ARGLASS
YAMAMURA

July 7, 2023

State of Georgia
Department of Natural Resources Environmental Protection Division
Air Protection Branch
Stationary Source Permitting Program
4244 International Parkway, Suite 120
Atlanta, Georgia 30354

RE: Minor New Source Review Permit Application
Arglass Yamamura, LLC
Expedited Permitting Requested

Dear Heather Brown:

Arglass Yamamura, LLC (Arglass) the parent company of Arglass V-F2, LLC is submitting this permit application for admission into the expedited permitting process at the Air Protection Branch. This permit application is for the collocation of a new facility (Argalss V-F2, LLC) with the already permitted Arglass Yamamua SE, LLC facility. This is the project for which a pre-permitting meeting was held on June 23, 2032.

Arglass is requesting that the two facilities be permitted as a single stationary source for the New Source Review permit. Arglass would entertain eventually having two administratively separate permits when the operating permits are to be issued to the two facilities under the Title V program.

Please note that AERMOD dispersion modeling was conducted on lead, selenium, hydrogen chloride and hydrogen fluoride. Please let us know whom to forward the relevant air dispersion modeling the electronic files. Please review the attached permit application and let Mr. Jeff Twaddle at jeff.twaddle@erm.com or me know if we can supply you with any more information. We look forward to hearing from you.

Sincerely,

José de Diego-Arozamena
Founder & CEO

Cc: Jeff Twaddle

Attachment

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch

Stationary Source Permitting Program
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404/363-7000
Fax: 404/363-7100

EXPEDITED PERMITTING PROGRAM – APPLICATION FOR ENTRY TO PROGRAM FOR AIR PERMITS

EPD Use Only

Date Received: ______________________ Application No. ______________________

To be eligible for expedited review, this application form must be accompanied by the complete permit application for the type of air permit being requested.

1. Contact Information

Facility Name: Arglass Yamamura, LLC

AIRS No. (if known): 04-13- -

Contact Person: Jose de Diego-Arozamena Title: Founder & CEO

Telephone No.: (229) 474-6823 Alternate Phone No.: (917) 385-9761

Email Address: jda@arglass.us

If EPD is unable to contact me, please contact the alternate contact person:

Contact Person: Jeff Twaddle, P.E, ERM Title: Partner

Telephone No.: (615) 656-4636 Alternate Phone No.: (615) 618-4715

Email Address: Jeff.Twaddle@erm.com

On Page 2 of this form, please check the appropriate box for which type of air permit you are requesting expedited review.

I have read the Expedited Review Program Standard Operating Procedures and accept all of the terms and conditions within. I have participated in the required pre-application meeting with EPD. I understand that it is my responsibility to ensure an application of the highest quality is submitted and to address any requests for additional information by the deadline specified. I understand that submittal of this request form is not a guarantee that expedited review will be granted.

Signature: ______________________ Date: July 7, 2023

2. **Applying For Which Type Of Permit: (Please Check Appropriate Box)**

Expedited Review Fees for Air Permits	
Permit Type – Please Check One	**Expedited Review Fee*** **as of March 1, 2021**
☐ Generic Permit: Concrete Batch Plant – Minor Source	$1,250
☐ Generic Permit: Concrete Batch Plant – Synthetic Minor Source	$1,875
☐ Generic Permit: Hot Mix Asphalt Plant – Synthetic Minor Source	$2,500
☐ Minor Source Permit (or Amendment)	$3,750
☐ Synthetic Minor Permit (or Amendment)	$5,000
☒ Major Source SIP Permit not subject to PSD or 112(g)	$7,500
☐ Title V 502(b)(10) Permit Amendment	$5,000
☐ Title V Minor Modification with Construction	$5,000
☐ Title V Significant Modification	$7,500
☐ Major Source SIP Permit subject to 112(g) but not subject to PSD	$18,750
☐ PSD Permit (or Amendment) not subject to NAAQS and/or PSD Increment Modeling	$18,750
☐ PSD Permit (or Amendment) subject to NAAQS and/or PSD Increment Modeling but not subject to Modeling for $PM_{2.5}$, NO_2, or SO_2	$25,000
☐ PSD Permit (or Amendment) subject to NAAQS and/or PSD Increment Modeling for $PM_{2.5}$, NO_2, or SO_2	$31,250
☐ PSD Permit (or Amendment) subject to NAAQS and/or PSD Increment Modeling for $PM_{2.5}$, NO_2, or SO_2 and also impacting a Class I Area	$37,500
☐ Nonattainment NSR Review Permit (or Amendment)	$50,000
* Do not send fee payment with this form. Upon acceptance of application for the expedited permit program, EPD will notify you and an invoice will appear on GECO. Fees must be paid via check to "Georgia Department of Natural Resources" within ten (10) business days of acceptance.	

3. **Comments.**

Commencement of construction is targeted for November 2023. The desired start-up for this facility is February 2025.

This section is optional. Applicants may use this field to include specific comments or requests for EPD consideration. For example, the applicant may use this field to request a public hearing or to remind EPD of review time needs and/or expectations that may differ from the time frames in the procedures.

ARGLASS

Construction Permit Application

NSR Minor Source

ARGLASS Yamamura, LLC

July 7, 2023

Project No.: 0682930

The business of sustainability

ERM

Title Page

July 7, 2023

Construction Permit Application

NSR Minor Source

Prepared for Arglass Yamamura, LLC

Environmental Resources Management, Inc.

901 Woodland Street
Suite 104
Nashville, Tennessee 37206
U.S.A.

Phone: +1 615 656 7100

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Acronyms and Abbreviations

°C	Degrees Celsius
°F	Degrees Fahrenheit
$\mu g/m^3$	Micrograms per Cubic Meter
AERMET	A Meteorological Data Preprocessor
AERMAP	AERMOD Mapping Program
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AERSURFACE	A tool used to determine surface characteristic values for AERMET
AAC	Allowable Ambient Concentration(s)
AP-42	USEPA's Compilation of Air Pollutant Emissions Factors[1]
bhp	Brake-Horsepower
BPIPPRM	Building Profile Input Program (PRIME Version)
CFR	Code of Federal Regulations
CH4	Methane
CO2	Carbon Dioxide
CO2e	Carbon Dioxide equivalence
ESP	Electrostatic Precipitator
F1 Facility	Furnace 1 Facility
F2 Facility	Furnace 2 Facility
GA EPD	Georgia Environmental Protection Department

[1] https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors

GHG	Greenhouse Gases
g/kg	Gram per kilogram
g/s	Grams per Second
gal/min	Gallons per Minute
GEP	Good Engineering Practice
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant(s)
HCl	Hydrogen Chloride
HF	Hydrogen Fluoride
K	Kelvin Scale of Temperature
kVA	Kilovolt-Amperes
kW	Kilowatt(s)
lb/ton	Pound per Short Ton
lb/yr	Pound per Year
LPG	Liquified Petroleum Gas
m	Meter(s)
m/s	Meters per Second
MER	Minimum Emission Rate
MMBtu/hr	Million British Thermal Units per hour
N2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NESHAP	National Emission Standard(s) for Hazardous Air Pollutants
No.	Number
NOx	Nitrogen Oxides
NSPS	New Source Performance Standard(s)
NSR	New Source Review
Pb	Lead
PM	Particulate Matter
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
SIP	State Implementation Plan
S	Sulfur
Se	Selenium
SO2	Sulfur Dioxide
TAP	Toxic Air Pollutant(s)
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTM	Universal Transverse Mercator (Coordinate System)

1. INTRODUCTION

Arglass V-F2 LLC is planning the construction of a new facility (F2 Facility) to be collocated at the Arglass Yamamura SE, LLC facility (F1 Facility) site in Valdosta, Georgia. The F2 Facility and the F1 Facility have a common ownership, Arglass Yamamura, LLC (Arglass). The new facility will operate independently of the F1 Facility. This permit application is being submitted by the two facilities' parent company, Arglass Yamamura, LLC.

The F2 Facility will produce glass containers. The glass containers will be bottles and jars for spirits, food, and beverage. The F1 Facility, which currently manufactures these containers will focus on beer containers upon start-up of the F2 Facility.

For an expeditious permit processing track, Arglass intends on pursuing a New Source Review (NSR) permit shared with the F1 Facility. The two facilities plan to seek individual permits at the Title V permitting stage.

The stationary source is currently a minor New Source Review (NSR) facility because its potential to emit is less than 250 tons per year for any NSR pollutant. This stationary source is a minor Title V facility its potential to emit is less than 100 tons per year of any regulated air pollutant, less than 10 tons per year of any single hazardous air pollutant (HAP) and less than 25 tons per year of any combination of HAP.

This permit application will be for a minor NSR permit because the emission rates sought will be less than the 250 ton per year. The combined emissions from the two facilities, F1 and F2 will exceed the Title V major source threshold of 100 tons per year after startup. This means that the site will be subject to the Title V permitting program.

Valdosta, located in Lowndes County is in attainment of the National Ambient Air Quality Standards (NAAQS).[2]

1.1 Request for Permitting

Arglass requests the following for an air permit:

- A State Implementation Plan (SIP) NSR Minor Source Permit that allows for a new facility that produces container glass collocated at the F1 Facility site.
- The SIP permit requested will be a single permit shared by the F1 facility.
- Expedited Permitting is requested. An online pre-permitting meeting was held on June 23, 2023
- Contained in this application is an update of the maximum air emissions at the F1 Facility per the GA EPD's request during the pre-permitting online conference call.
- The permit is to be drafted in the name of Arglass Yamamura, LLC, the Arglass Yamamura SE, LLC and Arglass F-V2, LLC's parent company.

1.2 Overview of Application

An outline of the contents of this permit application follows:

- Section 1 includes an introduction and application overview.
- Section 2 describes the facility and emission units required for this production.
- Section 3 describes the regulated air pollutants anticipated Potential to Emit (PTE). The method used to quantify these air emissions are also described.

[2] https://www3.epa.gov/airquality/greenbook/phistory_ga.html

- Section 4 describes the regulatory analysis for applicable and potentially applicable, yet non-applicable requirements.
- Section 5 contains an air toxics analysis.
- Appendix A includes a simplified process flow diagram and site location.
- Appendix B includes completed Georgia Environmental Protection Department (GA EPD) permit application forms.
- Appendix C includes a summary of PTE.
- Appendix D contains the emergency generator engine specifications.

2. FACILITY DESCRIPTION

Arglass is planning a project to construct a new glass manufacturing facility at the F1 Facility in Valdosta, Georgia. Arglass must commence construction of equipment, such as the glass melting furnace by November 2023 to ensure furnace startup by February 2025. This section provides a description of the glassmaking process and technical information for the air emission sources planned for the F2 Facility.

2.1 GLASSMAKING PROCESS OVERVIEW

Generally, glass manufacturing consists of three processes:

- Raw material handling and batch preparation;
- Hot end processing; and
- Cold end processing, packaging, and storage.

A simplified process flow diagram is provided as Figure A-1. These processes are briefly described as follows:

- Raw Material Handling and Batch Preparation (Batch House):

  Raw materials (sand, limestone, soda ash, and other solid mineral products) are delivered to the facility by rail car and by truck and unloaded in bulk into a bucket elevator or with a pneumatic transport system that transfers the different raw materials into storage silos. Crushed waste glass (cullet) is also stored as a raw material. The materials are weighed and blended to make a "batch" for transfer to the glass-melting furnace.

- Hot End Processing:

  The batch prepared in the Batch House is conveyed to the furnace for melting. The furnace melts the materials into molten glass, which is cooled to forming temperatures in the refiner, alcoves, and forehearth.

  The glass product passes through a hot end coating hood, where a coating is applied for surface preparation. The purpose of the application is so that the cold end coating that is applied at the tail end of the process properly adheres to the surface of the finished product.

  The coated glass is conveyed on a belt to an annealing oven, commonly referred to as a lehr, to remove residual stresses caused by the forming process and to prevent cracks by allowing the glass to cool evenly and gradually.

- Cold End Processing:

  A spray coater applies a low emission dispersion wax, which makes the glass slippery to prevent scratches and to prevent products from sticking together as they are conveyed for inspection and packaging.

2.2 Sources of Air Emissions

The emission sources associated with the new F2 Facility include:

- Material handling equipment supporting the Batch House;

- One (1) 495 metric-ton per day (546 short-ton per day) regenerative glass melting furnace with distributor and four (4) natural gas fired forehearths with a coloring system;
- Four (4) hot end coating systems;
- Four (4) mold preheating units;
- Four (4) natural gas fired annealing lehrs;
- Four (4) cold end coating systems;
- Two (2) compression ignition emergency generators; and
- Two (2) process water cooling units (one for standby purposes) and five (5) cooling towers (one for standby purposes).

The following sections provide technical descriptions and the basis for potential emissions from the equipment listed.

2.2.1 Batch House: Raw Material Handling and Batch Preparation

Material handling equipment associated with the batch house includes three (3) raw material truck unloading stations, three (3) raw material rail unloading station, fifteen (15) raw material storage silos, four (4) batch weighting systems, two (2) batch mixing systems, one (1) batch transport system, one (1) cullet hopper and crusher, and two (2) cullet silos.

The batch house equipment is listed in SIP Form 200 as follows and is identified in Table 2-1.

Table 2-1 Batch House Emission Unit IDs

Emission Unit ID	Description
TC04	Truck Unloading Station 4
TC05	Truck Unloading Station 5
TC06	Truck Unloading Station 6
RL04	Rail Unloading Station 4
RL05	Rail Unloading Station 5
RL06	Rail Unloading Station 6
SL18	Raw Material Silo 18
SL19	Raw Material Silo 19
SL20	Raw Material Silo 20
SL21	Raw Material Silo 21
SL22	Raw Material Silo 22
SL23	Raw Material Silo 23
S24	Raw Material Silo 24
SL25	Raw Material Silo 25
SL26	Raw Material Silo 26
SL27	Raw Material Silo 27

Emission Unit ID	Description
SL28	Raw Material Silo 28
SL29	Raw Material Silo 29
SL30	Raw Material Silo 30
SL31	Raw Material Silo 31
SL32	Raw Material Silo 32
WG05	Batch Weighting System 5
WG06	Batch Weighting System 6
WG07	Batch Weighting System 7
WG08	Batch Weighting System 8
MX03	Batch Mixing System 3
MX04	Batch Mixing System 4
TR02	Batch Transport System
CR02	Cullet hopper/Crusher
SL33	Cullet Silo 33
SL34	Cullet Silo 34

Equipment associated with raw material unloading, storage and batch preparation will vent to individual filters. These filters are an integral part of the silo and are not air pollution control devices because they prevent product from being released from the silo during filling.

2.2.2 Regenerative Glass-Melting Furnace

Arglass proposes to construct a new 495 metric-ton per day (546 short-ton per day) glass melting furnace. The new furnace will have a maximum gross heat input of 98.9 million Btu per hour (MMBtu/hr). The furnace will burn natural gas. Additionally, the furnace will use a transformer to achieve an 8,000 kVA electric boost as a supplementary heating system to increase the melting capacity of the furnace and improve glass quality.

Electrical boosting will be utilized to help melt the glass, as glass is an electrical conductor at high temperatures. Electric boosting increases the production rate of the furnace by placement of electrodes that apply extra energy directly into the glass bath in areas of the furnace that are difficult to heat using gas. The method improves convection currents in the melt, enabling increased pull rates and improved glass quality. Electric boosting lowers nitrogen oxides (NOx) emissions by offsetting fuel energy consumption by electrical energy. Further, it reduces particulate matter (PM) emissions since the electrodes heat the glass from within rather than above the molten glass surface due to volatilization of materials in the melt that combine with the supernatant gases and form condensates.

Backup No.2 Fuel Oil will be used during interruption of natural gas service (a malfunction scenario) for maintaining furnace temperatures high enough to keep the molten glass from solidifying and allow the furnace to come back to operating temperature relatively expeditiously. Arglass estimates that the maximum No.2 Fuel usage is equivalent that consumed for 160 hours per year at design capacity. During this malfunction scenario, molten glass will continue to flow at a slower rate (at a maximum of 150 tons per day) and the maximum heat input capacity will be 29.7 MMBtu/hr.

The glass melting furnace is listed in SIP Form 2.00 as GF02.

2.2.2.1 Furnace Ceramic Filter Air Pollution Control Device

The furnace exhaust will pass through an add-on air pollution control device. The air pollution control device will be a candle style ceramic filter for particulate matter. The ceramic material will be impregnated with catalyst material for removing acid gases such as NOx, sulfur dioxide (SO2), hydrogen chloride (HCl) and hydrogen fluoride (HF). The inlet temperature to the air pollution control device is anticipated to vary between 300 and 400°C (570 and 750 °F). Technical descriptions of the furnace control technologies for SO2 and other acid gases are discussed below. This refers to dry sorbent injection and ammonia (or urea) injection. This air pollution control device system is listed as CF02 in SIP Form 3.00.

At this point in project design, an Electrostatic Precipitator (ESP) is still under consideration for use as for PM air pollution control. The ESP is further discussed in Section 2.2.2.2.

In addition to PM abatement, the system will have a sorbent injection system that spray dry alkaline media into the duct upstream of the ceramic filter to control furnace SO2 air emissions. The dry media will adhere to the inside surface of the filter and form an alkaline layer that the furnace exhaust gases will have to penetrate as they pass through the filter. The contact of the media with the gases neutralizes the SO2 including other acid gases such as HCl and HF.

Ammonia injection will be for selective catalyst reduction of NOx. The catalyst imbedded in the ceramic filter. The ammonia in the presence of the catalyst chemically reduces NOx to nitrogen gas and oxygen gas.

Air Pollution Control Devices Continuous Compliance

Particulate Matter

Daily pressure drop measurement can be made across a single point location upstream of the ceramic filters and another point downstream of the filters. Pressure drop shall be recorded continuously. The continuous monitoring system shall be maintained and calibrated periodically.

Sulfur Dioxide

An operating limit for SO2 abatement can be established during an initial performance test in where the sorbent media setting can be recorded during the performance test. The sorbent media setting will establish the operating limit for continuous compliance purposes. Daily checks on the operating setting will be recorded.

Nitrogen Oxides

In anticipation of the applicability of the Title V Compliance Assurance Monitoring in 40 CFR 64, Arglass is proposing the use of a Continuous Emission Monitoring System for NOx emissions. Anticipated monitoring will be the outlet NOx concentration, NH3/NOx ratio, catalyst bed inlet temperature, and the catalyst activity.

2.2.2.2 Alternative Furnace Electrostatic Precipitator Air Pollution Control Device

PM control is still under evaluation although the primary choice is the ceramic filter. An alternative to the ceramic filter is under consideration and that is a dry ESP. In this case a Selective Catalyst Reduction (SCR) unit will be used for NOx control with ammonia injected upstream of the SCR unit. An alkaline dry sorbent injection will also be injected into the duct to assist in neutralizing the acid gases, primarily SO2, HCl and HF. This air pollution control device system is listed as ESP2 in SIP Form 3.00.

2.2.3 Forehearths

Following the furnace and distributor, molten glass will be cooled to forming temperatures in the four (4) natural gas-fired forehearths, each with a maximum heat input of 6.825 MMBtu/hr (total of 27.3 MMBtu/hr).

Arglass is considering the use of backup Liquid Petroleum Gas (LPG) during natural gas service interruption to maintain forehearths' temperatures high enough to keep the molten glass from solidifying. Arglass estimates that the maximum backup LPG usage to be equivalent to 160 hours per year at design burner capacity. The backup LPG fuelling scenario is considered a malfunction. In this scenario, glass will continue to flow at a maximum rate of 150 tons per day from the four forehearths. This glass pull rate will also aid in keeping the molten glass from solidifying.

The forehearths are listed in SIP Form 2.00 as FH02.

2.2.4 Hot End Coaters

Four (4) Hot End Coaters will be used. The Hot End Coaters apply a material on the glass while it is hot. The material coated primes the surface for the Cold End coating to adhere to the cooled glass surface. Each Hot End Coaters applies the material at a rate of 1.5 pounds per hour.

The Hot End Coaters are listed in SIP Form 2.00 as HE02.

2.2.5 Mold Preheaters

Four (4) Mold Preheaters, each with a maximum heat input capacity of 0.51175 MMBtu/hr (a total of 2.047 MMBtu/hr), will be used. The glass is introduced to the molds to form the glass into the shape of a bottle or jar. The molds are preheated so that the hot glass encountering the surface of the cooler mold does not fracture the glass.

The Mold Preheaters are listed in SIP Form 2.00 as MP02.

2.2.6 Annealing Lehrs

Four (4) natural gas-fired annealing lehrs, each with a maximum heat input of 2.3885 MMBtu/hr (total 9.554 MMBtu/hr), will be used to remove residual stresses on products caused by the forming process and to prevent cracks by allowing the products to cool evenly and gradually.

The annealing lehrs are listed in SIP Form 2.00 as LE02.

2.2.7 Cold End Coating Units

Four (4) Cold End spray coaters apply a low emission dispersion wax, which makes the glass slippery to prevent scratches and to prevent products from sticking together as they are conveyed for inspection and packaging. Each coater will dispense the wax at a rate of 2 gallons per hour.

The Cold End coating units are listed in SIP Form 2.00 as CE02.

2.2.8 Emergency Generators

Two (2) identical 1,000 kilowatts (kW) or 1,838 Brake-Horsepower (bhp) compression ignition emergency generators will provide backup power to the facility. The heat input capacity from each engine is 10.666 MMBtu per hour. Engine specifications have been supplied in Appendix D.

The emergency generators are listed in SIP Form 2.00 as EM04 and EM05.

2.2.9 Process Water Cooling and Cooling Towers

Two sets of cooling systems will be used at the F2 Facility. The first is a set of open-circuit cooling towers used for process water cooling and the second consists of closed-circuit cooling towers.

Two open-circuit cooling towers will be placed at the facility for process water cooling. One will be used as a standby unit. So, only one will operate at a time. These cooling towers will each operate at a circulation rate of 1,629 gallons per minutes (gal/min).

Five closed-circuit cooling towers will be placed at the facility. One will be used as a standby unit. So, four will be in operation. These cooling towers will each operate at a circulation rate of 859 gal/min with a total of 3,436 gal/min.

The cooling towers are listed in SIP Form 2.00 as CTA2.

3. PROJECT EMISSIONS ESTIMATES

Potential air pollutant emissions from the proposed facility were evaluated to assess applicability to state and federal regulations and to ensure the project will meet the applicable regulatory limits. Supporting emissions calculations that correspond to each emission unit are provided in this section operating at 8760 hours per year.

3.1 Emissions per Regulated Air Pollutant

3.1.1 Criteria Pollutants

Potential emissions from the facility emission sources were estimated using various calculation methodologies including vendor data, emission factors from USEPA's Compilation of Air Pollutant Emission Factors (AP-42) publication, material balances, and/or engineering calculations. A summary of facility-wide criteria pollutant emissions is provided in Appendix C. Based on the calculated emissions for all emission sources, the project is a NSR minor source and a Title V major source of criteria pollutant emissions.

3.1.2 Hazardous Air Pollutants

HAP emissions resulting from the glass manufacturing process are primarily based on furnace vendor data, and from combustion of natural gas and No. 2 Fuel Oil are based on EPA emission factors. A summary of facility-wide HAP emissions is provided in Appendix C. Based on the calculated emissions for all emission sources, the project and the site are not a major source of HAP.

3.1.3 Greenhouse Gases

Potential Greenhouse Gases (GHG) emissions (i.e., carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O)] were estimated for the sources associated with this project. The emission factors and methodology were obtained from USEPA's Mandatory Greenhouse Gas Reporting Rule in 40 CFR 98. GHG emissions on an individual and CO2 equivalent (CO2e) basis are summarized in Table Appendix C. In 40 CFR 98, USEPA defines CO2e emissions to be equivalent to CO2 emissions plus 25 times the CH4 emissions plus 298 times the N2O emissions, utilizing the applicable Global Warming Potentials (GWP) for CH4 and N2O.

3.2 Emissions per Emission Unit

3.2.1 Batch House

PM have a conservative filter emission rate of 0.044 grains per dry standard cubic foot. Each rail car unloading station; truck unloading station; silo; weighing station; mixing station; cullet hopper-crusher; and transport system is equipped with a filter. The maximum flow rate from each of the filters was quantified to be 1,177 cubic feet per minute. Operation of these emission units is assumed to occur at a rate of 8,760 hours per year. A PM emission rate can be calculated from these values. These air emission calculations are summarized in Appendix C.

3.2.2 Furnace

Emissions from the new furnace for the criteria pollutants, HCl, HF, and some HAP glass manufacturing metal compounds of arsenic, cadmium, chromium, lead, manganese and nickel were calculated using the potential annual glass pull rate. Emission from the furnace for other HAP and GHG were calculated using the natural gas design usage rate.

The source of the controlled emission factors used for the potential to emit for the furnace are provided in Appendix C of this permit application. Criteria pollutants, HAP and GHG emissions were calculated using the following:

- AP-42 emission factors for criteria pollutants and HAP in Section 1.4; and
- 40 CFR 98 Subparts A and C for GHG emissions

For the malfunction scenario in where natural gas interruption occurs, emissions from No.2 fuel combustion at maximum design capacity for a period of 160 hours per year was used to calculate the potential for air emissions. Emission factors from Section 1.3 of AP-42 for criteria pollutants and HAP were used in this scenario and 40 CFR 98 Subparts A and C for GHG. These emissions were assumed to be uncontrolled. Production will cease during this malfunction scenario.

The PTE for the furnace in Appendix C was calculated by adding 160 hours of emissions from the malfunction scenario above to 8,760 hours of normal operation emissions for a total of 8,920 operating hours per year. Even this is impossible occurrence, it is a simple accounting of emission and conservative.

3.2.3 Forehearths

Emissions from the forehearths were based on the heat input capacity of the four forehearth heating systems of 27.3 MMBtu/hr. Criteria pollutants, HAP and GHG emissions were calculated using the following:

- AP-42 emission factors for criteria pollutants and HAP in Section 1.4; and
- 40 CFR 98 Subparts A and C for GHG emissions

For the malfunction scenario in where natural gas interruption occurs, emissions from LPG combustion at maximum design capacity for a period of 160 hours per year was used to calculate the potential for air emissions. Emission factors from Section 1.3 of AP-42 for criteria pollutants and HAP were used in this scenario and 40 CFR 98 Subparts A and C for GHG. These emissions were assumed to be uncontrolled. Production will cease during this malfunction scenario.

The PTE for the furnace in Appendix C was calculated by adding 160 hours of emissions from the malfunction scenario above to 8,760 hours of normal operation emissions for a total of 8,920 operating hours per year. Even this is impossible occurrence, it is a simple accounting of emission and conservative.

3.2.4 Hot End Coaters

VOC emissions from the Hot End Coating hoods were based on the maximum coating rates of 1.5 pounds from each coater. A total of 6 pounds per hour of coating material can be applied at the four Hot End Coaters. The air emissions are based on a mass balance calculation. VOC content is assumed to be 100% volatilized. This means the VOC material content of 0.671 percent is assumed to be 100 percent volatilized.

3.2.5 Mold Preheaters

Emissions from the four Mold Preheaters were calculated using the design total heat input capacity of 2.047 MMBtu per hour firing natural gas and AP-42 emission factors from Section 1.4.

3.2.6 Lehrs

Emissions from the annealing lehrs were calculated using the maximum heat input capacity of 9.554 MMBtu per hour firing natural gas and AP-42 emission factors from Section 1.4. The average operating rate is expected to be 5,732 MMBtu per hour.

3.2.7 Cold End Coaters

VOC emissions from the Cold End Coating dispensers were based on the maximum coating rates of 2 gallons from each coater. The air emissions are based on a mass balance calculation. VOC content is assumed to be 100 percent volatilized.

3.2.8 Emergency Engines

Emissions from the emergency generator engines were calculated using emission factors from the vendor and Section 3.4 of AP-42 for SO2 and total HAP, provided in Appendix C. With the emission factors, the following was used to calculate the potential emissions.

- The potential operating schedule for emergency engines used was 500 hours of operation per year for each generator in accordance with USEPA guidance;[3]
- The emission factor for SO2 required a sulfur (S) content. A maximum S content of 15 ppm was used in accordance with 40 CFR §60.4207 and 40 CFR §1090.305(b).

3.2.9 Process Water Cooling and Water Cooling Towers

The emissions associated with the set of two process water-cooling towers and the set of four water-cooling towers are calculated in the same manner. Emissions from the standby unit are zero because they will not operate unless a normal operating one is taken offline. The water-cooling towers are a potential source of PM resulting primarily from natural dissolved solids in the make-up water. Trace VOC emissions potentially occur from water treatment chemicals (if any). Emissions from the cooling towers were calculated using the following:

- Circulating Water Flow Rate provided in Appendix C;
- The drift rate was calculated in accordance with AP-42 Table 13.4-1; and
- Average estimated solid/VOC concentration in water (Assumed 3000 ppm/100 ppm).

[3] John S. Seitz, “Calculating Potential to Emit (PTE) for Emergency Generators,” USEPA Office of Air Quality Planning and Standards (MD-10) Memorandum, September 6, 1995.

4. REGULATORY REQUIREMENTS

A summary of the applicability of federal and state air quality regulations related to the F2 Facility, is presented below. The facility is in Valdosta, Georgia in Lowndes County, which is in attainment for NAAQS pollutants.

The following regulatory requirements addressed in this summary include Prevention of Significant Deterioration (PSD) and Title V Permitting, New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants, and (NESHAP), and State of Georgia Rules for Air Quality Control in Chapter 391-3-1.

4.1 Prevention Of Significant Deterioration (PSD) And Title V Major Source

As presented in Appendix C, the combined F1 and F2 facilities will be a minor NSR source of air emissions for each of the criteria pollutants; however, a major source for the Title V program. Therefore, PSD permitting and accounting requirements do not apply, yet Title V permitting requirements will apply. The F2 facility HAP emissions are an area source. Therefore, Section 112(g) of the Clean Air Act permitting program will not apply to the F2 facility.

4.2 New Source Performance Standards

4.2.1 Standards Of Performance for Glass Manufacturing Plants (40 CFR 60 Subpart CC)

Glass furnaces constructed or modified after June 15, 1979, excluding certain small glass melting furnaces and all-electric melters, are subject to the Standards of Performance for Glass Manufacturing Plants in 40 CFR 60, Subpart CC. Based on the glass melting furnace's anticipated 2023 construction commencement date, the proposed furnace will be subject to the particulate emission standards set forth in this subpart.

The F2 Facility furnace is subject to the PM emission standards in 40 CFR §60.292(a)1 (Table CC-1).

- The emission limit in the standard is 0.1 gram of PM per kilogram (g/kg) or 0.2 pounds PM per ton (lb/ton) of glass produced because the furnace manufactures glass for containers and either gaseous fuel or liquid fuel will be used. A mixture of the two fuels will not be used.
- The emission limit in the standard is 0.13 g PM/kg of glass production (or 0.26 lb PM/ton of glass produced) while firing No. 2 Fuel Oil during the natural gas interruption malfunction scenario.

The proposed PM emission limit for the new furnace is based on 0.2 lb/ton of glass produced while using the primary fuel of natural gas. The furnace will comply with the standard through use of candle-shaped ceramic filters or the alternative use of a dry ESP. Compliance will be demonstrated through a source test for particulate matter (USEPA Method 5). Records of the glass production rate will have to be monitored during source testing.

Arglass will comply with the 40 CFR 60 Subpart CC PM standard through the use of the ceramic filter or alternatively, through the use of the ESP.

In accordance with 40 CFR §60.292(e), compliance with the emission limits is exempt during routine maintenance of add-on air pollution control device if:

1. Routine maintenance in each calendar year does not exceed 6 days;
2. Good air pollution control practices are performed to minimize emissions during the maintenance period; and
3. A report is submitted to GA EPD 10 days before the start of the routine maintenance (if 10 days cannot be provided, the report must be submitted as soon as practicable) and the report contains an explanation of the schedule of the maintenance.

4.2.2 Standards Of Performance for Stationary Compression Ignition Internal Combustion Engines (40 CFR 60 Subpart IIII)

The two-1,371 mechanical kW (1,838 bhp) diesel-fired emergency generator engines will be subject to 40 CFR 60, Subpart IIII. These two engines are Tier II-certified with specifications provided in Appendix D. Further technical information is provided in the engine specifications in Appendix D. In accordance with 40 CFR 60.4205(b), Arglass will comply with Subpart IIII by installing emergency generators equipped with model year 2007 or later engines that are certified to meet the emission standards for CI engines listed in 40 CFR part 1039, appendix I and the smoke standards as specified in 40 CFR 1039.105.

4.3 National Emission Standards for Hazardous Air Pollutants

USEPA NESHAP program is to control source categories believed to emit HAP with impacts on the environment. The F1 and F2 facility air emissions will be less than the major source thresholds for HAP. The major source thresholds for HAP are an annual emission rate that equals or exceeds 10 ton/yr of any single HAP or any combination of HAP that equals or exceeds 25 ton/yr. A non-major source is identified as an area source. The Arglass site (F1 Facility and F2 Facility operations) is an area source of HAP.

4.3.1 National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (40 CFR 63 Subpart ZZZZ)

The F2 Facility will be subject to this standard because it will be an owner and operator of two stationary reciprocating internal combustion engines (RICE) used to power an emergency generator as provided in 40 CFR §63.6585. Requirements for this standard are similar to the ones in 40 CFR 60 Subpart IIII.

4.3.2 National Emission Standards for Hazardous Air Pollutants for Glass Manufacturing Area Sources (40 CFR 63 Subpart SSSSSS)

This NESHAP standard applies to manufactures flat glass, glass containers, or pressed and blown glass by melting a mixture of raw materials, as defined in §63.11459, to produce molten glass and form the molten glass into sheets, containers, or other shapes. Intentional use of glass manufacturing metal HAP (oxides or compounds of arsenic, cadmium, chromium, lead, manganese, and nickel) in the glass manufacturing raw materials triggers this NESHAP applicability. Cullet and material that is recovered from a furnace control device for recycling into the glass formulation are not considered raw materials for the purposes of this NESHAP. Currently, there are no plans for use of glass manufacturing of metal HAP. In the even that such plans become desirable the proper notifications will be made. The NESHAP standard requires an initial notification be made to GA EPD 120 days after such material is used in accordance with 40 CFR §63.11456(a)(1).

This standard does not apply to the F2 Facility Glass-Melting Furnace.

4.4 Georgia State Regulation Requirements

- 391-3-1-.02(2)(b) - Visible Emissions

  This rule limits opacity to less than forty (40) percent for emission sources exhausting through stacks or similar structures. The proposed emissions sources will comply with this rule.

- 391-3-1-.02(2)(e) - Particulate Emission from Manufacturing Processes

  Georgia Air Quality Rule 391-3-1-.02(2)(e) states that no person shall cause, let, suffer, permit, or allow emissions of particulate matter from equipment in quantities equal to or exceeding the allowable rate specified by the equation;

E = 4.1P0.67

where: E = Emissions in pounds per hour

P = Process input weight rate in tons per hour.

The facility will maintain compliance with the limits set forth in this rule by monitoring process throughput and parametric monitoring of control devices, as applicable.

- 391-3-1-.02(2)(g) – Sulfur Dioxide

  Georgia Air Quality Rule 391-3-1-.02(2)(g) states that all fuel-burning sources below 100 MMBtu/hr heat input shall not burn fuel containing more than 2.5 % sulfur by weight. The facility will comply with this requirement by burning only compliant fuels, pipeline quality natural gas ultra-low sulfur diesel (ULSD), and liquefied petroleum gas (LPG). The diesel-fired emergency generator engines subject to 40 CFR 60 Subpart IIII are required to fire ULSD.

- 391-3-1-.03(1) – Source Activities subject to Construction SIP permitting

  Source activities subject to construction SIP permitting in accordance with Georgia Air Quality Rule 391-3-1-.03(1) include the following emission units:

  - Batch house sources consisting of raw material storage and handling equipment that vents to individual dust collection systems.
  - Natural Gas fired Regenerative Glass-Melting Furnace with No. 2 Fuel backup.
  - Forehearths
  - Annealing Lehrs
  - Two Emergency Generator Engines

- 391-3-1-.03(6) – Source Activities Exempt from SIP permitting

  Georgia Air Quality Rule 391-3-1-.03(6) lists specific criteria for source activities not subject to SIP permitting. Specific to the new Arglass facility, the following equipment is categorically exempt from Construction NSR SIP permitting.

  - Pursuant to Rule 391-3-1-.03(6)(b)11 the two (2) emergency generators are exempt from SIP permitting because they are stationary engines burning commercial fuel and used exclusively as emergency generators. This qualifies for an exemption even though 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ apply.

5. AIR TOXICS ANALYSIS

Georgia Rule for Air Quality 391-3-1-.02(2)(a)3.(ii) requires that sources of air emissions safeguard the public health, safety and welfare of the people of the State of Georgia. Georgia's air toxics program that was established pursuant to this rule requires applicants to evaluate the potential ambient air concentrations of specific compounds identified as toxic air pollutants (TAP). This is done using air dispersion modeling methods and comparing maximum predicted ambient air concentrations to the Allowable Ambient Concentration (AAC) as provided by the GA EPD in Appendix A of "Georgia Guideline for Ambient Impact Assessment of TAP" (GA EPD May 2017, Appendix A updated October 2018). An air dispersion model incorporates the source-specific parameters such as stack height, exit temperature, flow rate, and spatial location with meteorological conditions and building geometry to approximate the dispersion characteristics of an exhaust plume across a study area. The air modeling procedures for this assessment are outlined in "Georgia Guideline for Ambient Impact Assessment of TAP" (GA EPD May 2017).

This permit application conducted the assessment for the facility's TAP emissions including the proposed new equipment in accordance with GA EPD Guidance.[4]. Prior to conducting an air modeling analysis for TAP, it is necessary to first evaluate whether the emission rates exceed the Minimum Emission Rate (MER), which are *deminimis* emission rates below which a dispersion modeling demonstration is not required. A summary of TAP emission rates compared with the MER is given in Table 5-1, indicating that emissions of hydrogen chloride (HCl), hydrogen fluoride (HF), lead (Pb), and selenium (Se) require further evaluation using dispersion modeling methods. Facility-wide potential emissions of HCl, HF, Pb and Se were modeled, accordingly, to demonstrate that the AAC thresholds will be preserved. This section provides the detailed description for the analysis and results.

Table 5-1: Air Toxics Modeling Requirement Summary

TAP		Potential Emission Rate (lb/yr)	Minimum Emission Rate (MER) (lb/yr)	Modeling Required (yes/no)
7664-41-7	Ammonia	2,900	24,300	No
7647-01-0	Hydrogen Chloride	10,500	4,870	Yes
7664-39-3	Hydrogen Fluoride	9,305	284	Yes
7439-92-1	Lead	1,060	5.84	Yes
7782-49-2	Selenium	1,060	23.4	Yes

5.1 Model Selection

For the purposes of this dispersion modeling analysis, the USEPA regulatory model AERMOD version 22112 was used. AERMOD is the recommended model for air quality analyses per US EPA's Guideline on Air Quality Models (40 CFR Part 51, Appendix W). AERMOD is a steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. Several model options and input parameters are specified to customize the dispersion calculations to best approximate actual aerodynamic conditions at the site. The modeling was performed with AERMOD View commercial software developed by Lakes Environmental. The model options and input parameters used for this analysis project were selected in accordance with GA EPD guidelines and are discussed below.

[4] GUIDELINE FOR AMBIENT IMPACT ASSESSMENT OF TOXIC AIR POLLUTANT EMISSIONS, Revised May 2017

5.2 Model Processing Options

AERMOD model setup options must be specified at the start of the analysis to properly adjust dispersion calculations so that they are representative of actual aerodynamic conditions over the study area. Additionally, AERMOD has several options, some of which are designated “non-default,” that may be appropriate on a case-by-case basis. For this analysis, the “regulatory default” selection of model options was used. The regulatory default options direct AERMOD to use:

- Elevated terrain algorithms requiring input of terrain height data for receptors and emission sources;
- Stack tip downwash (building downwash automatically overrides);
- Calms processing routines;
- Buoyancy-induced dispersion; and
- Missing meteorological data processing routines.

5.3 Project-Specific Parameters

Regional and site-specific model inputs such as meteorological data, surrounding terrain conditions, building influences, and emission source characteristics each must be evaluated and appropriately selected in preparation of running AERMOD. The AERMOD Modeling System includes preprocessor programs AERSURFACE, AERMET, and AERMAP to develop the required input parameters representing meteorological conditions and the terrain elevations across the study area. Procedures for developing the project-specific data for the purposes of this analysis are described below.

5.3.1 Dispersion Coefficients

The AERMOD dispersion model can account for differences in air dispersion influences that are attributed to the land use in the study area as being characteristically urban or rural. The appropriate dispersion coefficients for taking land use into account are determined using the USEPA-preferred land use classification technique in 40 CFR 51, Appendix W, known as the “Auer” method. This classification method involves assessing land use for Auer’s categories within a three (3) kilometer radius of the site. USEPA recommends using urban dispersion coefficients and mixing heights if greater than 50 percent of the area is considered urban; otherwise, rural coefficients and mixing heights apply. Based on a review of land use in the vicinity of the site using USGS surface data and by inspecting aerial imagery, the “rural” dispersion option was used for this analysis.

5.3.2 Meteorological Data

GAEPD provides representative meteorological data to simulate atmospheric conditions in the vicinity of the emission sources on its website. Arglass is located in Lowndes County; therefore, the meteorological data set with surface data from Valdosta Regional Airport (Call ID KVLD) located approximately 3.5 miles to the east of the site was used with upper air observations from Tallahassee Regional Airport, Florida (Call ID KTLH). The most recent meteorological data period available is 2017-2021.

5.3.3 Surface Characteristics

Meteorological data available from GA EPD is provided with surface terrain characteristic already processed. Values for the albedo and Bowen ratio were determined by GA EPD for a given area and incorporated in the meteorological data files. Therefore, for this analysis, executing AERMET and AERSURFACE was not necessary.

5.3.4 Receptors

A tiered Cartesian grid of receptors in the near-field grid was set using 100-meter spacing out to 1.5 km from the facility, then 200-meter spacing out to 3 km from the facility, and 300-meter spacing out to 7.5 km from the facility. A separate system of receptors was set along the property boundary, with a spacing frequency of 25 meters or less. All receptor coordinates were referenced using the NAD83 datum (zone 17). Elevations were assigned to each receptor using the US EPA's AERMAP utility, which extracts elevations from the United States Geological Survey (USGS) National Elevation Dataset (NED) data available for the area. In this evaluation, the 1/3 degree (approximately 10 m) resolution data in GeoTIFF format was used.

5.3.5 Good Engineering Practice and Stack Height Downwash

Section 123 of the Clean Air Act, as amended, required the USEPA to promulgate regulations to assure that the degree of emission limitation required for the control of any air pollutant under an applicable SIP is not affected by that portion of any stack height which exceeds Good Engineering Practice (GEP) or by any other dispersion technique.

The formula for GEP stack height is given as:

$$H_{GEP} = H_B + 1.5L_B$$

where:

- H_{GEP} = formula GEP stack height;
- H_B = the building's height above stack base; and
- L_B = the lesser of the building's height or maximum projected width.

If a stack height is greater than 65 meters, the modeled height of the stack cannot exceed the GEP formula height. None of the existing or proposed stack heights exceed the minimum GEP height of 65 meters so the actual height was used in the modeling. However, the potential for downwash effects must be evaluated and incorporated in the model since the stacks are also less than 2.5 times the height of the Arglass buildings. The modeled stack heights do not exceed the 65-meter threshold for using the GEP formula height.

To include the potential influence that buildings may have on the dispersion of pollutants from the stack, the USEPA Building Profile Input Program "PRIME" version (BPIPPRM) was used. BPIPPRM requires a geo-referenced depiction of the facility's buildings, stacks, and other nearby structures which may influence dispersion. The position and height of buildings relative to the stack positions must be evaluated to determine how it will influence dispersion for each wind direction. The BPIPPRM utility produces the necessary direction-specific dimensions that are subsequently used by AERMOD to account for building wake effects. UTM coordinates for the stacks and the Arglass buildings including the proposed new structures were identified using a geo-referenced mapping utility.

5.3.6 Source Input Data

When setting up the AERMOD model, it is necessary to identify and input the emission source locations, dimensions, and exhaust parameters to best capture the actual site conditions that directly influence exhaust plume formation and dispersion patterns predicted by the model. For point sources (i.e., stacks), these data include stack coordinates, height, diameter, exit temperature, and exit flow rate. Table 5-2 provides a list of these model input parameters for existing and proposed sources. A plot plan, included in Appendix A, illustrates the locations of the modeled sources.

5.3.7 Model Emission Rates

Emission rates for this analysis are based on the facility's potential to emit for the proposed new and existing sources. Maximum short-term (1-hour, 24-hour) emissions are represented in the model assuming that the maximum short-term emission rate from each operation/source at the facility occurs simultaneously and continuously for the period. Although in practice this condition may be infrequent or impractical, this approach was taken to represent a worst-case short-term emission scenario that, when shown to have results below regulatory thresholds, gives a high level of confidence that human health will be protected. Emission rates used for the short-term modeling analysis are given with the model source parameters in Table 5-2. For the annually averaged AAC (HCl), the maximum potential annual emission rates were modeled.

Table 5-2: Point Source Model Input Parameters

Point Source ID	Description	X	Y	Base Elevation	Release Height	Stack Diameter	Exit Velocity	Exit Temp	HCl	HF	Pb	Se
		(m)	(m)	(m)	(m)	(m)	(m/s)	(K)	(g/s)	(g/s)	(g/s)	(g/s)
ST01	#1 Furnace	275800.59	3409170.03	61.51	39.9	1.2	15.2	622	0.065	0.0955	0.00662	0.00662
ST39	#2 Furnace	275835.84	3409106.8	60.79	39.9	1.8	15.0	622	0.086	0.0383	0.00863	0.00863

5.3.8 Model Results

Table 5-3 presents the maximum modeled concentrations for the 5-year meteorological data set. All modeled maximum concentration results are less than the AAC.

Table 5-3: Toxics Air Dispersion Modeling Results

TAP	Meteorological Data Year	Averaging Period	Maximum Model Concentration (µg/m^3)	AAC (µg/m^3)	% of AAC	UTM Easting	UTM Northing
HCl	2017	15-min	2.18	700	0.3%	275335.19	3409573.00
	2021	Annual	0.0533	20	0.3%	275935.19	3409573.00
HF	2018	15-min	1.97	245	0.8%	275335.19	3409573.00
	2018	24-hour	0.70	5.84	12%	275606.57	3409271.11
Pb	2020	24-hour	0.08	0.12	67%	275615.81	3408621.17
Se	2020	24-hour	0.08	0.48	17%	275615.81	3408621.17

* Per GA EPD guidance, the 1-hour model result is adjusted by a factor of 1.36 to convert to a 15-minute average

Electronic versions of the AERMOD input and output files as well as BPIP-Prime files, AERMAP files, and meteorological data were provided electronically to GA EPD.

APPENDIX A FIGURES

Environmental Resources Management

DESIGN:		DRAWN:	K Scott	CHKD.:	R. Akel
DATE:	7/06/2023	SCALE:	AS SHOWN	REVISION:	0
FILE:					

FIGURE A - 1

STACK LOCATIONS

ARGLASS Yamamura, LLC
VALDOSTA, GA

Legend

- Emission Point
- Property Boundary
- Structure Footprint

ERM

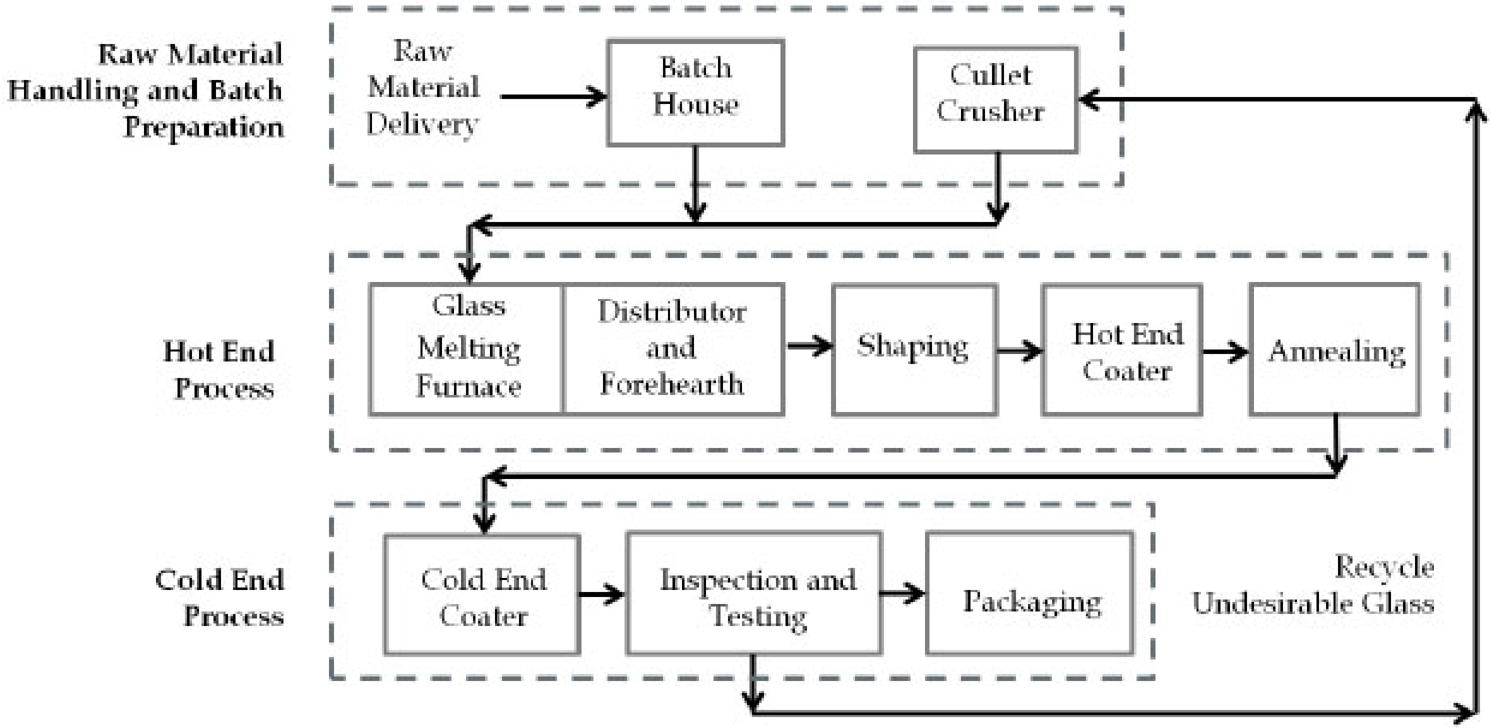

Figure A-2

Arglass VF-2, LLC

Furnace 2 Facility Process Flow Diagram

1 Arglass Road

Valdosta, GA

Environmental Resources Management
www.erm.com

APPENDIX B GA EPD FORMS

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch

Stationary Source Permitting Program
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404/363-7000
Fax: 404/363-7100

SIP AIR PERMIT APPLICATION

EPD Use Only

Date Received: ______________ Application No. ______________

FORM 1.00: GENERAL INFORMATION

1. Facility Information

Facility Name: Arglass Yamamura, LLC

AIRS No. (if known):

Facility Location: Street: 1 Arglass Road

City: Valdosta Georgia Zip: 31601 County: Lowndes

Is this facility a "small business" as defined in the instructions? Yes: ☐ No: ☒

2. Facility Coordinates

Latitude: 30° 47' " **NORTH** Longitude: 83° 20' " **WEST**

UTM Coordinates: 303705 m **EAST** 4314711 m **NORTH** **ZONE** 15S

3. Facility Owner

Name of Owner: Arglass Yamamura, LLC

Owner Address Street: 1 Arglass Road

City: Valdosta State: GA Zip: 31601

4. Permitting Contact and Mailing Address

Contact Person: Jeff Twaddle, P.E., ERM Title: Partner

Telephone No.: (615) 656-4636 Ext. Fax No.:

Email Address: Jeff.Twaddle@erm.com

Mailing Address: Same as: Facility Location: ☐ Owner Address: ☐ Other: ☒

If Other: Street Address: 901 Woodland Street, Suite 104

City: Nashville State: TN Zip: 37206

5. Authorized Official

Name: Jose de Diego-Arozamena Title: Founder and CEO

Address of Official Street: 10 East 22nd Street

City: New York State: NY Zip: 10010

This application is submitted in accordance with the provisions of the Georgia Rules for Air Quality Control and, to the best of my knowledge, is complete and correct.

Signature: [signature] Date: July 7, 2023

6. **Reason for Application: (Check all that apply)**

☐ New Facility (to be constructed)

☐ Existing Facility (initial or modification application)

☒ Permit to Construct

☐ Permit to Operate

☐ Change of Location

☐ Permit to Modify Existing Equipment: Affected Permit No.: ______

☐ Revision of Data Submitted in an Earlier Application

Application No.: ______

Date of Original Submittal: ______

7. **Permitting Exemption Activities (for permitted facilities only):**

Have any exempt modifications based on emission level per Georgia Rule 391-3-1-.03(6)(i)(3) been performed at the facility that have not been previously incorporated in a permit?

☒ **No** ☐ **Yes, please fill out the SIP Exemption Attachment** (See Instructions for the attachment download)

8. **Has assistance been provided to you for any part of this application?**

☐ **No** ☐ **Yes, SBAP** ☒ **Yes, a consultant has been employed or will be employed.**

If yes, please provide the following information:

Name of Consulting Company: Environmental Resource Management

Name of Contact: Jeff Twaddle, P.E.

Telephone No.: (615) 656-4636 Fax No.: ______

Email Address: Jeff.Twadle@erm.com

Mailing Address: Street: 901 Woodland Street, Suite 104

City: Nashville State: TN Zip: 37206

Describe the Consultant's Involvement:

General compliance consulting

9. **Submitted Application Forms:** Select only the necessary forms for the facility application that will be submitted.

No. of Forms	Form
3	2.00 Emission Unit List
1	2.01 Boilers and Fuel Burning Equipment
	2.02 Storage Tank Physical Data
	2.03 Printing Operations
	2.04 Surface Coating Operations
	2.05 Waste Incinerators (solid/liquid waste destruction)
1	2.06 Manufacturing and Operational Data
2	3.00 Air Pollution Control Devices (APCD)
	3.01 Scrubbers
2	3.02 Baghouses & Other Filter Collectors
1	3.03 Electrostatic Precipitators
5	4.00 Emissions Data
1	5.00 Monitoring Information
	6.00 Fugitive Emission Sources
1	7.00 Air Modeling Information

10. **Construction or Modification Date**

Estimated Start Date: November 23, 2023

11. If confidential information is being submitted in this application, were the guidelines followed in the "Procedures for Requesting that Submitted Information be treated as Confidential"?

☒ No ☐ Yes

12. New Facility Emissions Summary

Criteria Pollutant	New Facility (Furnace 2)	
	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)	43.90	
Nitrogen oxides (NOx)	148.61	
Particulate Matter (PM) (filterable only)	34.57	
PM <10 microns (PM10)	54.50	
PM <2.5 microns (PM2.5)	54.50	
Sulfur dioxide (SO_2)	91.49	
Volatile Organic Compounds (VOC)	42.77	
Greenhouse Gases (GHGs) (in CO2e)	107,793	
Ammonia	1.45	
Total Hazardous Air Pollutants (HAPs)	6.20	
Individual HAPs Listed Below:		
Lead	0.30	
HF	1.49	
HCl	2.99	

13. Existing Facility Emissions Summary

Criteria Pollutant	Current Facility (Furnace 1)		After Modification (F1+F2)	
	Potential (tpy)	Actual (tpy)	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)	71.66		115.56	
Nitrogen oxides (NOx)	100.77		249.38	
Particulate Matter (PM) (filterable only)	21.85		56.42	
PM <10 microns (PM10)	30.89		85.40	
PM <2.5 microns (PM2.5)	30.89		85.40	
Sulfur dioxide (SO_2)	95.36		186.85	
Volatile Organic Compounds (VOC)	31.95		74.73	
Greenhouse Gases (GHGs) (in CO2e)	70,007		177,801	
Total Hazardous Air Pollutants (HAPs)	4.57		10.77	
Ammonia	N/A		1.45	
Individual HAPs Listed Below:				
Lead	0.23		0.53	

HF	1.13		2.62	
HCl	2.26		5.25	

14. 4-Digit Facility Identification Code:

SIC Code: 3229 SIC Description: Glass Manufacturing Plant

NAICS Code: ______ NAICS Description: ______

15. Description of general production process and operation for which a permit is being requested. If necessary, attach additional sheets to give an adequate description. Include layout drawings, as necessary, to describe each process. References should be made to source codes used in the application.

See attached narrative

16. Additional information provided in attachments as listed below:

Attachment A - Application Narrative/Process Description

Attachment B - Permit Application Forms

Attachment C - Emission Calculations

Attachment D - Equipment Specifications

Attachment E -

Attachment F -

17. Additional Information: Unless previously submitted, include the following two items:

☐ Plot plan/map of facility location or date of previous submittal:

☐ Flow Diagram or date of previous submittal:

18. Other Environmental Permitting Needs:

Will this facility/modification trigger the need for environmental permits/approvals (other than air) such as Hazardous Waste Generation, Solid Waste Handling, Water withdrawal, water discharge, SWPPP, mining, landfill, etc.?

☐ **No** ☒ **Yes, please list below:**

19. List requested permit limits including synthetic minor (SM) limits.

20. Effective March 1, 2019, permit application fees will be assessed. The fee amount varies based on type of permit application. Application acknowledgement emails will be sent to the current registered fee contact in the GECO system. If fee contacts have changed, please list that below:

Fee Contact name:

Fee Contact email address:

Fee Contact phone number:

Fee invoices will be created through the GECO system shortly after the application is received. It is the applicant's responsibility to access the facility GECO account, generate the fee invoice, and submit payment within 10 days after notification.

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 2.00 – EMISSION UNIT LIST

Emission Unit ID	Name	Manufacturer and Model Number	Description
GF02	Glass Furnace No. 2	Custom Design	98.9 MMBtu/hr Natural Gas Fired Regenerative Glass Furnace
CE02	Cold End Coating Unit	Custom Design	Four (4) Cold End Coating Units
HE02	Hot End Coating Unit	Custom Design	Four (4) Hot End Coating Units
TC04	Truck Unloading Station 4	Custom Design	Raw Material Truck Unloading Station
TC05	Truck Unloading Station 5	Custom Design	Raw Material Truck Unloading Station
TC06	Truck Unloading Station 6	Custom Design	Raw Material Truck Unloading Station
RL04	Rail Unloading Station 4	Custom Design	Raw Material Rail Unloading Station
RL05	Rail Unloading Station 5	Custom Design	Raw Material Rail Unloading Station
RL06	Rail Unloading Station 6	Custom Design	Raw Material Rail Unloading Station
SL18	Raw Material Silo 18	Custom Design	Raw Material Storage Silo
SL19	Raw Material Silo 19	Custom Design	Raw Material Storage Silo
SL20	Raw Material Silo 20	Custom Design	Raw Material Storage Silo
SL21	Raw Material Silo 21	Custom Design	Raw Material Storage Silo
SL22	Raw Material Silo 22	Custom Design	Raw Material Storage Silo
SL23	Raw Material Silo 23	Custom Design	Raw Material Storage Silo
SL24	Raw Material Silo 24	Custom Design	Raw Material Storage Silo
SL25	Raw Material Silo 25	Custom Design	Raw Material Storage Silo
SL26	Raw Material Silo 26	Custom Design	Raw Material Storage Silo
SL27	Raw Material Silo 27	Custom Design	Raw Material Storage Silo

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 2.00 – EMISSION UNIT LIST

Emission Unit ID	Name	Manufacturer and Model Number	Description
SL28	Raw Material Silo 28	Custom Design	Raw Material Storage Silo
SL29	Raw Material Silo 29	Custom Design	Raw Material Storage Silo
SL30	Raw Material Silo 30	Custom Design	Raw Material Storage Silo
SL31	Raw Material Silo 31	Custom Design	Raw Material Storage Silo
SL32	Raw Material Silo 32	Custom Design	Raw Material Storage Silo
WG05	Batch Weighing Sys 5	Custom Design	Pickup Point for Batch Weighing System
WG06	Batch Weighing Sys 6	Custom Design	Pickup Point for Batch Weighing System
WG07	Batch Weighing Sys 7	Custom Design	Pickup Point for Batch Weighing System
WG08	Batch Weighing Sys 8	Custom Design	Pickup Point for Batch Weighing System
MX03	Batch Mixing System 3	Custom Design	Batch Mixer
MX04	Batch Mixing System 4	Custom Design	Batch Mixer
TR02	Batch Transport Sys 2	Custom Design	Pickup Point for Batch Transport
CR02	Cullet Hopper/Crusher 2	Custom Design	Pickup Point for Cullet Hopper and Crusher
SL33	Cullet Silo 3	Custom Design	Storage Silo for Cullet Materials
SL34	Cullet Silo 4	Custom Design	Storage Silo for Cullet Materials
FH02	Forehearths LT14-LT17	Custom Design	Four Natural Gas Forehearths Rated at 27.30 MMBtu/hr Total
LE02	Anealing Lehrs	Custom Design	Natural Gas Annealing Lehrs Rated at 5.732 MMBtu/hr Total
MP02	Mold Preheating	Custom Design	Natural Gas Fired Glass Mold Preheating
CTA2	Cooling Towers	Custom Design	Two 1,057 gpm Process Water and Four 8,277 gpm Cooling Water

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 2.00 – EMISSION UNIT LIST

Emission Unit ID	Name	Manufacturer and Model Number	Description
EM04	Emergency Generator 4	MTU 18V2000G76S or similar	12.354 MMBtu/hr Diesel Emergency Generator
EM05	Emergency Generator 5	MTU 18V2000G76S or similar	12.354 MMBtu/hr Diesel Emergency Generator

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 2.01 – BOILERS AND FUEL BURNING EQUIPMENT

Emission Unit ID	Type of Burner	Type of Draft[1]	Design Capacity of Unit (MMBtu/hr Input)	Percent Excess Air	Dates		Date & Description of Last Modification
					Construction	Installation	
GF02	Direct Flame		98.9				
FH02	Direct Flame		27.30				
LH02	Direct Flame		9.554				
MP02	Direct Flame		2.047				
EM04	Compression Ignition Internal Combustion Engine		12.354				
EM05	Compression Ignition Internal COmbustion Engine		12.354				

[1] This column does not have to be completed for natural gas only fired equipment.

Facility Name: Arglass VF-2, LLC **Date of Application:** July 2023

FUEL DATA

Emission Unit ID	Fuel Type	Potential Annual Consumption				Hourly Consumption		Heat Content		Percent Sulfur		Percent Ash in Solid Fuel	
		Total Quantity		Percent Use by Season									
		Amount	Units	Ozone Season May 1 - Sept 30	Non-ozone Season Oct 1 - Apr 30	Max.	Avg.	Min.	Avg.	Max.	Avg.	Max.	Avg.
GF01	**Natural Gas**	**849.38**	**MMScf**	**50%**	**50%**	**0.097 MMScf/hr**	**0.097 MMScf/hr**		**1,020 MMBtu/MMScf**				
GF01	**Diesel (Backup Only)**	**33,909**	**gal**	**50%**	**50%**	**211.93 gal/hr**			**0.14 MMBtu/gal**		**0.0015**		
FH02	**Natural Gas**	**236.52**	**MMScf**	**50%**	**50%**	**0.027 MMScf/hr**	**0.027 MMScf/hr**		**1,020 MMBtu/MMScf**				
FH02	**LPG (Backup Only)**	**23,040**	**gal**	**50%**	**50%**	**144 gal/hr**			**95,045 Btu/gal**		**0.0185**		
LH02	**Natural Gas**	**78.84**	**MMScf**	**50%**	**50%**	**0.009 MMScf/hr**	**0.006 MMScf/hr**		**1,020 MMBtu/MMScf**				
MP02	**Natural Gas**	**16.70**	**MMScf**	**50%**	**50%**	**0.002 MMScf/hr**	**0.001 MMScf/hr**		**1,020 MMBtu/MMScf**				
EM04	**Diesel**	**43,500**	**gal**	**50%**	**50%**	**87 gal/hr**			**0.14 MMBtu/gal**		**0.0015**		
EM05	**Diesel**	**43,500**	**gal**	**50%**	**50%**	**87 gal/hr**			**0.14 MMBtu/gal**		**0.0015**		

Fuel Supplier Information						
Fuel Type	Name of Supplier	Phone Number	Supplier Location			
			Address	City	State	Zip

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 2.06 – MANUFACTURING AND OPERATIONAL DATA

Normal Operating Schedule: 24 hours/day 7 days/week 365 weeks/yr

Additional Data Attached? ☒ - No ☐ - Yes, please include the attachment in list on Form 1.00, Item 16.

Seasonal and/or Peak Operating Periods: N/A

Dates of Annually Occurring Shutdowns: Continuous Operation

PRODUCTION INPUT FACTORS

Emission Unit ID	Emission Unit Name	Const. Date	Input Raw Material(s)	Annual Input	Hourly Process Input Rate		
					Design	Normal	Maximum
GF02	Glass Furnace No. 2		Limestone	< 36,027 tpy			
GF02	Glass Furnace No. 2		Dolomite	< 12,961 tpy			
GF02	Glass Furnace No. 2		Soda Ash	< 34,050 tpy			
GF02	Glass Furnace No. 2		Cullets	< 48,556 tpy			
GF02	Glass Furnace No. 2		Sand	< 122,236 tpy			
GF02	Glass Furnace No. 2		Feldspar	< 20,373 tpy			
GF02	Glass Furnace No. 2		Sodium Sulfate	< 1,019 tpy			
	Maximum potential input rates, usage depends on glass formula						

PRODUCTS OF MANUFACTURING

Emission Unit ID	Description of Product	Production Schedule		Hourly Production Rate (Give units: e.g. lb/hr, ton/hr)			
		Tons/yr	Hr/yr	Design	Normal	Maximum	Units
GF02	**Glass Products**	**199,290**	**8760**				

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

Form 3.00 – AIR POLLUTION CONTROL DEVICES - PART A: GENERAL EQUIPMENT INFORMATION

APCD Unit ID	Emission Unit ID	APCD Type (Baghouse, ESP, Scrubber etc)	Date Installed	Make & Model Number (Attach Mfg. Specifications & Literature)	Unit Modified from Mfg Specifications?	Gas Temp. °F		Inlet Gas Flow Rate (acfm)
						Inlet	Outlet	
CF02	GF02	Ceramic Filter+ Sorbent Injection + Ammonia						
ESP2 (Alternative Control Device)	GF02	ESP + Sorbent Injection+ Ammonia						
DC32	TC04	Fabric Filter						
DC33	TC05	Fabric Filter						
DC34	TC06	Fabric Filter						
DC35	RL04	Fabric Filter						
DC36	RL05	Fabric Filter						
DC37	RL06	Fabric Filter						
DC38	SL18	Fabric Filter						
DC39	SL19	Fabric Filter						
DC40	SL20	Fabric Filter						
DC41	SL21	Fabric Filter						
DC42	SL22	Fabric Filter						
DC43	SL23	Fabric Filter						
DC44	SL24	Fabric Filter						
DC45	SL25	Fabric Filter						
DC46	SL26	Fabric Filter						

Facility Name: Arglass VF-2, LLC **Date of Application:** July 2023

Form 3.00 – AIR POLLUTION CONTROL DEVICES – PART B: EMISSION INFORMATION

APCD Unit ID	Pollutants Controlled	Percent Control Efficiency		Inlet Stream To APCD		Exit Stream From APCD		Pressure Drop Across Unit (Inches of water)
		Design	Actual	lb/hr	Method of Determination	lb/hr	Method of Determination	
CF02	SO2, PM, NOx, HCl, HF							
ESP2	SO2, NOx, PM, HCl, HF							
DC32	Filterable PM							
DC33	Filterable PM							
DC34	Filterable PM							
DC35	Filterable PM							
DC36	Filterable PM							
DC37	Filterable PM							
DC38	Filterable PM							
DC39	Filterable PM							
DC40	Filterable PM							
DC41	Filterable PM							
DC42	Filterable PM							
DC43	Filterable PM							
DC44	Filterable PM							
DC45	Filterable PM							
DC46	Filterable PM							

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

Form 3.00 – AIR POLLUTION CONTROL DEVICES - PART A: GENERAL EQUIPMENT INFORMATION

APCD Unit ID	Emission Unit ID	APCD Type (Baghouse, ESP, Scrubber etc)	Date Installed	Make & Model Number (Attach Mfg. Specifications & Literature)	Unit Modified from Mfg Specifications?	Gas Temp. °F		Inlet Gas Flow Rate (acfm)
						Inlet	Outlet	
DC47	SL27	Fabric Filter						
DC48	SL28	Fabric Filter						
DC49	SL29	Fabric Filter						
DC50	SL30	Fabric Filter						
DC51	SL31	Fabric Filter						
DC52	SL32	Fabric Filter						
DC53	WG05	Fabric Filter						
DC54	WG06	Fabric Filter						
DC55	WG07	Fabric Filter						
DC56	WG08	Fabric Filter						
DC57	MX03	Fabric Filter						
DC58	MX04	Fabric Filter						
DC59	TR02	Fabric Filter						
DC60	CR02	Fabric Filter						
DC61	SL33	Fabric Filter						
DC62	SL34	Fabric Filter						

Facility Name: Arglass VF-2, LLC **Date of Application:** July 2023

Form 3.00 – AIR POLLUTION CONTROL DEVICES – PART B: EMISSION INFORMATION

APCD Unit ID	Pollutants Controlled	Percent Control Efficiency		Inlet Stream To APCD		Exit Stream From APCD		Pressure Drop Across Unit (Inches of water)
		Design	Actual	lb/hr	Method of Determination	lb/hr	Method of Determination	
DC47	Filterable PM							
DC48	Filterable PM							
DC49	Filterable PM							
DC50	Filterable PM							
DC51	Filterable PM							
DC52	Filterable PM							
DC53	Filterable PM							
DC54	Filterable PM							
DC55	Filterable PM							
DC56	Filterable PM							
DC57	Filterable PM							
DC58	Filterable PM							
DC59	Filterable PM							
DC60	Filterable PM							
DC61	Filterable PM							
DC62	Filterable PM							

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 3.02 – BAGHOUSES & OTHER FILTER COLLECTORS

APCD ID	Filter Surface Area (ft^2)	No. of Bags	Inlet Gas Dew Point Temp. (°F)	Inlet Gas Temp. (°F)	Bag or Filter Material	Pressure Drop (inches of water)	Cleaning Method	Gas Cooling Method	Leak Detection System Type
DC32				Ambient					
DC33				Ambient					
DC34				Ambient					
DC35				Ambient					
DC36				Ambient					
DC37				Ambient					
DC38				Ambient					
DC39				Ambient					
DC40				Ambient					
DC41				Ambient					
DC42				Ambient					
DC43				Ambient					
DC44				Ambient					
DC45				Ambient					
DC46				Ambient					
DC47				Ambient					

Attach a physical description, dimensions and drawings for each baghouse and any additional information available such as particle size, maintenance schedules, monitoring procedures and breakdown/by-pass procedures. Explain how collected material is disposed of or utilized. Include the attachment in the list on Form 1.00 *General Information*, Item 16

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 3.02 – BAGHOUSES & OTHER FILTER COLLECTORS

APCD ID	Filter Surface Area (ft²)	No. of Bags	Inlet Gas Dew Point Temp. (°F)	Inlet Gas Temp. (°F)	Bag or Filter Material	Pressure Drop (inches of water)	Cleaning Method	Gas Cooling Method	Leak Detection System Type
DC48				Ambient					
DC49				Ambient					
DC50				Ambient					
DC51				Ambient					
DC52				Ambient					
DC53				Ambient					
DC54				Ambient					
DC55				Ambient					
DC56				Ambient					
DC57				Ambient					
DC58				Ambient					
DC59				Ambient					
DC60				Ambient					
DC61				Ambient					
DC62				Ambient					
CF02				752					
ESP2				752					

Attach a physical description, dimensions and drawings for each baghouse and any additional information available such as particle size, maintenance schedules, monitoring procedures and breakdown/by-pass procedures. Explain how collected material is disposed of or utilized. Include the attachment in the list on Form 1.00 *General Information*, Item 16

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 3.03 –ELECTROSTATIC PRECIPITATORS

APCD ID	Type of ESP (Wet or Dry)	Field No.	Voltage (Volts)		Current (Amps)		Total Power (kW)	Water Flow Rate[1] e.g. Gal/min, Gal/hr	Inlet Gas Velocity e.g. ft/min, ft/sec	Spark Rate sparks/min
			Primary	Secondary	Primary	Secondary				
ESP2	Dry									

[1] Complete only for wet ESP's.

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 4.00 – EMISSION INFORMATION

Emission Unit ID	Air Pollution Control Device ID	Stack ID	Pollutant Emitted	Emission Rates				
				Hourly Actual Emissions (lb/hr)	Hourly Potential Emissions (lb/hr)	Actual Annual Emission (tpy)	Potential Annual Emission (tpy)	Method of Determination
GF02		ST39	CO		6.82		29.87	Vendor data
GF02	CF02/ESP2	ST39	NOx		27.30		119.57	Vendor data
GF02	CF02/ESP2	ST39	SO2		20.48		89.68	Vendor data
GF02	CF02/ESP2	ST39	Filterable PM		4.55		19.93	NSPS Subpart CC
GF02	CF02/ESP2	ST39	PM-10		9.10		39.86	Engineering Estimation
GF02	CF02/ESP2	ST39	PM-2.5		9.10		39.86	Engineering Estimtion
GF02		ST39	VOC		4.55		19.93	AP-42
GF02		ST39	Lead		0.07		0.30	Industry Factor
GF02	CF02/ESP2	ST39	HF		0.34		1.49	Vendor data
GF02	CF02/ESP2	ST39	HCl		0.68		2.99	Vendor data
GF02		ST39	Ammonia		0.33		1.45	Vendor data
GF02		ST39	Total HAPs				5.88	AP-42/Vendor data
GF02		ST39	CO2e				86,846	40 CFR 98 Subparts C & N
CE01		ST40	VOC		4.24		18.55	Mass Balance
CTA2		ST41, ST42, ST43, ST44,ST45	Filterable PM				6.67	Mass Balance
CTA2		ST41, ST42, ST43, ST44,ST45	PM10				6.67	Mass Balance

CTA2		ST41, ST42, ST43, ST44,ST45	PM2.5					6.67	Mass Balance
CTA2		ST41, ST42, ST43, ST44,ST45	VOC					0.22	Mass Balance
TCO4	DC32	ST46	Filterable PM		0.044			0.19	Filter Design
TC05	DC33	ST47	Filterable PM		0.044			0.19	Filter Design

Facility Name: Arglas Yamamura, LLC **Date of Application:** July 2023

FORM 4.00 – EMISSION INFORMATION

Emission Unit ID	Air Pollution Control Device ID	Stack ID	Pollutant Emitted	Emission Rates				
				Hourly Actual Emissions (lb/hr)	Hourly Potential Emissions (lb/hr)	Actual Annual Emission (tpy)	Potential Annual Emission (tpy)	Method of Determination
TC06	DC34	ST48	Filterable PM		0.044		0.19	Filter Design
RL04	DC35	ST49	Filterable PM		0.044		0.19	Filter Design
RL05	DC36	ST50	Filterable PM		0.044		0.19	Filter Design
RL06	DC37	ST51	Filterable PM		0.044		0.19	Filter Design
SL18	DC38	ST52	Filterable PM		0.044		0.19	Filter Design
SL19	DC39	ST53	Filterable PM		0.044		0.19	Filter Design
SL20	DC40	ST54	Filterable PM		0.044		0.19	Filter Design
SL21	DC41	ST55	Filterable PM		0.044		0.19	Filter Design
SL22	DC42	ST56	Filterable PM		0.044		0.19	Filter Design
SL23	DC43	ST57	Filterable PM		0.044		0.19	Filter Design
SL24	DC44	ST58	Filterable PM		0.044		0.19	Filter Design
SL25	DC45	ST59	Filterable PM		0.044		0.19	Filter Design
SL26	DC46	ST60	Filterable PM		0.044		0.19	Filter Design
SL27	DC47	ST61	Filterable PM		0.044		0.19	Filter Design
SL28	DC48	ST62	Filterable PM		0.044		0.19	Filter Design
SL29	DC49	ST63	Filterable PM		0.044		0.19	Filter Design
SL30	DC50	ST64	Filterable PM		0.044		0.19	Filter Design
SL31	DC51	ST65	Filterable PM		0.044		0.19	Filter Design
SL32	DC52	ST66	Filterable PM		0.044		0.19	Filter Design

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 4.00 – EMISSION INFORMATION

Emission Unit ID	Air Pollution Control Device ID	Stack ID	Pollutant Emitted	Emission Rates				
				Hourly Actual Emissions (lb/hr)	Hourly Potential Emissions (lb/hr)	Actual Annual Emission (tpy)	Potential Annual Emission (tpy)	Method of Determination
WG05	DC53	ST67	Filterable PM		0.044		0.19	Filter Design
WG06	DC54	ST68	Filterable PM		0.044		0.19	Filter Design
WG07	DC55	ST69	Filterable PM		0.044		0.19	Filter Design
WG08	DC56	ST70	Filterable PM		0.044		0.19	Filter Design
MX03	DC57	ST71	Filterable PM		0.044		0.19	Filter Design
MX04	DC58	ST72	Filterable PM		0.044		0.19	Filter Design
TR02	DC59	ST73	Filterable PM		0.044		0.19	Filter Design
CR02	DC60	ST74	Filterable PM		0.044		0.19	Filter Design
SL33	DC61	ST75	Filterable PM		0.044		0.19	Filter Design
SL34	DC62	ST76	Filterable PM		0.044		0.19	Filter Design
HE02			VOC		0.040		0.18	Mass Balance
FH02			CO		3.33		9.93	AP-42
FH02			NOx		4.54		11.87	AP-42
FH02			SO2		0.016		0.07	AP-42
FH02			Filterable PM		0.30		0.90	AP-42
FH02			PM-10		0.30		0.90	AP-42
FH02			PM-2.5		0.30		0.90	AP-42
FH02			VOC		0.15		0.65	AP-42
FH02			CO2e				13,991	40 CFR 98

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 4.00 – EMISSION INFORMATION

Emission Unit ID	Air Pollution Control Device ID	Stack ID	Pollutant Emitted	Emission Rates				
				Hourly Actual Emissions (lb/hr)	Hourly Potential Emissions (lb/hr)	Actual Annual Emission (tpy)	Potential Annual Emission (tpy)	Method of Determination
LE02			CO		0.79		3.45	AP-42
LE02			NOx		0.94		4.10	AP-42
LE02			SO2		0.006		0.02	AP-42
LE02			Filterable PM		0.071		0.31	AP-42
LE02			PM-10		0.071		0.31	AP-42
LE02			PM-2.5		0.071		0.31	AP-42
LE02			VOC		0.052		0.23	AP-42
LE02			CO2e				4,897	40 CFR 98
MP02			CO		0.17		0.25	AP-42
MP02			NOx		0.20		0.29	AP-42
MP02			SO2		0.001		0.002	AP-42
MP02			Filterable PM		0.015		0.022	AP-42
MP02			PM-10		0.015		0.022	AP-42
MP02			PM-2.5		0.015		0.022	AP-42
MP02			VOC		0.011		0.016	AP-42
MP02			CO2e				1,049	40 CFR 98
EM04			CO		0.61		0.15	Vendor Data
EM04			NOx		19.3		4.83	Vendor Data
EM04			SO2		0.015		0.005	AP-42

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 4.00 – EMISSION INFORMATION

Emission Unit ID	Air Pollution Control Device ID	Stack ID	Pollutant Emitted	Emission Rates				
				Hourly Actual Emissions (lb/hr)	**Hourly Potential Emissions** (lb/hr)	**Actual Annual Emission** (tpy)	**Potential Annual Emission** (tpy)	**Method of Determination**
EM04			Filterable PM		0.04		0.01	Vendor Data
EM04			PM-10		0.04		0.01	Vendor Data
EM04			PM-2.5		0.04		0.01	Vendor Data
EM04			VOC		5.80		1.45	Vendor Data
EM04			Total HAPs		0.01		0.0017	AP-42
EM04			CO2e				505	40 CFR 98
EM05			CO		0.61		0.15	Vendor Data
EM05			NOx		19.3		4.83	Vendor Data
EM05			SO2		0.015		0.004	Ap-42
EM05			Filterable PM		0.04		0.01	Vendor Data
EM05			PM-10		0.04		0.01	Vendor Data
EM05			PM-2.5		0.04		0.01	Vendor Data
EM05			VOC		5.80		1.45	Vendor Data
EM05			Total HAPs		0.01		0.0017	AP-42
EM05			CO2e				505	40 CFR 98

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 5.00 MONITORING INFORMATION

Emission Unit ID/ APCD ID	Emission Unit/APCD Name	Monitored Parameter		Monitoring Frequency
		Parameter	Units	
GF02	CF02/ESP2	Sorbent feed rate setting		Continuous
GF02	CF02	Pressure drop	Inches of w.c.	Continuous
GF02	CF02/ESP2	NOx		Continuous

Comments:
SO2 will be monitored via sorbent feed rate setting. A continuous emissions monitoring systems (CEMS) will be implemented to monitor NOx emissions.

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 7.00 – AIR MODELING INFORMATION: Stack Data

Stack ID	Emission Unit ID(s)	Stack Information			Dimensions of largest Structure Near Stack		Exit Gas Conditions at Maximum Emission Rate			
		Height Above Grade (ft)	Inside Diameter (ft)	Exhaust Direction	Height (ft)	Longest Side (ft)	Velocity (ft/sec)	Temperature (°F)	Flow Rate (acfm) Average	Flow Rate (acfm) Maximum
ST01	GF01	131	3.9	Up	102	1,541	50	660	35,838	
ST39	GF02	131	5.9	Up	102	1,541	49.2	752		80,666

NOTE: If emissions are not vented through a stack, describe point of discharge below and, if necessary, include an attachment. List the attachment in Form 1.00 *General Information*, Item 16.

See Section 5 of application narrative for air toxics modeling.

Facility Name: Arglass Yamamura, LLC **Date of Application:** July 2023

FORM 7.00 AIR MODELING INFORMATION: Chemicals Data

Chemical	Potential Emission Rate (lb/hr)	Toxicity	Reference	MSDS Attached
Lead (GF01)	0.05			☐
HF(GF01)	0.27			☐
HCl (GF01)	0.54			☐
Se (GF01)	0.05			☐
Lead (GF02)	0.07			☐
HF (GF02)	0.34			☐
HCl (GF02)	0.68			☐
Se (GF02)	0.07			☐
				☐
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APPENDIX C POTENTIAL TO EMIT SUMMARIES

Facility Emission Summary
Arglass Yamamura, LLC
Valdosta Georgia

F1 Facility Potential to Emit

Pollutant	Batch House (tpy)	Hot End/ Furnace (tpy)	Working End and Forehearth (tpy)	HE Coating (tpy)	Cold End Annealing Lehrs (tpy)	Mold Preaheating (tpy)	Cold End Coating (tpy)	Emergency Generators
CO	-	67.80	2.21	-	0.69	-	-	0.96
NOX	-	90.90	2.63	-	0.82	-	-	6.42
SO2	-	94.47	0.02	-	0.005	-	-	0.876
PM10	-	30.25	0.20	-	0.06	-	-	0.21
PM2.5	-	30.25	0.20	-	0.06	-	-	0.21
PM	6.03	15.18	0.20	-	0.06	-	-	0.21
VOC	-	16.97	0.145	0.012	0.04	-	13.89	0.89
CO2e	-	65,075	3,192	-	976			764
Lead	-	0.23	-	-	-	-	-	-
HF	-	1.13	-	-	-	-	-	-
HCl	-	2.26	-	-	-	-	-	-
Total HAPs	-	4.46	0.09	-	-	-	-	0.02

ERM

F2 Facility Potential to Emit

Pollutant	Batch House (tpy)	Hot End/ Furnace (tpy)	Working End and Forehearth (tpy)	HE Coating (tpy)	Cold End Annealing Lehrs (tpy)	Mold Preaheating (tpy)	Cold End Coating (tpy)	Emergency Generators
CO	-	29.97	9.93	-	3.45	0.25	-	0.30
NO_X	-	122.67	11.87	-	4.10	0.29	-	9.66
SO_2	-	91.38	0.07	-	0.025	0.002	-	0.009
PM_{10}	-	40.56	0.90	-	0.31	0.02	-	0.02
$PM_{2.5}$	-	40.56	0.90	-	0.31	0.02	-	0.02
PM	6.03	20.63	0.90	-	0.31	0.02	-	0.02
VOC	-	20.03	0.654	0.18	0.23	0.02	18.55	2.90
CO_{2e}	-	86,846	13,991	-	4,896	1,049	-	1,011
Lead	-	0.30	-	-	-	-	-	-
HF	-	1.49	-	-	-	-	-	-
HCl	-	2.99	-	-	-	-	-	-
Total HAPs	-	5.88	0.22	-	0.08	0.02	-	0.003
Ammonia	-	1.45	-	-	-	-	-	-

Facility Emission Summary
Arglass Yamamura, LLC
Valdosta Georgia

Site Wide Potential to Emit

Pollutant	Batch House (tpy)	Hot End/ Furnace (tpy)	Working End and Forehearth (tpy)	HE Coating (tpy)	Cold End Annealing Lehrs (tpy)	Mold Preaheating (tpy)	Cold End Coating (tpy)	Emergency Generators
CO	-	97.78	12.14	-	4.13	0.25	-	1.26
NO_X	-	213.58	14.50	-	4.92	0.29	-	16.09
SO_2	-	185.85	0.09	-	0.03	0.00	-	0.89
PM_{10}	-	70.81	1.10	-	0.37	0.02	-	0.23
$PM_{2.5}$	-	70.81	1.10	-	0.37	0.02	-	0.23
PM	12.05	35.81	1.10	-	0.37	0.02	-	0.23
VOC	-	36.99	0.80	0.19	0.27	0.02	32.45	3.78
CO_{2e}	-	151,921	17,184	-	5,873	1049	-	1,774
Lead	-	0.53	-	-	-	-	-	-
HF	-	2.62	-	-	-	-	-	-
HCl	-	5.25	-	-	-	-	-	-
Total HAPs	-	10.34	0.31	-	-	0.0166	-	0.023
Ammonia	-	1.45	-	-	-	-	-	-

F1 Facility Potential to Emit

Pollutant	Storage Tank	Cooling Tower Systems A & B	Total Facility-wide PTE (tpy)	Title V Threshold (tpy)	PSD Threshold (tpy)
CO	-	-	71.66	100	250
NOX	-	-	100.77	100	250
SO2	-	-	95.36	100	250
PM10	-	0.17	30.89	100	250
PM2.5	-	0.17	30.89	100	250
PM	-	0.17	21.85	100	250
VOC	Negligible	0.01	31.95	100	250
CO2e	-	-	70,007	100,000	100,000
Lead	-	-	0.23	10	250
HF	-	-	1.13	10	-
HCl	-	-	2.26	10	-
Total HAPs	Negligible	-	4.57	25	-

F2 Facility Potential to Emit

Pollutant	Storage Tank	Cooling Tower Systems A & B	Total Facility-wide PTE (tpy)	Title V Threshold (tpy)	PSD Threshold (tpy)
CO	-	-	**43.90**	100	250
NO_X	-	-	**148.61**	100	250
SO_2	-	-	**91.49**	100	250
PM_{10}	-	6.67	**54.50**	100	250
$PM_{2.5}$	-	6.67	**54.50**	100	250
PM	-	6.67	**34.57**	100	250
VOC	Negligible	0.22	**42.77**	100	250
CO_{2e}	-	-	107,793	100,000	100,000
Lead	-	-	**0.30**	10	250
HF	-	-	**1.49**	10	-
HCl	-	-	**2.99**	10	-
Total HAPs	Negligible	-	**6.20**	25	-
Ammonia	-	-	**1.45**	-	-

Site Wide Potential to Emit

Pollutant	Storage Tank	Cooling Tower Systems A & B	Total Facility-wide PTE (tpy)	Title V Threshold (tpy)	PSD Threshold (tpy)
CO	-	-	115.56	100	250
NO_X	-	-	249.38	100	250
SO_2	-	-	186.85	100	250
PM_{10}	-	6.84	85.40	100	250
$PM_{2.5}$	-	6.84	85.40	100	250
PM	-	6.84	56.42	100	250
VOC	Negligible	0.23	74.73	100	250
CO_{2e}	-	-	177,801	100,000	100,000
Lead	-	-	0.53	10	250
HF	-	-	2.62	10	-
HCl	-	-	5.25	10	-
Total HAPs	Negligible	-	10.77	25	-
Ammonia	-	-	1.45	-	-

Project Max Emission Summary
Arglass Southeast, LLC.
Valdosta, Georgia

Pollutant	Batch House (tpy)	Hot End/ Furnace (tpy)	Working End and Forehearth (tpy)	HE Coating (tpy)	Annealing Lehrs (tpy)	Mold preaheating (tpy)	Cold End Coating (tpy)	Emergency Generators	Storage Tank	Cooling Tower Systems A & B	Facility-Wide PTE (tpy)	PSD Threshold (tpy)
CO	-	29.97	9.93		3.45	0.25	-	0.30	-	-	**43.90**	250
NO_X	-	122.67	11.87		4.10	0.29	-	9.66	-	-	**148.61**	250
SO_2	-	91.38	0.07		0.025	0.002	-	0.009	-	-	**91.49**	250
PM_{10}	6.03	40.56	0.90		0.31	0.02	-	0.02	-	6.67	**54.50**	250
$PM_{2.5}$	6.03	40.56	0.90		0.31	0.02	-	0.02	-	6.67	**54.50**	250
PM-Filterable	6.03	20.63	0.90		0.31	0.02	-	0.02	-	6.67	**34.57**	250
VOC	-	20.03	0.654	0.18	0.23	0.02	18.55	2.90	Negligible	0.22	**42.77**	250
CO_{2e}	-	86,846	13,991		4,896	1,049	-	1,011	-	-	**107,793**	100,000
Lead	-	0.30	-		-		-	-	-	-	**0.30**	250
HF	-	1.49	-				-	-	-	-	**1.49**	-
HCl	-	2.99	-				-	-	-	-	**2.99**	-
Total HAPs	-	5.88	0.22	-	0.08	0.02	-	0.003	Negligible	-	**6.20**	-
Ammonia	-	1.45	-	-	-	-		-	-	-	**1.45**	

ERM

Batch House Potential TSP Emissions
Arglass Yamamura, LLC.
Valdosta, Georgia

Unit ID	Control Device ID	Control Efficiency (%)	Grain Loading per Actual Cubic foot of Outlet Air (grains/cuft)	Maximum Filter Exhaust Flow Rate (acfm)	PM Emission Rate Before Controls (lb/hr)	PM Emission Rate before Controls (tons/yr)
TC04	DC32	99%	0.0044	1177	4.44	19.4
TC05	DC33	99%	0.0044	1177	4.44	19.4
TC06	DC34	99%	0.0044	1177	4.44	19.4
RL04	DC35	99%	0.0044	1177	4.44	19.4
RL05	DC36	99%	0.0044	1177	4.44	19.4
RL06	DC37	99%	0.0044	1177	4.44	19.4
SL18	DC38	99%	0.0044	1177	4.44	19.4
SL19	DC39	99%	0.0044	1177	4.44	19.4
SL20	DC40	99%	0.0044	1177	4.44	19.4
SL21	DC41	99%	0.0044	1177	4.44	19.4
SL22	DC42	99%	0.0044	1177	4.44	19.4
SL23	DC43	99%	0.0044	1177	4.44	19.4
SL24	DC44	99%	0.0044	1177	4.44	19.4
SL25	DC45	99%	0.0044	1177	4.44	19.4
SL26	DC46	99%	0.0044	1177	4.44	19.4
SL27	DC47	99%	0.0044	1177	4.44	19.4
SL28	DC48	99%	0.0044	1177	4.44	19.4
SL29	DC49	99%	0.0044	1177	4.44	19.4
SL30	DC50	99%	0.0044	1177	4.44	19.4
SL31	DC51	99%	0.0044	1177	4.44	19.4
SL32	DC52	99%	0.0044	1177	4.44	19.4
WG05	DC53	99%	0.0044	1177	4.44	19.4
WG06	DC54	99%	0.0044	1177	4.44	19.4
WG07	DC55	99%	0.0044	1177	4.44	19.4
WG08	DC56	99%	0.0044	1177	4.44	19.4
MX03	DC57	99%	0.0044	1177	4.44	19.4
MX04	DC58	99%	0.0044	1177	4.44	19.4
TR02	DC59	99%	0.0044	1177	4.44	19.4
CR02	DC60	99%	0.0044	1177	4.44	19.4
SL33	DC61	99%	0.0044	1177	4.44	19.4
SL34	DC62	99%	0.0044	1177	4.44	19.4
					Total Emissions	**602.7**

Methodology
Emission Rate in lbs/hr (after controls) = (grains/cub. ft.) (cub. ft./min.) (60 min/hr) (lb/7000 grains)
Emission Rate in tons/yr = (lbs/hr) (8760 hr/yr) (ton/2000 lb)

Emission Rate in lbs/hr (before controls) = Emission Rate (after controls): (lbs/hr)/(1-control efficiency)
Emission Rate in tons/yr = (lbs/hr) (8760 hr/yr) (ton/2000 lb)

ERM

Batch House Potential TSP Emissions
Arglass Yamamura, LLC.
Valdosta, Georgia

Unit ID	Control Device ID	Control Efficiency (%)	Grain Loading per Actual Cubic foot of Outlet Air (grains/cuft)	PM Emission Rate after Controls (lb/hr)	PM Emission Rate after Controls (tons/yr)
TC04	DC32	99%	0.0044	0.044	0.19
TC05	DC33	99%	0.0044	0.044	0.19
TC06	DC34	99%	0.0044	0.044	0.19
RL04	DC35	99%	0.0044	0.044	0.19
RL05	DC36	99%	0.0044	0.044	0.19
RL06	DC37	99%	0.0044	0.044	0.19
SL18	DC38	99%	0.0044	0.044	0.19
SL19	DC39	99%	0.0044	0.044	0.19
SL20	DC40	99%	0.0044	0.044	0.19
SL21	DC41	99%	0.0044	0.044	0.19
SL22	DC42	99%	0.0044	0.044	0.19
SL23	DC43	99%	0.0044	0.044	0.19
SL24	DC44	99%	0.0044	0.044	0.19
SL25	DC45	99%	0.0044	0.044	0.19
SL26	DC46	99%	0.0044	0.044	0.19
SL27	DC47	99%	0.0044	0.044	0.19
SL28	DC48	99%	0.0044	0.044	0.19
SL29	DC49	99%	0.0044	0.044	0.19
SL30	DC50	99%	0.0044	0.044	0.19
SL31	DC51	99%	0.0044	0.044	0.19
SL32	DC52	99%	0.0044	0.044	0.19
WG05	DC53	99%	0.0044	0.044	0.19
WG06	DC54	99%	0.0044	0.044	0.19
WG07	DC55	99%	0.0044	0.044	0.19
WG08	DC56	99%	0.0044	0.044	0.19
MX03	DC57	99%	0.0044	0.044	0.19
MX04	DC58	99%	0.0044	0.044	0.19
TR02	DC59	99%	0.0044	0.044	0.19
CR02	DC60	99%	0.0044	0.044	0.19
SL33	DC61	99%	0.0044	0.044	0.19
SL34	DC62	99%	0.0044	0.044	0.19
					6.03

Methodology
Emission Rate in lbs/hr (after controls) = (grains/cub. ft.) (cub. ft./min.) (60 min/hr) (lb/7000 grains)
Emission Rate in tons/yr = (lbs/hr) (8760 hr/yr) (ton/2000 lb)

Emission Rate in lbs/hr (before controls) = Emission Rate (after controls): (lbs/hr)/(1-control efficiency)
Emission Rate in tons/yr = (lbs/hr) (8760 hr/yr) (ton/2000 lb)

Glass Furnace Emission Summary
Arglass Yamamura, LLC.
Valdosta Georgia

Maximum Heat Input:	98.9	MMBtu/hr	***Annual Fuel Usage:***	849.38	MMCF/year
Daily Glass Pull:	546	Short Tons/day	***Annual Heat Input:***	866,364	MMBtu/year
Fuel:	Natural Gas		***Annual Glass Pull:***	199,290	short tons/year
HHV:	1,020	MMBtu/MMCF	***Hours of Operation:***	8760	hr/year

Criteria Pollutants	Controlled Emission Factor	Units	PTE (lb/hr)	PTE (TPY)	Basis
CO	6.82	lb/hr	6.82	29.87	Supplied by furnace vendor
NOx	1.2	lb/ton	27.30	119.57	Supplied by furnace vendor
SO2	0.90	lb/ton	20.48	89.68	Supplied by furnace vendor
PM_{10}	0.40	lb/ton	9.10	39.86	Assumed to be double Filterable PM
$PM_{2.5}$	0.40	lb/ton	9.10	39.86	Assumed to be equal to PM10
PM	0.20	lb/ton	4.55	19.93	Table CC-1 for gaseous fuels of 40 CFR 60 Subpart CC (0.1 g PM/kg glass pulled).
VOC	0.20	lb/ton	4.55	19.93	Table 11.15-2 for uncontrolled container glass in AP-42
Se	0.003	lb/ton	0.07	0.30	Derived from engineering design firm's information
HF	0.015	lb/ton	0.34	1.49	Supplied by furnace vendor
HCl	0.030	lb/ton	0.68	2.99	Supplied by furnace vendor
Lead	0.003	lb/ton	0.07	0.30	Industry factor for all metal HAP
Total HAPs	-	-	-	5.88	Combustion (AP-42) + Process (Vendor Data/Industry Factors)
CO_{2e}	-	-	-	86,846	40 CFR Part 98 Supart C and N
Ammonia	0.33	lb/hr	0.33	1.45	Guidance from design team

ERM

Glass Furnace Emission Summary
Arglass Yamamura, LLC.
Valdosta Georgia

Hazardous Air Pollutants - Combustion	Emission Factor [1]	Units	PTE (TPY)	PTE (lb/yr)
Polycyclic Organic Matter	8.70E-05	lb/mmcuft	3.69E-05	0.07
Benzene	0.0021	lb/mmcuft	8.92E-04	1.78
Formaldehyde	0.075	lb/mmcuft	3.19E-02	63.70
Hexane	1.8	lb/mmcuft	7.64E-01	1,528.88
Naphthalene	0.00061	lb/mmcuft	2.59E-04	0.52
Toluene	0.0034	lb/mmcuft	1.44E-03	2.89
Beryllium	0.000012	lb/mmcuft	5.10E-06	0.01
Manganese	0.00038	lb/mmcuft	1.61E-04	0.32
Mercury	0.00026	lb/mmcuft	1.10E-04	0.22
Combustion HAP [2] Total			**0.80**	**1598.40**

[1] Emission factors from Table 1.4-3 and 1.4-4 of AP-42

[2] HAP emission totals do not include arsenic, cobalt, nickel, cadmium, selenium and chromium because they are accounted for in the process emissions above.

Greenhouse Gas - Natural Gas Fuel Combustion								
Fuel	**Emission Factor (kg/MMBtu)[1]**			**Emissions (metric tons per year)[2]**				**CO_2e**
(MMBtu/yr)	**CO_2**	**CH_4**	**N_2O**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Tons/yr**
866,364	53.02	1.0E-03	1.0E-04	45,934.6	0.87	0.087	45,982.1	50,686.5

1. Default emission factors from 40 CFR 98 Subpart C, Table C-1 and Table C-2 (natural gas).

2. Calculated based on emission factors and equations C-1b and C-8b of 40 CFR 98 Subpart C. CO_2e emissions calculated based on Global Warming Potentials from 40 CFR 98 Subpart A - Table A-1.

CO_2, CH_4, or N_2O Emissions = $1x10^{-3}$ * [Fuel * Emission Factor]

CO_2e Emissions = CO_2 Emissions + 25 (CH_4 Emissions) + 298 (N_2O Emissions)

ERM

Glass Furnace Emission Summary
Arglass Yamamura, LLC.
Valdosta Georgia

Greenhouse Gas - Glass Production: 40 CFR Part 98 Subpart N					
Carbonate-Based Raw Material	**Carbonate-Based Raw Material- Mineral**	**Material Consumed (pounds per year)**	**CO_2 Emission Factor (metric tons CO_2/metric tons carbonate-based raw material)[1]**	**CO_2 (Metric tons)[2]**	**CO_2 (tons)**
Limestone	$CaCO_3$	**72,054,830**	0.440	14,378.3	15,849.3
Dolomite	$CaMg(CO_3)_2$	**25,922,164**	0.477	5,607.7	6,181.4
Soda Ash	Na_2CO_3	**68,100,602**	0.415	12,817.1	14,128.4
Barium Carbonate	$BaCO_3$	**0**	0.223	N/A	N/A
Potassium Carbonate	K_2CO_3	**0**	0.318	N/A	N/A
Lithium Carbonate	Li_2CO_3	**0**	0.596	N/A	N/A
Strontium Carbonate	$SrCO_3$	**0**	0.298	N/A	N/A
			Total =	32,803.1	**36,159.1**

1. Default emission factors from 40 CFR Subpart N, Table N–1, CO_2 Emission Factors for Carbonate-Based Raw Materials.
2. Process emissions calculated based on Equation N-1 of 40 CFR 98 Subpart N.

3. Total process CO_2 emissions from continuous glass melting furnaces at the facility were calculated based on Equation N-2 of 40 CFR 98 Subpart N.

Subpart N Inputs - MF_i and F_i

Carbonate-Based Raw Material	**Carbonate-Based Raw Material- Mineral**	**MF_i[1]**		**F_i[2]**	
		Value	**Basis**	**Value**	**Basis**
Limestone	$CaCO_3$	1.0	Default	1.0	Default
Dolomite	$CaMg(CO_3)_2$	1.0	Default	1.0	Default
Soda Ash	Na_2CO_3	1.0	Default	1.0	Default
Barium Carbonate	$BaCO_3$	N/A	N/A	N/A	N/A
Potassium Carbonate	K_2CO_3	N/A	N/A	N/A	N/A
Lithium Carbonate	Li_2CO_3	N/A	N/A	N/A	N/A
Strontium Carbonate	$SrCO_3$	N/A	N/A	N/A	N/A

1. As per 40 CFR 98.144(b), you must measure carbonate-based mineral mass fractions at least annually to verify the mass fraction data provided by the supplier of the raw material; such measurements shall be based on sampling and chemical analysis using ASTM D3682–01 (Reapproved 2006) Standard Test Method for Major and Minor Elements in Combustion Residues from Coal Utilization Processes (incorporated by reference, see §98.7) or ASTM D6349–09 Standard Test Method for Determination of Major and Minor Elements in Coal, Coke, and Solid Residues from Combustion of Coal and Coke by Inductively Coupled Plasma—Atomic Emission Spectrometry (incorporated by reference, see §98.7). Alternatively, a default value of 1.0 can be used for the mass fraction (MF_i) of carbonate-based mineral i in Equation N–1 of Subpart N (40 CFR 98.143(c)).
2. As per 40 CFR 98.144(d), you must determine on an annual basis the calcination fraction for each carbonate consumed based on sampling and chemical analysis using an industry consensus standard. This chemical analysis must be conducted using an x-ray fluorescence test or other enhanced testing method published by an industry consensus standards organization (e.g., ASTM, ASME, API, etc.). Alternatively, you may assume the calcination fraction for a carbonate-based raw material to be equal to 1.0 as per 40 CFR 98.143(b)(2)(iv).

Note: PM10 and PM2.5 = filterable + condensable

Glass Furnace Emission Summary
Arglass Yamamura, LLC.
Valdosta Georgia

Maximum Heat Input:	29.7	MMBtu/hr	***Annual Fuel Usage:***	33,909	gal/year
Daily Glass Pull:	150.00	Short Tons/day	***Annual Heat Input:***	4,747	MMBtu/year
Fuel:	Diesel Fuel		***Annual Glass Pull:***	1,000	short tons/year
HHV:	140,000	Btu/gal	***Hours of Operation:***	160	Hrs/year

Furnace Emergency Operations with Fuel Oil Backup

Criteria Pollutants	Emission Factor	Units	PTE (lb/hr)	PTE (TPY)	Basis
CO	0.2	lb/ton	1.25	0.100	AP-42 Emission Factors
NOx	6.2	lb/ton	38.75	3.10	AP-42 Emission Factors
SO2	3.40	lb/ton	21.25	1.70	AP-42 Emission Factors
PM_{10}	1.40	lb/ton	8.75	0.70	AP-42 Emission Factors
$PM_{2.5}$	1.40	lb/ton	8.75	0.70	AP-42 Emission Factors
PM	1.4	lb/ton	8.75	0.70	AP-42 Emission Factors
VOC	0.2	lb/ton	1.25	0.100	AP-42 Emission Factors

Forehearth Emission Summary
Arglass Yamamura, LLC.
Valdosta Georgia

Forehearths LT11, LT12, LT13 and LT14

Firing Rate and Fuel Use: (1)	
Maximum Firing Rate (MMScf/hr)	0.027
Average Firing Rate (MMScf/hr)	0.027
Heating value of Fuel (MMBtu/MMScf)	1,020
Total Firing Rate For 4 Forehearths (MMBtu/hr)	27.30
Total Annual Operating Hours (hr/yr)	8,760
Potential Annual Heat Input (MMBtu/yr)	239,148
Potential Annual Fuel Usage (MMScf/yr)	234.5
Emission Factors (lb/MMscf) (2)	
CO	84
NOx	100
SO2	0.6
PM/PM-10/PM-2.5	7.6
VOC	5.5
Emission Factors (ton/MMBtu) (3)	
CO_2	5.84E-02
CH_4	1.10E-06
N_2O	1.10E-07
Hourly Emissions (lb/hr)	
CO	2.25
NOx	2.676
SO2	0.016
PM/PM-10/PM-2.5	0.203
VOC	0.147
Annual Emissions (TPY)	
CO	9.85
NOx	11.723
SO2	0.070
PM/PM-10/PM-2.5	0.891
VOC	0.645
CO2e	13,991.3

Notes:

(1) Heat Inputs and firing rates are calculated for three (3) forehearths combined.

(2) Emission factors are based on AP-42 Table 1.4-2 natural gas combustion for small boilers (<100 Mmbtu/hr)

(3) Calculated based on emission factors in 40 CFR 98 Subpart C, Tables C-1 & C-2

Forehearth Emission Summary
Arglass Yamamura, LLC.
Valdosta Georgia

Forehearths LT11, LT12 and LT13 during Emergency Backup Fuel Firing

Firing Rate and Fuel Use (Liquified Petroleum Gas (LPG)): (1)	
Maximum Fuel Rate (gal/hr)	144
Heating value of Fuel (BTU/gal)(2)	95,045
Total Firing Rate for 4 Forehearths (MMBtu/hr)	13.7
Total Annual Operating Hours (hr/yr)	160
Maximum Annual Heat Input (MMBtu/yr)	2,184
Maximum Annual Fuel Usage (gal/yr)	22,978
Emission Factors (lb/Mgal) (3)	
CO	7.5
NOx	13
SO2	0.002
PM/PM-10/PM-2.5	0.7
VOC	0.8
Hourly Emissions (lb/hr)	
CO	1.08
NOx	1.867
SO2	0.000
PM/PM-10/PM-2.5	0.101
VOC	0.115
Annual Emissions (TPY)	
CO	0.086
NOx	0.149
SO2	0.000
PM/PM-10/PM-2.5	0.008
VOC	0.009

Notes:

(1) Heat Inputs and firing rates are calculated for four (4) forehearths combined.

(2) Heating value of LPG will be adjusted via mixers such that it is equivalent to the heating value of natural gas. The heating value of 1020 BTU/SCF for natural gas is converted to BTU/gal using the densities of 0.044 lb/scf for natural gas and 4.1 lb/gal for LPG.

(3) Emission factors are based on AP-42 Table 1.5-1 for LPG combustion for commercial boilers; calculations assume a sulfur content of 185 ppmw per Gas Processors Association.

(3) Calculated based on emission factors in 40 CFR 98 Subpart C, Tables C-1 & C-2

Hot End Coater Emissions
Arglass Yamamura, LLC
Valdosta Georgia

Four (4) Hot End Coaters

Material	Density (Lb/Gal)	Weight % Organics	Gal of Mat. (gal/hour)	Pounds VOC per gallon of Material	Potential VOC pounds per hour	Potential VOC tons per year
L1 = 1.5lb/h	7.51	0.671%	0.200	0.050	0.010	0.04
L2 = 1.5lb/h	7.51	0.671%	0.200	0.050	0.010	0.04
L3 = 1.5 lb/h	7.51	0.671%	0.200	0.050	0.010	0.04
L4 = 1.5 lb/h	7.51	0.671%	0.200	0.050	0.010	0.04
Sum					0.040	0.18

Calculation Methodology

Pounds of VOC per Gallon Coating = (Density (lb/gal) * Weight % Organics)

Potential VOC Pounds per Hour = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/hour)

Potential VOC tons per year = Potential VOC Pounds per Hour * 8760 hrs/yr * 1 ton/2000 lbs

Mould Preheating Emissions
Arglass Yamamura, LLC
Valdosta Georgia

***Firing Rate and Fuel Use:* (1)**	
Maximum Firing Rate (MMScf/hr)	0.002
Average Firing Rate (MMScf/hr)	0.001
Heating value of Fuel (MMBtu/MMScf)	1,020
Maximum Firing Rate (MMBtu/hr)	2.047
Average Firing Rate (MMBtu/hr)	0.682
Total Annual Operating Hours (hr/yr)	8,760
Potential Annual Heat Input (MMBtu/yr)	17,934
Potential Annual Fuel Usage (MMScf/yr)	17.58
***Emission Factors (lb/MMscf)* (2)**	
CO	84
NOx	100
SO2	0.6
PM/PM-10/PM-2.5	7.6
VOC	5.5
***Emission Factors (ton/MMBtu)* (3)**	
CO_2	5.84E-02
CH_4	1.10E-06
N_2O	1.10E-07
Hourly Emissions (lb/hr)	
CO	0.17
NOx	0.201
SO2	0.001
PM/PM-10/PM-2.5	0.015
VOC	0.011
Annual Emissions (TPY)	
CO	0.25
NOx	0.29
SO2	0.002
PM/PM-10/PM-2.5	0.022
VOC	0.016
CO2e	1049.2

Notes:

(1) Heat inputs and firing rates are calculated for four (4) lehrs combined.

(2) Emission factors are based on AP-42 Table 1.4-2 natural gas combustion for small boilers (<100 Mmbtu/hr)

(3) Calculated based on emission factors in 40 CFR 98 Subpart C, Tables C-1 & C-2

Emissions Summary for Four (4) Annealing Lehrs
Arglass Yamamura, LLC.
Valdosta Georgia

Firing Rate and Fuel Use: [(1)]	
Maximum Firing Rate (MMScf/hr)	0.009
Average Firing Rate (MMScf/hr)	0.006
Heating value of Fuel (MMBtu/MMScf)	1,020
Maximum Firing Rate (MMBtu/hr)	9.554
Average Firing Rate (MMBtu/hr)	5.732
Total Annual Operating Hours (hr/yr)	8,760
Potential Annual Heat Input (MMBtu/yr)	83,693
Potential Annual Fuel Usage (MMScf/yr)	82.05
Emission Factors (lb/MMscf) [(2)]	
CO	84
NOx	100
SO2	0.6
PM/PM-10/PM-2.5	7.6
VOC	5.5
Emission Factors (ton/MMBtu) [(3)]	
CO_2	5.84E-02
CH_4	1.10E-06
N_2O	1.10E-07
Hourly Emissions (lb/hr)	
CO	0.79
NOx	0.937
SO2	0.006
PM/PM-10/PM-2.5	0.071
VOC	0.052
Annual Emissions (TPY)	
CO	3.45
NOx	4.10
SO2	0.02
PM/PM-10/PM-2.5	0.31
VOC	0.23
CO2e	4896.5

Notes:

(1) Heat inputs and firing rates are calculated for four (4) lehrs combined.

(2) Emission factors are based on AP-42 Table 1.4-2 natural gas combustion for small boilers (<100 Mmbtu/hr)

(3) Calculated based on emission factors in 40 CFR 98 Subpart C, Tables C-1 & C-2

Cold End Coater Emissions
Arglass Yamamura, LLC.
Valdosta Georgia

Four (4) Cold End Coaters

Low Emission Dispersion Wax: Glasskote SC 100 E; 23,5% organic apprxox 30% loss; 1:100 mixed

Material	Density (Lb/Gal)	Weight % Organics	Gal of Mat. (gal/hour)	Pounds VOC per gallon of Material	Potential VOC pounds per hour	Potential VOC tons per year
L1	7.51	7.050%	2	0.529	1.059	4.64
L2	7.51	7.050%	2	0.529	1.059	4.64
L3	7.51	7.050%	2	0.529	1.059	4.64
L4	7.51	7.050%	2	0.529	1.059	4.64
Sum					4.236	18.55

Calculation Methodology

Pounds of VOC per Gallon Coating = (Density (lb/gal) * Weight % Organics)

Potential VOC Pounds per Hour = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/hour)

Potential VOC tons per year = Potential VOC Pounds per Hour * 8760 hrs/yr * 1 ton/2000 lbs

Emergency Generator Emissions
Arglass Yamamura, LLC.
Valdosta Georgia

Two (2) 1250 kVa (1,000 eKW) Emergency Generators [1] = 2x 1838 bhp engine capacity

Firing Rate and Fuel Use:		
Firing Rate at Full Load (Gal/hr)	87	
Heating value of Fuel (Btu/Gal)	140,000	
Firing Rate (MMBtu/hr)	12.354	
Rated Horsepower (bhp)	1,838	
Total Annual Operating Hours (hr/yr)	500	
Number of Generators	2	
Emission Factors (g/bhp-hr) or (lb/MMBtu) [2],[3]		
CO (g/bhp-hr) [2]	0.15	
NOx (g/bhp-hr) [2]	4.77	
SO2 (lb/MMBtu) [3]	0.001515	
PM/PM-10/PM-2.5 (g/bhp- hr) [2]	0.010	
VOC (as HC) (g/bhp-hr) [2]	1.431	
Total HAP (lb/MMBtu) [3]	0.0017	
Emission Factors (ton/MMBtu) [4]		
CO_2	8.15E-02	
CH_4	3.31E-06	
N_2O	6.61E-07	
Hourly Emissions Per Generator (lb/hr)		***Total Generator Hourly Emissions (lb/hr)***
CO	0.61	1.22
NOx	19.3	38.66
SO2	0.019	0.04
PM/PM-10/PM-2.5	0.04	0.08
VOC	5.80	11.6
Total HAP	0.01	0.01
Annual Emissions Per Generator (TPY)		***Total Generator Annual Emissions (ton/yr)***
CO	0.15	0.3
NOx	4.83	9.66
SO2	0.005	0.01
PM/PM-10/PM-2.5	0.010	0.02
VOC (as HC)	1.45	2.9
Total HAPs	0.0017	0.003
CO2e	505	1011

Notes:

(1) Specifications sheet for Rolls Royce (MTU) 1000 ekW 1250 kVA 60 Hz 1800 rpm 480 Volts generatorfor the purposes of calculating PTE.

(2) Nominal emission rates as provided on the representative Rolls Royce Specification Sheet. NOx emission emission factor was assumed to be the equal to the NOx+NMHC emission factor. Assumes VOC is 30% of the NOx emission factor which analogous to information in AP-42 Section 3.4. In this case, NMHC+NOx emission factor is assumed to represent NOx as a conservative measure.

(3) HAP emission factor was assumed to be the sum of HAP emissions in Table 3.4-3 of AP-42. The SO2 emissoin Factor was provided in Table 3.4-1 of AP-42 with the sulfur content of 15 ppm (or 0.0015%) as provided in 40 CFR §60.4207 and 40 CFR §1090.305(b).

(4) Calculated based on emission factors in 40 CFR 98 Subpart C, Tables C-1 & C-2

Cooling Tower Emission Summary
Arglass Yamamura, LLC.
Valdosta Gerorgia

A: **Two (2) Open Circuit Non-Contact Cooling Towers of process water system; Concept one operating one standby**

Number of Cooling Towers in Operation	1	and an additional one on standby
One Cooling Tower Water Circulating Rate	370	cubic meter/hr/cooling tower at 5000kW cooling capacity
	6.2	cubic meter/min/cooling tower
	1,629	gal/min/cooling tower
	97,744	gal/hr/cooling tower

Operating Amount per Cooling Tower		Operating Time
Amount Processed	Units	Hours
856,234,513	Gallons/yr	8760

Air Contaminant	Emission Factors per Cooling Tower (lb/hr)	PTE (ton/yr/tower)	PTE from Operating Towers (ton/yr)
PM-10	0.489	2.14	2.14
PM-2.5	0.489	2.14	2.14
PM	0.489	2.14	2.14
VOC	0.0163	0.07	0.07

Emissions Calculations per Cooling Tower

Average Circulating Water Flow Rate		97,744	gal/hr/cooling tower @88 degrees F = 31°C
Average Annual Solid Concentration in water		3,000	ppmv
Average Annual VOC Concentration in water		100.0	ppmv
		0.020%	AP-42 Table 13.4-1 for induced draft drift in cooling towers
Drift Volume		19.55	gal/hr/cooling tower
Water Density		8.3453	lb/gal
Drift Mass		163.14	lb/hr/cooling tower
	PM/PM10/PM2.5	0.4894	lb/hr based on 3,000 ppmv of total solids in cooling water
	VOC	0.0163	lb/hr based 100 ppmv of VOCs in cooling water

<u>Methodology</u>
PM: 97,744 gal/hr x 0.02% drift x 3000 ppm ÷ 1,000,000 = 0.4849 lb/hr of PM
VOC: 97,744 gal/hr x 0.02% drift x 100 ppm ÷ 1,000,000 = 0.0163 lb/hr of VOC

Cooling Tower Emission Summary
Arglass Yamamura, LLC.
Valdosta Gerorgia

B: **Four (4) Closed Circuit Non-Contact Cooling Towers from cooling water system; Concept four operating one standby; 5 installed**

Number of Cooling Towers in Operation	4	and an additional one on standby
One Cooling Tower Water Circulation Rate	195	cubic meter/hr/cooling tower
	3.25	cubic meter/min/cooling tower
	859	gal/min/cooling tower
	51,540	gal/hr/cooling tower

Operating Amount per Cooling Tower		Operating Time
	Units	Hours
451,490,400	Gallons/yr	8760

Air Contaminant	Emission Factors per Cooling Tower (lb/hr)	PTE (ton/yr/tower)	PTE from Operating Towers (ton/yr)
PM-10	0.26	1.13	4.52
PM-2.5	0.26	1.13	4.52
PM	0.26	1.13	4.52
VOC	0.009	0.0377	0.15

Emission Calculations per Cooling Tower

Water Ciruclation Rate		51,540	gal/hr/cooling tower @88 degrees F = 31°C
Average Annual Solid Concentration in water		3,000	ppm
Average Annual VOC Concentration in water		100.0	ppm
		0.02%	AP-42 Table 13.4-1 for induced draft drift in cooling towers
Drift Volume		10.31	gal/hr/cooling tower
Water Density		8.3453	lb/gal
Drift Mass		86.02	lb/hr/cooling tower
	PM/PM10/PM2.5	0.2581	lb/hr based on 3,000 ppm of total solids in cooling water
	VOC	0.0086	lb/hr based on 100 ppm of VOCs in cooling water

Methodology
PM: 51,540 gal/hr x 0.02% drift x 3000 ppm ÷ 1,000,000 = 0.2581 lb/hr of PM
VOC: 51,540 gal/hr x 0.02% drift x 100 ppm ÷ 1,000,000 = 0.0086 lb/hr of VOC

Combustion HAP Emissions
Arglass Yamamura, LLC.
Valdosta Georgia

Hazardous Air Pollutants from Natural Gas Combustion Sources Other than the Furance				
Hazardous Air Pollutants - Combustion	**Emission Factor (lb/mmcuft) [1]**	**Mold Preheating PTE (TPY)**	**Lehrs PTE (TPY)**	**Forehearths PTE (TPY)**
Polycyclic Organic Matter	8.70E-05	7.65E-07	3.57E-06	1.02E-05
Benzene	0.0021	1.85E-05	8.62E-05	2.46E-04
Formaldehyde	0.075	6.59E-04	3.08E-03	8.79E-03
Hexane	1.8	1.58E-02	7.38E-02	2.11E-01
Naphthalene	0.00061	5.36E-06	2.50E-05	7.15E-05
Toluene	0.0034	2.99E-05	1.39E-04	3.99E-04
Arsenic	0.0002	1.76E-06	8.21E-06	2.34E-05
Beryllium	0.000012	1.05E-07	4.92E-07	1.41E-06
Cadmium	0.0011	9.67E-06	4.51E-05	1.29E-04
Chromium	0.0014	1.23E-05	5.74E-05	1.64E-04
Cobalt	0.000084	7.38E-07	3.45E-06	9.85E-06
Manganese	0.00038	3.34E-06	1.56E-05	4.45E-05
Mercury	0.00026	2.29E-06	1.07E-05	3.05E-05
Nickel	0.0021	1.85E-05	8.62E-05	2.46E-04
Selenium	0.000024	2.11E-07	9.85E-07	2.81E-06
Total HAP	1.89E+00	**1.66E-02**	**7.74E-02**	2.21E-01
	Processing Rate (mmcuft/yr)	17.58	82.05	234.5

[1] Emission factors from Table 1.4-3 and 1.4-4 of AP-42

Combustion HAP Emissions
Arglass Yamamura, LLC.
Valdosta Georgia

Hazardous Air Pollutants from Standby Diesel Fuel Combustion Sources			
Hazardous Air Pollutants - Combustion	**Emission Factor [1]**	**Units of Measure**	**Furnace PTE (TPY)**
Polycyclic Organic Matter	0.00116	lb/kgal	1.96E-05
Benzene	0.000214	lb/kgal	3.63E-06
Ethylbenzene	0.0000636	lb/kgal	1.08E-06
Formaldehyde	0.0033	lb/kgal	5.59E-05
1,1,1-Tricholoroethane	0.000236	lb/kgal	4.00E-06
Naphthalene	0.0011	lb/kgal	1.86E-05
Toluene	0.0062	lb/kgal	1.05E-04
Xylene	0.000109	lb/kgal	1.85E-06
Arsenic	4	$lb/10^{12}$ Btu	9.49E-06
Beryllium	3	$lb/10^{12}$ Btu	7.12E-06
Cadmium	3	$lb/10^{12}$ Btu	7.12E-06
Chromium	3	$lb/10^{12}$ Btu	7.12E-06
Lead	9	$lb/10^{12}$ Btu	2.14E-05
Manganese	6	$lb/10^{12}$ Btu	1.42E-05
Mercury	3	$lb/10^{12}$ Btu	7.12E-06
Nickel	3	$lb/10^{12}$ Btu	7.12E-06
Selenium	15	$lb/10^{12}$ Btu	3.56E-05
Total HAP [2]	0.01924		**3.26E-04**
Fuel Energy		10^{12} BTU/yr	4.75E-03
Processing Rate		kgal/yr	33.9

[1] Emission factors from Table 1.4-3 and 1.4-4 of AP-42
[2] Assume metal HAPs are negligible

Combustion HAP Emissions
Arglass Yamamura, LLC.
Valdosta Georgia

HAP Pollutants from LPG Use		
Hazardous Air Pollutants - Combustion	**Emission Factor [1]**	**Forehearths PTE (TPY)**
Polycyclic Organic Matter	0.00116	1.33E-05
Benzene	0.000214	2.46E-06
Ethylbenzene	0.0000636	7.31E-07
Formaldehyde	0.0033	3.79E-05
1,1,1-Tricholoroethane	0.000236	2.71E-06
Naphthalene	0.0011	1.26E-05
Toluene	0.0062	7.12E-05
Xylene	0.000109	1.25E-06
Arsenic	4	4.37E-06
Beryllium	3	3.28E-06
Cadmium	3	3.28E-06
Chromium	3	3.28E-06
Lead	9	9.83E-06
Manganese	6	6.55E-06
Mercury	3	3.28E-06
Nickel	3	3.28E-06
Selenium	15	1.64E-05
Total HAP [2]	0.01704	**1.96E-04**
Fuel Energy		2.18E-03
Processing Rate		22.98

Combustion HAP Emissions
Arglass Yamamura, LLC.
Valdosta Georgia

POM HAP	AP-42 Emission Factor (lb/kgal)
Naphthalene	1.10E-03
Acenaphthene	2.11E-05
Acenaphthylene	2.50E-07
Anthracene	1.22E-06
Benz(a)anthracene	4.01E-06
Benzo(p,k)fluoranthene	1.48E-06
Fluoranthene	4.84E-06
Fluorene	4.47E-06
Indo(1,2,3-cd)pyrene	2.14r-06
Phenanthrene	1.05E-05
Pyrene	4.25E-06
OCDD	3.10E-09
Benzo(g,h,i)perylene	2.26E-06
Chrysene	2.38E-06
Dibenzo(a,h)anthracene	1.67E-06

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Unit ID	Control Device ID	Control Efficiency (%)	Grain Loading per Actual Cubic foot of Outlet Air (grains/cub. ft.)	Maximum Filter Exhaust Flow Rate (acfm.)	FPM Emission Rate Before Controls (lb/hr)	FPM Emission Rate before Controls (tons/yr)
TC01	DC01	99.00%	0.0044	1177	4.44	19.4
TC02	DC02	99.00%	0.0044	1177	4.44	19.4
TC03	DC03	99.00%	0.0044	1177	4.44	19.4
RL01	DC04	99.00%	0.0044	1177	4.44	19.4
RL02	DC05	99.00%	0.0044	1177	4.44	19.4
RL03	DC06	99.00%	0.0044	1177	4.44	19.4
SL01	DC07	99.00%	0.0044	1177	4.44	19.4
SL02	DC08	99.00%	0.0044	1177	4.44	19.4
SL03	DC09	99.00%	0.0044	1177	4.44	19.4
SL04	DC10	99.00%	0.0044	1177	4.44	19.4
SL05	DC11	99.00%	0.0044	1177	4.44	19.4
SL06	DC12	99.00%	0.0044	1177	4.44	19.4
SL07	DC13	99.00%	0.0044	1177	4.44	19.4
SL08	DC14	99.00%	0.0044	1177	4.44	19.4
SL09	DC15	99.00%	0.0044	1177	4.44	19.4
SL10	DC16	99.00%	0.0044	1177	4.44	19.4
SL11	DC17	99.00%	0.0044	1177	4.44	19.4
SL12	DC18	99.00%	0.0044	1177	4.44	19.4
SL13	DC19	99.00%	0.0044	1177	4.44	19.4
SL14	DC20	99.00%	0.0044	1177	4.44	19.4
SL15	DC21	99.00%	0.0044	1177	4.44	19.4
WG01	DC22	99.00%	0.0044	1177	4.44	19.4
WG02	DC23	99.00%	0.0044	1177	4.44	19.4
WG03	DC24	99.00%	0.0044	1177	4.44	19.4
WG04	DC25	99.00%	0.0044	1177	4.44	19.4
MX01	DC26	99.00%	0.0044	1177	4.44	19.4
MX02	DC27	99.00%	0.0044	1177	4.44	19.4
TR01	DC28	99.00%	0.0044	1177	4.44	19.4
CR01	DC29	99.00%	0.0044	1177	4.44	19.4
SL16	DC30	99.00%	0.0044	1177	4.44	19.4
SL17	DC31	99.00%	0.0044	1177	4.44	19.4
					Total Emissions	**602.7**

Methodology
Emission Rate in lbs/hr (after controls) = (grains/cub. ft.) (cub. ft./min.) (60 min/hr) (lb/7000 grains)
Emission Rate in tons/yr = (lbs/hr) (8760 hr/yr) (ton/2000 lb)

Emission Rate in lbs/hr (before controls) = Emission Rate (after controls): (lbs/hr)/(1-control efficiency)
Emission Rate in tons/yr = (lbs/hr) (8760 hr/yr) (ton/2000 lb)

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Unit ID	Control Device ID	Control Efficiency (%)	Grain Loading per Actual Cubic foot of Outlet Air (grains/cub. ft.)	FPM Emission Rate after Controls (lb/hr)	FPM Emission Rate after Controls (tons/yr)
TC01	DC01	99.00%	0.0044	0.044	0.19
TC02	DC02	99.00%	0.0044	0.044	0.19
TC03	DC03	99.00%	0.0044	0.044	0.19
RL01	DC04	99.00%	0.0044	0.044	0.19
RL02	DC05	99.00%	0.0044	0.044	0.19
RL03	DC06	99.00%	0.0044	0.044	0.19
SL01	DC07	99.00%	0.0044	0.044	0.19
SL02	DC08	99.00%	0.0044	0.044	0.19
SL03	DC09	99.00%	0.0044	0.044	0.19
SL04	DC10	99.00%	0.0044	0.044	0.19
SL05	DC11	99.00%	0.0044	0.044	0.19
SL06	DC12	99.00%	0.0044	0.044	0.19
SL07	DC13	99.00%	0.0044	0.044	0.19
SL08	DC14	99.00%	0.0044	0.044	0.19
SL09	DC15	99.00%	0.0044	0.044	0.19
SL10	DC16	99.00%	0.0044	0.044	0.19
SL11	DC17	99.00%	0.0044	0.044	0.19
SL12	DC18	99.00%	0.0044	0.044	0.19
SL13	DC19	99.00%	0.0044	0.044	0.19
SL14	DC20	99.00%	0.0044	0.044	0.19
SL15	DC21	99.00%	0.0044	0.044	0.19
WG01	DC22	99.00%	0.0044	0.044	0.19
WG02	DC23	99.00%	0.0044	0.044	0.19
WG03	DC24	99.00%	0.0044	0.044	0.19
WG04	DC25	99.00%	0.0044	0.044	0.19
MX01	DC26	99.00%	0.0044	0.044	0.19
MX02	DC27	99.00%	0.0044	0.044	0.19
TR01	DC28	99.00%	0.0044	0.044	0.19
CR01	DC29	99.00%	0.0044	0.044	0.19
SL16	DC30	99.00%	0.0044	0.044	0.19
SL17	DC31	99.00%	0.0044	0.044	0.19
					6.03

Methodology
Emission Rate in lbs/hr (after controls) = (grains/cub. ft.) (cub. ft./min.) (60 min/hr) (lb/7000 grains)
Emission Rate in tons/yr = (lbs/hr) (8760 hr/yr) (ton/2000 lb)

Emission Rate in lbs/hr (before controls) = Emission Rate (after controls): (lbs/hr)/(1-control efficiency)
Emission Rate in tons/yr = (lbs/hr) (8760 hr/yr) (ton/2000 lb)

ERM

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Maximum Heat Input:	72.0	MMBtu/hr	***Annual Fuel Usage:***	618.35	MMCF/year
Daily Glass Pull:	435	Short Tons/day	***Annual Heat Input:***	630,720	MMBtu/year
Fuel:	Natural Gas		***Annual Glass Pull:***	150,745	short tons/year
HHV:	1,020	MMBtu/MMCF	***Hours of Operation:***	8760	Hrs/year

Criteria Pollutants	**Emission Factor**	**Units**	**PTE (lb/hr)**	**PTE (TPY)**	**Basis**
CO	15.5	lb/hr	15.48	67.8	Vendor Data
NOx	1.2	lb/ton	21.75	90.4	Vendor Data
SO2	1.25	lb/ton	22.66	94.2	Vendor Data
PM_{10}	0.40	lb/ton	7.25	30.1	Vendor Data
$PM_{2.5}$	0.40	lb/ton	7.25	30.1	Vendor Data
PM	0.2	lb/ton	3.63	15.1	Vendor Data
VOC	3.9	lbs/hr	3.87	17.0	Vendor Data
Se	0.003	lb/ton	0.05	0.23	Derived from engineering design firm data.
HF	0.02	lb/ton	0.27	1.13	Vendor Data
HCl	0.03	lb/ton	0.54	2.26	Vendor Data
Lead	0.003	lb/ton	0.05	0.23	Industry factor for all metal HAP
Total HAPs	-	-	-	4.46	Combustion (AP-42) + Process (Vendor Data/Industry Factors)
CO_{2e}	-	-	-	64,251	40 CFR Part 98 Supart C and N

Hazardous Air Pollutants - Combustion	**Emission Factor**	**Units**	**PTE (TPY)**	**PTE (lb/yr)**
Acetaldehyde	1.20E-05	lbs/MMBTU	0.0038	7.57
Acrolein	1.70E-05	lbs/MMBTU	0.0054	10.72
Benzene	2.10E-06	lbs/MMBTU	0.0007	1.32
Ethylbenzene	1.60E-05	lbs/MMBTU	0.0050	10.09
Formaldehyde	7.40E-05	lbs/MMBTU	0.0233	46.67
Hexane	1.80E-03	lbs/MMBTU	0.5676	1135.30
Phenol	4.00E-06	lbs/MMBTU	0.0013	2.52
Toluene	3.30E-06	lbs/MMBTU	0.0010	2.08
Xylene (total)	2.50E-05	lbs/MMBTU	0.0079	15.77
Combustion HAP Total			**0.62**	

Note: HAP emission factors taken from AP-42.

Greenhouse Gas - Natural Gas Fuel Combustion								
Fuel	**Emission Factor (kg/MMBtu)[1]**			**Emissions (metric tons per year)[2]**				**CO_2e**
(MMBtu/yr)	**CO_2**	**CH_4**	**N_2O**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Tons/yr**
630,720	53.02	1.0E-03	1.0E-04	33,440.8	0.63	0.063	33,475.3	36,900.2

1. Default emission factors from 40 CFR 98 Subpart C, Table C-1 and Table C-2 (natural gas).
2. Calculated based on emission factors and equations C-1b and C-8b of 40 CFR 98 Subpart C. CO_2e emissions calculated based on Global

CO_2, CH_4, or N_2O Emissions = $1x10^{-3}$ * [Fuel * Emission Factor]

ERM

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

CO_2e Emissions = CO_2 Emissions + 25 (CH_4 Emissions) + 298 (N_2O Emissions)

Greenhouse Gas - Glass Production: 40 CFR Part 98 Subpart N					
Carbonate-Based Raw Material	**Carbonate-Based Raw Material-Mineral**	**Material Consumed (pounds per year)**	**CO_2 Emission Factor (metric tons CO_2/metric tons carbonate-based raw material)[1]**	**CO_2 (Metric tons)$_2$**	**CO_2 (tons)**
Limestone	$CaCO_3$	**54,503,012**	0.440	10,875.9	11,988.6
Dolomite	$CaMg(CO_3)_2$	**19,607,791**	0.477	4,241.7	4,675.7
Soda Ash	Na_2CO_3	**51,511,993**	0.415	9,695.0	10,686.9
Barium Carbonate	$BaCO_3$	**0**	0.223	N/A	N/A
Potassium Carbonate	K_2CO_3	**0**	0.318	N/A	N/A
Lithium Carbonate	Li_2CO_3	**0**	0.596	N/A	N/A
Strontium Carbonate	$SrCO_3$	**0**	0.298	N/A	N/A
			Total =	24,812.6	**27,351.1**

1. Default emission factors from 40 CFR Subpart N, Table N–1, CO_2 Emission Factors for Carbonate-Based Raw Materials.
2. Process emissions calculated based on Equation N-1 of 40 CFR 98 Subpart N.
3. Total process CO_2 emissions from continuous glass melting furnaces at the facility were calculated based on Equation N-2 of 40 CFR 98 Subpart N.

Subpart N Inputs - MF_i and F_i

Carbonate-Based Raw Material	**Carbonate-Based Raw Material-Mineral**	**MF_i[1]**		**F_i[2]**	
		Value	**Basis**	**Value**	**Basis**
Limestone	$CaCO_3$	1.0	Default	1.0	Default
Dolomite	$CaMg(CO_3)_2$	1.0	Default	1.0	Default
Soda Ash	Na_2CO_3	1.0	Default	1.0	Default
Barium Carbonate	$BaCO_3$	N/A	N/A	N/A	N/A
Potassium Carbonate	K_2CO_3	N/A	N/A	N/A	N/A
Lithium Carbonate	Li_2CO_3	N/A	N/A	N/A	N/A
Strontium Carbonate	$SrCO_3$	N/A	N/A	N/A	N/A

1. As per 40 CFR 98.144(b), you must measure carbonate-based mineral mass fractions at least annually to verify the mass fraction data provided by the supplier of the raw material; such measurements shall be based on sampling and chemical analysis using ASTM D3682–01 (Reapproved 2006) Standard Test Method for Major and Minor Elements in Combustion Residues from Coal Utilization Processes (incorporated by reference, see §98.7) or ASTM D6349–09 Standard Test Method for Determination of Major and Minor Elements in Coal, Coke, and Solid Residues from Combustion of Coal and Coke by Inductively Coupled Plasma—Atomic Emission Spectrometry (incorporated by reference, see §98.7). Alternatively, a default value of 1.0 can be used for the mass fraction (MF_i) of carbonate-based mineral i in Equation N–1 of Subpart N (40 CFR 98.143(c)).
2. As per 40 CFR 98.144(d), you must determine on an annual basis the calcination fraction for each carbonate consumed based on sampling and chemical

Note: PM10 and PM2.5 = filterable + condensable

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Table 1-A

Maximum Heat Input:	72.0	MMBtu/hr	***Annual Fuel Usage:***	11.29	MMCF/year
Daily Glass Pull:	435	Short Tons/day	***Annual Heat Input:***	11,520	MMBtu/year
Fuel:	Natural Gas		***Annual Glass Pull:***	826	short tons/year
HHV:	1,020	MMBtu/MMCF	***Hours of Operation:***	160	Hrs/year

Normal Operating Scenario					
Criteria Pollutants	**Emission Factor**	**Units**	**PTE (lb/hr)**	**PTE (TPY)**	**Basis**
CO	15.5	lb/hr	15.48	1.2	Vendor Data
NOx	1.2	lb/ton	21.75	0.5	Vendor Data
SO2	1.25	lb/ton	22.66	0.5	Vendor Data
PM_{10}	0.40	lb/ton	7.25	0.2	Vendor Data
$PM_{2.5}$	0.40	lb/ton	7.25	0.2	Vendor Data
FPM	0.2	lb/ton	3.63	0.1	Vendor Data
VOC	3.9	lbs/hr	3.87	0.3	Vendor Data

Table 1-B

Maximum Heat Input:	23.9	MMBtu/hr	***Annual Fuel Usage:***	27,305	gal/year
Daily Glass Pull:	22.05	Short Tons/day	***Annual Heat Input:***	3,823	MMBtu/year
Fuel:	Diesel Fuel		***Annual Glass Pull:***	147	short tons/year
HHV:	140,000	Btu/gal	***Hours of Operation:***	160	Hrs/year

Emergency Operations with Fuel Oil Backup					
Criteria Pollutants	**Emission Factor**	**Units**	**PTE (lb/hr)**	**PTE (TPY)**	**Basis (1)**
CO	0.2	lb/ton	0.18	0.015	AP-42 Emission Factors
NOx	6.2	lb/ton	5.70	0.46	AP-42 Emission Factors
SO2	3.40	lb/ton	3.12	0.25	AP-42 Emission Factors
PM_{10}	1.40	lb/ton	1.29	0.10	AP-42 Emission Factors
$PM_{2.5}$	1.40	lb/ton	1.29	0.10	AP-42 Emission Factors
FPM	1.4	lb/ton	1.29	0.10	AP-42 Emission Factors
VOC	0.2	lb/ton	0.18	0.015	AP-42 Emission Factors

(1) AP-42 Emission Factors from Chapter 11.15, Glass Manufacturing, Tables 11.15-1 and 11.15-2.

ERM

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Forehearths LT11, LT12 and LT13

Firing Rate and Fuel Use: [1]	
Maximum Firing Rate (MMScf/hr)	0.011
Average Firing Rate (MMScf/hr)	0.006
Heating value of Fuel (MMBtu/MMScf)	1,020
Total Firing Rate For Three Forehearths (MMBtu/hr)	11.4
Total Annual Operating Hours (hr/yr)	8,760
Permitted Annual Heat Input (MMBtu/yr)	53,652
Permitted Annual Fuel Usage (MMScf/yr)	52.6
Emission Factors (lb/MMscf) [2]	
CO	84
NOx	100
SO2	0.6
FPM/PM-10/PM-2.5	7.6
VOC	5.5
Total HAP	1.89
Emission Factors (ton/MMBtu) [3]	
CO_2	5.84E-02
CH_4	1.10E-06
N_2O	1.10E-07
Hourly Emissions (lb/hr)	
CO	0.94
NOx	1.118
SO2	0.007
FPM/PM-10/PM-2.5	0.085
VOC	0.061
Total HAP	0.021
Annual Emissions (TPY)	
CO	2.21
NOx	2.630
SO2	0.016
FPM/PM-10/PM-2.5	0.200
VOC	0.145
Total HAP	0.093
CO2e	3,138.9

Notes:

(1) Heat Inputs and firing rates are calculated for three (3) forehearths combined.

(2) Emission factors are based on AP-42 Table 1.4-2 natural gas combustion for small boilers (<100 Mmbtu/hr)

(3) Calculated based on emission factors in 40 CFR 98 Subpart C, Tables C-1 & C-2

ERM

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Table 2-B

Forehearths LT11, LT12 and LT13 during Emergency Backup Fuel Firing

Firing Rate and Fuel Use (Liquified Petroleum Gas (LPG)): [(1)]	
Maximum Fuel Rate (gal/hr)	60
Heating value of Fuel (BTU/gal)[(2)]	95,045
Total Firing Rate For Three Forehearths (MMBtu/hr)	5.7
Total Annual Operating Hours (hr/yr)	160
Permitted Annual Heat Input (MMBtu/yr)	912
Permitted Annual Fuel Usage (gal/yr)	9,595
Emission Factors (lb/Mgal) [(3)]	
CO	7.5
NOx	13
SO2	0.0019
FPM/PM-10/PM-2.5	0.7
VOC	0.8
Emission Factors (ton/MMBtu) [(3)]	
CO_2	5.84E-02
CH_4	1.10E-06
N_2O	1.10E-07
Hourly Emissions (lb/hr)	
CO	0.45
NOx	0.780
SO2	0.000
FPM/PM-10/PM-2.5	0.042
VOC	0.048
Annual Emissions (TPY)	
CO	0.036
NOx	0.062
SO2	0.000
FPM/PM-10/PM-2.5	0.003
VOC	0.004
CO2e	53.4

Notes:

(1) Heat Inputs and firing rates are calculated for three (3) forehearths combined.

(2) Heating value of LPG will be adjusted via mixers such that it is equivalent to the heating value of natural gas. The heating value of 1020 BTU/SCF for natural gas is converted to BTU/gal using the densities of 0.044 lb/scf for natural gas and 4.1 lb/gal for LPG.

(3) Emission factors are based on AP-42 Table 1.5-1 for LPG combustion for commercial boilers; calculations assume a sulfur content of 185 ppmw per Gas Processors Association.

(4) Calculated based on emission factors in 40 CFR 98 Subpart C, Tables C-1 & C-2

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Four (4) Hot End Coaters

Certincoat® TC100

Material	Density (Lb/Gal)	Weight % Organics	Gal of Mat. (gal/hour)	Pounds VOC per gallon of Material	Potential VOC pounds per hour	Potential VOC tons per year
L1 = 1.2 l b/h	7.51	0.671%	0.16	0.05	0.008	0.04
L2 =1.2 lb/h	7.51	0.671%	0.16	0.05	0.008	0.04
L3 = 1.2 lb/h	7.51	0.671%	0.16	0.05	0.008	0.04
L4 = 1.2 lb/h	7.51	0.671%	0.16	0.05	0.008	0.04
Sum					0.032	0.14

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

***Firing Rate and Fuel Use:* [1]**	
Maximum Firing Rate (MMScf/hr)	0.006
Average Firing Rate (MMScf/hr)	0.002
Heating value of Fuel (MMBtu/MMScf)	1,020
Maximum Firing Rate (MMBtu/hr)	5.714
Total Annual Operating Hours (hr/yr)	8,760
Permitted Annual Heat Input (MMBtu/yr)	16,686
Permitted Annual Fuel Usage (MMScf/yr)	16.36
***Emission Factors (lb/MMscf)* [2]**	
CO	84
NOx	100
SO2	0.6
FPM/PM-10/PM-2.5	7.6
VOC	5.5
***Emission Factors (ton/MMBtu)* [3]**	
CO_2	5.84E-02
CH_4	1.10E-06
N_2O	1.10E-07
Hourly Emissions (lb/hr)	
CO	0.47
NOx	0.560
SO2	0.003
FPM/PM-10/PM-2.5	0.043
VOC	0.031
Annual Emissions (TPY)	
CO	0.69
NOx	0.82
SO2	0.005
FPM/PM-10/PM-2.5	0.062
VOC	0.045
CO2e	976.2

Notes:

(1) Heat inputs and firing rates are calculated for three (3) lehrs combined.

(2) Emission factors are based on AP-42 Table 1.4-2 natural gas combustion for small boilers (<100 Mmbtu/hr)

(3) Calculated based on emission factors in 40 CFR 98 Subpart C, Tables C-1 & C-2

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Three (3) Cold End Coaters With a Maximum Application Rate of 21 gal/hr each

Material	Density (Lb/Gal)	Weight % Organics	Gal of Mat. (gal/hour)	Pounds VOC per gallon of Material	Potential VOC pounds per hour	Potential VOC tons per year
Low Emission Dispersion Wax	7.51	0.671%	63.000	0.050	3.172	13.89

Calculation Methodology

Pounds of VOC per Gallon Coating = (Density (lb/gal) * Weight % Organics)

Potential VOC Pounds per Hour = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/hour)

Potential VOC tons per year = Potential VOC Pounds per Hour * 8760 hrs/yr * 1 ton/2000 lbs

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Two (2) Cummins QSK23-G7 NR2, Model DQCB 750 kW, Tier 2 Emergency Generators

Inputs

Description	Value	Units	Notes
Annual Operating Hours	500	hrs/yr	1
Engine Rating	1,220	bhp	
Sulfur Content in Diesel Fuel	15	ppm	2

Emissions Summary - Two Engines (total)

Pollutant	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tpy)
Filterable PM	0.38	0.09
PM_{10}	0.38	0.09
$PM_{2.5}$	0.38	0.09
NO_X	23.13	5.78
CO	2.15	0.54
SO_2	5.00	1.25
VOC	3.27	0.82
CO_2e	2,815.56	703.89
Total HAP	0.07	0.016

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Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Emissions Calculations - Per Engine

Pollutant	Emission Factor (lb/hp-hr)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tpy)	Notes	
Filterable PM	0.0002	0.19	0.05	3	spec sheet
PM_{10}	0.0002	0.19	0.05	3	spec sheet
$PM_{2.5}$	0.0002	0.19	0.05	3	spec sheet
NO_X	0.0095	11.57	2.89	3	spec sheet
CO	8.82E-04	1.08	0.27	3	spec sheet
SO_2	2.05E-03	2.50	0.63	4	
VOC	0.0013	1.63	0.41	4	
CO_2	1.15	1403.00	350.75	4	
N_2O	9.26E-06	0.01	<0.01	5	
CH_4	4.63E-05	0.06	0.01	5	
CO_2e	-	1407.78	351.94	6	
Benzene	6.53E-06	0.01	<0.01	7	
Toluene	2.86E-06	0.00	<0.01	7	
Xylenes	2.00E-06	<0.01	<0.01	7	
Formaldehyde	8.26E-06	<0.01	<0.01	7	
Acetaldehyde	5.37E-06	<0.01	<0.01	7	
Acrolein	6.48E-07	<0.01	<0.01	7	
Polycylic aromatic hydrocarbons (	1.18E-06	<0.01	<0.01	7	
Total HAP	-	0.03	<0.01		

Notes:

1. Emergency generators are limited to 300 hours of operation per year.
2. Per 40 CFR 60.4207(b), represents maximum sulfur content for nonroad diesel fuel, as specified in 40 CFR 80.510(b)(1)(i).

3. Emission factors from Cummins 2019 EPA Tier 2 Exhaust Emission Compliance Statement included in specification sheet.

4.Emission factors from AP-42 Section 3.3 Stationary Diesel Engines Table 3.3.-1 for diesel fuel.

5. Emission factor from 40 CFR 98 Table C-2 to Subpart C for petroleum fuel. Convert from kg to lb, and convert from MMBtu to hp-hr (* 7000 Btu/hp-hr / 1,000,000 Btu/MMBtu).

6. Global Warming Potentials from 40 CFR 98 Subpart A Table A-1.

Convert from MMBtu to hp-hr (* 7000 Btu/hp-hr / 1,000,000 Btu/MMBtu).

ERM

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

One (1) Kohler 50REOZK 64kVa (51 eKW) Emergency Generator

Inputs

Description	Value	Units	Notes
Annual Operating Hours	500	hrs/yr	1
Engine Rating	86	bhp	
Sulfur Content in Diesel Fuel	15	ppm	2

Emissions Summary

Pollutant	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tpy)
Filterable PM	0.19	0.05
PM_{10}	0.19	0.05
$PM_{2.5}$	0.19	0.05
NO_X	1.06	0.27
CO	0.70	0.18
SO_2	0.18	0.04
VOC	0.12	0.03
CO_2e	99.24	24.81
Total HAP	0.00	0.001

ERM

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Emissions Calculations

Pollutant	Emission Factor (lb/hp-hr)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tpy)	Notes
Filterable PM	0.0022	0.19	0.05	3
PM_{10}	0.0022	0.19	0.05	3
$PM_{2.5}$	0.0022	0.19	0.05	3
NO_X	0.0123	1.06	0.27	4
CO	8.16E-03	0.70	0.18	4
SO_2	2.05E-03	0.18	0.04	3
VOC	0.0013	0.12	0.03	3
CO_2	1.15	98.90	24.73	3
N_2O	9.26E-06	0.00	<0.01	5
CH_4	4.63E-05	0.00	0.00	3
CO_2e	-	99.24	24.81	6
Benzene	6.53E-06	0.00	<0.01	7
Toluene	2.86E-06	0.00	<0.01	7
Xylenes	2.00E-06	<0.01	<0.01	7
Formaldehyde	8.26E-06	<0.01	<0.01	7
Acetaldehyde	5.37E-06	<0.01	<0.01	7
Acrolein	6.48E-07	<0.01	<0.01	7
Polycylic aromatic hydrocarbons (PAH)	1.18E-06	<0.01	<0.01	7
Total HAP	-	0.00	<0.01	

Notes:

1. Emergency generators are limited to 300 hours of operation per year.
2. Per 40 CFR 60.4207(b), represents maximum sulfur content for nonroad diesel fuel, as specified in 40 CFR 80.510(b)(1)(i).
3. Emission factors from AP-42 Section 3.3 *Stationary Diesel Engines* Table 3.3.-1 for diesel fuel. As per footnote 'f,' TOC is 9% methane and 91% nonmethane.
4. Emission Factors from EPA Tier 3 requirements for NOX and CO for nonroad diesel engines, 37-75 kW (50-100 hp) in g/bhp-hr, converted to lb/bhp-hr.
5. Emission factor from 40 CFR 98 Table C-2 to Subpart C for petroleum fuel. Convert from kg to lb, and convert from MMBtu to hp-hr (* 7000 Btu/hp-hr / 1,000,000 Btu/MMBtu).
6. Global Warming Potentials from 40 CFR 98 Subpart A Table A-1.
7. Emission factors from AP-42 Section 3.3 *Gasoline and Diesel Industrial Engines* Table 3.3-2. Convert from MMBtu to hp-hr (* 7000 Btu/hp-hr / 1,000,000 Btu/MMBtu).

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

One (1) John Deere JU4H-UFADR0 121 BHP diesel fire pump engine

Inputs

Description	Value	Units	Notes
Annual Operating Hours	500	hrs/yr	1
Engine Rating	121	bhp	
Sulfur Content in Diesel Fuel	15	ppm	2

Emissions Summary

Pollutant	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tpy)
Filterable PM	0.27	0.07
PM_{10}	0.27	0.07
$PM_{2.5}$	0.27	0.07
NO_X	1.49	0.37
CO	0.99	0.25
SO_2	0.25	0.06
VOC	0.16	0.04
CO_2e	139.62	34.91
Total HAP	3.25E-03	8.12E-04

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Emissions Calculations

Pollutant	Emission Factor (lb/hp-hr)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (tpy)	Notes
Filterable PM	0.0022	0.27	0.07	3
PM_{10}	0.0022	0.27	0.07	3
$PM_{2.5}$	0.0022	0.27	0.07	3
NO_X	0.0123	1.49	0.37	4
CO	8.16E-03	0.99	0.25	4
SO_2	2.05E-03	0.25	0.06	3
VOC	0.0013	0.16	0.04	3
CO_2	1.15	139.15	34.79	3
N_2O	9.26E-06	0.00	<0.01	5
CH_4	4.63E-05	0.01	0.00	3
CO_2e	-	139.62	34.91	6
Benzene	6.53E-06	0.00	<0.01	7
Toluene	2.86E-06	0.00	<0.01	7
Xylenes	2.00E-06	<0.01	<0.01	7
Formaldehyde	8.26E-06	<0.01	<0.01	7
Acetaldehyde	5.37E-06	<0.01	<0.01	7
Acrolein	6.48E-07	<0.01	<0.01	7
Polycylic aromatic hydrocarbons (PAH)	1.18E-06	<0.01	<0.01	7
Total HAP	-	0.00	<0.01	

Notes:

1. Emergency generators are limited to 300 hours of operation per year.
2. Per 40 CFR 60.4207(b), represents maximum sulfur content for nonroad diesel fuel, as specified in 40 CFR 80.510(b)(1)(i).

per footnote 'f,' TOC is 9% methane and 91% nonmethane.

75 kW (50-100 hp) in g/bhp-hr, converted to lb/bhp-hr.

lb, and convert from MMBtu to hp-hr (* 7000 Btu/hp-hr / 1,000,000 Btu/MMBtu).

6. Global Warming Potentials from 40 CFR 98 Subpart A Table A-1.

Convert from MMBtu to hp-hr (* 7000 Btu/hp-hr / 1,000,000 Btu/MMBtu).

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Two (2) Cooling Towers of process water system; Concept one operating one standby
each 5000KW cooling capacity ; water circulation = 240m3/h 4.00 m3/min 1057 gpm

Operating Amount		Operating Time
Amount Processed	Units	Hours
9,256,589	Gallons/yr	8760

Air Contaminant	PTE Tons/yr	Calculation Methodology	Emission Factors	Units
PM-10	0.03	Mass Balance	0.008	lb/hr
PM-2.5	0.03	Mass Balance	0.008	lb/hr
FPM	0.03	Mass Balance	0.008	lb/hr
VOC	0.001	Mass Balance	0.0003	lb/hr

Calculation of lb/hr Emissions

	9256589.333		
Average Circulating Water Flow Rate	1,057	gpm	@88 degrees F = 31°C
	0.42	m3/min	
Average Annual Solid Concentration in water	3,000	ppmv	
Average Annual VOC Concentration in water	100.0	ppmv	
	0.0005%	Drift in Cooling Towers	
FPM/PM10/PM2.5	0.008	lb/hr based on 3,000 ppmv of total solids in cooling water	
VOC	0.0003	lb/hr based 100 ppmv of VOCs in cooling water	

<u>Methodology</u>
1,057 gpm x 60 minutes/hour x 0.000005 (% drift) x 3.8 L/Gal x 2.2e-6 lb/mg x 3000 ppmv = 0.83 lb/hr of PM
1,057 gpm x 60 minutes/hour x 0.000005 (% drift) x 3.8 L/Gal x 2.2e-6 lb/mg x 100 ppmv = 0.0003 lb/hr of VOC

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APPENDIX D SPECIFICATIONS

Emissions Summary
Arglass Yamamura, LLC
Valdosta, Georgia

Three (3) Cooling Towers from cooling water system; Concept two operating one standby
each: water circulation = 470m3/h => in operation 940 m3/h 15.67 m3/min 4139 gpm

Operating Amount		Operating Time
Amount Processed	Units	Hours
36,254,975	Gallons/yr	8760

Air Contaminant	PTE Tons/yr	Calculation Methodology	Emission Factors	Units
PM-10	0.14	Mass Balance	0.031	lb/hr
PM-2.5	0.14	Mass Balance	0.031	lb/hr
FPM	0.14	Mass Balance	0.031	lb/hr
VOC	0.005	Mass Balance	0.001	lb/hr

Calculation of lb/hr Emissions

	36254974.89		
Average Circulating Water Flow Rate	4,139	gpm	@88 degrees F = 31°C
	0.42	m3/min	
Average Annual Solid Concentration in water	3,000	ppmv	
Average Annual VOC Concentration in water	100.0	ppmv	
	0.0005%	Drift in Cooling Towers	
FPM/PM10/PM2.5	0.031	lb/hr based on 3,000 ppmv of total solids in cooling water	
VOC	0.001	lb/hr based on 100 ppmv of VOCs in cooling water	

<u>Methodology</u>
4,139 gpm x 60 minutes/hour x 0.000005 (% drift) x 3.8 L/Gal x 2.2e-6 lb/mg x 3000 ppmv = 0.83 lb/hr of PM
4,139 gpm x 60 minutes/hour x 0.000005 (% drift) x 3.8 L/Gal x 2.2e-6 lb/mg x 100 ppmv = 0.001 lb/hr of VOC

ERM

Diesel Generator Set

mtu 18V2000 DS1250

1,250 kWe/60 Hz/Standby/380 - 4,160V
Reference *mtu* 18V2000 DS1250 (1,000 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	480V † ‡	600V ‡	4,160V
Phase	3	3	3	3
PF	0.8	0.8	0.8	0.8
Hz	60	60	60	60
kW	1,250	1,250	1,250	1,250
kVA	1,562	1,562	1,562	1,562
Amps	2,374	1,879	1,503	216
skVA@30% voltage dip	2,700	3,100	4,650	3,100
Generator model*	743RSL4052	742RSL4048	743RSS4288	742FSM4366
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	4 LEAD WYE	4 LEAD WYE	4 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 18V2000 diesel engine
  - 40.2 liter displacement
  - Common rail fuel injection
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	18V2000G76S
Type	4-cycle
Arrangement	18-V
Displacement: L (in^3)	40.2 (2,448)
Bore: cm (in)	13.5 (5.3)
Stroke: cm (in)	15.6 (6.15)
Compression ratio	17.5:1
Rated speed: rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,371 (1,838)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	122 (32.2)
Engine jacket water capacity: L (gal)	73 (19.3)
System coolant capacity: L (gal)	185 (48.9)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#12 JIC 37° female 1" NPT adapter provided
Fuel return connection size	#12 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	1,500 (396)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	329 (87)
At 75% of power rating: L/hr (gal/hr)	251 (66)
At 50% of power rating: L/hr (gal/hr)	171 (45)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	950 (251)
Heat rejection to coolant: kW (BTUM)	515 (29,288)
Heat rejection to after cooler: kW (BTUM)	340 (19,335)
Heat radiated to ambient: kW (BTUM)	117.3 (6,671)
Fan power: kW (hp)	33.5 (44.9)

Air requirements

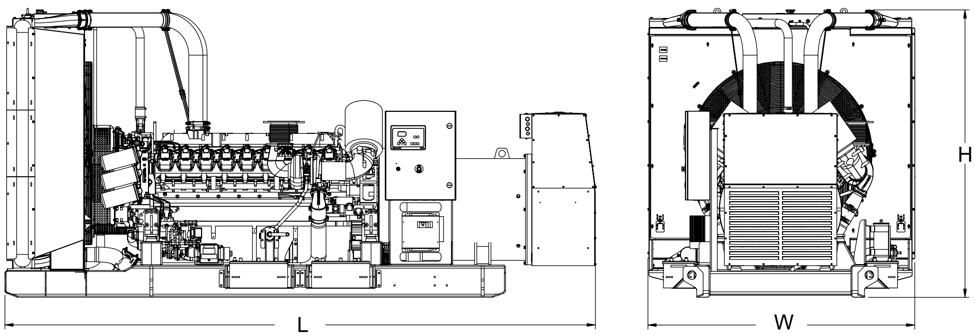
Aspirating: *m^3/min (SCFM)	102 (3,602)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	1,512 (53,396)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	428 (15,224)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	480 (896)
Gas volume at stack temperature: m^3/min (CFM)	252 (8,899)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,036 x 2,275 x 2,454 mm (198.3 x 89.6 x 96.6 in)	9,525 kg (21,000 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	88.4

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.77	0.15	0.01

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA Standards.

Rating definitions and conditions

— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.

— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).

— Deration factor:
- Consult your local ***mtu*** Distributor for altitude derations.
- Consult your local ***mtu*** Distributor for temperature derations.

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