dust suppressant, or shutdown of operations. The use of additional control measures shall, at all times, comply with all air, surface water, ground water, solid waste, and hazardous waste laws and regulations. Implementation of the above-mentioned control measures in accordance with the terms and conditions of this permit is appropriate and sufficient to satisfy the requirements of OAC rule 3745-31-05(A)(3).

- d. See Facility-Wide Terms and Conditions B.4.a) above.

c) Operational Restrictions

- (1) None.

d) Monitoring and/or Recordkeeping Requirements

- (1) The permittee shall perform weekly checks when the emissions unit is in operation and when the weather conditions allow, for any visible emissions of fugitive dust from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit. The presence or absence of any visible fugitive emissions shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:
 - a. the location and color of the emissions;
 - b. whether the emissions are representative of normal operations;
 - c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;
 - d. the total duration of any visible emissions incident; and
 - e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item d)(1)d. above or continue the weekly check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit). With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal operations or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions or specify the corrective actions that were taken to eliminate abnormal visible emissions.

(2) See Facility-Wide Terms and Conditions B.4.b) above.

e) Reporting Requirements

- (1) All applications, notifications, or reports required *in writing* are to be submitted through Ohio EPA's eBusiness Center: Air Services online web portal. Hardcopy submissions will be accepted on an as-needed basis if the permittee cannot submit the required documents through Air Services. In the event of a hardcopy submission, the post-marked date or the date the document is delivered in person will be recognized as the date submitted. Electronic submittal of applications, notifications, or reports to Ohio EPA fulfills the requirement to submit information to the director, the appropriate Ohio EPA DO/LAA, and/or any other individual or organization identified as a recipient unless otherwise specified in this permit. Consistent with OAC rule 3745-15-03, the application, notification, or report is considered *submitted* on the date the submittal is successful using a valid electronic signature. Signature by the signatory authority may be represented as provided through procedures established in Air Services.
- (2) The permittee shall submit an annual Permit Evaluation Report (PER) to Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The PER shall cover a reporting period of no more than 12 months for each air contaminant source identified in this permit.



- (3) The permittee shall identify the following information in the annual PER in accordance with the monitoring requirements for visible emissions in section d)(1):
- all days during which any visible emissions of fugitive dust were observed from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit; and
 - any corrective actions taken to minimize or eliminate the visible emissions.

(4) See Facility-Wide Terms and Conditions B.4.c) above.

f) Testing Requirements

- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitation

PE shall not exceed 1.51 pounds per hour and 6.62 tons per year for emissions units F002 and F003, individually.

Applicable Compliance Method

Compliance with the hourly PE limitation identified above shall be demonstrated using an emission factor of 0.34 pounds PE per ton of aluminum melted. This emission factor was developed based on the results of emission tests performed at similar sources.

If required, compliance with the hourly PE limitation shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 5 of 40 CFR Part 60, Appendix A.

The annual emission limitation was established by multiplying the hourly emission limitation by 8,760 hours per year and dividing by 2,000 pounds per ton. Therefore, compliance with the annual limitation shall be ensured provided compliance is maintained with the hourly limitation.

b. Emission Limitation

SO₂ emissions shall not exceed 2.30 pounds per hour and 10.08 tons per year for emissions units F002 and F003, individually.

Applicable Compliance Method

Compliance with the hourly SO₂ emission limitation identified shall be demonstrated using an emission factor of 0.51 pounds SO₂ per ton of aluminum melted. This emission factor was developed based on the results of emission tests performed at similar sources.

If required, compliance with the hourly SO₂ limitation shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4 and 6 of 40 CFR Part 60, Appendix A.

The annual emission limitation was established by multiplying the hourly emission limitation by 8,760 hours per year and dividing by 2,000 pounds per ton. Therefore,



compliance with the annual limitation shall be ensured provided compliance is maintained with the hourly limitation.

c. Emission Limitation

CO emissions shall not exceed 6.42 pounds per hour and 28.10 tons per year for emissions units F002 and F003, individually.

Applicable Compliance Method

Compliance with the hourly CO emission limitation identified above shall be demonstrated using an emission factor of 1.43 pounds CO per ton of aluminum melted. This emission factor was developed based on the results of emission tests performed at similar sources.

If required, compliance with the hourly CO limitation shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4 and 10 of 40 CFR Part 60, Appendix A.

The annual emission limitation was established by multiplying the hourly emission limitation by 8,760 hours per year and dividing by 2,000 pounds per ton. Therefore, compliance with the annual limitation shall be ensured provided compliance is maintained with the hourly limitation.

d. Emission Limitation

VOC emissions shall not exceed 11.16 pounds per hour and 48.88 tons per year for emissions units F002 and F003, individually.

Applicable Compliance Method

Compliance with the hourly VOC emission limitation identified above shall be demonstrated using an emission factor of 2.48 pounds VOC per ton of aluminum melted. This emission factor was developed based on the results of emission tests performed at the facility on 8/14/2019.

If required, compliance with the hourly VOC limitation shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4 and 18 or 25/25A, as appropriate, of 40 CFR Part 60, Appendix A.

The annual emission limitation was established by multiplying the pound of VOC per ton of aluminum melted emission factor by the emission unit's maximum actual rated capacity and dividing the result by 2,000 pounds per ton.

e. Emission Limitation

Phenol emissions shall not exceed 0.16 pound per hour and 0.71 ton per year for emissions units F002 and F003, individually.

Applicable Compliance Method

Compliance with the hourly phenol emission limitation identified above shall be demonstrated using an emission factor of 0.04 pounds phenol per ton of aluminum



melted. This emission factor was developed based on the results of emission tests performed at similar sources.

If required, compliance with the hourly phenol limitation shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4 and 18 of 40 CFR Part 60, Appendix A.

The annual emission limitation was established by multiplying the hourly emission limitation by 8,760 hours per year and dividing by 2,000 pounds per ton. Therefore, compliance with the annual limitation shall be ensured provided compliance is maintained with the hourly limitation.

f. Emission Limitation

Visible PE of fugitive dust shall not exceed 5% opacity, as a 3-minute average.

Applicable Compliance Method

If required, compliance with the visible PE limitation identified above shall be demonstrated through the results of visible emission observations performed in accordance with Method 9 of 40 CFR Part 60, Appendix A.

(2) See Facility-Wide Terms and Conditions B.4.d) above.

g) Miscellaneous Requirements

(1) None.

2. Emissions Unit Group - Pouring and Cooling Turntables: F004, F005, F006, F007, F008

EU ID	Operations, Property and/or Equipment Description
F004	1100 Pouring and Cooling Turntable 4A.
F005	1500 Pouring and Cooling Turntable 4B.
F006	Pouring and Cooling Table 1B (eight station turntable).
F007	Pouring and Cooling Table 5 (eight station turntable).
F008	Pouring and Cooling Table 6 (eight station turntable).

a) This permit document constitutes a PTI issued in accordance with ORC 3704.03(F) and a PTO issued in accordance with ORC 3704.03(G).

(1) For the purpose of a PTI document, the EU T&C identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

a. None.

(2) For the purposes of a PTO document, the EU T&C identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

a. b)(1)c.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	ORC 3704.03(T) and OAC rule 3745-31-05(A)(3)	CO emissions shall not exceed 1.43 pounds per ton of aluminum. VOC emissions shall not exceed 2.48 pounds per ton of aluminum. See b)(2)a. below.
b.	OAC rule 3745-31-05(A)(3)(a)(ii)	See b)(2)a. below.
c.	OAC rule 3745-31-05(D) [Federally enforceable requirements to avoid Title V and to comply with OAC rule 3745-21-11(B)]	See Facility-Wide Terms and Conditions in sections B.3. and B.4.
d.	OAC rule 3745-17-07(B) OAC rule 3745-17-08(B)	Exempt. Not located in an area specified in Appendix A of OAC rule 3745-17-08.

(2) Additional Terms and Conditions

a. The Best Available Technology (BAT) requirements under OAC rule 3745-31-05(A)(3) do not apply to the PE and SO₂ emissions from this air contaminant source since the potential to emit for each is less than 10 tons per year.

b. See Facility-Wide Terms and Conditions B.4.a) above.

c) Operational Restrictions

(1) None.

d) Monitoring and/or Recordkeeping Requirements

(1) The permittee shall perform weekly checks when the emissions unit is in operation and when the weather conditions allow, for any visible emissions of fugitive dust from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit. The presence or absence of any visible fugitive emissions shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:

- a. the location and color of the emissions;
- b. whether the emissions are representative of normal operations;
- c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;
- d. the total duration of any visible emissions incident; and
- e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item d)(1)d. above or continue the weekly check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit). With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal operations or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions or specify the corrective actions that were taken to eliminate abnormal visible emissions.

(2) See Facility-Wide Terms and Conditions B.4.b) above.

e) Reporting Requirements

(1) All applications, notifications, or reports required *in writing* are to be submitted through Ohio EPA's eBusiness Center: Air Services online web portal. Hardcopy submissions will be accepted on an as-needed basis if the permittee cannot submit the required documents through Air Services. In the event of a hardcopy submission, the post-marked date or the date the document is delivered in person will be recognized as the date submitted. Electronic submittal of applications, notifications, or reports to Ohio EPA fulfills the requirement to submit information to the director, the appropriate Ohio EPA DO/LAA, and/or any other individual or



organization identified as a recipient unless otherwise specified in this permit. Consistent with OAC rule 3745-15-03, the application, notification, or report is considered *submitted* on the date the submittal is successful using a valid electronic signature. Signature by the signatory authority may be represented as provided through procedures established in Air Services.

- (2) The permittee shall submit an annual Permit Evaluation Report (PER) to Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The PER shall cover a reporting period of no more than 12 months for each air contaminant source identified in this permit.
- (3) The permittee shall identify the following information in the annual PER in accordance with the monitoring requirements for visible emissions in section d)(1):
 - a. all days during which any visible emissions of fugitive dust were observed from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit; and
 - b. any corrective actions taken to minimize or eliminate the visible emissions.

(4) See Facility-Wide Terms and Conditions B.4.c) above.

f) Testing Requirements

- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

- a. Emissions Limitation

CO emissions shall not exceed 1.43 pounds per ton of aluminum.

Applicable Compliance Method

Compliance with the CO emission limitation identified above shall be demonstrated using an emission factor of 1.43 pounds CO per ton of aluminum melted. This emission factor was developed based on the results of emission tests performed at similar sources.

If required, compliance with the CO limitation shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4 and 10 of 40 CFR Part 60, Appendix A.

- b. Emissions Limitation

VOC emissions shall not exceed 2.48 pounds per ton of aluminum.

Applicable Compliance Method

Compliance with the VOC emission limitation identified above shall be demonstrated using an emission factor of 2.48 pounds VOC per ton of aluminum melted. This emission factor was developed based on the results of emission tests performed at the facility on 8/14/2019.

If required, compliance with the VOC limitation shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4 and 18 or 25/25A, as appropriate, of 40 CFR Part 60, Appendix A.



(2) See Facility-Wide Terms and Conditions B.4.d) above.

g) Miscellaneous Requirements

(1) None.

3. P002, Heat Treat Furnace Unit #1

Operations, Property and/or Equipment Description:

35 MMBtu/hr Heat Treat Furnace Unit. Consisting of three Eclipse furnaces (10 MMBtu/hr each) and two age ovens (2.5 MMBtu/hr each)

a) This permit document constitutes a PTI issued in accordance with ORC 3704.03(F) and a PTO issued in accordance with ORC 3704.03(G).

(1) For the purpose of a PTI document, the EU T&C identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

a. None.

(2) For the purposes of a PTO document, the EU T&C identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

a. b)(1)c.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	ORC 3704.03(T) and OAC rule 3745-31-05(A)(3)	CO emissions shall not exceed 0.082 lb/MMBtu. NO _x emissions shall not exceed 0.098 lb/MMBtu.
b.	OAC rule 3745-31-05(A)(3)(a)(ii)	See b)(2)a. below.
c.	OAC rule 3745-31-05(D) [Federally enforceable requirements to avoid Title V]	See Facility-Wide Terms and Conditions in section B.3.
d.	OAC rule 3745-17-07(A)(1)	Visible PE from any stack shall not exceed 20% opacity, as a 6-minute average, except as provided by rule.
e.	OAC rule 3745-17-10(B)(1)	PE shall not exceed 0.020 lb/MMBtu of actual heat input.

(2) Additional Terms and Conditions

a. The Best Available Technology (BAT) requirements under OAC rule 3745-31-05(A)(3) do not apply to the PE, VOC, and SO₂ emissions from this air contaminant source since the uncontrolled potential to emit for each is less than 10 tons per year.



- c) Operational Restrictions
 - (1) The permittee shall only fire natural gas as fuel in this emissions unit.
- d) Monitoring and/or Recordkeeping Requirements
 - (1) For each day a fuel other than natural gas is used in this emissions unit, the permittee shall maintain records of the type and quantity of fuel burned.
- e) Reporting Requirements
 - (1) All applications, notifications, or reports required *in writing* are to be submitted through Ohio EPA's eBusiness Center: Air Services online web portal. Hardcopy submissions will be accepted on an as-needed basis if the permittee cannot submit the required documents through Air Services. In the event of a hardcopy submission, the post-marked date or the date the document is delivered in person will be recognized as the date submitted. Electronic submittal of applications, notifications, or reports to Ohio EPA fulfills the requirement to submit information to the director, the appropriate Ohio EPA DO/LAA, and/or any other individual or organization identified as a recipient unless otherwise specified in this permit. Consistent with OAC rule 3745-15-03, the application, notification, or report is considered *submitted* on the date the submittal is successful using a valid electronic signature. Signature by the signatory authority may be represented as provided through procedures established in Air Services.
 - (2) The permittee shall submit an annual Permit Evaluation Report (PER) to Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The PER shall cover a reporting period of no more than 12 months for each air contaminant source identified in this permit.
- f) Testing Requirements
 - (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:
 - a. Emissions Limitation

CO emissions shall not exceed 0.082 lb/MMBtu.

Applicable Compliance Method

Compliance with the CO emission limitation identified above shall be demonstrated by dividing the emission factor of 84 lb/10⁶ scf (AP-42 Table 1.4-1, July 1998) by a conversion factor 1,020 MMBtu/10⁶ scf.

If required, compliance with the CO limitation shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4 and 10 of 40 CFR Part 60, Appendix A.
 - b. Emission Limitation

NO_x emissions shall not exceed 0.098 lb/MMBtu.



Applicable Compliance Method

Compliance with the NO_x emission limitation identified above shall be demonstrated by dividing the emission factor of 100 lb/10⁶ scf (AP-42 Table 1.4-1, July 1998) by a conversion factor 1,020 MMBtu/10⁶ scf.

If required, compliance with the NO_x limitation shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4 and 7E of 40 CFR Part 60, Appendix A.

c. Emission Limitation

Visible PE from any stack shall not exceed 20% opacity, as a 6-minute average, except as provided by rule.

Applicable Compliance Method

If required, compliance with the visible PE limitation identified above shall be demonstrated through the results of visible emission observations performed in accordance with Method 9 of 40 CFR Part 60, Appendix A.

d. Emission Limitation

PE shall not exceed 0.020 lb/MMBtu of actual heat input.

Applicable Compliance Method

If required, compliance with the PE limitation identified above shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 5 of 40 CFR Part 60, Appendix A.

g) Miscellaneous Requirements

(1) None.

4. P902, Furnace #1

Operations, Property and/or Equipment Description:

Natural Gas Fired Aluminum Reverberator Furnace #1 (21 MMBtu heat input capacity and 4.5 tons/hr melt capacity).

a) This permit document constitutes a PTI issued in accordance with ORC 3704.03(F) and a PTO issued in accordance with ORC 3704.03(G).

(1) For the purpose of a PTI document, the EU T&C identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

a. None.

(2) For the purposes of a PTO document, the EU T&C identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

a. b)(1)b.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC Rule 3745-31-05(A)(3)	PE shall not exceed 2.62 pounds per hour and 11.46 tons per year. NO_x emissions shall not exceed 4.64 pounds per hour and 20.34 tons per year. VOC emissions shall not exceed 4.82 pounds per hour and 21.11 tons per year. Hydrogen fluoride emissions shall not exceed 0.10 pound per hour and 0.422 ton per year. Visible PE of fugitive dust shall not exceed 5% opacity, as a 3-minute average. Visible PE from any stack shall not exceed 5% opacity, as a 3-minute average. See b)(2)a. below.
b.	OAC rule 3745-31-05(D) [Federally enforceable requirements to avoid Title V and to comply with OAC rule 3745-21-11(B)]	See Facility-Wide Terms and Conditions in sections B.3 and B.4.



c.	OAC rule 3745-17-07(A)(1) OAC rule 3745-17-11(B)(1)	The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).
d.	OAC rule 3745-17-07(B) OAC rule 3745-17-08(B)	Exempt. Not located in an area specified in Appendix A of OAC rule 3745-17-08.
e.	40 CFR Part 63, Subpart RRR [40 CFR 63.1500 – 63.1520]	Exempt. See b)(2)b. and c)(2) below.

(2) Additional Terms and Conditions

a. The permittee shall minimize or eliminate visible particulate emissions of fugitive dust by employing best available control measures. These measures shall include, but not be limited to, the following:

- i. The installation and use of hoods, fans and other equipment to adequately enclose, contain, capture and vent the fugitive dust; and
- ii. The collection efficiency is sufficient to minimize or eliminate visible particulate emissions of fugitive dust at the point(s) of capture to the extent possible with good engineering design.

Nothing in this paragraph shall prohibit the permittee from employing other control measures to ensure compliance, as described below. Ohio EPA may require additional control measures at any or all operations described above if deemed necessary based on observed visible emissions.

b. An area source of hazardous air pollutant emissions that only melts clean charge, internal scrap, or customer returns, as defined in 40 CFR 63.1503, and does not operate a thermal chip dryer.

c. See Facility-Wide Terms and Conditions B.4.a) above.

c) Operational Restrictions

- (1) The permittee shall only combust natural gas as fuel in this emissions unit.
- (2) The emissions unit shall be charged with only clean charge, internal scrap, or customer returns, as defined in 40 CFR 63.1503.
- (3) Chlorine shall not be added for demagging the aluminum.
- (4) Alloying, if any performed in this emissions unit, shall be done employing only clean materials.

d) Monitoring and/or Recordkeeping Requirements

- (1) The permittee shall maintain monthly records of the total amount of aluminum charged in the furnace, in pounds or tons, for this emissions unit.
- (2) The permittee shall perform weekly checks when the emissions unit is in operation and when the weather conditions allow, for any visible particulate emissions from the stack and for any visible emissions of fugitive dust from the egress points (i.e., building windows, doors, roof



monitors, etc.) serving this emissions unit. The presence or absence of any visible emissions shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:

- a. the location and color of the emissions;
- b. whether the emissions are representative of normal operations;
- c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;
- d. the total duration of any visible emissions incident; and
- e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item d)(2)d. above or continue the weekly check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit). With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal operations or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions or specify the corrective actions that were taken to eliminate abnormal visible emissions.

- (3) Modeling to demonstrate compliance with the Ohio EPA's "Air Toxic Policy" was not necessary because the emissions unit's maximum annual emissions for each toxic compound will be less than 1.0 ton. OAC Chapter 3745-31 requires permittees to apply for and obtain a new or modified federally enforceable permit-to-install and operate (FEPTIO) prior to making a "modification" as defined by OAC rule 3745-31-01. The permittee is hereby advised that changes in the composition of the materials, or use of new materials, that would cause the emissions of any pollutant that has a listed TLV to increase to above 1.0 ton per year may require the permittee to apply for and obtain a new FEPTIO.

(4) See Facility-Wide Terms and Conditions B.4.b) above.

e) Reporting Requirements

- (1) All applications, notifications, or reports required *in writing* are to be submitted through Ohio EPA's eBusiness Center: Air Services online web portal. Hardcopy submissions will be accepted on an as-needed basis if the permittee cannot submit the required documents through Air Services. In the event of a hardcopy submission, the post-marked date or the date the document is delivered in person will be recognized as the date submitted. Electronic submittal of applications, notifications, or reports to Ohio EPA fulfills the requirement to submit information to the director, the appropriate Ohio EPA DO/LAA, and/or any other individual or organization identified as a recipient unless otherwise specified in this permit. Consistent with OAC rule 3745-15-03, the application, notification, or report is considered *submitted* on the date the submittal is successful using a valid electronic signature. Signature by the signatory authority may be represented as provided through procedures established in Air Services.



- (2) The permittee shall submit an annual Permit Evaluation Report (PER) to Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The PER shall cover a reporting period of no more than 12 months for each air contaminant source identified in this permit.
- (3) The permittee shall identify the following information in the annual PER in accordance with the monitoring requirements for visible emissions in section d)(2):
 - a. all days during which any visible particulate emissions were observed from the stack serving this emissions unit;
 - b. all days during which any visible emissions of fugitive dust were observed from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit; and
 - c. any corrective actions taken to minimize or eliminate the visible particulate emissions from the stack and/or visible emissions of fugitive dust.

(4) See Facility-Wide Terms and Conditions B.4.c) above.

f) Testing Requirements

- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

- a. Emissions Limitation

PE shall not exceed 2.62 pounds per hour and 11.46 tons per year.

Compliance Method

If required, compliance with the hourly PE limitation identified above shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 5 of 40 CFR Part 60, Appendix A.

The annual emission limitation was established by multiplying the hourly emission limitation by 8,760 hours per year and dividing by 2,000 pounds per ton. Therefore, compliance with the annual limitation shall be ensured provided compliance is maintained with the hourly limitation.

- b. Emission Limitation

NO_x emissions shall not exceed 4.64 pounds per hour and 20.34 tons per year.

Applicable Compliance Method

If required, compliance with the hourly NO_x limitation identified above shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4 and 7 of 40 CFR Part 60, Appendix A.

The annual emission limitation was established by multiplying the hourly emission limitation by 8,760 hours per year and dividing by 2,000 pounds per ton. Therefore, compliance with the annual limitation shall be ensured provided compliance is maintained with the hourly limitation.



c. Emission Limitation

VOC emissions shall not exceed 4.82 pounds per hour and 21.11 tons per year.

Applicable Compliance Method

Compliance with the hourly VOC limitation identified above shall be demonstrated by multiplying an emission factor of 1.07 pounds VOC per ton of aluminum charged by the emission unit's maximum actual rated capacity. This emission factor was developed based on the results of emission tests performed at the facility on 8/13/2019.

If required, compliance with the hourly VOC limitation shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4 and 18 or 25/25A, as appropriate, of 40 CFR Part 60, Appendix A.

The annual emission limitation was established by multiplying the hourly emission limitation by 8,760 hours per year and dividing by 2,000 pounds per ton. Therefore, compliance with the annual limitation shall be ensured provided compliance is maintained with the hourly limitation.

d. Emission Limitation

Hydrogen fluoride emissions shall not exceed 0.10 pound per hour and 0.422 ton per year.

Applicable Compliance Method

If required, compliance with the hourly hydrogen fluoride limitations identified above shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4 and 13A/B of 40 CFR Part 60, Appendix A.

The annual emission limitation was established by multiplying the hourly emission limitation by 8,760 hours per year and dividing by 2,000 pounds per ton. Therefore, compliance with the annual limitation shall be ensured provided compliance is maintained with the hourly limitation.

e. Emission Limitation

Visible PE of fugitive dust shall not exceed 5% opacity, as a 3-minute average.

Visible PE from any stack shall not exceed 5% opacity, as a 3-minute average.

Applicable Compliance Method

If required, compliance with the visible PE limitations identified above shall be demonstrated through the results of visible emission observations performed in accordance with Method 9 of 40 CFR Part 60, Appendix A.

(2) See Facility-Wide Terms and Conditions B.4.d) above.

g) Miscellaneous Requirements

(1) None.

5. Emissions Unit Group - Melting Furnace Group 1: P923, P924

EU ID	Operations, Property and/or Equipment Description
P923	Furnace #4. Natural gas fired aluminum melting furnace with 7 MMBTU/hr heat input capacity and 1.5 TPH (3,000 lb/hr) melt capacity.
P924	Furnace #2. Natural gas fired aluminum melting furnace with 5,630,034 BTU/hr heat input capacity and 2.2 TPH (4,400 lb/hr) melt capacity.

a) This permit document constitutes a PTI issued in accordance with ORC 3704.03(F) and a PTO issued in accordance with ORC 3704.03(G).

(1) For the purpose of a PTI document, the EU T&C identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

a. None.

(2) For the purposes of a PTO document, the EU T&C identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

a. b)(1)c.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	ORC 3704.03(T) and OAC rule 3745-31-05(A)(3)	VOC emissions shall not exceed 1.07 pounds per ton of aluminum charged. See b)(2)a. below.
b.	OAC rule 3745-31-05(A)(3)(a)(ii)	See b)(2)a. below.
c.	OAC rule 3745-31-05(D) [Federally enforceable requirements to avoid Title V and to comply with OAC rule 3745-21-11(B)]	See Facility-Wide Terms and Conditions in sections B.3 and B.4.
d.	OAC rule 3745-17-07(A)(1)	Visible PE from any stack shall not exceed 20% opacity, as a 6-minute average, except as provided by rule.
e.	OAC rule 3745-17-07(B) OAC rule 3745-17-08(B)	Exempt. Not located in an area specified in Appendix A of OAC rule 3745-17-08.



f.	OAC rule 3745-17-11(B)(1)	PE shall not exceed 5.38 pounds per hour for emissions unit P923 (based on a maximum process weight rate of 3,000 pounds per hour). PE shall not exceed 6.95 pounds per hour for emissions unit P924 (based on a maximum process weight rate of 4,400 pounds per hour).
g.	40 CFR Part 63, Subpart RRR [40 CFR 63.1500 – 63.1520]	Exempt. See b)(2)b. and c)(3) below.

(2) Additional Terms and Conditions

- a. The Best Available Technology (BAT) requirements under OAC rule 3745-31-05(A)(3) do not apply to the PE, NO_x, CO and hydrogen fluoride emissions from this air contaminant source since the potential to emit for each is less than 10 tons per year.
- b. An area source of hazardous air pollutant emissions that only melts clean charge, internal scrap, or customer returns, as defined in 40 CFR 63.1503, and does not operate a thermal chip dryer.
- c. See Facility-Wide Terms and Conditions B.4.a) above.

c) Operational Restrictions

- (1) The permittee shall only combust natural gas as fuel in this emissions unit.
- (2) Neither demagging nor degassing shall be performed in this emissions unit. Only fluxing, performed with the addition of dry powdered fluxes, for the sole purpose of preventing, reducing, and removing oxide impurities from the aluminum melt, shall be permitted in this emissions unit.
- (3) The emissions unit shall be charged with only clean charge, internal scrap, or customer returns, as defined in 40 CFR 63.1503.

d) Monitoring and/or Recordkeeping Requirements

- (1) The permittee shall maintain monthly records of the total amount of aluminum charged in the furnace, in pounds or tons, for this emissions unit.
- (2) The permittee shall perform weekly checks when the emissions unit is in operation and when the weather conditions allow, for any visible particulate emissions from the stack and for any visible emissions of fugitive dust from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit. The presence or absence of any visible emissions shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:
 - a. the location and color of the emissions;
 - b. whether the emissions are representative of normal operations;
 - c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;



- d. the total duration of any visible emissions incident; and
- e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item d)(2)d. above or continue the weekly check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit). With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal operations or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions or specify the corrective actions that were taken to eliminate abnormal visible emissions.

- (3) Modeling to demonstrate compliance with the Ohio EPA's "Air Toxic Policy" was not necessary because the emissions unit's maximum annual emissions for each toxic compound will be less than 1.0 ton. OAC Chapter 3745-31 requires permittees to apply for and obtain a new or modified federally enforceable permit-to-install and operate (FEPTIO) prior to making a "modification" as defined by OAC rule 3745-31-01. The permittee is hereby advised that changes in the composition of the materials, or use of new materials, that would cause the emissions of any pollutant that has a listed TLV to increase to above 1.0 ton per year may require the permittee to apply for and obtain a new FEPTIO.

(4) See Facility-Wide Terms and Conditions B.4.b) above.

e) Reporting Requirements

- (1) All applications, notifications, or reports required *in writing* are to be submitted through Ohio EPA's eBusiness Center: Air Services online web portal. Hardcopy submissions will be accepted on an as-needed basis if the permittee cannot submit the required documents through Air Services. In the event of a hardcopy submission, the post-marked date or the date the document is delivered in person will be recognized as the date submitted. Electronic submittal of applications, notifications, or reports to Ohio EPA fulfills the requirement to submit information to the director, the appropriate Ohio EPA DO/LAA, and/or any other individual or organization identified as a recipient unless otherwise specified in this permit. Consistent with OAC rule 3745-15-03, the application, notification, or report is considered *submitted* on the date the submittal is successful using a valid electronic signature. Signature by the signatory authority may be represented as provided through procedures established in Air Services.
- (2) The permittee shall submit an annual Permit Evaluation Report (PER) to Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The PER shall cover a reporting period of no more than 12 months for each air contaminant source identified in this permit.
- (3) The permittee shall identify the following information in the annual PER in accordance with the monitoring requirements for visible emissions in section d)(2):
 - a. all days during which any visible particulate emissions were observed from the stack serving this emissions unit;



- b. all days during which any visible emissions of fugitive dust were observed from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit; and
- c. any corrective actions taken to minimize or eliminate the visible particulate emissions from the stack and/or visible emissions of fugitive dust.

(4) See Facility-Wide Terms and Conditions B.4.c) above.

f) Testing Requirements

- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitation

VOC emissions shall not exceed 1.07 pounds per ton of aluminum charged.

Applicable Compliance Method

Compliance with the VOC emission limitation identified above shall be demonstrated using an emission factor of 1.07 pounds VOC per ton of aluminum charged. This emission factor was developed based on the results of emission tests performed at the facility on 8/13/2019.

If required, compliance with the VOC emission limitation above shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4, and 18 or 25/25A of 40 CFR Part 60, Appendix A.

b. Emissions Limitation

Visible PE from any stack shall not exceed 20% opacity, as a 6-minute average, except as provided by rule.

Applicable Compliance Method

If required, compliance with the visible PE limitation identified above shall be demonstrated through the results of visible emission observations performed in accordance with Method 9 of 40 CFR Part 60, Appendix A.

c. Emissions Limitation

PE shall not exceed 5.38 pounds per hour for emissions unit P923

PE shall not exceed 6.95 pounds per hour for emissions unit P924.

Applicable Compliance Method

If required, compliance with the PE limitation identified above shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 5 of 40 CFR Part 60, Appendix A.

(2) See Facility-Wide Terms and Conditions B.4.d) above.

g) Miscellaneous Requirements

- (1) None.

6. Emissions Unit Group - Melting Furnace Group 2: P925, P926

EU ID	Operations, Property and/or Equipment Description
P925	New Furnace #5. Natural gas fired aluminum melting furnace with 10.6 MMBTU/hr heat input capacity and 2.25 TPH (4,500 lb/hr) melt capacity.
P926	New Furnace #6. Natural gas fired aluminum melting furnace with 10.6 MMBTU/hr heat input capacity and 2.25 TPH (4,500 lb/hr) melt capacity.

a) This permit document constitutes a PTI issued in accordance with ORC 3704.03(F) and a PTO issued in accordance with ORC 3704.03(G).

(1) For the purpose of a PTI document, the EU T&C identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

a. None.

(2) For the purposes of a PTO document, the EU T&C identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

a. b)(1)c.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	ORC 3704.03(T) and OAC rule 3745-31-05(A)(3)	VOC emissions shall not exceed 1.07 pounds per ton of aluminum charged. NO _x emissions shall not exceed 1.03 pounds per ton of aluminum charged. See b)(2)a. below.
b.	OAC rule 3745-31-05(A)(3)(a)(ii)	See b)(2)a. below.
c.	OAC rule 3745-31-05(D) [Federally enforceable requirements to avoid Title V and to comply with OAC rule 3745-21-11(B)]	See Facility-Wide Terms and Conditions in sections B.3 and B.4.
d.	OAC rule 3745-17-07(A)(1)	Visible PE from any stack shall not exceed 20% opacity, as a 6-minute average, except as provided by rule.



e.	OAC rule 3745-17-07(B) OAC rule 3745-17-08(B)	Exempt. Not located in an area specified in Appendix A of OAC rule 3745-17-08.
f.	OAC rule 3745-17-11(B)(1)	PE shall not exceed 7.05 pounds per hour (based on a maximum process weight rate of 4,500 pounds per hour).
g.	40 CFR Part 63, Subpart RRR [40 CFR 63.1500 – 63.1520]	Exempt. See b)(2)b. and c)(3) below.

(2) Additional Terms and Conditions

- a. The Best Available Technology (BAT) requirements under OAC rule 3745-31-05(A)(3) do not apply to the PE, CO and hydrogen fluoride emissions from this air contaminant source since the potential to emit for each is less than 10 tons per year.
- b. An area source of hazardous air pollutant emissions that only melts clean charge, internal scrap, or customer returns, as defined in 40 CFR 63.1503, and does not operate a thermal chip dryer.
- c. See Facility-Wide Terms and Conditions B.4.a) above.

c) Operational Restrictions

- (1) The permittee shall only combust natural gas as fuel in this emissions unit.
- (2) Neither demagging nor degassing shall be performed in this emissions unit. Only fluxing, performed with the addition of dry powdered fluxes, for the sole purpose of preventing, reducing, and removing oxide impurities from the aluminum melt, shall be permitted in this emissions unit.
- (3) The emissions unit shall be charged with only clean charge, internal scrap, or customer returns, as defined in 40 CFR 63.1503.

d) Monitoring and/or Recordkeeping Requirements

- (1) The permittee shall maintain monthly records of the total amount of aluminum charged in the furnace, in pounds or tons, for this emissions unit.
- (2) The permittee shall perform weekly checks when the emissions unit is in operation and when the weather conditions allow, for any visible particulate emissions from the stack and for any visible emissions of fugitive dust from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit. The presence or absence of any visible emissions shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:
 - a. the location and color of the emissions;
 - b. whether the emissions are representative of normal operations;
 - c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;



- d. the total duration of any visible emissions incident; and
- e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item d)(2)d. above or continue the weekly check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit). With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal operations or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions or specify the corrective actions that were taken to eliminate abnormal visible emissions.

- (3) Modeling to demonstrate compliance with the Ohio EPA's "Air Toxic Policy" was not necessary because the emissions unit's maximum annual emissions for each toxic compound will be less than 1.0 ton. OAC Chapter 3745-31 requires permittees to apply for and obtain a new or modified federally enforceable permit-to-install and operate (FEPTIO) prior to making a "modification" as defined by OAC rule 3745-31-01. The permittee is hereby advised that changes in the composition of the materials, or use of new materials, that would cause the emissions of any pollutant that has a listed TLV to increase to above 1.0 ton per year may require the permittee to apply for and obtain a new FEPTIO.

(4) See Facility-Wide Terms and Conditions B.4.b) above.

e) Reporting Requirements

- (1) All applications, notifications, or reports required *in writing* are to be submitted through Ohio EPA's eBusiness Center: Air Services online web portal. Hardcopy submissions will be accepted on an as-needed basis if the permittee cannot submit the required documents through Air Services. In the event of a hardcopy submission, the post-marked date or the date the document is delivered in person will be recognized as the date submitted. Electronic submittal of applications, notifications, or reports to Ohio EPA fulfills the requirement to submit information to the director, the appropriate Ohio EPA DO/LAA, and/or any other individual or organization identified as a recipient unless otherwise specified in this permit. Consistent with OAC rule 3745-15-03, the application, notification, or report is considered *submitted* on the date the submittal is successful using a valid electronic signature. Signature by the signatory authority may be represented as provided through procedures established in Air Services.
- (2) The permittee shall submit an annual Permit Evaluation Report (PER) to Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The PER shall cover a reporting period of no more than 12 months for each air contaminant source identified in this permit.
- (3) The permittee shall identify the following information in the annual PER in accordance with the monitoring requirements for visible emissions in section d)(2):
 - a. all days during which any visible particulate emissions were observed from the stack serving this emissions unit;



- b. all days during which any visible emissions of fugitive dust were observed from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit; and
- c. any corrective actions taken to minimize or eliminate the visible particulate emissions from the stack and/or visible emissions of fugitive dust.

(4) See Facility-Wide Terms and Conditions B.4.c) above.

f) Testing Requirements

- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitation

VOC emissions shall not exceed 1.07 pounds per ton of aluminum charged.

Applicable Compliance Method

Compliance with the VOC emission limitation identified above shall be demonstrated using an emission factor of 1.07 pounds VOC per ton of aluminum charged. This emission factor was developed based on the results of emission tests performed at the facility on 8/13/2019.

If required, compliance with the VOC limitation shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4, and 18 or 25/25A of 40 CFR Part 60, Appendix A.

b. Emissions Limitation

NO_x emissions shall not exceed 1.03 pounds per ton of aluminum charged.

Applicable Compliance Method

If required, compliance with the NO_x emission limitation identified above shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 4, and 7 of 40 CFR Part 60, Appendix A.

c. Emissions Limitation

Visible PE from any stack shall not exceed 20% opacity, as a 6-minute average, except as provided by rule.

Applicable Compliance Method

If required, compliance with the visible PE limitation identified above shall be demonstrated through the results of visible emission observations performed in accordance with Method 9 of 40 CFR Part 60, Appendix A.

d. Emissions Limitation

PE shall not exceed 7.05 pounds per hour.



Applicable Compliance Method

If required, compliance with the PE limitation identified above shall be determined based on the results of emission testing conducted in accordance with Methods 1 through 5 of 40 CFR Part 60, Appendix A.

(2) See Facility-Wide Terms and Conditions B.4.d) above.

g) Miscellaneous Requirements

(1) None.



VOC-RACT Study

**General Aluminum Manufacturing
Company
Ravenna, Ohio**

June 2026
Version 4

Prepared For:

General Aluminum Manufacturing
Company
Ravenna, Ohio

Prepared By:

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Executive Summary

This Reasonably Achievable Control Technology for emissions of volatile organic compounds (VOC-RACT) Study was conducted to per the requirements of OAC Rule 3745-21-11(B) for VOC emitting sources at General Aluminum Manufacturing Company (GAMCO) located in Ravenna, OH. The VOC- RACT study focused on the VOC emitting sources at GAMCO. This study included emission sources of the pouring and cooling turntables and the aluminum melting furnaces but excluded the de minimis, insignificant, categorically exempt sources, and sources with very low potential VOC emissions (less than 10 lbs/day VOC).

Key findings of the VOC-RACT Study include the following:

- The use of an add-on control, such as thermal incineration to control VOC emissions from the pouring and cooling tables will not be economically feasible.
- Continuation of 2.48 pounds of VOC emissions per ton metal processed and 63.48 tons per 12-month rolling summation which is the approved VOC limit in PTIO P0128540 is proposed as VOC-RACT for the pouring and cooling tables. GAMCO will continue the current operations considered RACT immediately (OAC 3745-21-11(B)(16)).
- Good combustion & operation practices (GCOP) plan as VOC control measure is proposed as VOC-RACT for the melting furnaces.
- Continuation of 1.07 pounds of VOC emissions per ton metal processed with 27.39 tons per rolling 12-month summation which is the approved VOC limit in PTIO P0128540 is proposed as VOC-RACT for the melting furnaces. GAMCO will continue the current operations considered RACT immediately (OAC 3745-21-11(B)(16)).

1.0 Introduction

The GAMCO facility, located at 5159 South Prospect Street in Ravenna, Portage County, Ohio, is a manufacturer of aluminum castings. Operations at the facility include melting, pouring/cooling, knockout, finishing, heat treat and additional support processes. This VOC-RACT study was conducted per Ohio Administrative Code (OAC) Rule 3745-21-11(B) at the GAMCO facility for their VOC emitting sources as potential VOC emissions are greater than 50 TPY.

1.1 Facility Information

Table 1-1: Facility Identification Information

Facility Name, Address:	General Aluminum Manufacturing Company 5159 South Prospect St. Rootstown, OH 44266
Ohio EPA Facility ID:	1667070012
Owner or Operator's representative:	Jeff Stevenson EHS Specialist 5159 South Prospect St. Rootstown, OH 44266 (330) 298-7250
Responsible Official:	Teresa Reckner Director of Human Resources 5159 South Prospect St. Rootstown, OH 44266 (330) 298-7211
Standard Industrial Classification (SIC) Code:	3365
North American Industry Classification System (NAICS) Code:	331524

1.2 Sources Subject to VOC RACT Study

GAMCO is located in Portage County and has the potential to emit 50 tons per year or more of VOC emissions which is not controlled by Ohio's CTG regulations; the current PTI P0128540 limits facility-wide VOC emissions to 96.3 tons per rolling 12-month summation. Portage County was recently designated as serious nonattainment for the 2015 8-Hour Ozone National Ambient Air Quality Standards (NAAQS). The major source threshold for VOCs and NO_x has decreased from 100 TPY to 50 TPY for sources in Portage County. GAMCO is currently not permitted under a Title V Permit, but GAMCO submitted an initial Title V Permit application in September 2025.

Per OAC Rule 3745-21-11(B), GAMCO is required to conduct a detailed engineering study to determine the technical and economic feasibility of reducing the VOC emissions from the sources at the facility. The emission sources that are subject to the VOC RACT study are identified below:

- F002 - Pouring and Cooling Table 1A
- F003 - Pouring and Cooling Table 2
- F004 - Pouring and Cooling #1100 Table 4A
- F005 - Pouring and Cooling #1500 Table 4B
- F006 - Pouring and Cooling Table 1B
- F007 - Pouring/Cooling New Table #5
- F008 - Pouring/Cooling New Table #6
- P902 - Furnace #1
- P923 - Furnace #4
- P924 - Furnace #2
- P925 - New Furnace #5
- P926 - New Furnace #6

This source list excluded de minimis, insignificant, categorically exempt sources, and sources with very low potential VOC emissions (less than 10 lbs/day VOC) from the detailed engineering study. Design, installation, and operation of any VOC control technology for these small sources would be prohibitively expensive.

2.0 Pouring and Cooling Turntables

Seven pouring and cooling tables are operated at the GAMCO facility. Molten aluminum is poured into molds and releases VOC from decomposition of binders in the cores. As the aluminum castings cool, mold release agents, and residual binder components evaporate and generate VOCs. Pursuant to Ohio EPA guidance, site-specific RACT must be assessed in this report to determine whether the site-specific conditions still represent RACT for the 2015 ozone NAAQS.

2.1 General Source Information

The most recent application for the emission sources is the initial Title V Permit application, A0080050. The application was submitted in September 2025.

General information on the sources (F002 through F008) per OAC 3745-21-11(B)(5) are provided in the following tables. The company identification, Ohio EPA emission unit identification number and source description is included in Table 2-1.

Table 2-1: Source Description

Ohio EPA EU ID	Company Identification	Source Description	Source Classification Codes	VOC PTE (tpy)*
F002	Pouring and Cooling Table 1A	Pouring and Cooling Table 1A. Six devices with two molds each on a rotating turn table.	3-04-001-14	48.88
F003	Pouring and Cooling Table 2	Pouring and Cooling Table 2. Eight devices with two molds each on a rotating turn table.	3-04-001-14	48.88
F004	Pouring and Cooling #1100 Table 4A	1100 Pouring and Cooling Turntable 4A	3-04-001-14	21.72
F005	Pouring and Cooling #1500 Table 4	1500 Pouring and Cooling Turntable 4B	3-04-001-14	21.72
F006	Pouring and Cooling Table 1B	Pouring and Cooling Table 1B (eight station turntable)	3-04-001-14	24.44
F007	Pouring/Cooling New Table #5	Pouring and Cooling Table 5 (eight station turntable)	3-04-001-14	24.44
F008	Pouring/Cooling New Table #6	Pouring and Cooling Table 6 (eight station turntable)	3-04-001-14	24.44

See Appendix D for detailed VOC PTE emissions calculations.

* Note that PTE identified is based on hourly capacity at 8,760 hours/year; total pouring and cooling turntable VOC emissions are limited to 63.48 tons per rolling 12-month summation per PTIO P0128540.

Month, year installed and normal operating schedule for the reference sources is presented in Table 2-2.

Table 2-2: Installation Dates and Normal Operating Schedule

Ohio EPA EU ID	Installation Dates	Operating Schedule (hours/day, days/week, weeks/year)
F002	06/1994	24/7/52
F003	06/1994	24/7/52
F004	06/2015	24/7/52
F005	06/2015	24/7/52
F006	02/2016	24/7/52
F007	05/2018	24/7/52
F008	05/2018	24/7/52

Table 2-3 includes annual, average and maximum daily production rates for the affected sources during the past three years (2023, 2024 and 2025). The quantity of aluminum processed was used as the production rates.

Table 2-3: Annual, Average and Maximum Daily Production Rates

Ohio EPA EU ID	Annual Production Rates, tons			Average Daily Production Rates, tons			Maximum Daily Production Rates, tons		
	2023	2024	2025	2023	2024	2025	2023	2024	2025
F002	0	0	0	0	0	0	0	0	0
F003	3,467	3,713	3,666	9.50	10.16	10.17	13.00	13.76	13.57
F004	0	0	0	0	0	0	0	0	0
F005	0	0	0	0	0	0	0	0	0
F006	3,494	3,388	2,832	9.59	9.40	7.74	13.36	15.60	12.86
F007	4,455	2,916	4,251	12.20	7.98	11.65	15.13	12.82	18.53
F008	5,008	4,014	4,792	13.75	10.99	13.17	17.18	14.11	17.34

There is no existing control equipment for these sources. A plot plan is included in Appendix A which identifies the locations of each pouring and cooling turntable. The VOC emissions data per OAC 3745-21-11(B)(7) is included in Table 2-4. Detailed emission calculations per OAC 3745-21-11(B)(17) are included in Appendix D. General composition of the VOC emissions are light distillates. No coating materials or cleanup solvents are used for these sources. VOC emission testing was performed for F003 in August 2019, and a copy of the test report summary

is included in Appendix B.

Table 2-4: Highest Average and Maximum Daily and Annual VOC Emissions in Previous Three Calendar Years

Ohio EPA EU ID	Average Daily VOC Emissions (lb/day)	Maximum Daily VOC Emissions (lb/day)	Annual VOC Emissions (tpy)
F002	0	0	0
F003	25.19 (2024)	34.14 (2024)	3.08 (2024)
F004	0	0	0
F005	0	0	0
F006	23.78 (2023)	38.69 (2024)	2.90 (2023)
F007	30.27 (2023)	45.96 (2025)	3.69 (2023)
F008	34.10 (2023)	43.00 (2025)	4.15 (2023)

See Appendix D for detailed VOC daily/annual emissions calculations.

2.2 Evaluation of Available Control Technologies

Pursuant to OAC 3745-21- 11(B)(8), technical feasibility of at least five types of control technologies should be evaluated for the affected sources.

2.2.1 Thermal Incinerator (with and without heat recovery)

The thermal incineration/oxidation process removes VOCs from a gas stream through combustion and converts VOCs into carbon dioxide (CO₂), water vapor, and small quantities of other organic compounds. In thermal incineration, the gas stream passes through a combustion chamber where a natural gas-fueled flame ignites the VOCs in the vapor stream.

Thermal incinerators typically require temperatures of approximately 1,200 to 1,800°F to achieve 90 to 95 percent conversion of VOC to CO₂. The performance of the incinerator/oxidizer is dependent on the gas stream heating value, inert content, gas moisture content, and the amount of excess combustion air. For optimum performance, exhaust temperature for the referenced emission units will need to be maintained to the temperature range listed above. Thermal incinerators require high VOC concentrations to sustain combustion reactions and supplemental fuel usage is required to sustain combustion reaction if VOC concentration is low.

A search of the United States Environmental Protection Agency's (USEPA's) RACT/BACT/LAER Clearinghouse (RBLC) database over the past 20 years to identify control technology for pouring and cooling processes for aluminum casting facilities show no add on control except for one facility utilizing regenerative thermal oxidizers as control for mold cooling lines. A summary of the RBLC search results is presented in Section 2.2.7. Therefore, thermal incineration can be considered a technically feasible form of VOC control from the reference emission units.

2.2.2 Catalytic Incinerator (with and without heat recovery)

Catalytic incineration/oxidation is a thermal oxidation process where combustion of VOC occurs at a relatively low temperature. Combustion is accomplished by passing combustion gases over a specialized catalyst where the VOC is converted to CO₂. The optimal working temperature range for oxidation catalysts is approximately 400 to 800°F. Catalytic incineration is often chosen for its ability to handle low VOC concentrations, with optimal performance typically occurring at concentrations below 20% of the lower explosive limit (LEL). While high concentrations can be treated, they risk exceeding the catalyst's thermal capacity, requiring dilution to stay within safe operating limits, increasing operating costs.

Catalytic incineration is best suited for continuous operation, particularly in industrial settings, where it often uses a precious metal catalyst to oxidize VOCs at lower temperatures, which reduces fuel usage compared to thermal oxidation. However, preheating the waste stream to the desired temperature range is required to initiate the reaction, necessitating continuous fuel burning (often natural gas whose combustion generates additional VOC and ozone precursor emissions) if heat recovery is insufficient. Catalytic systems are susceptible to catalyst deactivation (poisoning) from compounds like particulate, sulfur, phosphorus, and halogens, requiring strict pre-treatment of the waste stream.

The operation of the rotating pouring and cooling turntables creates an environment where VOC emissions are intermittent based on pouring cycles, mold changes, etc.; as noted above, catalytic incineration is best suited for continuous load operation. Emissions from the pouring and cooling turntables are captured through a canopy above the open-aired turntable. This canopy captures the exhaust the initial pouring of the aluminum into the permanent molds through the removal of the cooled castings at the end of the process; turntable moves a position after each pour resulting in a gradual cooling of the castings between initial pour and casting removal. The exhaust stream emissions from the pouring and cooling turntables contains additional pollutants, including particulate matter and sulfur dioxide, which could foul the catalytic oxidizer and requiring pre-treatment. Sulfur compounds are not considered catalyst friendly and form corrosive byproducts that damage the catalyst resulting in reduced performance. The draw from the overhead canopy will also pull in surrounding foundry air around the open-aired turntables which could include additional combustible or condensable materials into the captured exhaust stream.

Although the total hydrocarbon concentration of the pouring and cooling turntable exhaust is low (averaging 8 ppm from the 2019 stack testing), the temperature of the pouring and cooling turntables is typically less than 100°F and would require additional, continuous heating of the exhaust gas, with additional natural gas combustion to maintain catalyst light-off temperature resulting in additional VOC and NO_x (ozone precursor) emissions, to maintain a an optimal working temperature for catalytic incineration.

Based on the above discussion, the pouring and cooling turntable exhaust profile (low temperature, additional pollutants, intermittent VOC loading) would not be conducive to catalytic incineration; and this control option is considered to be technically infeasible. An economic feasibility evaluation was not conducted on this technically infeasible control option.

In addition, a search of the RBLC database did not list catalytic incineration as a control option for processes similar to the referenced emission units.

2.2.3 Carbon Adsorber (with and without recovery of the organic compounds)

Adsorption is a process that bonds gaseous molecules to other surfaces. The VOC emission streams are collected by the fume exhaust hoods and passes through a bed of activated carbon. The VOCs are adsorbed by the carbon until the carbon bed is exhausted. Upon reaching capacity in the carbon bed, the VOCs can be desorbed and recycled for further use or incinerated. Carbon adsorption can be employed in two forms: fixed-bed adsorption and fluidized-bed adsorption. Fixed bed carbon adsorption uses two or more carbon beds. While two or more beds are in regeneration, one bed is in use. Fluidized-bed adsorption employs a single bed that contains beaded activated carbon. The VOC stream is pushed through the bed of beaded activated carbon and exits while the VOC-laden carbon is continually removed and replaced for regeneration.

Carbon adsorption is technically feasible but not recommended for gas streams with concentrations below 700 ppm. Allowable VOC concentration for the combined reference emission units is considerably less than the recommended 700 ppm (less than 10 ppmv) and would not be considered technically effective. The pouring/cooling table exhaust gases (300° - 450°F) would be too hot for effective removal without the addition of a dilution air system which would further increase flow and drop the inlet concentration. Carbon adsorption is relatively sensitive to emission stream humidity and temperature. Dehumidification is necessary if the emission stream has a high relative humidity and cooling may be required if the emission stream temperature exceeds 120 to 130°F (per U.S. EPA Handbook: Control Technologies for Hazardous Air Pollutants EPA/625/6-91/014. June 1991). Current literature searches did not identify carbon adsorption systems existing as control devices for these types of emission sources.

Based on the information above, this technology is not a reasonable control option for these emission units and considered to be technically infeasible. An economic feasibility evaluation was not conducted on this technically infeasible control option.

In addition, adsorption technology has not been demonstrated as a control option on these types of sources, and it is not listed in the RBLC search for these types of emission units.

2.2.4 Condenser

Condensation systems utilize a coolant and/or refrigeration source to cool the exhaust stream to convert the VOC from a gaseous phase to a liquid phase. Often, condensation is used in combination with other control methods. When used alone, high-recovery efficiencies (greater than 95 percent) using condensation can be achievable for organic compound concentrations greater than 5,000 ppmv. Reasonable organic compound removal efficiencies of 50 percent or more can be achieved at concentrations as low as 500 ppmv.

Allowable VOC concentration for the reference emission units is less than 10 ppmv with a high volume of air flow rate. To achieve adequate control from a condenser, a unit would require a very large heat-transfer service area and low coolant temperatures (near freezing) as condensers scale with gas volume (larger condenser, larger, pumps, larger refrigeration duty) which results in a more energy-intensive operation for the condenser. The exhaust stream emissions from the pouring and cooling turntables contain additional pollutants, including particulate matter, which could form sticky deposits on the condenser resulting in poor performance and require pre-treatment separation prior.

Based on the above discussion, the pouring and cooling turntable exhaust profile (low concentration, high air flow rates, additional pollutants) would not be conducive to condensation; and this control option is considered to be technically infeasible. An economic feasibility evaluation was not conducted on this technically infeasible control option.

In addition, condenser technology has not been demonstrated as a control option on these types of sources, and it is not listed in the RBLC search for these types of emission units.

2.2.5 Scrubber

In the scrubbing process, certain constituents of a gas stream are selectively removed by a liquid. The vapor stream is introduced to a scrubber system screen tray column that has a countercurrent of absorber liquid. The VOC-laden vapor stream is directed into the scrubber system, where the VOCs are absorbed upon contact with the absorber liquid. The cleaned gas is exhausted, and the VOC laden absorber liquid can be treated and recycled back into the scrubber system. The degree of control depends on the solubility of gas, gas and liquid throughput rates, contact time, mechanism of contact, and types of scrubber.

Gas absorption is commonly used to recover products or to purify gas streams with high concentrations of water-soluble compounds. Per the USEPA Cost Control Manual (document ID: EPA/452/B-02-001), gas absorbers are most effective for gas streams with pollutant concentrations between 250 and 10,000 ppmv. Allowable VOC concentration (less than 10 ppmv) for the combined reference emission units is considerably less than the 250 – 10,000 ppmv range and would not be considered technically effective. Low concentrations of organics in an exhaust stream require long contact times and large quantities of absorbent for effective removal. Absorptions are generally more practical for processes in which the absorbent is easily regenerated, or the resulting solution can be used as a make-up stream.

Based on the information above, absorption (scrubbing) technology is not a reasonable control option and therefore considered to be technically infeasible. An economic feasibility evaluation was not conducted on this technically infeasible control option.

In addition, scrubbing technology has not been demonstrated as a control option on these types of sources, and it is not listed in the RBLC search for these types of emission units.

2.2.6 Operational Restrictions

GAMCO proposed operational restrictions in a PTIO application that was approved by Ohio EPA by issuing PTIO P0128540 on July 29, 2021. Per the PTIO, GAMCO has a maximum annual throughput limit of 51,190 tons of aluminum charged per rolling 12-month summation. Annual VOC emissions limit from the pouring and cooling process is 2.48 pounds per ton metal processed and 63.48 tons per rolling 12-month summation.

2.2.7 USEPA RACT/BACT/LAER Clearinghouse Review

USEPA's RBLC database was reviewed for process type 82.123 – Misc. Secondary Aluminum Casting Lines. Three facilities were listed and two of them include casting pouring/cooling and mold pouring/cooling processes. A summary of the facilities, processes and VOC control methods are listed in Table 2-5. Based on the RBLC database review, one facility, Defiance Casting Operations utilized regenerative thermal oxidizer as VOC control method for mold cooling lines; these lines were originally installed utilizing the lost foam casting process which generates hazardous air pollutants (HAPs) in the form of styrene. The facility has a capacity of 26,762 tons per year aluminum for each line or 107,048 tons per year for all four lines based on a rolling 12-months. GAMCO has taken an operational restriction of 51,190 tons of aluminum charged per year, as a rolling 12-month summation which has less than 50% of the capacity of the facility utilizing the regenerative thermal oxidizer as VOC control. GAMCO identified thermal incineration as a technically feasible form of VOC control from the emission units and performed an economic analysis of the cost-effectiveness of the control technology.

Table 2-5: Summary of RBLC Search

RBLC ID	Facility Name	Process Name	Capacity	Control Method Description
OH-0320	GM Powertrain, Defiance Plant	Mold Fill Pouring Stations (2)	26,775 tons per year aluminum for both stations based on a rolling 12-months	None
OH-0334	Defiance Casting Operations	Mold Fill Pouring Stations (4)	26,762 tons per year aluminum for each station based on a rolling 12-months	None
		Mold Cooling Line (4)	26,762 tons per year aluminum for each line based on a rolling 12-months	Regenerative Thermal Oxidizer
		Casting cooling tunnel (4)	26,762 tons per year aluminum for each tunnel based on a rolling 12-months	None

2.3 Economic Feasibility of Technically Feasible Control Technology

As discussed in the preceding sections, a thermal oxidizer was identified as a technically feasible VOC control measure for Pouring and Cooling Tables. GAMCO performed an economic feasibility evaluation on a thermal oxidation technology and a summary of the economic evaluation is presented in Table 2-6. Appendix C includes the supporting calculations and cost-model printouts for the technology.

The cost-estimation was performed utilizing spreadsheets presented in the USEPA's Air Pollution Control Cost Manual for Thermal Oxidizers. The cost data was obtained from the Chemical Engineering Plant Cost Index (CEPCI) and cost was adjusted to 2025 dollars. Due to low VOC concentration in the gas streams, a minimum achievable VOC destruction efficiency of 95 percent was assumed. The combined allowable PTE emission rate of 63.5 tons of VOC per year for all seven pouring and cooling turntables was used. For concentration purposes, all VOC was assumed to be benzene.

Table 2-6: Cost Effectiveness of Thermal Incinerators

Control Option	Total Capital Investment	Total Annualized Cost (\$/year)	VOC Cost Effectiveness (\$/Ton of VOC)
Regenerative Thermal Oxidizer	\$16,805,525	\$4,791,680	\$75,453

The VOC inlet concentration is very low (less than 10 ppmv) and a high removal efficiency would be difficult to achieve. An efficiency of 95% was assumed for the regenerative thermal oxidizer (RTO) for cost estimates. Typically an RTO has up to 99% VOC control efficiency, but a if lower control efficiency, such as 90% was used for cost calculation, the VOC cost effectiveness is estimated at \$79,645 per ton of VOC removal.

The calculation methodologies used presented in Appendix B utilize the US.EPA provided Incinerators and Oxidizers Calculation Spreadsheet, updated December 2024) as presented in the U.S. EPA's Air Pollution Control Cost Manual which includes U.S. EPA cost multiplier estimates for direct and indirect installation (actual GAMCO labor rates were utilized for the annualized operating cost estimates). This spreadsheet is intended to be used in combination with the Control Cost Manual and was utilized as a first cut to determine if the cost feasibility would be close enough to warrant contacting an RTO vendor for a more site-specific quote. As the resulting cost per ton of removal was substantial, a vendor was not contacted to provide a site-specific equipment and installation cost. As a conservative check, the U.S. EPA estimated RTO equipment cost was reduced by 50% which resulted in an estimated \$60,588 per ton of VOC removal; still considered economically infeasible even with the significantly reduced equipment cost estimate. For a detailed description of the oxidizer control technology and cost methodology, see Section 3.2, Chapter 2 (Incinerators and Oxidizers) of the Air Pollution Control Cost Manual (as updated in 2016).

2.4 Control Technology Selection

Only a regenerative thermal oxidizer was considered to be a technically feasible add on control options for VOC emissions from the pouring and cooling tables. The cost of such a system was over \$75,453 per ton of VOC removed, which is higher than the level that can be considered economically viable.

Pursuant to OAC 3745-21- 11(B)(11), technical feasibility of modifying or replacing the source in order to minimize or eliminate the VOC emissions should be evaluated for the affected sources. The pouring and cooling tables are integral part of the aluminum casting process. The intricate aluminum casting poured by GAMCO requires the use of sand cores that use organic binders, resulting in VOC emissions that are an inherent aspect of the pouring/cooling process. There are no options to replace the pouring cooling tables, that utilize sand cores, for the casting of molten aluminum. It should be noted that sand cores, and the associated VOC emissions, are no longer manufactured onsite.

Based on an evaluation of all control technologies above, GAMCO is proposing a VOC-RACT limit of 2.48 pounds per ton metal processed and a combined pouring and cooling turntable 63.48 tons per 12-month rolling summation which is included in the currently approved VOC limit in PTIO #P0128540. GAMCO will continue the current emission limit considered RACT immediately (OAC 3745-21-11(B)(16)).

3.0 Aluminum Melting Furnaces

Five natural gas fired aluminum melting furnaces are operated at GAMCO. Aluminum melting furnaces generate VOC emissions primarily from incomplete combustion and fluxing agents. Pursuant to Ohio EPA guidance, site-specific RACT must be assessed in this report to determine whether the site-specific conditions still represent RACT for the 2015 ozone NAAQS.

3.1 General Source Information

The most recent application for the emission sources is the initial Title V Permit application, A0080050. The application was submitted in September 2025.

General information on the sources (P902, P923 through P926) per OAC 3745-21-11(B)(5) are provided in the following tables. The company identification, Ohio EPA emission unit identification number and source description is included in Table 3-1.

Table 3-1: Source Description

Ohio EPA EU ID	Company Identification	Source Description	Source Classification Codes	VOC PTE (tpy)*
P902	Furnace #1	Natural Gas Fired Aluminum Reverberator Furnace #1 (21 MMBtu heat input capacity and 4.5 tons/hr melt capacity)	3-04-001-37	21.09
P923	Furnace #4	Furnace #4. Natural gas fired aluminum melting furnace with 7 MMBTU/hr heat input capacity and 1.5 TPH (3,000 lb/hr) melt capacity. Previously identified as the #314 Furnace at the Conneaut facility.	3-04-001-37	7.03
P924	Furnace #2	Furnace #2. Natural gas fired aluminum melting furnace with 5,630,034 BTU/hr heat input capacity and 2.2 TPH (4,400 lb/hr) melt capacity.	3-04-001-37	10.31
P925	New Furnace #5	New Furnace #5. Natural gas fired aluminum melting furnace with 10.6 MMBTU/hr heat input capacity and 2.25 TPH (4,500 lb/hr) melt capacity.	3-04-001-37	10.54
P926	New Furnace #6	New Furnace #6. Natural gas fired aluminum melting furnace with 10.6 MMBTU/hr heat input capacity and 2.25 TPH (4,500 lb/hr) melt capacity	3-04-001-37	10.54

See Appendix D for detailed VOC PTE emissions calculations.

* Note that PTE identified is based on hourly capacity at 8,760 hours/year; total melting furnace VOC

emissions are limited to 27.39 tons per rolling 12-month summation per PTIO P0128540

Month, year installed and normal operating schedule for the reference sources is presented in Table 3-2.

Table 3-2: installation Dates and Normal Operating Schedule

Ohio EPA EU ID	Installation Dates	Operating Schedule (hours/day, days/week, weeks/year)
P902	06/1996	24/7/52
P923	06/2015	24/7/52
P924	10/2017	24/7/52
P925	08/2018	24/7/52
P926	08/2018	24/7/52

Table 3-3 includes annual, average and maximum daily production rates for the affected sources during the past three years (2023, 2024 and 2025). The quantity of aluminum processed was used as the production rates to include in the table.

Table 3-3: Annual, Average and Maximum Daily Production Rates

Ohio EPA EU ID	Annual Production Rates, tons			Average Daily Production Rates, tons			Maximum Daily Production Rates, tons		
	2023	2024	2025	2023	2024	2025	2023	2024	2025
P902	3,494	3,388	2,832	9.59	9.28	7.74	13.36	15.60	12.86
P923	0	0	0	0	0	0	0	0	0
P924	3,467	3,713	3,666	9.50	10.16	10.07	13.00	13.76	13.57
P925	4,455	2,916	4,251	12.20	7.98	11.65	15.13	12.82	18.53
P926	5,008	4,014	4,792	13.75	10.99	13.17	17.18	14.11	17.34

There is no existing control equipment for these sources. A plot plan is included in Appendix A which identifies the locations of each aluminum melting furnace. The VOC emissions data per OAC 3745-21-11(B)(7) is included in Table 3-4. Detailed emission calculations per OAC 3745-21-11(B)(17) is included in Appendix D. General composition of the VOC emissions includes a mix of light hydrocarbons, aromatic hydrocarbons, and oxygenated organic compounds. No coating materials or cleanup solvents are used for these sources. VOC emission testing was performed for P925 in August 2019 and a copy of the test report summary is included in Appendix B.

Table 3-4: Highest Average and Maximum Daily and Annual VOC Emissions in Previous Three Calendar Years

Ohio EPA EU ID	Average Daily VOC Emissions (lb/day)	Maximum Daily VOC Emissions (lb/day)	Annual VOC Emissions (tpy)
P902	10.22 (2023)	16.62 (2024)	0.96 (2023)
P923	0	0	0
P924	10.83 (2024)	14.67 (2024)	1.02 (2024)
P925	13.01 (2023)	19.75 (2025)	1.22 (2023)
P926	14.65 (2023)	18.48 (2025)	1.37 (2023)

See Appendix D for detailed VOC daily/annual emissions calculations.

3.2 Evaluation of Available Control Technologies

Pursuant to OAC 3745-21- 11(B)(8), technical feasibility of at least five types of control technologies should be evaluated for the affected sources.

3.2.1 Thermal and Catalytic Incinerator (with and without heat recovery)

Thermal incinerators typically require temperatures of approximately 1,200 to 1,800°F to achieve 90 to 95 percent conversion of VOC to CO₂. The performance of the incinerator/oxidizer is dependent on the gas stream heating value, inert content, gas moisture content, and the amount of excess combustion air. For optimum performance, exhaust temperature for the referenced emission units will need to be maintained to the temperature range listed above. Thermal incinerators require high VOC concentrations to sustain combustion reactions and supplemental fuel usage is required to sustain combustion reaction if VOC concentration is low.

The VOC content of the five melting furnaces together is less than 25 ppmv based on the permit limit. The exhaust stream emissions from the aluminum melting furnaces contain additional pollutants, including particulate matter, flux residues, and small amounts of sulfur dioxide, which could foul, plug, or corrode the thermal oxidizer and require pre-treatment separation prior. Adding additional draw to a central thermal incinerator for all of the aluminum furnaces may affect the furnace pressure and draft conditions which could cause increased aluminum oxidation, dross formation, or affect the quality of the product alloy. Additional natural gas combustion would be required to maintain thermal incinerator temperature on the low VOC content exhaust stream, resulting in additional VOC and NO_x (ozone precursor) emissions.

Catalytic incineration/oxidation is a thermal oxidation process where combustion of VOC occurs at a relatively low temperature. Combustion is accomplished by passing combustion gases over a specialized catalyst where the VOC is converted to CO₂. The optimal working temperature range for oxidation catalysts is approximately 400 to 800°F. Catalytic incineration is often chosen for its ability to handle low VOC concentrations, with optimal performance typically occurring at concentrations below 20% of the lower explosive limit (LEL). While high concentrations can be treated, they risk exceeding the catalyst's thermal capacity, requiring

dilution to stay within safe operating limits, increasing operating costs. Catalytic incineration is best suited for continuous operation, particularly in industrial settings, where it often uses a precious metal catalyst to oxidize VOCs at lower temperatures, which reduces fuel usage compared to thermal oxidation. Catalytic systems are susceptible to catalyst deactivation (poisoning) from compounds like particulate, sulfur, phosphorus, and halogens, requiring strict pre-treatment of the waste stream.

The nature of the aluminum melting furnace can create an environment where VOC emissions are intermittent based on charging, flux additions, cleaning cycles, etc.; as noted previously, catalytic incineration is best suited for continuous load operation. The exhaust stream emissions from the aluminum melting furnaces contain additional pollutants, including particulate matter, flux residue, and small amounts of sulfur dioxide, which could foul the catalytic oxidizer and require pre-treatment separation prior. Sulfur compounds are not considered catalyst friendly and form corrosive byproducts that damage the catalyst resulting in performance drop.

Based on the above discussion, the aluminum melting furnace exhaust profile (temperature, exhaust flow rate, and additional pollutants) and the potential for negative product effects from furnace draft condition changes would not be conducive to thermal or catalytic incineration; and these control options are considered to be technically infeasible. An economic feasibility evaluation was not conducted on these technically infeasible control options.

Therefore, thermal and catalytic incineration can be considered technically infeasible form of VOC control from the furnaces. An economic feasibility evaluation was not conducted on this technically infeasible control option.

In addition, a search of USEPA's RBLC database over the past 20 years to identify VOC control technology for melting furnaces for secondary aluminum processes show no add on control. A summary of the RBLC search results are presented in Section 3.2.6.

3.2.2 Carbon Adsorber (with and without recovery of the organic compounds)

Carbon adsorption is not technically feasible for controlling VOC emissions from the aluminum melting furnaces. Carbon adsorption is most effective at low temperatures (less than 130°F). The furnace exhaust gases (greater than 450°F) would be too hot for effective removal without the addition of a dilution air system which would further increase flow and drop the inlet concentration. According to USEPA, activated carbon is not as effective in situations in which the vent stream has high moisture content due to fouling concern and require energy to regenerate the carbon. Carbon adsorption is therefore technically infeasible for these emission sources. An economic feasibility evaluation was not conducted on this technically infeasible control option.

In addition, adsorption technology has not been demonstrated as a control option on these types of sources, and it is not listed in the RBLC search for these types of emission units.

3.2.3 Condenser

Condensation process to remove VOC from the furnaces is not feasible because of the low inlet concentration (25 ppmv) and high flow. Use of condensation as a VOC emission control device is generally effective for sources with VOC concentration greater than 5,000 ppm and flowrate lower than 2,000 acfm. The reference source exhaust stream is so dilute that cooling temperatures will need to be very low causing the moisture carried in the air stream to condense and plug the tubes. Condensation is therefore technically infeasible for these emission sources. An economic feasibility evaluation was not conducted on this technically infeasible control option.

In addition, condenser technology has not been demonstrated as a control option on these types of sources, and it is not listed in the RBLC search for these types of emission units.

3.2.4 Scrubber

Scrubber operation is detailed in Section 2.2.5. Gas absorption (scrubbing) is commonly used to recover products or to purify gas streams with high concentrations of water-soluble compounds. Per the USEPA Cost Control Manual (document ID: EPA/452/B-02-001), gas absorbers are most effective for gas streams with pollutant concentrations between 250 and 10,000 ppmv. Actual VOC concentration (less than 30 ppmv based on testing results) for the combined reference emission units is considerably less than the 250 – 10,000 ppmv range and would not be considered technically effective. Low concentrations of organics in an exhaust stream require long contact times and large quantities of absorbent for effective removal. Absorptions are generally more practical for processes in which the absorbent is easily regenerated, or the resulting solution can be used as a make-up stream. Scrubbing is not technically feasible for controlling VOC emissions from the furnaces because of the low inlet concentration.

Based on the information above, absorption (scrubbing) technology is not a reasonable control option and therefore considered to be technically infeasible. An economic feasibility evaluation was not conducted on this technically infeasible control option.

In addition, scrubbing technology has not been demonstrated as a control option on these types of sources, and it is not listed in the RBLC search for these types of emission units.

3.2.5 Operational Restrictions

GAMCO proposed operational restrictions in a PTIO application that was approved by Ohio EPA by issuing PTIO P0128540 on July 29, 2021. Per the PTIO, GAMCO has a maximum annual throughput limit of 51,190 tons of aluminum charged per rolling 12-month summation. Annual VOC emissions limit from the aluminum melting furnaces is 1.07 pounds per ton metal processed and 27.39 tons per rolling 12-month summation.

3.2.6 USEPA RACT/BACT/LAER Clearinghouse Review

USEPA's RBLC database was reviewed for process type 82.121 –Secondary AL Furnaces. Five facilities were listed and three of them include melting furnaces. A summary of the facilities,

processes and VOC control methods are listed in Table 3-5. Based on the RBLC database review, one facility utilized Good Combustion Practices (GCP) and the remaining two facilities utilized Good Combustion & Operation Practices (GCOP) Plan as a VOC control method for melting furnaces.

Table 3-5: Summary of RBLC Search

RBLC ID	Facility Name	Process Name	Capacity	Control Method Description
AL-0306	Element 13	Melting/Sidewell Furnace 8	36 MMBtu/hr	Good Combustion Practices (GCP)
KY-0103	Logan Aluminum, Inc.	EP 129/130/135/136 (9041/9045/9046/9047-1&2) Sidewell Melt Furnaces A1/2 & B1/2	15 tons Al/hr	Good Combustion & Operation Practices (GCOP)
KY-0116	Novelis Corporation - Guthrie	EU 031 - Sidewell Melting Furnace #2	14.3 tons/hr	Good Combustion & Operation Practices (GCOP)
KY-0116	Novelis Corporation - Guthrie	EU 030 - Sidewell Melting Furnace #1	14.3 tons/hr	Good Combustion & Operation Practices (GCOP)
KY-0116	Novelis Corporation - Guthrie	EU 033 - Front-Load Tilting Melting Furnace	15 tons/hr	Good Combustion & Operation Practices (GCOP)

No technically feasible add-on control measure was identified for the furnaces. Therefore, economic feasibility of an add-on control was not evaluated.

3.3 Control Technology Selection

An evaluation of all control technologies showed there is no technically feasible add on control for VOC emissions from the aluminum melting furnaces. An RBLC search for similar emission sources identified good combustion & operation practices (GCOP) as approved VOC control measure. Therefore, GAMCO proposes the following as VOC-RACT for the melting furnaces.

- GCOP
- VOC limit of 1.07 pounds per ton metal processed and a combined aluminum melting furnace 27.39 tons per rolling 12-month summation which is included in the currently approved VOC limit in PTIO P0128540.

Pursuant to OAC 3745-21- 11(B)(11), technical feasibility of modifying or replacing the source in order to minimize or eliminate the VOC emissions should be evaluated for the affected sources. The furnaces utilize natural gas fired burners to provide heat for the melting of aluminum ingot and sows which minimizes VOC emissions that are an inherent aspect of the aluminum melting process. There are no options to replace the natural gas-fired aluminum melting furnaces with a

different fuel source that would reduce or eliminate VOC emissions for the aluminum melting process.

GAMCO will install, maintain, and operate the source in accordance with the manufacturer's specifications and with good operating practices for the control of VOC emissions from the source as considered RACT for good combustion & operation practices (OAC 3745-21-11(B)(15)). Good operating practices related to the furnaces which would constitute RACT include regular natural gas burner tuning as part of the current Preventative Maintenance (PM) system. Furnace gas mains, burners, and air intake filters are inspected monthly as part of the PM system; clean-outs and maintenance repairs are documented on work orders as necessary following inspections. Additionally, GAMCO will continue implement the good operating practice of complying with incoming metal purchasing specifications/contracts which are utilized to ensure that metal charged to the furnaces is free of materials (oils, plastics, etc.) that could contribute to VOC emissions at the furnace in order to meet the "clean charge" definitions of issued air permits and the Secondary Aluminum NESHAP (40 CFR Part 63, Subpart RRR).

GAMCO will continue the current good combustion & operation practices and VOC emission limit considered RACT immediately (OAC 3745-21-11(B)(16)).

Appendix A

Facility Plot Plan

Appendix B

Stack Testing Summary Pages



EMISSIONS COMPLIANCE STUDY

Performed At The

General Aluminum Manufacturing Company

Rootstown Facility

Furnace 5, Pouring/Cooling Turntable 2, Knockout, SO₂ Core Making Machine and

North Baghouse

Ravenna, Ohio

Test Date(s)

August 13 and 14, 2019

Report No.

TRC Environmental Corporation Report 339151

Report Submittal Date

September 10, 2019

TRC Environmental Corporation
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Monroeville, Pennsylvania 15146
USA

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Report Certification

I certify that to the best of my knowledge:

- Testing data and all corresponding information have been checked for accuracy and completeness.
- Sampling and analysis have been conducted in accordance with the approved protocol and applicable reference methods (as applicable).
- All deviations, method modifications, or sampling and analytical anomalies are summarized in the appropriate report narrative(s).

A handwritten signature in black ink, appearing to read "E. White", positioned above a horizontal line.

Eric S. White
Office Practice Leader

September 10, 2019

Date

TRC was operating in conformance with the requirements of ASTM D7036-04 during this test program.

A handwritten signature in black ink, appearing to read "B. Randall", positioned above a horizontal line.

Bruce Randall
TRC Emission Testing Technical Director



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EMISSIONS COMPLIANCE STUDY

1.0 INTRODUCTION

TRC Environmental Corporation (TRC) performed an emissions compliance test program on the Furnace 5, Pouring/Cooling Turntable 2, Knockout, SO₂ Core Making Machine and North Baghouse at the Rootstown Facility of General Aluminum Manufacturing Company (GAMCO) in Ravenna, Ohio on August 13 and 14, 2019. The tests were authorized by and performed for GAMCO.

The purpose of this test program was to determine volatile organic compounds (VOCs) on the Furnace 6, Pouring/Cooling Turntable 2, Knockout, SO₂ Core Making Machine and filterable particulate matter (FPM) on the North Baghouse at the Rootstown facility. The test program was conducted according to the TRC Test Protocol dated May 29, 2019.

1.1 Project Contact Information

Participants		
Test Facility	General Aluminum Manufacturing Company Rootstown Facility 5159 South Prospect Street Ravenna, Ohio 44266 Permit No. PTIO P0125514 Facility No. 1667070012	Mark Brislen General Manager (330) 298-7280 mbrislen@generalaluminum.com
Air Emissions Testing Body (AETB)	TRC Environmental Corporation 2500 Eldo Road, Suite 2 Monroeville, Pennsylvania 15146	Eric S. White, QI Office Practice Leader (412) 789-4569 (phone) EWhite@TRCCompanies.com

The tests were conducted by Eric S. White, QI; Craig L. Grunden, QI; Christian W. Bartley, QI; Robert K. Dornenburg; and Kyle T. Byrne of TRC. Documentation of the on-site ASTM D7036-04 Qualified Individual(s) (QI) can be located in the appendix to this report.

Sean Vadas of the Akron Regional Air Quality Management District (ARAQMD) observed the testing.

1.2 Facility and Process Description

GAMCO currently operates an aluminum foundry at the Rootstown Facility. The aluminum foundry consists of melting furnaces, pouring/cooling turntables, knockout, finishing, and sand core making operations.



2.0 SUMMARY OF RESULTS

The results of this test program are summarized in the table below. Detailed individual run results are presented in Section 6.0.

Unit ID	Emission Point	Pollutant Tested	Measured Emissions	Emission Limit
Furnace 5	P925 Outlet	VOCs	0.55 lb/ton	1.67 lb/ton
Pouring/Cooling Table 2	F003 Outlet	VOCs	2.86 lb/hr	9.76 lb/hr
			1.66 lb/ton	2.17 lb/ton
Knockout	P906 Outlet	VOCs	0.134 lb/hr	11.47 lb/hr
			0.08 lb/ton	3.57 lb/ton
SO ₂ Core Making	P909 and P911	VOCs	0.101 lb/hr	0.91 lb/hr
			1.63 lb/ton	0.92 lb/ton
North Baghouse	NBH-01 Outlet	FPM	1.52 lb/hr	1.79 lb/hr

The table below summarizes the test methods used, as well as the number and duration of each at each test location:

Unit ID/Sample Location	Parameter Measured	USEPA Test Method	No. of Runs	Run Duration (min)
Furnace 5 (P925), Pouring/Cooling Table 2 (F003), Knockout (P906), SO ₂ Core Making (P909 and P911)	Volumetric Flow rate	*1-4	3	30
	O ₂ /CO ₂	3		N/A
	Ethane/Methane	18		
	VOCs	25A		60
North Baghouse (NBH-01)	Filterable Particulate (FPM)	5		60

* Some sources utilized the Wet / Dry bulb procedure for % moisture rather than Method 4.



3.0 DISCUSSION OF RESULTS

Furnace 5 stack yielded higher than expected VOC numbers from pretesting. Due to a recent fire at Triangle labs, no Method 25 media was available. We extracted Method 18 bag samples for Ethane / Methane analysis. The result will be subtracted from the on-site result for NMNEVOC results.

Two of the sources were below 120 degrees Fahrenheit and in an ambient environment. A decision was made to forgo the USEPA Method 4 moisture procedure and apply ASTM Method E337-62.

No problems were encountered with the testing equipment during the test program. Source operation appeared normal during the entire test program. No changes or problems were encountered that required modification of any procedures presented in the test plan. No adverse test or environmental conditions were encountered during the conduct of this test program.

4.0 SAMPLING AND ANALYSIS PROCEDURES

All testing, sampling, analytical, and calibration procedures used for this test program were performed in accordance with the methods presented in the following sections. Where applicable, the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, USEPA 600/R-94/038c, September 1994 was used to supplement procedures.

4.1 Determination of Sample Point Locations by USEPA Method 1

This method is applicable to gas streams flowing in ducts, stacks, and flues and is designed to provide guidance for the selection of sampling ports and traverse points at which sampling for air pollutants will be performed. Sample ports must be located at least two duct diameters downstream and a half a duct diameter upstream from any flow disturbance.

The cross-section of the measurement site was divided into a number of equal areas, and the traverse points were located in the center of each area. The minimum number of points were determined from Figure 1-1 (particulate) at the North Baghouse stack and Figure 1-2 (non-particulate) of the Method for all remaining sources.

4.2 Volumetric Flow Rate Determination by USEPA Method 2

This method is applicable for the determination of the average velocity and the volumetric flow rate of a gas stream.



The gas velocity head (ΔP) and temperature were measured at traverse points defined by USEPA Method 1. The velocity head was measured with a Type S (Stausscheibe) pitot tube and oil-filled manometer; and the gas temperature was measured with a Type K thermocouple. The average gas velocity in the flue was calculated based on: the gas density (as determined by USEPA Methods 3 and 4); the flue gas pressure; the average of the square roots of the velocity heads at each traverse point, and the average flue gas temperature.

4.3 CO₂ and O₂ Determination by USEPA Method 3

This method is applicable for the determination of CO₂ and O₂ concentrations and dry molecular weight of a sample from an effluent gas stream of a fossil-fuel combustion process or other process.

A gas sample was extracted from the source using multi-point integrated sampling. The gas sample was analyzed using a Fyrite analyzer.

4.4 Moisture Determination by USEPA Method 4

This method is applicable for the determination of the moisture content of stack gas.

A gas sample was extracted at a constant rate from the source. Moisture was removed from the sample stream by a series of pre-weighed impingers immersed in an ice bath. A minimum of 21 dry standard cubic feet of flue gas was collected during each sample run.

4.5 Filterable PM Determination by USEPA Method 5

This method is applicable for the determination of PM emissions from stationary sources. USEPA Methods 2-4 were performed concurrently with, and as an integral part of, these determinations.

Flue gas was withdrawn isokinetically from the source at traverse points determined per USEPA Method 1, and PM was collected in the nozzle, probe liner, and on a glass fiber filter. The probe liner and filter were maintained at a temperature of 120 $\pm$ 14°C (248 + 25°F). The PM mass, which included any material that condensed at or above the filtration temperature, was determined gravimetrically after the removal of uncombined water.

4.6 Gaseous Organic Compound Determination by USEPA Method 18

This method is designed to measure gaseous organics emitted from an industrial source. This method will not determine compounds that (1) are polymeric (high molecular weight), (2) can polymerize before analysis, or (3) have very low vapor pressures at stack or instrument conditions.



An integrated sample of flue gas was collected in Tedlar® bags. The major organic components of the sample were separated by gas chromatography (GC) and individually quantified by flame ionization, photoionization, electron capture, or other appropriate detection principles.

4.7 Total Organic Concentration Determination by USEPA Method 25A

This method is applicable for the determination of total gaseous organic concentration of vapors consisting primarily of alkanes, alkenes, and/or arenes (aromatic hydrocarbons). The concentration is expressed in terms of propane (or other appropriate organic calibration gas) or in terms of carbon.

A gas sample was extracted from the source through a heated sample line and glass fiber filter to a flame ionization analyzer (FIA). If necessary, a source-specific response factor was developed for the FIA.

4.8 Moisture Determination by ASTM Method E337-62

This method utilizes the flue gas wet bulb/dry bulb temperatures and absolute pressure to approximate the moisture content in the flue gas. Moisture content was calculated as follows:

$$Bws = \left[\frac{e' - AP(t - t')}{P} \right]$$

where:

e' = saturated vapor pressure of water, in.Hg,
at the wet bulb temperature, t'

$$A = 3.67 \times 10^{-4} [1 + 0.00064(t' - 32)]$$

P = absolute pressure, in.Hg, in the duct

t = dry bulb temperature, °F

t' = wet bulb temperature, °F

5.0 QUALITY ASSURANCE PROCEDURES

TRC integrates our Quality Management System (QMS) into every aspect of our testing service. We follow the procedures specified in current published versions of the test Method(s) referenced in this report. Any modifications or deviations are specifically identified in the body of the report. We routinely participate in independent, third party audits of our activities, and maintain accreditation from the Stack Testing Accreditation Council (STAC) and the American Association for Laboratory Accreditation (A2LA) that our



operations conform with the requirements of ASTM D 7036 as an Air Emission Testing Body (AETB).

These accreditations demonstrate that our systems for training, equipment maintenance and calibration, document control and project management will fully ensure that project objectives are achieved in a timely and efficient manner with a strict commitment to quality.

All calibrations are performed in accordance with the test Method(s) identified in this report. If a Method allows for more than one calibration approach, or if approved alternatives are available, the calibration documentation in the appendices specifies which approach was used. All measurement devices are calibrated or verified at set intervals against standards traceable to the National Institute of Standards and Technology (NIST). NIST traceability information is available upon request.

ASTM D7036-04 specifies that: *“AETBs shall have and shall apply procedures for estimating the uncertainty of measurement. Conformance with this section may be demonstrated by the use of approved test protocols for all tests. When such protocols are used, reference shall be made to published literature, when available, where estimates of uncertainty for test methods may be found.”* TRC conforms with this section by using approved test protocols for all tests.



6.0 TEST RESULTS SUMMARY

GAMCO - Rootstown Furnace #5 (P925) Compliance Test

	Date	Start Time	End Time	Total Time (min)	lbs melted	tons melted	lbs VOC	lbs VOC/ton	% of current
Run 1	8/13/2019	7:55	8:54	0:59	1,824	0.91	0.81	0.89	53.2%
Run 2	8/13/2019	9:08	10:07	0:59	3,727	1.86	0.83	0.45	26.7%
Run 3	8/13/2019	10:20	11:19	0:59	3,973	1.99	0.61	0.31	18.4%
Averages					3,175	1.59	0.75	0.55	32.8%

Emission factor limit from current permitting:

Limit lbs VOC/ton: **1.67****GAMCO - Rootstown North Baghouse Compliance Test**

	Date	Start Time	End Time	Total Time (min)	lb PM/hr	% of current
Run 1	8/13/2019	7:45	8:54	1:09	1.47	82.3%
Run 2	8/13/2019	10:00	11:05	1:05	1.56	87.1%
Run 3	8/13/2019	11:47	12:52	1:05	1.53	85.4%
Averages					1.52	84.9%

Emission limit from current permitting (sum of P906, P908, and two de minimis sand core machines):

Limit lbs PE/hr: **1.79****GAMCO - Rootstown SO2 Scrubber (P909 & P911) Compliance Test**

	Date	Start Time	End Time	Total Time (min)	ton sand	lbs VOC	lbs VOC/ton	% of current
Run 1	8/13/2019	14:00	14:59	0:59	0.26	0.13	0.50	54.1%
Run 2*	8/13/2019	15:05	16:04	0:59	0.12	0.09	0.77	83.4%
Run 3*	8/13/2019	16:15	17:14	0:59	0.02	0.08	3.63	394.3%
Averages					0.13	0.10	1.63	177.3%

Emission factor limit from current permitting:

Limit lbs VOC/ton: **0.92**

*Note the second SO2 core machine went down in the middle of Run 2 and didn't operate during Run 3.

GAMCO - Rootstown Pouring/Cooling Turntable #2 (F003) Compliance Test

	Date	Start Time	End Time	Total Time (min)	lbs thru	tons thru	lbs VOC	lbs VOC/ton	% of current
Run 1	8/14/2019	7:50	8:49	0:59	3,585	1.79	2.63	1.46	67.5%
Run 2	8/14/2019	8:55	9:54	0:59	3,707	1.85	2.68	1.44	66.5%
Run 3	8/14/2019	10:00	10:59	0:59	3,160	1.58	3.27	2.07	95.3%
Averages					3,484	1.74	2.86	1.66	76.4%

Emission factor limit from current permitting:

Limit lbs VOC/ton: **2.17****GAMCO - Rootstown Knockout (P906) Compliance Test**

	Date	Start Time	End Time	Total Time (min)	lbs thru	tons thru	lbs VOC	lbs VOC/ton	% of current
Run 1	8/14/2019	11:50	12:49	0:59	3,492	1.75	0.128	0.07	2.1%
Run 2		12:55	13:54	0:59	3,691	1.85	0.151	0.08	2.3%
Run 3		14:00	14:59	0:59	3,259	1.63	0.123	0.08	2.1%
Averages					3,481	1.74	0.134	0.08	2.2%

Emission factor limit from current permitting:

Limit lb VOC/ton metal: **3.57**

FURNACE 5



Method 25A Test Results Summary

Project Number:	339151	Test Date(s):	08/13/19
Customer:	General Aluminum Company	Facility:	Rootstown, Ohio
Unit Identification:	Furnace 5	Recorded by:	ESW
Load Level/Condition:	MNOC		

Location	Furnace 5			
Test Run No.	1	2	3	Average
Test Date	8/13/2019	8/13/2019	8/13/2019	
Test Time - Start	7:55	9:08	10:20	
Test Time - End	8:54	10:07	11:19	
THC (ppmvw as Propane)	28.69	29.13	24.00	27.27
Volumetric Flow Rate (scfm)	7399	7515	7199	7371
THC (lb/hr as Propane)	1.458	1.503	1.186	1.382
THC (lbC/hr)	1.191	1.228	0.969	1.130
Fractional Gas Moisture Content (B _{ws})	0.056	0.059	0.060	0.058
THC (ppmvd as Propane)	30.379	30.97	25.53	28.96

POURING / COOLING TURNTABLE 2



Method 25A Test Results Summary

Project Number:	339151	Test Date(s):	08/14/19
Customer:	General Aluminum Company	Facility:	Rootstown, Ohio
Unit Identification:	Turntable	Recorded by:	ESW
Load Level/Condition:	MNOC		

Location	Turntable			
Test Run No.	1	2	3	Average
Test Date	8/14/2019	8/14/2019	8/14/2019	
Test Time - Start	7:50	8:55	10:00	
Test Time - End	8:49	9:54	10:59	
THC (ppmvw as Propane)	7.40	7.69	8.99	8.03
Volumetric Flow Rate (scfm)	51674	50655	51693	51341
THC (lb/hr as Propane)	2.626	2.675	3.191	2.831
THC (lbC/hr)	2.146	2.186	2.608	2.313
Fractional Gas Moisture Content (B _{ws})	0.022	0.023	0.023	0.023
THC (ppmvd as Propane)	7.57	7.87	9.20	8.21

KNOCKOUT



Method 25A Test Results Summary

Project Number:	339151	Test Date(s):	08/14/19
Customer:	General Aluminum Company	Facility:	Rootstown, Ohio
Unit Identification:	Knockout	Recorded by:	ESW
Load Level/Condition:	MNOC		

Location	Knockout			
Test Run No.	1	2	3	Average
Test Date	8/14/2019	8/14/2019	8/14/2019	
Test Time - Start	11:50	12:55	14:00	
Test Time - End	12:49	13:54	14:59	
THC (ppmvw as Propane)	6.19	7.01	5.70	6.30
Volumetric Flow Rate (scfm)	3022	3128	3141	3097
THC (lb/hr as Propane)	0.128	0.151	0.123	0.134
THC (lbC/hr)	0.105	0.123	0.100	0.109
Fractional Gas Moisture Content (B _{ws})	0.029	0.028	0.027	0.028
THC (ppmvd as Propane)	6.37	7.21	5.86	6.48

SO₂ CORE MAKING MACHINE



Method 25A Test Results Summary

Project Number:	339151	Test Date(s):	08/13/19
Customer:	General Aluminum Company	Facility:	Rootstown, Ohio
Unit Identification:	SO2 Scrubber	Recorded by:	ESW
Load Level/Condition:	MNOC		

Location	SO2 Scrubber			
Test Run No.	1	2	3	Average
Test Date	8/13/2019	8/13/2019	8/13/2019	
Test Time - Start	14:00	15:05	16:15	
Test Time - End	14:59	16:04	17:14	
THC (ppmvw as Propane)	6.41	4.41	4.07	4.96
Volumetric Flow Rate (scfm)	3624	3622	3651	3632
THC (lb/hr as Propane)	0.160	0.110	0.102	0.124
THC (lbC/hr)	0.130	0.090	0.083	0.101
Fractional Gas Moisture Content (B _{ws})	0.035	0.032	0.023	0.030
THC (ppmvd as Propane)	6.64	4.56	4.17	5.12

NORTH BAGHOUSE

PARTICULATE TEST RESULTS SUMMARY

Page 1 of 1

Company: General Aluminum Company
 Plant: Rootstown, Ohio
 Unit: North BH
 Location: Stack

Test Run Number:	1	2	3	Average
Source Condition:	MNOC	MNOC	MNOC	
Date:	8/13/2019	8/13/2019	8/13/2019	
Start Time:	7:45	10:00	11:47	
End Time:	8:54	11:05	12:52	
Sample Duration (min):	60.0	60.0	60.0	60.0
Average Gas Temp, T_s , (°F):	95.5	93.7	94.5	94.5
Average Gas Temp, T_s , (°C):	35.3	34.3	34.7	34.7
Fractional Gas Moisture Content, B_{ws} :	0.03	0.04	0.02	0.03
Gas CO ₂ Content (%vol):	0.0	0.0	0.0	0.0
Gas O ₂ Content (%vol):	21.0	21.0	21.0	21.0
Gas Wet MW, M_s , (lb/lbmole-mole):	28.51	28.44	28.60	28.52
Average Gas Velocity, V_s , (ft/sec):	49.09	46.98	47.17	47.75
Average Gas Velocity V_s , (m/sec):	14.96	14.32	14.38	14.55
Measured Volumetric Flow Rate:				
Q (actual ft ³ /min):	141,939	135,842	136,404	138,062
Q _{std} (std ft ³ /min):	128,619	123,765	124,096	125,493
Q _{std(dry)} (dry std ft ³ /min):	124,679	119,219	121,308	121,735
Q _m (actual m ³ /min):	4,019	3,847	3,863	3,909
Q _{stdm} (std. m ³ /min):	3,642	3,504	3,514	3,553
Q _{stdm(dry)} (dry std. m ³ /min):	3,530	3,376	3,435	3,447
Sample Volume, $V_{m(std)}$, (dry std ft ³):	52.069	50.327	50.877	51.091
Sample Volume, $V_{m(std)(metric)}$, (dry std. m ³):	1.474	1.425	1.441	1.447
PM Collected, m_p , (mg):				
Filterable	4.65	4.98	4.85	4.83
PM Concentration, C_s , (gr/dscf):				
Filterable	0.0014	0.0015	0.0015	0.0015
PM Emission Rate, ER_{M2} , (lb/hr based on measured volumetric flow rate):				
Filterable:	1.47	1.56	1.53	1.52
Isokinetic Variance (I)	96.9	98.0	97.3	97.4

Appendix C

Cost Calculations for a Regenerative Thermal Oxidizer to Control Pouring and Cooling Turntable VOC Emissions

Data Inputs

Select the type of oxidizer

Regenerative Thermal Oxidizer

Enter the following information for your emission source:

Composition of Inlet Gas Stream				
Pollutant Name	Concentration (ppmv)	Lower Explosive Limit (LEL) (ppmv)*	Heat of Combustion (Btu/scf)	Molecular Weight
Benzene	5.9	14,000	3,475	78.11

Note: The lower explosion limit (LEL), heat of combustion and molecular weight for some commonly used VOC/HAP are provided in the table below. In addition, the heat of combustion to be entered in column D is a lower heating value (LHV), not a higher heating value (HHV).

Enter the design data for the proposed oxidizer:

Number of operating hours/year	5,200 hours/year	Percent Energy Recovery (HR) =	70 percent
Inlet volumetric flow rate(Q _{in}) at 77°F and 1 atm.	359,380 scfm		
Pressure drop (ΔP)	19 inches of water		* 19 inches of water is a default pressure drop for thermal oxidizers. User should enter actual value, if known.
Motor/Fan Efficiency (e)	60 percent*		* 60% is a default fan efficiency. User should enter actual value, if known.
Inlet Waste Gas Temperature (T _{in})	100 °F*		* 100°F is a default temperature. User should enter actual value, if known.
Operating Temperature (T _o)	1900 °F		* Note: Default value for T _{fi} is 2000°F for thermal regenerative oxidizers. Use actual value if known. T _{fi} for regenerative oxidizers typically between 1800 and 2000°F.
Destruction and Removal Efficiency (DRE)	95 percent		
Estimated Equipment Life	20 Years*		* 20 years is the typical equipment life. User should enter actual value, if known.
Heat Loss (η)	1 percent*		* 1 percent is a default value for the heat loss. User should enter actual value, if known. Heat loss is typically between 0.2 and 1.5%.

Enter the cost data:

Desired dollar-year	2025		
CEPCI* for 2025	829.3	Enter the CEPCI value for 2025	536.4 2016 CEPCI
Annual Interest Rate (i)	6.75 %		*Enter dollar year first.
Electricity (Cost _{elec})	0.169 \$/kWh		
Natural Gas Fuel Cost (Cost _{fuel})	0.006219 \$/scf		
Operator Labor Rate	\$20.00 per hour		
Maintenance Labor rate	\$30.00 per hour		
Contingency Factor (CF)	10.0 Percent		* 10 percent of the total capital investment F45is a default value for construction contingencies. User may enter values between 5 and 15 percent.

* CEPCI is the Chemical Engineering Plant Cost Escalation/De-escalation Index. The use of CEPCI in this spreadsheet is not an endorsement of the index for purposes of cost escalation or de-escalation, but is there merely to allow for availability of a well-known cost index to spreadsheet users. Use of other well-known cost indexes (e.g., M&S) is acceptable.

Data Sources for Default Values Used in Calculations:

Parameters for Common Compounds:

Compound	LEL (ppmv)	Heat of Combustion (Btu/scf)	Molecular Weight
Methane*	50,000	911	16.04
Ethane	30,000	1,631	30.07
Propane	21,000	2,353	44.09
Butane	19,000	3,101	58.12
Pentane	14,000	3,709	72.15
Hexane	11,000	4,404	86.17
Octane	10,000	5,796	114.23
Nonane	8,000	6,493	128.25
Decane	8,000	7,190	142.28
Ethylene**	27,000	1,499	28.05
Propylene	20,000	2,182	42.08
Cyclohexane	13,000	4,180	84.16
Benzene**	14,000	3,475	78.11
Toluene**	11,000	4,274	92.14
Methyl Chloride (Chloromethane)**	82,500	705	50.49

Footnotes
* Greenhouse gas.
** Hazardous air pollutant.

Data Element	Default Value	Sources for Default Values used in the calculation . . .	If you used your own site-specific values, please enter the value used and the reference source . . .	Recommended data sources for site-specific information
Electricity Cost (\$/kWh)	0.0641	Average annual electricity cost for industrial plants is based on 2016 price data compiled by the U.S. Energy Information Administration from data reported on Form EIA-861 and 8615, (https://www.eia.gov/electricity/annual/html/epa_02_04.html).		Plant's utility bill or use U.S. Energy Information Administration (EIA) data for most recent year. Available at http://www.eia.gov/electricity/data.cfm#sales .
Fuel Cost (\$/Mscf)	3.51	Annual average price paid for natural gas by industrial facilities in 2016 from the U.S. Energy Information Administration. Available at http://www.eia.gov/dnav/ng/hist/n3035us3A.htm .		Check with fuel supplier or use U.S. Energy Information Administration (EIA) data for most recent year." Available at http://www.eia.gov/dnav/ng/hist/n3035us3A.htm .
Operator Labor (\$/hour)	26.61	Bureau of Labor Statistics, May 2016 National Occupational Employment and Wage Estimates – United States, May 2016 (https://www.bls.gov/oes/current/oes_nat.htm). Hourly rates for operators based on data for plant and System Operators – other (51-8099).		Use plant-specific labor rate.
Maintenance Labor (\$/hour)	27.40	Bureau of Labor Statistics, May 2016 National Occupational Employment and Wage Estimates – United States, May 2016 (https://www.bls.gov/oes/current/oes_nat.htm). Hourly rates for maintenance workers based on electrical and electronics commercial and industrial equipment repairers (49-2094).		Use plant-specific labor rate.

Design Parameters

The following design parameters for the oxidizer were calculated based on the values entered on the Data Inputs' tab. These values were used to prepare the costs shown on the Cost Estimate' tab.

Composition of Inlet Gas Stream		Concentration in Waste Stream (ppmv) From Data Inputs Tab	Adjusted Concentration with Dilution Air (ppmv)
Pollutant Name			
Benzene		6	NA
	0	0	NA
	0	0	NA
	0	0	NA
	0	0	NA
	0	0	NA
	0	0	NA
	0	0	NA
	0	0	NA
	0	0	NA
Total	0	6	0

Constants used in calculations:

Temperature of auxiliary fuel (T_{af}) =
Density of auxiliary fuel at 77 °F (ρ_{af}) =
Heat input of auxiliary fuel (-Δh_{af}) =
Density of waste gas at 77 °F (ρ_{wg}) =
Mean Heat Capacity of Air (C_{mean})

Reference Temperature (T_{ref}) =

77.0 °F
0.0408 lb_m/ft³
21,502 Btu/lb
0.0739 lb_m/ft³
0.255 Btu/lb °F

(For thermal oxidizers)

Parameter	Equation	Calculated Value	Units	Value	Units
Sum of volume fraction of combustible components =	= [Σx _i] =		6 ppmv		
Lower Explosive Limit of waste gas (LEL _{wg})	= [Σ[(x _i)/(LEL _i) × LEL _i]] ⁻¹ = Where x _i is the volume fraction and LEL _i the lower explosive limit for each combustible component in the waste gas.		14,000 ppmv		
% LEL _{wg}	= (Total Combustible Conc. in Mixture/LEL _{wg}) × 100 =		0.04 percent		* Note: Since the LEL of the waste gas stream is below 25%, no dilution air is needed.
Dilution Factor	= (LEL _{wg} × 0.249)/(Σx _i) =		Not applicable		
Lower Explosive Limit (LEL) of waste gas after addition of dilution air	= (Total Adjusted Conc. With Dilution Air/LEL _{wg}) × 100 =		Not Applicable		
Inlet volumetric flow rate(Q _{wi}) at 77°F and 1 atm.	(From Data Entry Tab) =		359,380 scfm		
Oxygen Content of gas stream	= 100 - (Σx _i × 100/10 ³) =		20.90 percent		
Fan Power Consumption (FP)	= [(1.17 × 10 ⁻³) × Q _{wi} × ΔP]/η = = Q _{air} = (From Data Entry Tab)		1331.5 kW 359,380 scfm 1,900 °F		
Operating temperature of oxidizer (T _o)	= Heat Recovery × (T _g - T _{ad}) + T _{ad} =		1,360 °F		
Temperature of waste gas at outlet to preheater (T _{ad})	= T _g - 0.95(T _g - T _{ad}) =		190 °F		
Temperature of flue gas exiting the regenerative oxidizer (T _{fl})					
Heat input of waste gas (-Δh _{wg})	= Σ (-Δh _i) x _i Where (-Δh _i) is the heat of combustion and x _i the fraction of component "i" at 77 °F. (Calculated using Equation 2.45 in Appendix B)		0.02 Btu/scf		0.3 Btu/lb
Estimated Auxiliary Fuel Flow (Q _{af}) at 77 °F and 1 atm.			696.04 scfm		
Auxiliary fuel Energy Input =			610,621 Btu/min		
Minimum Energy required for combustion stabilization =	= 5% × Total Energy Input = 0.05 × Q _g × C _{mean} × (T _g - T _{ad}) =		601,516 Btu/min		
Is the calculated auxiliary fuel sufficient to stabilize combustion?	(Note: If the auxiliary fuel energy input > 5% of Total Energy Input, then the auxiliary fuel is sufficient.)		Yes		
Auxiliary fuel flow (Q _{af}) at 77°F and 1 atm. =			696 scfm		
Total Volumetric Throughput (Q _{tot}) at 77 °F and 1 atm.	= Q _g = Q _{wg} + Q _{af} + Q _{ad} + Q _{af} =		360,076 scfm		

Capital Recovery Factor:

Parameter	Equation	Calculated Value
Capital Recovery Factor (CRF) =	i (1 + i) ⁿ / (1 + i) ⁿ - 1 = Where n = Equipment Life and i= Interest Rate	0.0926

Cost Estimate

Direct Costs

Total Purchased equipment costs (in 2025 dollars)

Incinerator + auxiliary equipment^a (A) =
 Equipment Costs (EC) for Regenerative Oxidizer $= (2.204 \times 100,000 + 11.57 \text{ Qtot}) \times (2025 \text{ CEPI}/1999 \text{ CEPCI}) =$ \$8,194,460 in 2025 dollars

Instrumentation^b = $0.10 \times A =$ \$819,446
 Sales taxes = $0.03 \times A =$ \$245,834
 Freight = $0.05 \times A =$ \$409,723

Total Purchased equipment costs (B) = \$9,669,462 in 2025 dollars

Footnotes

a - Auxiliary equipment includes equipment (e.g., duct work) normally not included with unit furnished by incinerator vendor.

b - Includes the instrumentation and controls furnished by the incinerator vendor.

Direct Installation Costs (in 2025 dollars)

Foundations and Supports = $0.08 \times B =$ \$773,557
 Handling and Erection = $0.14 \times B =$ \$1,353,725
 Electrical = $0.04 \times B =$ \$386,778
 Piping = $0.02 \times B =$ \$193,389
 Insulation for Ductwork = $0.01 \times B =$ \$96,695
 Painting = $0.01 \times B =$ \$96,695
 Site Preparation (SP) = \$0
 Buildings (Bldg) = \$0
 Total Direct Installation Costs = \$2,900,839
 Total Direct Costs (DC) = $B + C + SP + \text{Bldg} =$ \$12,570,301 in 2025 dollars

Total Indirect Installation Costs (in 2025 dollars)

Engineering = $0.10 \times B =$ \$966,946
 Construction and field expenses = $0.05 \times B =$ \$483,473
 Contractor fees = $0.10 \times B =$ \$966,946
 Start-up = $0.02 \times B =$ \$193,389
 Performance test = $0.01 \times B =$ \$96,695

Total Indirect Costs (IC) = \$2,707,449

Contingency Cost (C) = $CF(IC+DC) =$ \$1,527,775
 Total Capital Investment = $DC + IC + C =$ \$16,805,525 in 2025 dollars

Direct Annual Costs

Annual Electricity Cost = Annual Electricity Usage $\times$ Operating Hours/year $\times$ Electricity Price = \$1,170,125
 Annual Fuel Costs for Natural Gas = $\text{Cost}_{\text{fuel}} \times \text{Fuel Usage Rate} \times 60 \text{ min/hr} \times \text{Operating hours/year}$ \$1,350,542
 Operating Labor
 Operator = $0.5 \text{ hours/shift} \times \text{Labor Rate} \times (\text{Operating hours}/8 \text{ hours/shift})$ \$6,500
 Supervisor = 15% of Operator \$975
 Maintenance Costs
 Labor = $0.5 \text{ hours/shift} \times \text{Labor Rate} \times (\text{Operating Hours}/8 \text{ hours/shift})$ \$9,750
 Materials = 100% of maintenance labor \$9,750

Direct Annual Costs (DC) = \$2,547,642 in 2025 dollars

Indirect Annual Costs

Overhead = 60% of sum of operating, supervisor, maintenance labor and maintenance materials \$16,185
 Administrative Charges = 2% of TCI \$336,111
 Property Taxes = 1% of TCI \$168,055
 Insurance = 1% of TCI \$168,055
 Capital Recovery = $\text{CRF}[\text{TCI}-1.08(\text{cat. Cost})]$ \$1,555,632

Indirect Annual Costs (IC) = \$2,244,038 in 2025 dollars

Total Annual Cost = $DC + IC =$ \$4,791,680 in 2025 dollars

Cost Effectiveness

Cost Effectiveness = (Total Annual Cost)/(Annual Quantity of VOC/HAP Pollutants Destroyed)

Total Annual Cost (TAC) = \$4,791,680 per year in 2025 dollars
 VOC/HAP Pollutants Destroyed = 63.5 tons/year
 Cost Effectiveness = \$75,453 per ton of pollutants removed in 2025 dollars

Appendix D

Detailed Emission Calculations

Emission Calculations Detail for Table 2-1

Max. Actual Rated Capacity
39,420 Tons/year metal

Flow Diagram Designation
P&C Table 1A (F002)

Max. Actual Rated Capacity
4.50 Tons/hour metal

Process Description:

GAMCO - Rootstown (Prospect St.)

P&C Table 1A (F002)

Control Device: N/A

Facility Process Name:		Criteria Pollutants								Units
P&C Table 1A (F002)										
Emission Factor Basis:		PM	SO ₂	NO _x	VOC	CO	Phenol	PM ₁₀	PM _{2.5}	
lb/ton metal										
Emission Factors:		0.34	0.51		2.48	1.43	0.04	0.34	0.26	lb/ton
(source)		Note 1	Note 1		Note 5	Note 1	Note 3	Note 2	Note 4	
Capture Efficiencies:		95	95		95	95	95	95	95	%
Stack Emission Rate:										
Hourly (lb/hr)		1.44	2.19		10.60	6.09	0.15	1.44	1.12	lb/hr
Annual (TPY)		6.29	9.57		46.44	26.69	0.68	6.29	4.91	TPY
Fugitive Emission Rate:										
Hourly (lb/hr)		0.08	0.12		0.56	0.32	0.01	0.08	0.06	lb/hr
Annual (TPY)		0.33	0.50		2.44	1.40	0.04	0.33	0.26	TPY
Total Emission Rate:										
Hourly (lb/hr)		1.51	2.30		11.16	6.42	0.16	1.51	1.18	lb/hr
Annual (TPY)		6.62	10.08		48.88	28.10	0.71	6.62	5.17	TPY

Note 1: Emission factor from emissions testing conducted at Ravenna (Walnut Street) facility in July, 1998.

CO and SO₂ emission factor from max of three runs + two 20% safety factors.

VOC emission factor from average of three runs + two 20% safety factors.

PM emission factors from maximum of three runs + 20% safety factor.

Note 2: PM₁₀ Assumed to be equal to PM

Note 3: Emission factor (lb/ton sand) developed from Ashland Chemical Test Data (8/20/97) and a sand:metal ratio of 1:1.

Note 4: PM_{2.5} developed from USEPA's PMCalculator.

Note 5: Emission factors from Rootstown stack testing on 8/14/2019 on F003. Maximum of three runs + 20% safety factor.

Maximum Operating Schedule:

24 hours/day

8,760 hours/year

Comments:

Max. Actual Rated Capacity
39,420 Tons/year metal

Flow Diagram Designation
P&C Table 2 (F003)

Max. Actual Rated Capacity
4.50 Tons/hour metal

Process Description:

GAMCO - Rootstown (Prospect St.)
P&C Table 2 (F003)
Control Device: N/A

Facility Process Name:		Criteria Pollutants								Units
P&C Table 2 (F003)										
Emission Factor Basis:		PM	SO ₂	NO _x	VOC	CO	Phenol	PM ₁₀	PM _{2.5}	
lb/ton metal										
Emission Factors:		0.34	0.51		2.48	1.43	0.04	0.34	0.26	lb/ton
(source)		Note 1	Note 1		Note 5	Note 1	Note 3	Note 2	Note 4	
Capture Efficiencies:		95	95		95	95	95	95	95	%
Stack Emission Rate:										
Hourly (lb/hr)		1.44	2.19		10.60	6.09	0.15	1.44	1.12	lb/hr
Annual (TPY)		6.29	9.57		46.44	26.69	0.68	6.29	4.91	TPY
Fugitive Emission Rate:										
Hourly (lb/hr)		0.08	0.12		0.56	0.32	0.01	0.08	0.06	lb/hr
Annual (TPY)		0.33	0.50		2.44	1.40	0.04	0.33	0.26	TPY
Total Emission Rate:										
Hourly (lb/hr)		1.51	2.30		11.16	6.42	0.16	1.51	1.18	lb/hr
Annual (TPY)		6.62	10.08		48.88	28.10	0.71	6.62	5.17	TPY

Note 1: Emission factor from emissions testing conducted at Ravenna (Walnut Street) facility in July, 1998.
CO and SO₂ emission factor from max of three runs + two 20% safety factors.
VOC emission factor from average of three runs + two 20% safety factors.
PM emission factors from maximum of three runs + 20% safety factor.

Note 2: PM₁₀ Assumed to be equal to PM

Note 3: Emission factor (lb/ton sand) developed from Ashland Chemical Test Data (8/20/97) and a sand:metal ratio of 1:1.

Note 4: PM_{2.5} developed from USEPA's PMCalculator.

Note 5: Emission factors from Rootstown stack testing on 8/14/2019 on F003. Maximum of three runs + 20% safety factor.

Maximum Operating Schedule:

24 hours/day
8,760 hours/year

Comments:

Max. Actual Rated Capacity
17,520 Tons/year metal

Flow Diagram Designation
P&C #1100 Table 4A (F004)

Max. Actual Rated Capacity
2.00 Tons/hour metal

Process Description:

GAMCO - Rootstown (Prospect St.)
P&C #1100 Table 4A (F004)
Control Device: N/A

Facility Process Name:		Criteria Pollutants								Units
P&C #1100 Table 4A (F004)		PM	SO ₂	NO _x	VOC	CO	Phenol	PM ₁₀	PM _{2.5}	
Emission Factor Basis:		lb/ton metal								
Emission Factors:		0.34	0.51		2.48	1.43	0.04	0.34	0.26	lb/ton
(source)		Note 1	Note 1		Note 5	Note 1	Note 3	Note 2	Note 4	
Capture Efficiencies:		95	95		95	95	95	95	95	%
Stack Emission Rate:										
Hourly (lb/hr)		0.64	0.97		4.71	2.71	0.07	0.64	0.50	lb/hr
Annual (TPY)		2.80	4.25		20.64	11.86	0.30	2.80	2.18	TPY
Fugitive Emission Rate:										
Hourly (lb/hr)		0.03	0.05		0.25	0.14	0.00	0.03	0.03	lb/hr
Annual (TPY)		0.15	0.22		1.09	0.62	0.02	0.15	0.11	TPY
Total Emission Rate:										
Hourly (lb/hr)		0.67	1.02		4.96	2.85	0.07	0.67	0.52	lb/hr
Annual (TPY)		2.94	4.48		21.72	12.49	0.32	2.94	2.30	TPY

Note 1: Emission factor from emissions testing conducted at Ravenna (Walnut Street) facility in July, 1998.
CO and SO₂ emission factor from max of three runs + two 20% safety factors.
VOC emission factor from average of three runs + two 20% safety factors.
PM emission factors from maximum of three runs + 20% safety factor.

Note 2: PM₁₀ Assumed to be equal to PM

Note 3: Emission factor (lb/ton sand) developed from Ashland Chemical Test Data (8/20/97) and a sand:metal ratio of 1:1.

Note 4: PM_{2.5} developed from USEPA's PMCalculator.

Note 5: Emission factors from Rootstown stack testing on 8/14/2019 on F003. Maximum of three runs + 20% safety factor.

Maximum Operating Schedule:

24 hours/day
8,760 hours/year

Comments:

Max. Actual Rated Capacity
17,520 Tons/year metal

Flow Diagram Designation
P&C #1500 Table 4B (F005)

Max. Actual Rated Capacity
2.00 Tons/hour metal

Process Description:

GAMCO - Rootstown (Prospect St.)
P&C #1500 Table 4B (F005)
Control Device: N/A

Facility Process Name:		Criteria Pollutants								Units
P&C #1500 Table 4B (F005)		PM	SO ₂	NO _x	VOC	CO	Phenol	PM ₁₀	PM _{2.5}	
Emission Factor Basis:		lb/ton metal								
Emission Factors:		0.34	0.51		2.48	1.43	0.04	0.34	0.26	lb/ton
(source)		Note 1	Note 1		Note 5	Note 1	Note 3	Note 2	Note 4	
Capture Efficiencies:		95	95		95	95	95	95	95	%
Stack Emission Rate:										
Hourly (lb/hr)		0.64	0.97		4.71	2.71	0.07	0.64	0.50	lb/hr
Annual (TPY)		2.80	4.25		20.64	11.86	0.30	2.80	2.18	TPY
Fugitive Emission Rate:										
Hourly (lb/hr)		0.03	0.05		0.25	0.14	0.00	0.03	0.03	lb/hr
Annual (TPY)		0.15	0.22		1.09	0.62	0.02	0.15	0.11	TPY
Total Emission Rate:										
Hourly (lb/hr)		0.67	1.02		4.96	2.85	0.07	0.67	0.52	lb/hr
Annual (TPY)		2.94	4.48		21.72	12.49	0.32	2.94	2.30	TPY

Note 1: Emission factor from emissions testing conducted at Ravenna (Walnut Street) facility in July, 1998.
CO and SO₂ emission factor from max of three runs + two 20% safety factors.
VOC emission factor from average of three runs + two 20% safety factors.
PM emission factors from maximum of three runs + 20% safety factor.

Note 2: PM₁₀ Assumed to be equal to PM

Note 3: Emission factor (lb/ton sand) developed from Ashland Chemical Test Data (8/20/97) and a sand:metal ratio of 1:1.

Note 4: PM_{2.5} developed from USEPA's PMCalculator.

Note 5: Emission factors from Rootstown stack testing on 8/14/2019 on F003. Maximum of three runs + 20% safety factor.

Maximum Operating Schedule:

24 hours/day
8,760 hours/year

Comments:

Max. Actual Rated Capacity
19,710 Tons/year metal

Flow Diagram Designation
P&C Table 1B (F006)

Max. Actual Rated Capacity
2.25 Tons/hour metal

Process Description:

GAMCO - Rootstown (Prospect St.)
P&C Table 1B (F006)

Control Device: N/A

Facility Process Name:		Criteria Pollutants								Units
P&C Table 1B (F006)		PM	SO ₂	NO _x	VOC	CO	Phenol	PM ₁₀	PM _{2.5}	
Emission Factor Basis:										
lb/ton metal										
Emission Factors:		0.34	0.51		2.48	1.43	0.04	0.34	0.26	lb/ton
(source)		Note 1	Note 1		Note 5	Note 1	Note 3	Note 2	Note 4	
Capture Efficiencies:										%
Stack Emission Rate:										
	Hourly (lb/hr)									lb/hr
	Annual (TPY)									TPY
Fugitive Emission Rate:										
	Hourly (lb/hr)	0.76	1.15		5.58	3.21	0.08	0.76	0.59	lb/hr
	Annual (TPY)	3.31	5.04		24.44	14.05	0.36	3.31	2.58	TPY
Total Emission Rate:										
	Hourly (lb/hr)	0.76	1.15		5.58	3.21	0.08	0.76	0.59	lb/hr
	Annual (TPY)	3.31	5.04		24.44	14.05	0.36	3.31	2.58	TPY

Note 1: Emission factor from emissions testing conducted at Ravenna (Walnut Street) facility in July, 1998.
CO and SO₂ emission factor from max of three runs + two 20% safety factors.
VOC emission factor from average of three runs + two 20% safety factors.
PM emission factors from maximum of three runs + 20% safety factor.

Note 2: PM₁₀ Assumed to be equal to PM

Note 3: Emission factor (lb/ton sand) developed from Ashland Chemical Test Data (8/20/97) and a sand:metal ratio of 1:1.

Note 4: PM_{2.5} developed from USEPA's PMCalculator.

Note 5: Emission factors from Rootstown stack testing on 8/14/2019 on F003. Maximum of three runs + 20% safety factor.

Maximum Operating Schedule:

24 hours/day
8,760 hours/year

Comments:

Max. Actual Rated Capacity
19,710 Tons/year metal

Flow Diagram Designation
P&C New Table #5 (F007)

Max. Actual Rated Capacity
2.25 Tons/hour metal

Process Description:

GAMCO - Rootstown (Prospect St.)
P&C New Table #5 (F007)
Control Device: N/A

Facility Process Name:		Criteria Pollutants								Units
P&C New Table #5 (F007)		PM	SO ₂	NO _x	VOC	CO	Phenol	PM ₁₀	PM _{2.5}	
Emission Factor Basis:										
lb/ton metal										
Emission Factors:		0.34	0.51		2.48	1.43	0.04	0.34	0.26	lb/ton
(source)		Note 1	Note 1		Note 5	Note 1	Note 3	Note 2	Note 4	
Capture Efficiencies:										%
Stack Emission Rate:										
	Hourly (lb/hr)									lb/hr
	Annual (TPY)									TPY
Fugitive Emission Rate:										
	Hourly (lb/hr)	0.76	1.15		5.58	3.21	0.08	0.76	0.59	lb/hr
	Annual (TPY)	3.31	5.04		24.44	14.05	0.36	3.31	2.58	TPY
Total Emission Rate:										
	Hourly (lb/hr)	0.76	1.15		5.58	3.21	0.08	0.76	0.59	lb/hr
	Annual (TPY)	3.31	5.04		24.44	14.05	0.36	3.31	2.58	TPY

Note 1: Emission factor from emissions testing conducted at Ravenna (Walnut Street) facility in July, 1998.
CO and SO₂ emission factor from max of three runs + two 20% safety factors.
VOC emission factor from average of three runs + two 20% safety factors.
PM emission factors from maximum of three runs + 20% safety factor.

Note 2: PM₁₀ Assumed to be equal to PM

Note 3: Emission factor (lb/ton sand) developed from Ashland Chemical Test Data (8/20/97) and a sand:metal ratio of 1:1.

Note 4: PM_{2.5} developed from USEPA's PMCalculator.

Note 5: Emission factors from Rootstown stack testing on 8/14/2019 on F003. Maximum of three runs + 20% safety factor.

Maximum Operating Schedule:

24 hours/day
8,760 hours/year

Comments:

Max. Actual Rated Capacity
19,710 Tons/year metal

Flow Diagram Designation
P&C New Table #6 (F008)

Max. Actual Rated Capacity
2.25 Tons/hour metal

Process Description:

GAMCO - Rootstown (Prospect St.)
P&C New Table #6 (F008)
Control Device: N/A

Facility Process Name:		Criteria Pollutants								Units
P&C New Table #6 (F008)		PM	SO ₂	NO _x	VOC	CO	Phenol	PM ₁₀	PM _{2.5}	
Emission Factor Basis:										
lb/ton metal										
Emission Factors:		0.34	0.51		2.48	1.43	0.04	0.34	0.26	lb/ton
(source)		Note 1	Note 1		Note 5	Note 1	Note 3	Note 2	Note 4	
Capture Efficiencies:										%
Stack Emission Rate:										
Hourly (lb/hr)										lb/hr
Annual (TPY)										TPY
Fugitive Emission Rate:										
Hourly (lb/hr)		0.76	1.15		5.58	3.21	0.08	0.76	0.59	lb/hr
Annual (TPY)		3.31	5.04		24.44	14.05	0.36	3.31	2.58	TPY
Total Emission Rate:										
Hourly (lb/hr)		0.76	1.15		5.58	3.21	0.08	0.76	0.59	lb/hr
Annual (TPY)		3.31	5.04		24.44	14.05	0.36	3.31	2.58	TPY

Note 1: Emission factor from emissions testing conducted at Ravenna (Walnut Street) facility in July, 1998.
CO and SO₂ emission factor from max of three runs + two 20% safety factors.
VOC emission factor from average of three runs + two 20% safety factors.
PM emission factors from maximum of three runs + 20% safety factor.

Note 2: PM₁₀ Assumed to be equal to PM

Note 3: Emission factor (lb/ton sand) developed from Ashland Chemical Test Data (8/20/97) and a sand:metal ratio of 1:1.

Note 4: PM_{2.5} developed from USEPA's PMCalculator.

Note 5: Emission factors from Rootstown stack testing on 8/14/2019 on F003. Maximum of three runs + 20% safety factor.

Maximum Operating Schedule:

24 hours/day
8,760 hours/year

Comments:

Emission Calculations Detail for Table 2-4

General Aluminum Manufacturing Company - Rootstown Division

VOC RACT Study

Emission Calculation Detail for Table 2-4

	Highest Daily Average Tons of Aluminum Processed in 2022 - 2025 (tons/day)		VOC Emission Factor (lbs VOC/ton) ¹	Average Daily VOC Emissions (lbs/day)
F002	0	No operation 2022 - 2025	2.48	0.00
F003	10.16	from 2024	2.48	25.19
F004	0	No operation 2022 - 2025	2.48	0.00
F005	0	No operation 2022 - 2025	2.48	0.00
F006	9.59	from 2023	2.48	23.78
F007	12.20	from 2023	2.48	30.27
F008	13.75	from 2023	2.48	34.10

	Highest Daily Maximum Tons of Aluminum Processed in 2022 - 2025 (tons/day)		VOC Emission Factor (lbs VOC/ton) ¹	Maximum Daily VOC Emissions (lbs/day)
F002	0	No operation 2022 - 2025	2.48	0.00
F003	13.76	from 2024	2.48	34.14
F004	0	No operation 2022 - 2025	2.48	0.00
F005	0	No operation 2022 - 2025	2.48	0.00
F006	15.60	from 2024	2.48	38.69
F007	18.53	from 2025	2.48	45.96
F008	17.34	from 2025	2.48	43.00

	Highest Annual Tons of Aluminum Processed in 2022 - 2025 (tons/year)		VOC Emission Factor (lbs VOC/ton) ²	Maximum Annual VOC Emissions (tons/year)
F002	0	No operation 2022 - 2025	1.66	0.00
F003	3,713	from 2024	1.66	3.08
F004	0	No operation 2022 - 2025	1.66	0.00
F005	0	No operation 2022 - 2025	1.66	0.00
F006	3,494	from 2023	1.66	2.90
F007	4,455	from 2023	1.66	3.69
F008	5,008	from 2023	1.66	4.15

Note 1: Emission factor from Rootstown stack testing on 8/14/2019 on F003. Maximum of three runs + 20% safety factor; utilized for air permitting.

Note 2: Emission factor from Rootstown stack testing on 8/14/2019 on F003. Average of three runs; utilized for actual annual air emission reporting.

Example calculation

VOC emissions (lbs/day) = daily throughput x VOC emission factor

VOC emissions (tons/year) = annual throughput x VOC emission factor x (1 ton / 2000 lbs

Emission Calculations Detail for Table 3-1

Max. Actual Rated Capacity
39,420 Tons/year

Max. Burner Fuel Usage
180.35 MMCF/year

Flow Diagram Designation
Furnace #1 (P902)

Max. Actual Rated Capacity
4.50 Tons/hour

Max. Burner Fuel Usage
0.021 MMCF/hour

Process Description:

GAMCO - Rootstown (Prospect St.)
Furnace #1 (P902)
Control Device: N/A

Facility Process Name:		Criteria Pollutants										Greenhouse Gases			Units
Furnace #1 (P902)		PM	SO2	NOx	VOC	CO	PM10	HF	PM2.5	Lead	NH3	CO2	Methane	N2O	
Emission Factor Basis:															
Emission Factors:		lb/ton metal	0.58		1.03	1.07	0.58	0.12	0.29						lb/ton
		lb/MMCF		0.60		84.00			0.0005	3.20	120,019	2.2619	0.2262		lb/MMCF
(source)			Note 1	Note 3	Note 1	Note 6	Note 3	Note 2	Note 1	Note 4	Note 3	Note 3	Note 5	Note 5	Note 5
Stack Emission Rate:															
		Hourly (lb/hr)	2.62	0.01	4.64	4.82	1.73	2.62	0.53	1.31	1.0E-05	0.07	2,471	0.05	0.005 lb/hr
		Annual (TPY)	11.46	0.05	20.34	21.09	7.57	11.46	2.33	5.76	4.5E-05	0.29	10,823	0.20	0.020 TPY

Note 1: Emission factor from emissions testing conducted at Rootstown (Prospect Street) facility in October, 2001.
Maximum furnace emission factor from maximum of three runs + 20% safety factor.

Note 2: PM10 Assumed to be equal to PM

Note 3: Emission factor from AP-42, Fifth Edition, Table 1.4-1 & 2.

Note 4: PM2.5 developed from USEPA's PMCalculator.

Note 5: Emission factors from the Mandatory Greenhouse Gas Reporting Rule (40 CFR Part 98, Subpart C), updated 11/2013.

Note 6: Emission factors from Rootstown stack testing on 8/13/2019 on P925. Maximum of three runs + 20% safety factor.

Comments:

Maximum Operating Schedule:

24 hours/day
8,760 hours/year

Max. Actual Rated Capacity
13,140 Tons/year

Max. Burner Fuel Usage
60.12 MMCF/year

Flow Diagram Designation
Furnace #4 (P923)

Max. Actual Rated Capacity
1.50 Tons/hour

Max. Burner Fuel Usage
0.0069 MMCF/hour

Process Description:

GAMCO - Rootstown (Prospect St.)
Furnace #4 (P923)
Control Device: N/A

Facility Process Name:			Criteria Pollutants									Greenhouse Gases			Units	
Furnace #4 (P923)																
Emission Factor Basis:			PM	SO2	NOx	VOC	CO	PM10	HF	PM2.5	Lead	NH3	CO2	Methane	N2O	
Emission Factors:			lb/ton metal	0.58	1.03	1.07		0.58	0.12	0.29						lb/ton
		lb/MMCF		0.60			84.00				0.0005	3.20	120,019	2.2619	0.2262	lb/MMCF
(source)			Note 1	Note 3	Note 1	Note 6	Note 3	Note 2	Note 1	Note 4	Note 3	Note 3	Note 5	Note 5	Note 5	
Stack Emission Rate:																
	Hourly (lb/hr)		0.87	0.00	1.55	1.61	0.58	0.87	0.18	0.44	3.4E-06	0.02	824	0.02	0.002	lb/hr
	Annual (TPY)		3.82	0.02	6.78	7.03	2.52	3.82	0.78	1.92	1.5E-05	0.10	3,608	0.07	0.007	TPY

Note 1: Emission factor from emissions testing conducted at Rootstown (Prospect Street) facility in October, 2001.
Maximum furnace emission factor from maximum of three runs + 20% safety factor.

Note 2: PM10 Assumed to be equal to PM

Note 3: Emission factor from AP-42, Fifth Edition, Table 1.4-1 & 2.

Note 4: PM2.5 developed from USEPA's PMCalculator.

Note 5: Emission factors from the Mandatory Greenhouse Gas Reporting Rule (40 CFR Part 98, Subpart C), updated 11/2013.

Note 6: Emission factors from Rootstown stack testing on 8/13/2019 on P925. Maximum of three runs + 20% safety factor.

Comments:

Maximum Operating Schedule:

24 hours/day
8,760 hours/year

Max. Actual Rated Capacity
19,272 Tons/year

Max. Burner Fuel Usage
48.35 MMCF/year

Flow Diagram Designation
Furnace #2 (P924)

Max. Actual Rated Capacity
2.20 Tons/hour

Max. Burner Fuel Usage
0.0055 MMCF/hour

Process Description:

GAMCO - Rootstown (Prospect St.)
Furnace #2 (P924)
Control Device: N/A

Facility Process Name:			Criteria Pollutants									Greenhouse Gases			Units	
Furnace #2 (P924)																
Emission Factor Basis:			PM	SO2	NOx	VOC	CO	PM10	HF	PM2.5	Lead	NH3	CO2	Methane	N2O	
Emission Factors:			lb/ton metal	0.58	1.03	1.07		0.58	0.12	0.29						lb/ton
		lb/MMCF		0.60			84.00				0.0005	3.20	120,019	2.2619	0.2262	lb/MMCF
(source)			Note 1	Note 3	Note 1	Note 6	Note 3	Note 2	Note 1	Note 4	Note 3	Note 3	Note 5	Note 5	Note 5	
Stack Emission Rate:																
	Hourly (lb/hr)		1.28	0.00	2.27	2.35	0.46	1.28	0.26	0.64	2.8E-06	0.02	662	0.01	0.001	lb/hr
	Annual (TPY)		5.60	0.01	9.95	10.31	2.03	5.60	1.14	2.81	1.2E-05	0.08	2,902	0.05	0.005	TPY

Note 1: Emission factor from emissions testing conducted at Rootstown (Prospect Street) facility in October, 2001.
Maximum furnace emission factor from maximum of three runs + 20% safety factor.

Note 2: PM10 Assumed to be equal to PM

Note 3: Emission factor from AP-42, Fifth Edition, Table 1.4-1 & 2.

Note 4: PM2.5 developed from USEPA's PMCalculator.

Note 5: Emission factors from the Mandatory Greenhouse Gas Reporting Rule (40 CFR Part 98, Subpart C), updated 11/2013.

Note 6: Emission factors from Rootstown stack testing on 8/13/2019 on P925. Maximum of three runs + 20% safety factor.

Comments:

Maximum Operating Schedule:

24 hours/day
8,760 hours/year

Max. Actual Rated Capacity
19,710 Tons/year

Max. Burner Fuel Usage
91.04 MMCF/year

Flow Diagram Designation
New Furnace #5 (P925)

Max. Actual Rated Capacity
2.25 Tons/hour

Max. Burner Fuel Usage
0.0104 MMCF/hour

Process Description:

GAMCO - Rootstown (Prospect St.)
New Furnace #5 (P925)
Control Device: N/A

Facility Process Name:			Criteria Pollutants										Greenhouse Gases			Units
New Furnace #5 (P925)																
Emission Factor Basis:			PM	SO2	NOx	VOC	CO	PM10	HF	PM2.5	Lead	NH3	CO2	Methane	N2O	
Emission Factors:			lb/ton metal	0.58	1.03	1.07		0.58	0.12	0.29						lb/ton
		lb/MMCF		0.60			84.00				0.0005	3.20	120,019	2.2619	0.2262	lb/MMCF
(source)			Note 1	Note 3	Note 1	Note 6	Note 3	Note 2	Note 1	Note 4	Note 3	Note 3	Note 5	Note 5	Note 5	
Stack Emission Rate:																
	Hourly (lb/hr)		1.31	0.01	2.32	2.41	0.87	1.31	0.27	0.66	5.2E-06	0.03	1,247	0.02	0.002	lb/hr
	Annual (TPY)		5.73	0.03	10.17	10.54	3.82	5.73	1.16	2.88	2.3E-05	0.15	5,463	0.10	0.010	TPY

Note 1: Emission factor from emissions testing conducted at Rootstown (Prospect Street) facility in October, 2001.
Maximum furnace emission factor from maximum of three runs + 20% safety factor.

Note 2: PM10 Assumed to be equal to PM

Note 3: Emission factor from AP-42, Fifth Edition, Table 1.4-1 & 2.

Note 4: PM2.5 developed from USEPA's PMCalculator.

Note 5: Emission factors from the Mandatory Greenhouse Gas Reporting Rule (40 CFR Part 98, Subpart C), updated 11/2013.

Note 6: Emission factors from Rootstown stack testing on 8/13/2019 on P925. Maximum of three runs + 20% safety factor.

Comments:

Maximum Operating Schedule:

24 hours/day
8,760 hours/year

Max. Actual Rated Capacity
19,710 Tons/year

Max. Burner Fuel Usage
91.04 MMCF/year

Flow Diagram Designation
New Furnace #6 (P926)

Max. Actual Rated Capacity
2.25 Tons/hour

Max. Burner Fuel Usage
0.0104 MMCF/hour

Process Description:

GAMCO - Rootstown (Prospect St.)
New Furnace #6 (P926)
Control Device: N/A

Facility Process Name:			Criteria Pollutants										Greenhouse Gases			Units
New Furnace #6 (P926)																
Emission Factor Basis:			PM	SO2	NOx	VOC	CO	PM10	HF	PM2.5	Lead	NH3	CO2	Methane	N2O	
Emission Factors:			lb/ton metal	0.58	1.03	1.07		0.58	0.12	0.29						lb/ton
		lb/MMCF		0.60			84.00				0.0005	3.20	120,019	2.2619	0.2262	lb/MMCF
(source)			Note 1	Note 3	Note 1	Note 6	Note 3	Note 2	Note 1	Note 4	Note 3	Note 3	Note 5	Note 5	Note 5	
Stack Emission Rate:																
	Hourly (lb/hr)		1.31	0.01	2.32	2.41	0.87	1.31	0.27	0.66	5.2E-06	0.03	1,247	0.02	0.002	lb/hr
	Annual (TPY)		5.73	0.03	10.17	10.54	3.82	5.73	1.16	2.88	2.3E-05	0.15	5,463	0.10	0.010	TPY

Note 1: Emission factor from emissions testing conducted at Rootstown (Prospect Street) facility in October, 2001.
Maximum furnace emission factor from maximum of three runs + 20% safety factor.

Note 2: PM10 Assumed to be equal to PM

Note 3: Emission factor from AP-42, Fifth Edition, Table 1.4-1 & 2.

Note 4: PM2.5 developed from USEPA's PMCalculator.

Note 5: Emission factors from the Mandatory Greenhouse Gas Reporting Rule (40 CFR Part 98, Subpart C), updated 11/2013.

Note 6: Emission factors from Rootstown stack testing on 8/13/2019 on P925. Maximum of three runs + 20% safety factor.

Comments:

Maximum Operating Schedule:

24 hours/day
8,760 hours/year

Emission Calculations Detail for Table 3-4

General Aluminum Manufacturing Company - Rootstown Division**VOC RACT Study****Emission Calculation Detail for Table 3-4**

	Highest Daily Average Tons of Aluminum Processed in 2022 - 2025 (tons/day)		VOC Emission Factor (lbs VOC/ton) ¹	Average Daily VOC Emissions (lbs/day)
P902	9.59	from 2023	1.07	10.22
P923	0	No operation 2022 - 2025	1.07	0.00
P924	10.16	from 2024	1.07	10.83
P925	12.20	from 2023	1.07	13.01
P926	13.75	from 2023	1.07	14.65

	Highest Daily Maximum Tons of Aluminum Processed in 2022 - 2025 (tons/day)		VOC Emission Factor (lbs VOC/ton) ¹	Maximum Daily VOC Emissions (lbs/day)
P902	15.60	from 2024	1.07	16.62
P923	0	No operation 2022 - 2025	1.07	0.00
P924	13.76	from 2024	1.07	14.67
P925	18.53	from 2025	1.07	19.75
P926	17.34	from 2025	1.07	18.48

	Highest Annual Tons of Aluminum Processed in 2022 - 2025 (tons/year)		VOC Emission Factor (lbs VOC/ton) ²	Maximum Annual VOC Emissions (tons/year)
P902	3,494	from 2023	0.55	0.96
P923	0	No operation 2022 - 2025	0.55	0.00
P924	3,713	from 2024	0.55	1.02
P925	4,455	from 2023	0.55	1.22
P926	5,008	from 2023	0.55	1.37

Note 1: Emission factor from Rootstown stack testing on 8/13/2019 on P925. Maximum of three runs + 20% safety factor; utilized for air permitting.

Note 2: Emission factors from Rootstown stack testing on 8/13/2019 on P925. Average of three runs; utilized for actual annual air emission reporting.

Example calculation

VOC emissions (lbs/day) = daily throughput x VOC emission factor

VOC emissions (tons/year) = annual throughput x VOC emission factor x (1 ton / 2000 lbs

Public Notice
Ohio Environmental Protection Agency
Draft State Implementation Plan
VOC Reasonably Available Control Technology (RACT)
for General Aluminum Manufacturing Company (Facility ID 1667070012)

Portage County

Notice is hereby given that the Director of the Ohio Environmental Protection Agency, (Ohio EPA) is submitting to the United States Environmental Protection Agency (U.S. EPA) Reasonably Available Control Technology (RACT) for General Aluminum Manufacturing Company (Facility ID 1667070012) for approval into Ohio's state implementation plan (SIP) for the 2015 ozone National Ambient Air Quality Standard (NAAQS).

On March 17, 2025, Ohio submitted a revision to Ohio's SIP to address RACT requirements for the 2015 8-hour ozone NAAQS. As noted in this submittal, OAC rule 3745-21-11(B) requires facilities that have the potential to emit of fifty tons per year or more, but less than one hundred tons per year of volatile organic compounds (VOC) and are located in nonattainment counties to submit a RACT study for sources not controlled by Ohio's CTG regulations in OAC Chapter 3745-21 or by categorical non-CTG RACT in OAC rules 3745-21-12, 3745-21-14, 3745-21-16, 3745-21-21 and 3745-21-25.

Ohio is now submitting source-specific VOC RACT for General Aluminum Manufacturing Company (Facility ID 1667070012) for approval into Ohio's SIP. This facility is located in the Cleveland 2015 ozone maintenance area and has no prior existing source-specific RACT established in OAC rule 3745-21-09.

The updated RACT Study was submitted per OAC rule 3745-21-11(B). Ohio has determined that the updated RACT study, along with supplemental information submitted subsequently, is sufficient to justify implementing good combustion and operating practices and maintaining the VOC limitations for several emissions units associated with the aluminum melting furnaces and the pouring and cooling turntables that are approved in their current permit-to-install and operate proposed by the facility to act as RACT under the 2015 ozone standard.

Ohio EPA is now requesting approval of the proposed RACT for General Aluminum Manufacturing Company into Ohio's SIP.

Ohio EPA is seeking public comment to satisfy U.S. EPA requirements for public involvement in SIP related activities in accordance with 40 CFR 51.102.

The public comment period will run until October 5, 2026. Written comments should be submitted at: <https://ohioepa.commentinput.com> - Search by entering the permit # (P0140906 for General Aluminum Manufacturing Company) in the "Search Projects" search box.

A public hearing on this action may be requested by contacting Kathryn Jobe at 614-728-0671 or kathryn.jobe@epa.ohio.gov later than 30 days from the draft public notice. If a public hearing is requested, a new notification will be published to identify the time and location of the public hearing. The public hearing will be held at least 30 days after the date of the new notification.

All interested persons are entitled to comment on these changes. All comments submitted to the above address by the close of business 30 days from when the draft public notice is issued will be considered by Ohio EPA prior to final action on this action. Written statements submitted after this time period may be considered as time and circumstances permit but will not be part of the official record.

Questions or comments about this document should be directed to Kathryn Jobe at 614-728-0671 or kathryn.jobe@epa.ohio.gov.



DATE

Ms. Anne Vogel
Regional Administrator
U.S. EPA, Region 5
77 West Jackson Blvd.
Chicago, Illinois 60604

Re: Revision to Ohio's Reasonably Available Control Technology (RACT) State Implementation Plan for the 2015 Ozone National Ambient Air Quality Standards – Source-Specific Volatile Organic Compound (VOC) RACT for General Aluminum Manufacturing Company (Facility ID 1667070012)

Dear Administrator Vogel:

On March 17, 2025, Ohio submitted a revision to Ohio's State Implementation Plan (SIP) to address Reasonably Available Control Technology (RACT) requirements for the 2015 8-hour ozone National Ambient Air Quality Standards (NAAQS) for areas classified as serious. As noted in this submittal, Ohio EPA adopted requirements in OAC rule 3745-21-11 for facilities in the nonattainment areas that emit fifty tons per year or more, but less than one hundred tons per year of volatile organic compounds (VOC) from sources not controlled by Ohio's CTG regulations in OAC Chapter 3745-21 or by categorical non-CTG RACT in OAC rules 3745-21-12, 3745-21-14, 3745-21-16, 3745-21-21 and 3745-21-25 to submit an updated RACT study within one year of the effective date of the rule. Upon review of the RACT study, Ohio EPA evaluated if the RACT proposed by the facility is appropriate to satisfy RACT requirements under the 2015 ozone standard.

Ohio is now submitting source-specific VOC RACT for General Aluminum Manufacturing Company (Facility ID 1667070012) for approval into Ohio's SIP. This facility is located in the Cleveland 2015 ozone maintenance area and has no prior existing source-specific RACT established in OAC rule 3745-21-09.

The updated VOC RACT Study was submitted per OAC rule 3745-21-11. Ohio has determined that the updated RACT study, along with supplemental information submitted subsequently, is sufficient to justify implementing the good combustion and operating practices and maintaining the VOC limitations for several emissions units associated with the aluminum melting furnaces and the pouring and cooling turntables that are approved in their current permit-to-install and operate proposed by the facility to act as RACT under the 2015 ozone standard. The RACT study is provided

in Appendix A, and the permit that incorporated RACT is provided as Appendix B. Within the permit, we have highlighted the terms and conditions associated with RACT and request only those provisions are subject to this SIP revision request. Appendix C provides the permit strategy write-up for the permit.

Ohio held a public comment period on Ohio's RACT determination from September 3 to October 5, 2026. Appendix D contains the public notice. ***[Ohio's response to comments received during the public comment period is in Appendix E/No comments were received during the public comment period].***

This SIP does not include the relaxation of any existing requirements and therefore will not interfere with the attainment or maintenance of the NAAQS in accordance with section 110(l) of the CAA.

Ohio EPA is now requesting approval of the proposed RACT for General Aluminum Manufacturing Company into Ohio's SIP.

Ohio EPA is submitting this SIP via U.S. EPA's State Planning Electronic Collaboration System (SPeCS). If you have questions, please contact Jennifer Van Vlerah in our Division of Air Pollution Control at (614) 644-3696.

Sincerely,

John Logue
Director

Cc: Bob Hodanbosi, Chief, Division of Air Pollution Control, Ohio EPA

Enclosures