MOLDED PRODUCTS
A Division of Atlas Roofing Corporation

November 21, 2024

Northern Nevada Public Health
Air Quality Management Division
1001 E Ninth St., Building B
Reno, NV 89512

RE: Atlas Molded Products, A Division of Atlas Roofing Corporation, Air Operating Permit # AAIR19-0047 Synthetic Minor Air Operating Permit Authority to Construct

Dear Sir or Madam:

Atlas Molded Products, A Division of Atlas Roofing Corporation, submits herewith a Synthetic Minor Air Operating Permit Authority to Construct to update and correct historical raw material throughputs and potential air emissions. No new equipment is proposed in this application.

Atlas Roofing Corporation has submitted check # 64-1278 for $ 6189.00, the Synthetic Minor Permit fee.

If you have any further questions, don't hesitate to get in touch with Atlas Director of Safety Environmental Josh Livingston at (720)-648-3208 or via email at JLivingston@atlasroofing.com.

Sincerely,

Atlas Molded Products, A Division of Atlas Roofing Corporation

Edouard Selle
Plant Manager – Responsible Official

Application to Modify the Air Operating Permit

MOLDED PRODUCTS
A Division of Atlas Roofing Corporation

13695 Mt. Anderson Street
Reno, Nevada 89506

November 14, 2024

ACCESS ENVIRONMENTAL SOLUTIONS

1100 Augusta Drive, Unit 704
Oxford, Mississippi 38655
Phone (662) 680-9927
Fax (662) 680-9208

APPLICATION CHECKLIST

This checklist must be included with your application. Check the appropriate box for each item. If an item is incomplete or not applicable, please detail why it is incomplete or not applicable in the "Notes" section at the end of the checklist. **Reference Page 11 for more detailed information about the required supplemental documents.**

Yes	No	N/A	
☒	☐	☐	Application for Authority to Construct
☒	☐	☐	Site Map
☒	☐	☐	Process Flow Diagram (as applicable) • Clearly depict all emissions units (EU's) and show emission unit ID numbers (EU ID #'s) • Indicate emission control application points
☒	☐	☐	Equipment List. Include the following areas of information: • Descriptions and specifications • Power/capacity ratings • EU ID Numbers • Dates of manufacture, installation, and operation
☒	☐	☐	Air Pollution Control Equipment/Measures List
☒	☐	☐	Emissions unit and/or control device worksheet for each emission unit and/or control device.
☒	☐	☐	Detailed Emissions Calculations – Emissions calculations should be included for each (EU) and for each regulated pollutant (lbs/hr and tons/yr); Calculations should include controls, hours of operation, throughput/fuel usage, Emission Factors, etc. The calculations should also match the application forms. The following should also be included: • Potential to Emit (PTE) • Emissions Increase (existing facilities only). The prior PTE vs proposed PTE.
☒	☐	☐	Operational Information (if not included in the required worksheet)
☐	☐	☒	Safety Data Sheets (as applicable)
☐	☐	☒	Compliance Monitoring Devices List (as applicable)
☐	☐	☒	Exhaust Stack Information List (if not included in the required worksheet)
☐	☐	☒	Federal Performance Standards List (if not included in the required worksheet)
☐	☐	☒	Applicable Requirement Supplement (as applicable)
☐	☐	☒	Construction Schedule (as applicable)
☐	☐	☒	Applicable Requirements Exemption List (as applicable)

Yes	No	N/A	
☐	☐	☒	Manufacturer specification sheet for each emissions unit and/or control device and Manufacturer's Guarantee (if applicable, due to control efficiencies claimed)
☒	☐	☐	Source Testing Data (if referenced in calculations)
☒	☐	☐	Electronic version of all documents submitted via email to AQMDPermitting@nnph.org or thumb drive included.
☒	☐	☐	Applicability Determination Fee. The invoice must be paid in full before the application is processed.

Notes:

The purpose of this application is to update and correct potential raw material throughputs and potential air emissions. No new equipment is proposed in this application.

NORTHERN NEVADA Public Health | Air Quality

FOR AQMD USE ONLY
Permit No.:

APPLICATION FOR AUTHORITY TO CONSTRUCT

Facility Information		
1. ☐ New Permit ☒ Permit Modification		
2. **Existing facilities only.** Permit Number (AAIRXX-XXXX): 19-0047		
3. Facility Name: Atlas Roofing Corporation		4. NAICS: 326140
5. Facility Location: ☒ Stationary ☐ Portable		
6. Facility Address: 13695 Mt Anderson Street		APN: 09005117
City: Reno	State: NV	ZIP Code: 89506
7. Facility latitude and longitude coordinates: 39.649229 deg / -119.884504 deg		
8. **Stationary facilities only.** Is the facility located within 1,000 feet of the outer boundary of a school, hospital, or residential area? ☒ Yes ☐ No		
9. Operating Schedule Hours Per Day: 24	Days Per Week: 7	Weeks Per Year: 52
10. On-Site Contact Information		
Name: Edouard Selle		
Title: Plant Manager		
Phone Number: 775-343-3400	Fax Number: 775-343-3407	
Email: eselle@atlasroofing.com		
Optional (#11 – #13). If there are records required under the operating permit, and they will be kept at a location other than the facility, specify the location:		
11. Facility Name: Same		
12. Facility Address:		
City:	State:	ZIP Code:
13. On-Site Contact Information		
Name:		
Title:		
Phone Number:	Fax Number:	
Email:		

Company Information (all fields must be completed)

14. **Existing facilities only.** Has the company ownership changed? ☐Yes ☒No ☐N/A
If "Yes", submit an *Application for Change of Ownership* and Fee, in addition to this application.

15. Legal Company Name: Atlas Roofing Corporation

16. Mailing Information

Mailing Address: 13695 Mt Anderson Street		
City: Reno	State: NV	ZIP Code: 89506
Permitting Contact Name: Edouard Selle		
Title: Plant Manager		
Phone Number: 775-343-3400	Fax Number: 775-343-3407	
Email: eselle@atlasroofing.com		

17. Billing Information

Billing Address: 13695 Mt Anderson Street		
City: Reno	State: NV	ZIP Code: 89506
Billing Contact Name: Edouard Selle		
Title: Plant Manager		
Phone Number: 775-343-3400	Fax Number: 775-343-3407	
Email: eselle@atlasroofing.com		

Responsible Official Information

Name of Responsible Official: Edouard Selle		
Title: Plant Manager		
Phone Number: 775-343-3400	Fax Number: 775-343-3407	
Email: eselle@atlasroofing.com		
Mailing Address: 13695 Mt Anderson Street		
City: Reno	State: NV	ZIP Code: 89506

Facility Manager/Environmental Representative (Optional)

Name: Josh Livingston	Title: Director Safety & Environmental	
Phone Number: 720-648-3208	Fax Number:	
Email: jlivingston@atlasroofing.com		
Mailing Address: 2100 Riveredge Pkwy, Ste 600		
City: Atlanta	State: GA	ZIP Code: 30328

Environmental Consultant Information (Optional)

By identifying a consultant, the RO consents that such consultant has the authority to communicate directly with the AQMD for the limited purpose of providing supplemental information and comments in support of the information already provided by the RO in the application. The RO acknowledges that any change to, or withdrawal of the application must be done by the RO.

Name: David Sykes	Title: Principal Engineer	
Phone Number: 662-680-9927	Fax Number: 662-680-9208	
Email: david.sykes@accessenvironmetal.com		
Mailing Address: 1100 Augusta Drive, Ste 704		
City: Oxford	State: MS	ZIP Code: 38655

Application Description

Describe all equipment and processes being proposed in the application. Make sure the narrative matches the process flow diagram (as applicable). For existing facilities, make sure to describe any revisions or modifications being requested, and include any equipment to be removed and/or replaced. Reference the instructions on Page 12 for more information.

The purpose of this application is to update and correct potential raw material throughputs and potential air emissions. No new equipment is proposed in this application.

NOTE: Applicant agrees to allow on-site inspection during and after construction by the Air Quality Management Division (AQMD) during working hours and without prior notice. The operator must notify the AQMD when the facility commences and completes construction. An official Permit to Operate will not be issued until a final inspection is made and all required test data has been forwarded to the AQMD showing the equipment meets all district, state, and federal regulations.

This application is submitted in accordance with the provisions of Section 030.000, and under penalty of perjury, to the best of my knowledge the information supplied in this document is true and correct.

11/21/2024

Responsible Official Signature   Date

Edouard Selle   Plant Manager

Print Name   Title

NORTHERN NEVADA Public Health | Air Quality

FOR AQMD USE ONLY
AIR QUALITY MGMT. NOV 22 2024 WASHOE COUNTY HEALTH DIST.
Permit No.:

BOILER WORKSHEET

☐ Supplemental Information

Facility Information		
1. ☐ New Permit ☒ Permit Modification		
2. **Existing facilities only.** Permit Number (AAIRXX-XXXX): 19-0047		
3. Facility Name: Atlas Roofing Corporation		
4. Facility Address: 13695 Mt Anderson Street		
City: Reno	State: NV	ZIP Code: 89506
Specifications		
5. Emission Unit ID (EU ID): I.001		
6. Manufacturer: Hurst	7. Date of Manufacture: 2007	
8. Model No.: Series 500 Scotch Marine	9. Serial No.: S1250-150-128	
10. Max. heat input rate (MMBtu/hr): 10.5		
11. Max. hours of operation per year: 8760		
12. Primary fuel type: ☒ Natural Gas ☐ Diesel ☐ Propane/LPG ☐ Other (specify):		
12.a. Sulfur content for distillate fuel other than diesel: NA		
13. Secondary fuel type: ☐ N/A ☐ Natural Gas ☐ Diesel ☐ Propane/LPG ☒ Other(specify): Pentane emitted from process		
13.a. Sulfur content for distillate fuel other than diesel: NA		
14. Max. rated emissions concentrations (in ppm) for the burner: NO_x: 100 lb/MMCF CO: 84 lb/MMCF		
15. Exhaust stack parameters:		
Height (feet): 36	Diameter (inches): 18	Temperature (°F): 328
Velocity (ft/sec):	OR Exhaust Volume (ft^3/min): 2237	

16.	Did construction, modification, or reconstruction commence after August 17, 1971, but on or before September 18, 1978, and does the indirect heating unit have a maximum design heat input capacity to combust more than 250 MMBtu/hr? ☐Yes ☒No (If "Yes", this boiler may be subject to 40 CFR Part 60, Subpart D)
17.	Did construction, modification, or reconstruction commence after September 18, 1978, and does the indirect heating unit have a maximum design heat input capacity to combust more than 250 MMBtu/hr? ☐Yes ☒No (If "Yes", this boiler may be subject to 40 CFR Part 60, Subpart Da)
18.	Did construction, modification, or reconstruction commence after June 19, 1984, and does the indirect heating unit have a maximum heat input capacity to combust more than 100 MMBtu/hr, but less than 250 MMBtu/hr? ☐Yes ☒No (If "Yes", this boiler may be subject to 40 CFR Part 60, Subpart Db)
19.	Did construction, modification, or reconstruction commence after June 9, 1989, and does the indirect heating unit have a maximum design heat input capacity to combust 10 MMBtu/hr or more, but less than 100 MMBtu/hr? ☒Yes ☐No (If "Yes", this boiler may be subject to 40 CFR Part 60, Subpart Dc)
20.	Is the boiler operating at a major source for hazardous pollutants? ☐Yes ☒No (If "Yes", and the boiler/process heater is new; OR if "Yes" and construction of the boiler/process heater began after June 4, 2010, and met the applicability criteria at the time of construction, the boiler may be subject to 40 CFR Part 63, Subpart DDDDD)

Attach manufacturer's specification sheet(s) for the boiler and the burner. Duplicate sheet as needed.

NORTHERN NEVADA Public Health | Air Quality

FOR AQMD USE ONLY
AIR QUALITY MGMT. NOV 22 2024 WASHOE COUNTY HEALTH DIST.
Permit No.:

BOILER WORKSHEET

☐ Supplemental Information

Facility Information		
1. ☐ New Permit ☒ Permit Modification		
2. **Existing facilities only.** Permit Number (AAIRXX-XXXX): 19-0047		
3. Facility Name: Atlas Roofing Corporation		
4. Facility Address: 13695 Mt Anderson Street		
City: Reno	State: NV	ZIP Code: 89506
Specifications		
5. Emission Unit ID (EU ID): J.001		
6. Manufacturer: Hurst	7. Date of Manufacture: 2020	
8. Model No.: Series 500 Scotch Marine	9. Serial No.: SG-2-250-150	
10. Max. heat input rate (MMBtu/hr): 10.5		
11. Max. hours of operation per year: 8760		
12. Primary fuel type: ☒ Natural Gas ☐ Diesel ☐ Propane/LPG ☐ Other (specify):		
12.a. Sulfur content for distillate fuel other than diesel: NA		
13. Secondary fuel type: ☒ N/A ☐ Natural Gas ☐ Diesel ☐ Propane/LPG ☐ Other(specify):		
13.a. Sulfur content for distillate fuel other than diesel: NA		
14. Max. rated emissions concentrations (in ppm) for the burner: NO_x: 100 lb/MMCF CO: 84 lb/MMCF		
15. Exhaust stack parameters:		
Height (feet): 36	Diameter (inches): 18	Temperature (˚F): 400
Velocity (ft/sec):	OR Exhaust Volume (ft³/min): 3560	

16.	Did construction, modification, or reconstruction commence after August 17, 1971, but on or before September 18, 1978, and does the indirect heating unit have a maximum design heat input capacity to combust more than 250 MMBtu/hr? ☐Yes ☒No (If "Yes", this boiler may be subject to 40 CFR Part 60, Subpart D)
17.	Did construction, modification, or reconstruction commence after September 18, 1978, and does the indirect heating unit have a maximum design heat input capacity to combust more than 250 MMBtu/hr? ☐Yes ☒No (If "Yes", this boiler may be subject to 40 CFR Part 60, Subpart Da)
18.	Did construction, modification, or reconstruction commence after June 19, 1984, and does the indirect heating unit have a maximum heat input capacity to combust more than 100 MMBtu/hr, but less than 250 MMBtu/hr? ☐Yes ☒No (If "Yes", this boiler may be subject to 40 CFR Part 60, Subpart Db)
19.	Did construction, modification, or reconstruction commence after June 9, 1989, and does the indirect heating unit have a maximum design heat input capacity to combust 10 MMBtu/hr or more, but less than 100 MMBtu/hr? ☒Yes ☐No (If "Yes", this boiler may be subject to 40 CFR Part 60, Subpart Dc)
20.	Is the boiler operating at a major source for hazardous pollutants? ☐Yes ☒No (If "Yes", and the boiler/process heater is new; OR if "Yes" and construction of the boiler/process heater began after June 4, 2010, and met the applicability criteria at the time of construction, the boiler may be subject to 40 CFR Part 63, Subpart DDDDD)

Attach manufacturer's specification sheet(s) for the boiler and the burner. Duplicate sheet as needed.

NORTHERN NEVADA Public Health | Air Quality

FOR AQMD USE ONLY
Permit No.:

EMISSION CONTROL DEVICE WORKSHEET

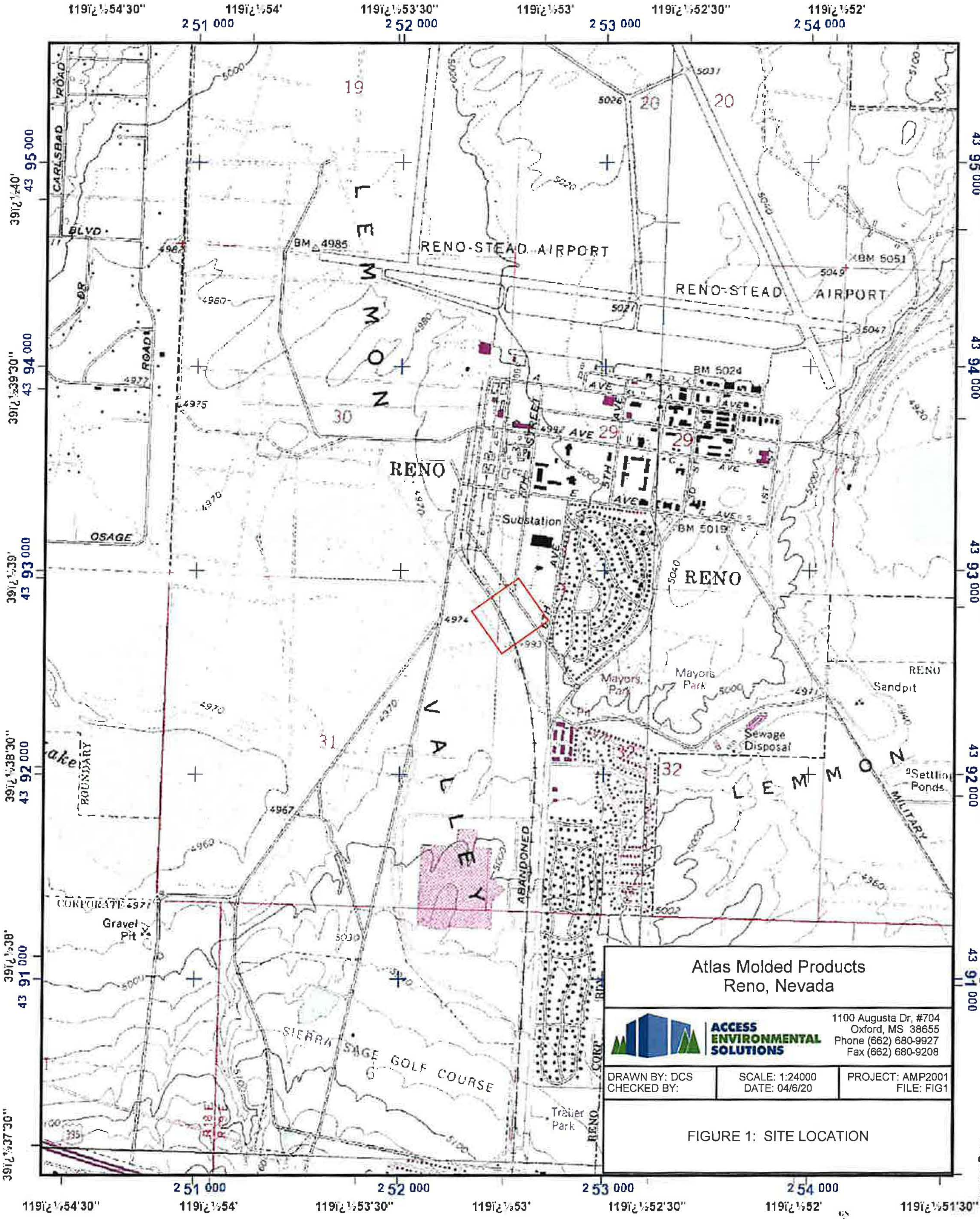
☐ Supplemental Information

Facility Information		
1. ☐ New Permit ☒ Permit Modification		
2. **Existing facilities only.** Permit Number (AAIRXX-XXXX): 19-0047		
3. Facility Name: Atlas Roofing Corporation		
4. Facility Address: 13695 Mt Anderson Street		
City: Reno	State: NV	ZIP Code: 89506

Control Device Specifications	
5. Manufacturer: Hurst	6. Date of Manufacture: 2007
7. Model No.: Series 500 Scotch Marine	8. Serial No.: S1250-150-128
9. Rated Control Efficiency (%): 99.999 Pollutants Controlled: ☐ CO ☐ NO_x ☒ VOC ☐ PM_{10} ☐ $PM_{2.5}$ ☐ SO_2 ☐ Other (specify):	
10. Description of the control device: Steam Boiler	
11. Proposed operating parameters (e.g., pressure drop, cfm, temperature, pH): The combustion temperature required for the boiler to generate steam is much higher than the temperature required to control emissions. Therefore, monitoring of combustion temperature is not proposed.	
12. Emission unit(s) or process(es) venting emissions to the control device: 2 EPS Pre-expanders, 18 bead conditioning bags, 1 block mold, 6 shape molds.	

Attach flow diagram(s) and manufacturer's specification sheet(s). Duplicate sheet as needed.

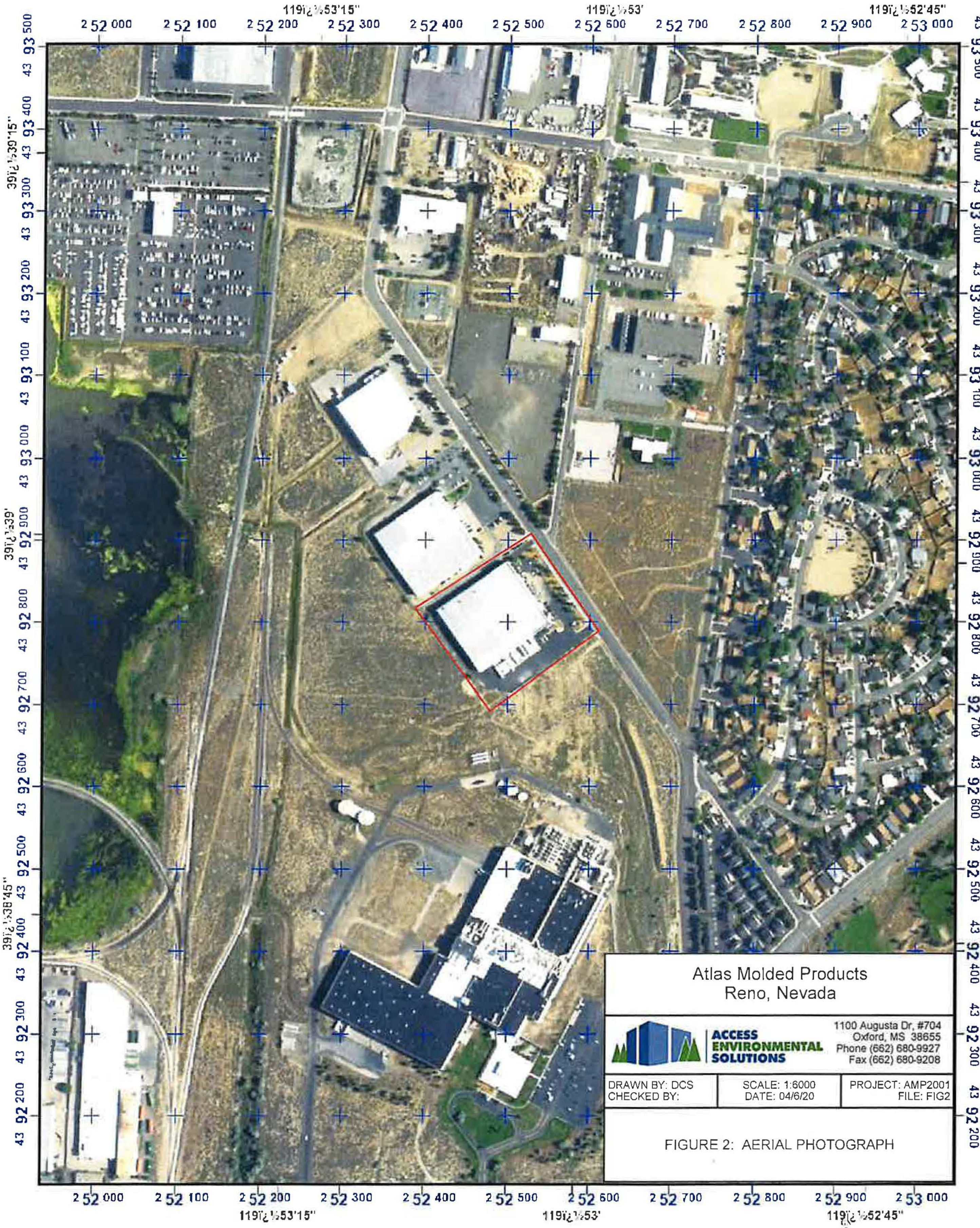
Figure 1: Site Location



1:24000 scale

Universal Transverse Mercator (UTM) Projection Zone 11
North American Datum of 1983
1000 meter UTM / USNG / MGRS
Grid Zone Designation 11S
100 000 m Squares KD

Figure 2: Site Aerial Photo

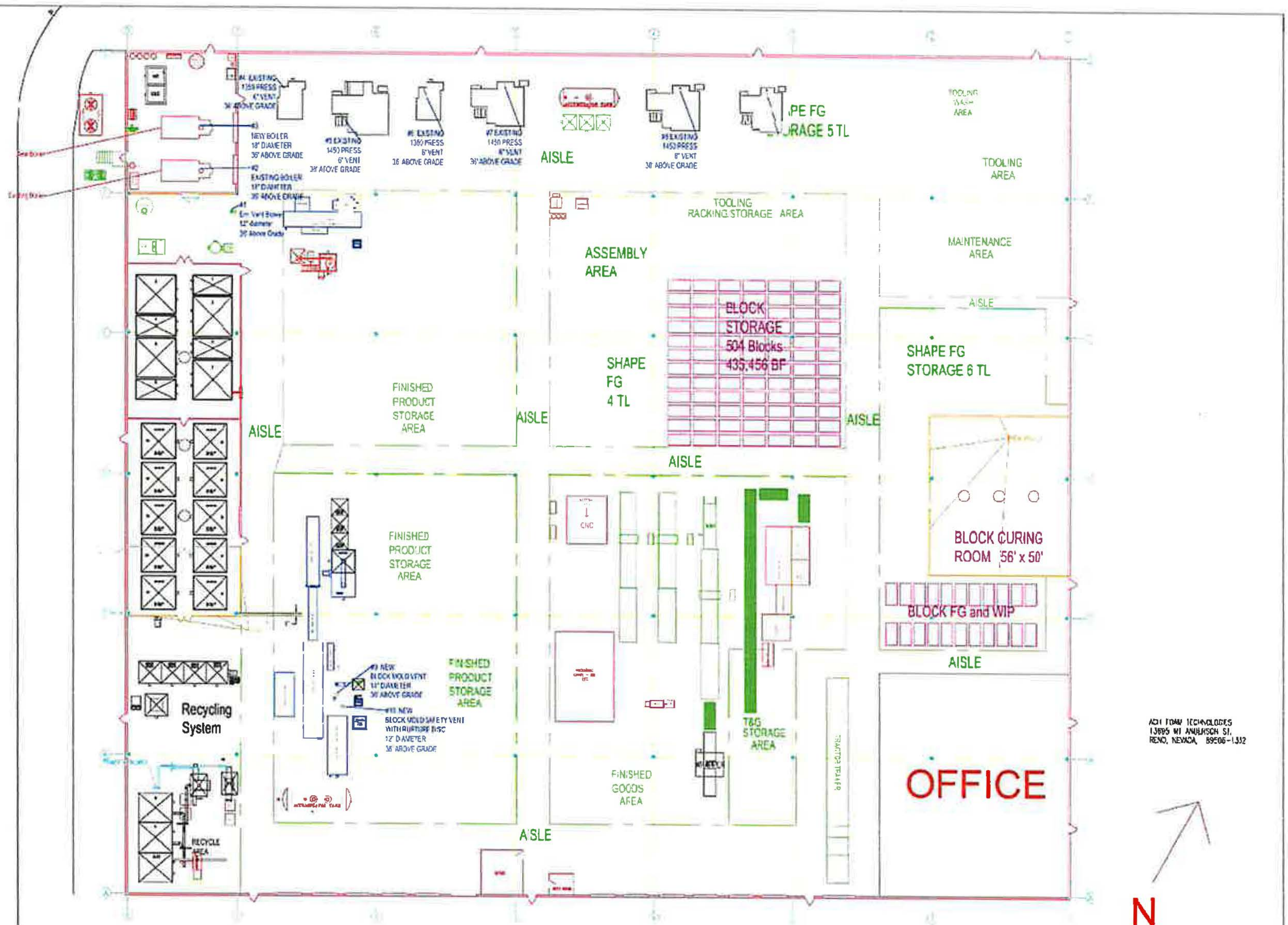


1:6000 scale

Universal Transverse Mercator (UTM) Projection Zone 11
North American Datum of 1983
100 meter UTM / USNG / MGRS
Grid Zone Designation: 11S
100,000-m Squares KD

Magnetic declination of 15E at center of map on March 17, 2011

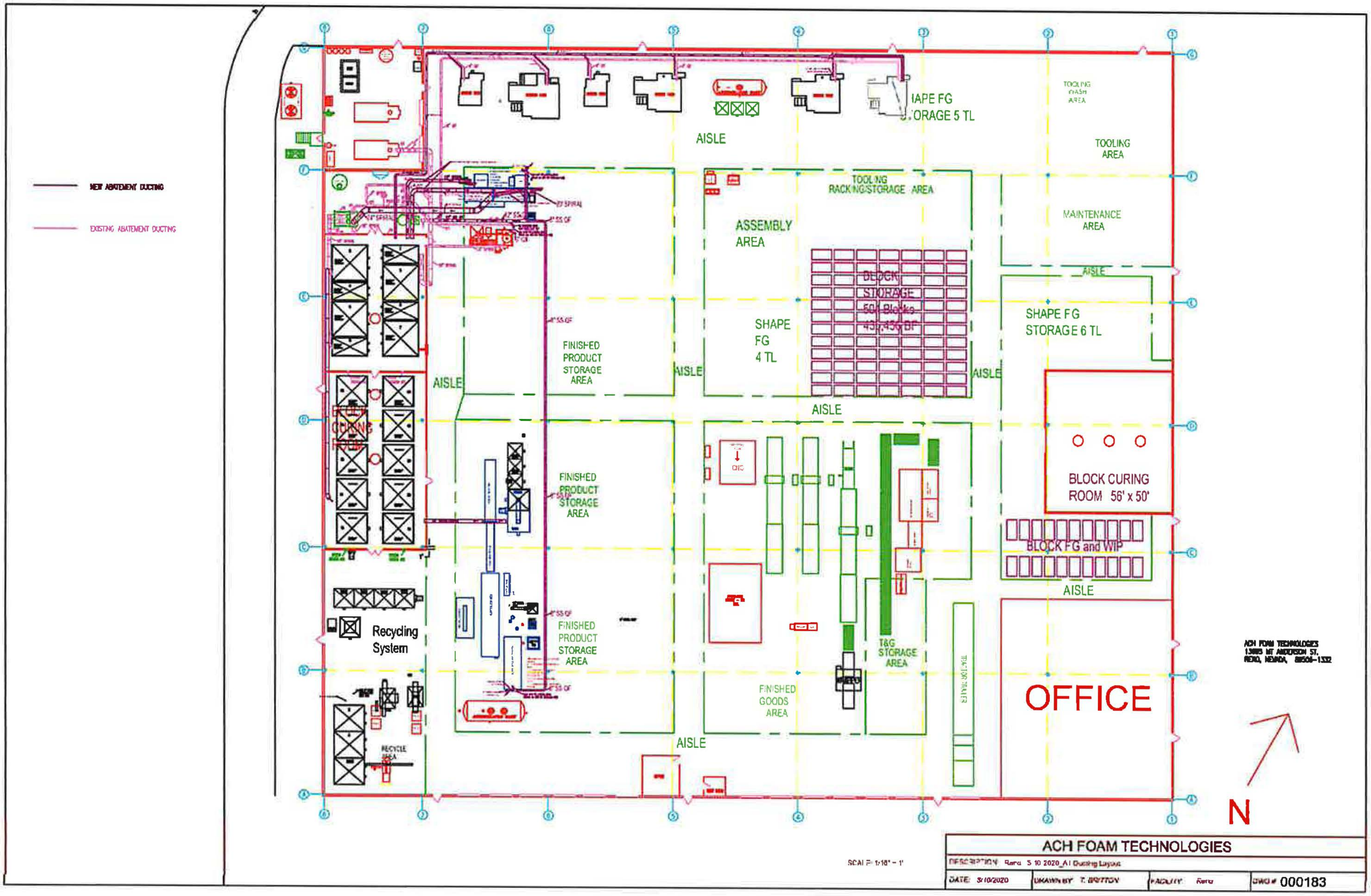
Figure 3: Equipment Layout



SCALE 1/16" = 1'

ACH FOAM TECHNOLOGIES			
DESCRIPTION Reno - 2-20-2020_Plant Layout			
DATE 2-20-2020	DRAWN BY T. BRITTON	FACILITY Reno	DWG # 000183

Figure 4: Abatement System Ducting



NEW ABATEMENT DUCTING
EXISTING ABATEMENT DUCTING
AISLE
TOOLING WASH AREA
TOOLING AREA
TOOLING RACKING/STORAGE AREA
ASSEMBLY AREA
MAINTENANCE AREA
BLOCK STORAGE
SHAPE FG 4 TL
SHAPE FG STORAGE 6 TL
FINISHED PRODUCT STORAGE AREA
BLOCK CURING ROOM
BLOCK CURING ROOM 56' x 50'
BLOCK FG and WIP
Recycling System
RECYCLE AREA
T&G STORAGE AREA
FINISHED GOODS AREA
TRACTOR TRAILER
OFFICE
N
ACH FOAM TECHNOLOGIES
RENO, NEVADA,
SCALE: 1/16" = 1'
ACH FOAM TECHNOLOGIES
DATE: 3/10/2020
DRAWN BY: T. BRITTON
FACILITY: Reno
DWG # 000183

Attachment A: Process Description

Attachment A: Process Description

Facility Description

The Atlas Molded Products facility is located at 13695 Mount Anderson Street in Reno, Nevada. The property is zoned I, "All-Industrial," by the Washoe County Development Office. The 8-acre site includes a 102,000 square foot manufacturing building, loading docks, tractor-trailer parking, and employee parking.

Process Description

Atlas Molded Products manufactures expanded polystyrene (EPS) foam and foam products. The facility receives as its primary raw material EPS beads. EPS beads are made using a polymerization process which produces translucent spherical beads of polystyrene, about the size of sugar granules. During this process, pentane gas is added to the material to assist expansion during subsequent processing.

EPS foam is produced in a three-stage process:

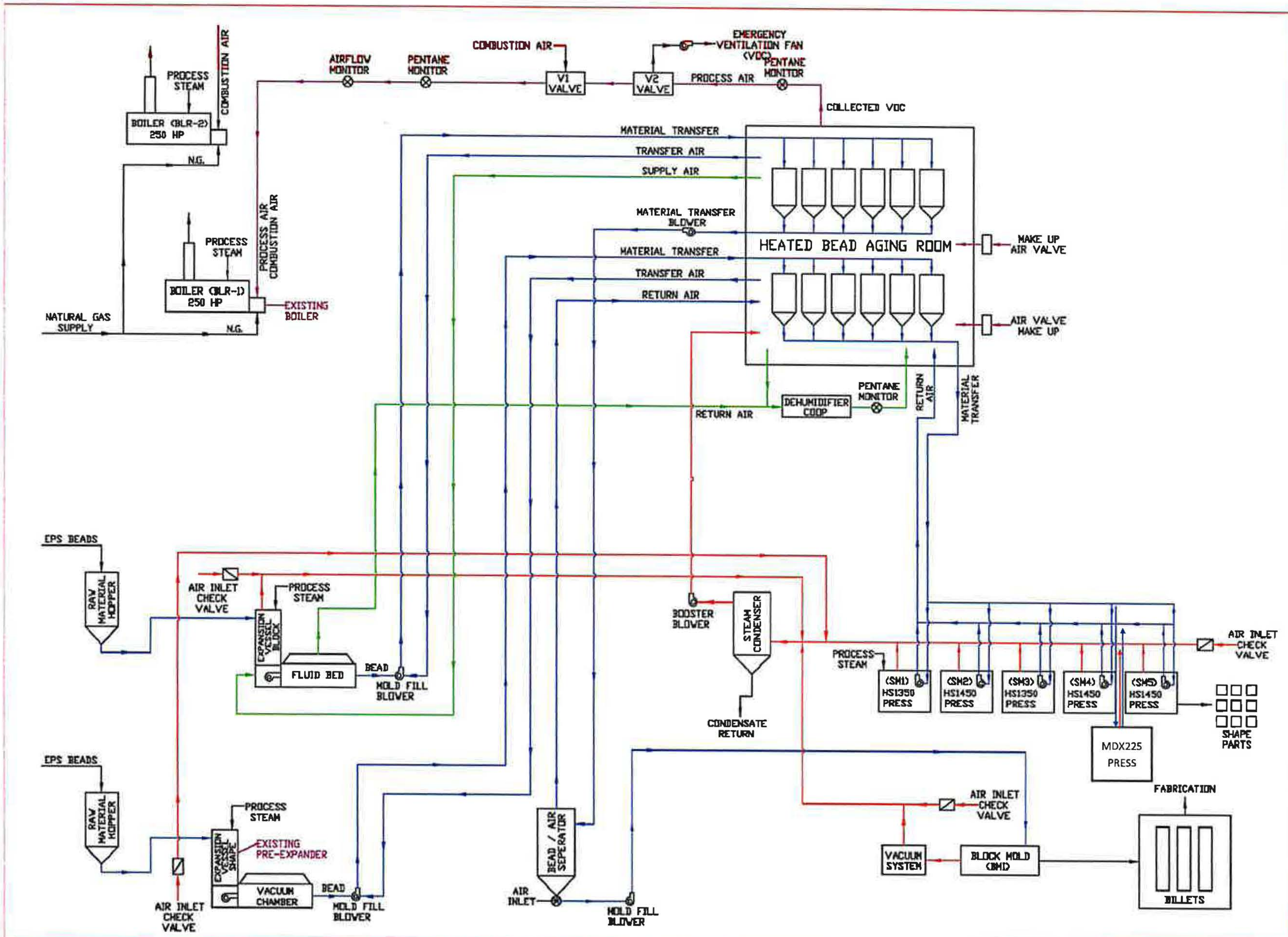
Pre-expansion - Upon contact with steam the pentane contained in the beads starts to boil and the beads are expanded to between 40 to 50 times their original volume.

Conditioning - After expansion, the beads undergo a maturing period in order to reach an equilibrium temperature and pressure.

Molding - The beads are placed within a mold and again reheated with steam. The pre-foamed beads expand further, completely fill the mold cavity, and fuse together. The beads are molded to form blocks or customized shape products.

There are two molding processes for EPS. Block molding produces large blocks of EPS which can then be cut into shapes or sheets for use in both packaging and building/construction applications. Shape molding produces parts which have custom designed specifications such as electronic product packaging. The Atlas Molded Products Reno Facility currently performs both block molding and shape molding.

Attachment B: Process Flow Diagram



13695 MOUNT ANDERSON ST
RENO, NEVADA 89506
775-343-3400

ACH FOAM TECHNOLOGIES

REVISION RECORD		
NO	REVISION	DATE
1	ADDED BLOCK MOLD & PRE-EXPANDER	6-20

DATE: 3-10-2020

DRAWN: T. BRITTON

CHECKED:

EXPANDED POLYSTYRENE BLOCK AND SHAPE MOLDING FACILITY
RENO, NEVADA

SHEET	OF
1	1

Attachment C: Equipment List

Attachment C: Equipment List

Currently Permitted Equipment

- B.001 - One (1) Kurtz Pre-Expander, Model # VSD-3000, Serial # 130-230-VD-149

  Stack Diameter: 6"
  Stack height: (Connected to Abatement System)
  Capacity: 3,000 lbs./Hr. @ nominal 1lb./cu. Ft. Density
  Capacity: 2,500 lbs./Hr. @ nominal 0.8lb./cu. Ft. Density

- C.001 - One (1) Hirsch Pre-Expander, Model # Preex 6000

  Stack Diameter: 6"
  Stack height: (Connected to Abatement System)
  Capacity: 1,170 lbs./Hr. @ 2lb./cu. Ft. Density
  Capacity: 930 lbs./Hr. @ 1.12lb./cu. Ft. Density

- D.001-D.018 - Eighteen (18) Bead Conditioning Bags with frames

  Throughput shown is for each of the 18 bags.

Bag Capacity (cubic feet)	Bead Density (lbs/cubic foot)	Bag Capacity (lbs)	Hang Time Required (hrs)	Bag Throughput (lbs/hr)
2,300	0.75	1,725	8	216
	0.90	2,070	10	207
	1.00	2,300	10	230
	1.25	2,875	12	240
	1.35	3,105	15	207
	1.80	4,140	24	173
	3.00	6,900	72	96

- E.001 - One (1) Kurtz <u>Block Mold</u> w/vacuum system, Serial # 6-13-12-247

  Cavity Size : 48.8" x 52.5" x 244"(362 cu. ft.) X 196"(290 cu. ft.)
  Note: Cavity will be modified to: 48.8" x 50" x 196" (276.75 cu. ft.)
  Steam Vent Stack Diameter: 14" Exhaust Vent
  Stack Height approximately 36 ft. (Located on Floor Plan)
  Stack Exhaust: Saturated Steam, air, Pentane
  Rate: 14,400 CFM (240 cu. ft./sec.)
  Note: (Approximately 5 second exhaust burst per cycle)
  Vacuum System Stack Diameter: 8"
  Stack Height: (Connected to Abatement System)
  Max. Capacity: 15 Blocks/Hr. @ nominal 1lb. /cu. Ft. Density
  Nominal capacity: 10-12 Block/Hr. @ 1lb./cu. Ft. Density

- F.001-F.006 - Six (6) Shape Molds

  Throughput shown is for each of the 6 molds.
  426 pounds per hour each

- G.001-G.006 - Six (6) Wire Cutters

  15 blocks per hour total
  2,404 pounds per hour total

- H.001-H.002 - Two (2) Densifiers

  333 pounds per hour total

- I.001 - One (1) 10.5 MMBtu/hr Hurst Natural Gas Boiler (VOC Emissions Control)

  Fuel: Natural Gas
  Input: BTU/HR: 10,500,000 (10,500MBH)
  Output: 8,625 LBS/HR Steam
  Stack Diameter: 18 inch
  Stack height approximately 36 ft. (Located on Floor Plan)
  Exhaust Flow: 2,237 ACFM at 328 F

- J.001 - One (1) 10.5 MMBtu/hr Hurst Natural Gas Boiler, Series 500 Scotch Marine, Model SG-2-250-150

  Fuel: Natural Gas
  Input: BTU/HR: 10,500,000 (10,500MBH)
  Output: 8,625 LBS/HR Steam
  Stack Diameter: 18 inch
  Stack height approximately 36 ft. (Located on Floor Plan)
  Exhaust Flow: 3,560 ACFM at 400 F

Attachment D: List of Materials and Estimated Quantities

Attachment D: List of Materials and Estimated Quantities

	Source	Raw Materials	Potential Quantities		VOC Content (%)
			Hourly (lbs)	Annual (tons)	
B.001	Block Pre-Expander	EPS Beads	3,000	13,140	6.5
C.001	Shape Pre-Expander	EPS Beads	1,170	5,125	6.5
D.001-018	Bead Conditioning Bags	Expanded EPS Beads	240/bag	1,051/bag	5.5
E.001	Kurtz Block Mold	Expanded EPS Beads	3,372	14,769	3.6
F.001-006	Shape Molds	Expanded EPS Beads	426 each	1,866 each	2.0
G.001-006	Hot Wire Cutters	EPS Block	2,404	10,533	3.0
H.001-002	Densifiers	EPS Scrap	333	1,460	2.0
I.001	Hurst Boiler	Natural Gas	10,500 CF	92 MMCF	N/A
J.001	Hurst Boiler	Natural Gas	10,500 CF	92 MMCF	N/A

Attachment E: Description of Emissions Control Equipment

Attachment E: Description of Emissions Control Equipment

Source I.001: Hurst 250 Natural Gas-Fired Boiler

Design Specifications include:

- Steam output 8,625 lbs/hr
- Gross output 8,369 MMBtu/hr
- Firing rate on natural gas (1,000 Btu/cf) 10,500 cfh

Operating parameters monitored for effective operation of the Boiler include:

- Combustion temperature
- Steam pressure
- Water level
- Water temperature

Description of Emissions Control Operation

The existing, currently permitted, Hurst 250 HP boiler is used to control VOC emissions from the pre-expanders, bead conditioning bags, shape molds, and block mold. The boiler has been specifically designed for VOC emissions control and uses natural gas as a supplemental fuel.

Testing conducted in 2021 and submitted to the Air Quality Management Division indicated a capture efficiency of 87.69% and a destruction efficiency of 99.999% for an overall control efficiency of 87.69%.

The capture efficiency was determined by calculating the VOC content of the raw material (beads), testing the VOC content retained in the finished products, and measuring the amount of VOC at the inlet of the emissions control boiler. The percentage of the raw material VOC that was neither retained in the finished product nor measured at the boiler inlet was assumed to be emitted uncontrolled.

Attachment F: Emissions Calculations

Maximum Potential Controlled Air Emissions
AMP Reno

Source ID	Emissions Source	Operational Limits	Potential Emissions (Tons per Year) PM10	PM2.5	SO2	NOX	CO	VOC
A.001	Storage Silo	None						
B.001	Block Pre-Expander and Fluid Bed	36 tons bead per 24 hours						19.90
C.001	Shape Pre-Expander	14 tons bead per 24 hours						7.76
D.001 - D.018	Bead Conditioning Bags	2.88 tons per 24 hours per bag						27.90
E.001	Kurtz Block Mold	36 tons bead per 24 hours						1.52
F.001-F.006	Shape Molds	6 tons per 24 hours per shape mold						11.76
G.001-G.006	Hot Wire Cutters	None	18.19	18.19				0.56
H.001-H.002	Densifiers	None						7.71
I.001	Hurst 10.5 mmBTU/hr boiler	10,500 CF natural gas per hour	0.25	0.08	0.03	4.38	3.68	0.24
J.001	Hurst 10.5 mmBTU/hr boiler	10,500 CF natural gas per hour	0.25	0.08	0.03	4.38	3.68	0.24
	Facility-Wide Limits		18.69	18.35	0.06	8.76	7.36	77.59

Based on 6 shape molds and 18 aging bags.

Block Expander Capacity
Atlas Molded Products
Reno, Nevada

Kurtz Pre-Expander, Model # VSD-3000, Serial # 130-230-VD-149

Stack Diameter: 6”
Stack height: (Connected to Abatement System)
Capacity: 3,000 lbs./Hr. @ nominal 1lb./cu. Ft. Density
Nominal capacity: 2500 lbs./Hr. (.80 Density)

Capacity: 36 tons / 24 hour period

Block Expander Emissions Calculation
Atlas Molded Products
Reno, Nevada

Kurtz Pre-Expander, Model # VSD-3000, Serial # 130-230-VD-149
Capacity: 36 tons / 24 hour period

Emissions for expansion were calculated by multiplying the potential throughput of raw beads times the nominal bead pentane content times the % of pentane that is emitted at expansion. This pentane emission factor was developed from bead testing conducted at AMP's Byron Center, Michigan, facility in 2024.

36.00 tons expanded / 24 hours	x	6.000 % pentane	=	4320.000 lbs total pentane per 24 hours
4320.00 lbs total pentane per 24 hours	x	20.50 % of release at expansion	=	885.600 lbs released at expansion per 24 hours
885.60 lbs released at expansion per 24 hours	x	365.00 days/year	=	323244.00 pounds / year VOC emissions
323244.00 pounds / year VOC emissions	/	2000.00 lbs/ton	=	161.62 tons / year VOC emissions

The Pentane Emissions Control System efficiency testing conducted August 3-5, 2021 determined the capture and destruction efficiency to be 87.69% leaving 12.31% emissions.

161.62 tons / year VOC emissions	x	12.31 % emitted	=	19.90 tons / year VOC emissions
			=	4.54 lbs / hour

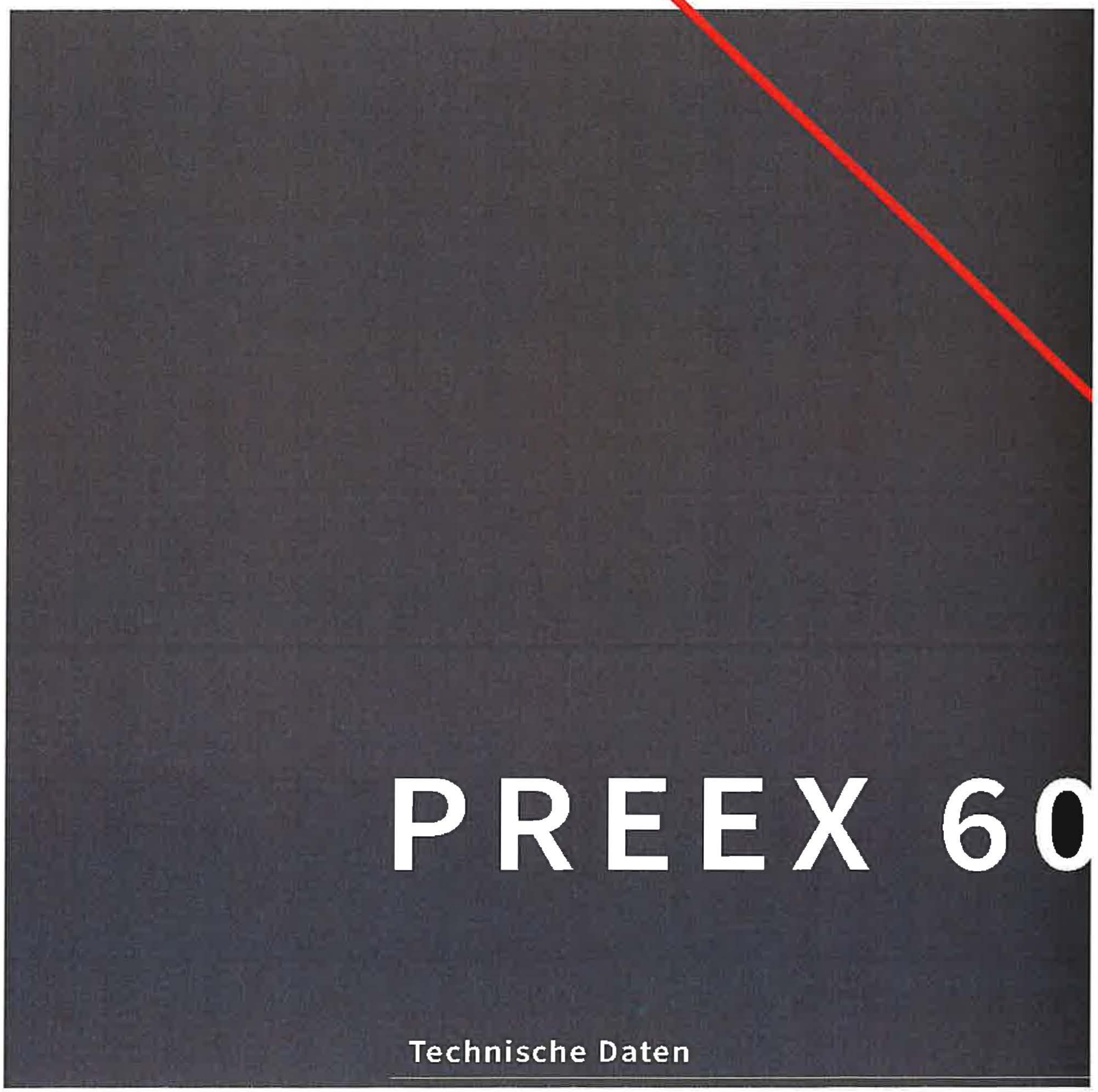
Shape Expander Capacity
Atlas Molded Products
Reno, Nevada

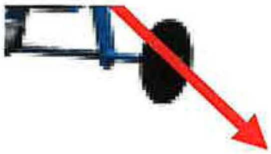
Hirsch Preex 6000

Capacity: 1170 lbs/hr at 2 lb/cubic ft density
Capacity: 930 lbs/hr at 1.12 lb/cubic ft density

Maximum capacity: 14.04 tons/24 hour period

SPECIFICATIONS





12 g/l (0.75 lb/ft^3)	18 g/l (1.12 lb/ft^3)	25 g/l (1.56 lb/ft^3)	32 g/l (2 lb/ft
280 kg/h (620 lb/h)	420 kg/h (930 lb/h)	500 kg/h (1100 lb/h)	530 kg/ (1170 lb,

15

Shape Expander Emissions Calculation
Atlas Molded Products
Reno, Nevada

Hirsch Preex 6000

Capacity: 1170 lbs/hr at 2 lb/cubic ft density
Capacity: 930 lbs/hr at 1.12 lb/cubic ft density
Maximum capacity: 14.04 tons/24 hour period

Emissions for expansion were calculated by multiplying the potential throughput of raw beads times the nominal bead pentane content times the % of pentane that is emitted at expansion. This pentane emission factor was developed from bead testing conducted at AMP's Byron Center, Michigan, facility in 2024.

14.04 tons expanded / 24 hours	x	6.000 % pentane	=	1684.800 lbs total pentane per 24 hours
1684.80 lbs total pentane per 24 hours	x	20.50 % of release at expansion	=	345.384 lbs released at expansion per 24 hours
345.38 lbs released at expansion per 24 hours	x	365.00 days/year	=	126065.16 pounds / year VOC emissions
126065.16 pounds / year VOC emissions	/	2000.00 lbs/ton	=	63.03 tons / year VOC emissions

The Pentane Emissions Control System efficiency testing conducted August 3-5, 2021 determined the capture and destruction efficiency to be 87.69% leaving 12.31% emissions.

63.03 tons / year VOC emissions	x	12.31 % emitted	=	7.76 tons / year VOC emissions
			=	1.77 lbs / hour

Bead Conditioning Bag Throughput

Atlas Molded Products

Reno, Nevada

Throughput shown is for each of the 18 bags.

Bag Capacity (cubic feet)	Bead Density (lbs/cubic foot)	Bag Capacity (lbs)	Hang Time Required (hrs)	Bag Throughput (lbs/hr)	Bag Throughput (tons/24 hours)
2,300	0.75	1,725	8	216	2.59
	0.90	2,070	10	207	2.48
	1.00	2,300	10	230	2.76
	1.25	2,875	12	240	2.88
	1.35	3,105	15	207	2.48
	1.80	4,140	24	173	2.07
	3.00	6,900	72	96	1.15

Maximum Throughput per Bag	2.88

Total for 18 Bags	51.75

Bead Conditioning Bag Throughput
Atlas Molded Products
Reno, Nevada

Capacity: 51.75 tons / 24 hour period total for 18 bags

Emissions for expansion were calculated by multiplying the potential throughput of raw beads times the nominal bead pentane content times the estimated % of pentane that is emitted at bead aging.

51.75 tons expanded / 24 hours	x	6.000 % pentane	=	6210.000 lbs total pentane per 24 hours
6210.00 lbs total pentane per 24 hours	x	20.00 % of release at bead aging	=	1242.000 lbs released at bead aging per 24 hours
1242.00 lbs released at bead aging per 24 hours	x	365.00 days/year	=	453330.00 pounds / year VOC emissions
453330.00 pounds / year VOC emissions	/	2000.00 lbs/ton	=	226.67 tons / year VOC emissions

The Pentane Emissions Control System efficiency testing conducted August 3-5, 2021 determined the capture and destruction efficiency to be 87.69% leaving 12.31% emissions.

226.67 tons / year VOC emissions	x	12.31 % emitted	=	27.90 tons / year VOC emissions
			=	6.37 lbs / hour

Block Molding Throughput
Atlas Molded Products
Reno, Nevada

The Kurtz Block Mold has a capacity of 3,372 pounds per hour or 40.46 tons per 24-hour period.

Block bead expansion capacity bottlenecks the molding capacity at 36 tons/24-hour period.

Kurtz Block Mold capacity supplied by equipment vendor below.

David Sykes

From:	Tony Britton <tbritton@achfoam.com>
Sent:	Wednesday, January 15, 2020 10:51 AM
To:	Wayne Bell
Subject:	FW: [External]RE: VSD 3000 Batch Expander S/N M2/1799
Follow Up Flag:	Follow up
Flag Status:	Flagged

SEE BELOW

Tony Britton
Atlas Molded Products | Facility Engineer
KC Shape Plant | 4001 Kaw Drive Kansas City, KS 66102
Office: 913-601-3741 | Cell: 316-706-4203 | tbritton@achfoam.com | www.AtlasMoldedProducts.com
ATLAS | MOLDED PRODUCTS
A Division of Atlas Roofing Corporation

From: Ritterling, Michael <Michael.Ritterling@kurtzersa.com>
Sent: Wednesday, January 15, 2020 10:17 AM
To: Tony Britton <tbritton@achfoam.com>; Cantrall, Trish <Trish.Cantrall@kurtzersa.com>; INFO-KNA <usa@kurtzersa.com>
Cc: Floryance, John <John.Floryance@kurtzersa.com>
Subject: RE: [External]RE: VSD 3000 Batch Expander S/N M2/1799

Hi Tony,
The VSD3000 has an approximate throughput of 3,086 lbs/hr at Density 0.937 lbs/Cu ft.
The VSD3000 has an approximate throughput of 3,372 lbs/hr at Density 1.125 lbs/cu.ft
The above is given based on a properly operating Pre Expander.

Mit freundlichen Grüßen / Best Regards,

Michael Ritterling
Service Manager – Particle Foam Machines & Foundry Machines

Kurtz Ersa, Inc.
1779 Pilgrim Road
Plymouth, Wi 53073

Direct: 920-892-9251

Mobile: 920-917-8896

Fax: 920-893-1562

Block Molding Emissions Calculation

Atlas Molded Products

Reno, Nevada

Kurtz Block Mold at 36 tons / 24-hour period

Stack testing conducted at the AMP facility located in Byron Center, Michigan, indicated that 1.57% of the initial raw bead pentane content is emitted through block molding. A nominal raw bead pentane content of 6% was assumed.

36.000 tons beads molded / 24 hours	x	6.000 % pentane	=	4320.000 lbs total pentane per 24 hours
4320.000 lbs total pentane per 24 hours	x	1.57 % released	=	67.824 lbs released per 24 hours
67.824 lbs released per 24 hours	x	365.000 days/yr	=	24755.760 lbs / yr VOC PTE
24755.760 lbs / yr VOC PTE	x	2000.00 lbs/ton	=	12.38 tons / year VOC emissions

The Pentane Emissions Control System efficiency testing conducted August 3-5, 2021 determined the capture and destruction efficiency to be 87.69% leaving 12.31% emissions.

12.38 tons / year VOC emissions	x	12.31 % emitted	=	1.52 tons / year VOC emissions
			=	0.35 lbs / hour

Plant	ItemID	Press	Parts / Hr	Item Weight (lbs)	Production (lbs/hr)	Maximum Throughput (lbs/hr)	90th Percentile Throughput (lbs/hr)	Maximum Throughput (tons/24 hrs)	90th Percentile Throughput (tons/24 hrs)	
ERNNV	EPSH5506033_01	S-H1350	308.58	0.876	270.32	270.32	270.32	3.24	3.24	
ERNNV	EPSH11109_01	S-H1350	154.29	0.8865	136.78					
ERNNV	EPSH11107_01	S-H1350	154.29	0.7801	120.36					
ERNNV	EPSHWINESP2_01	S-H1350	514.3	0.1787	91.91					
ERNNV	EPSHWINESP3_01	S-H1350	360.01	0.2503	90.11					
ERNNV	EPSHBRL_01	S-H1350	720.02	0.1123	80.86					
ERNNV	EPSH2010014_01	S-H1350	205.72	0.3541	72.85					
ERNNV	EPSHBRL_02	S-H1350	822.88	0.0651	53.57					
ERNNV	EPSHTPP_01	S-H1450	308.58	4.4799	1382.41	1382.41				This is a 6 pcf Arcel part
ERNNV	EPSH2425029_01	S-H1450	51.43	13.3004	684.04	684.04		8.21		
ERNNV	EPSH1313016_01	S-H1450	205.72	2.22	456.70					
ERNNV	EPSH101711001_01	S-H1450	205.72	2.1472	441.72					
ERNNV	EPSHHNY_01	S-H1450	102.86	4.1381	425.64		425.64		5.11	
ERNNV	EPSH1316017_01	S-H1450	154.29	2.456	378.94					
ERNNV	EPSH1517021_01	S-H1450	102.86	3.61	371.32					
ERNNV	EPSH100473001_01	S-H1450	205.72	1.7056	350.88					
ERNNV	EPSH201314_01	S-H1450	154.29	1.9462	300.28					
ERNNV	EPSH201314CB_08	S-H1450	154.29	1.9462	300.28					
ERNNV	EPSHFFAB_01	S-H1450	51.43	5.837	300.20					
ERNNV	EPSH100654002_01	S-H1450	760.49	0.3683	280.09					
ERNNV	EPSH100654001_01	S-H1450	282.01	0.9923	279.84					
ERNNV	EPSH100655001_01	S-H1450	204.91	1.3491	276.44					
ERNNV	EPSH100655002_01	S-H1450	624.59	0.4426	276.44					
ERNNV	EPSH151212_02	S-H1450	154.29	1.6959	261.66					
ERNNV	EPSH100473002_01	S-H1450	205.72	1.2128	249.50					
ERNNV	EPSH1189_01	S-H1450	308.57	0.7916	244.26					
ERNNV	EPSHWINESP6_02	S-H1450	308.58	0.7784	240.20					
ERNNV	EPSHWINESP6_01	S-H1450	308.58	0.7775	239.92					
ERNNV	EPSH101103002_01	S-H1450	246.24	0.9428	232.16					
ERNNV	EPSH101103001_01	S-H1450	176.65	1.3142	232.15					
ERNNV	EPSH1089_01	S-H1450	308.58	0.7471	230.54					
ERNNV	EPSH869_01	S-H1450	411.44	0.5421	223.04					
ERNNV	EPSH151212_01	S-H1450	154.29	1.4132	218.04					
ERNNV	EPSH151212CB_03	S-H1450	154.29	1.4132	218.04					
ERNNV	EPSH7908015_01	S-H1450	617.16	0.3372	208.11					
ERNNV	EPSH7909015_01	S-H1450	617.16	0.3363	207.55					
ERNNV	EPSH868_01	S-H1450	411.44	0.4954	203.83					
ERNNV	EPSH13134_01	S-H1450	154.29	1.2825	197.88					
ERNNV	EPSH12109_02	S-H1450	205.72	0.9422	193.83					
ERNNV	EPSH121213_01	S-H1450	154.29	1.254	193.48					
ERNNV	EPSH867_01	S-H1450	411.44	0.4596	189.10					
ERNNV	EPSH1086_01	S-H1450	308.58	0.6037	186.29					
ERNNV	EPSH9510014_01	S-H1450	205.72	0.8939	183.89					
ERNNV	EPSHWINESP12_02	S-H1450	154.29	1.114	171.88					
ERNNV	EPSHWINESP12_03	S-H1450	154.29	1.1135	171.80					
ERNNV	EPSH9408015_01	S-H1450	617.16	0.2776	171.32					
ERNNV	EPSHRNWP_01	S-H1450	102.86	1.6345	168.12					
ERNNV	EPSH864_01	S-H1450	411.44	0.3642	149.85					
ERNNV	EPSH8308015_01	S-H1450	617.16	0.239	147.50					
ERNNV	EPSH8610_01	S-H1450	205.72	0.6153	126.58					
ERNNV	EPSHWINE3MAG_02	S-H1450	411.44	0.2109	86.77					
ERNNV	EPSH100473003_01	S-H1450	205.72	0.2369	48.74					

Shape Molding Emissions Calculation

Atlas Molded Products
Reno, Nevada

The shape molds are capable of producing parts of widely varying shapes and sizes. In turn, the configuration of the parts will determine the maximum number of parts that can be produced in an hour. Atlas Molded Products has determined that the maximum production capacity for each shape mold for parts expected to be manufactured will consume 6 tons of expanded EPS beads per 24-hour period. Bead testing was conducted at the AMP Gainesville, Georgia, facility in 2009 and it was determined that the expanded beads entering molding contained 2.02% by weight pentane (VOC) and that the molding process released 36% of that pentane from the beads.

<u>EMISSIONS FOR ONE SHAPE MOLD</u>

The maximum production capacity for parts expected to be manufactured will consume 6 tons of expanded EPS beads per 24-hour period.

6.000 tons expanded beads / 24 hours	x	2.020 % pentane	=	242.400 lbs total pentane per 24 hours
242.400 lbs total pentane per 24 hours	x	36.00 % released	=	87.264 lbs released per 24 hours
87.264 lbs released per 24 hours	x	365.000 days/yr	=	31851.360 lbs / yr VOC PTE
31851.360 lbs / yr VOC PTE	x	2000.00 lbs/ton	=	15.93 tons / year VOC emissions

The Pentane Emissions Control System efficiency testing conducted August 3-5, 2021 determined the capture and destruction efficiency to be 87.69% leaving 12.31% emissions.

15.93 tons / year VOC emissions	x	12.31 % emitted	=	1.96 tons / year VOC emissions
			=	0.45 lbs / hour

<u>TOTAL FOR 6 SHAPE MOLDS</u>

Multiplying this emission rate for a single shape mold by the 6 shape molds in operation yields:

1.96 tons / year VOC emissions	x	6.00 Molds	=	11.76 tons / year VOC emissions
			=	2.69 lbs / hour

Foam Cutting Emissions Calculation
Atlas Molded Products
Reno, Nevada

Consider a 4 ft x 3 ft x 16 ft foam block, first cut in half to make two 4 ft x 3 ft x 8 ft blocks, then cut lengthwise to make 4 ft x 8 ft panels, each 1.5 inches thick.

The total area cut would be one cut of 4 ft x 3 ft area to split the block in half plus 46 cuts of 4 ft x 8 ft area each to slice each half into 24 panels of 1.5 inch thickness.

Cross-cut

Area Cut =	4 ft	x	3 ft	=	12 sq ft
Wire thickness =	0.02 inches				
Volume cut =	0.020 cu feet				

Panel Slicing

Area Cut =	4 ft	x	8 ft	=	32 sq ft
Number of slices =	46				
Total Area Cut =	1472 sq ft				
Wire thickness =	0.02 inches				
Volume cut =	2.453 cu feet				

Total

Total Volume Cut per Block =	2.473 cu ft
Block Density =	0.835 lb/cu ft
Theoretical Mass Loss =	2.065 lbs per block
Measured Loss as % of Calculated Loss[1]	13.82 %
Actual Mass Loss =	0.285 lbs per block
Hourly Cutting Rate =	15 blocks/hour
Hourly Mass Loss =	4.281 lbs/hour
Pentane Emissions (@ 3%)	0.128 lbs/hour
Particulate Matter Emissions (@ 97%)	4.153 lbs/hour

Annual Potential Emissions (@24/365)

Annual Mass Loss =	18.752 tons/year
Annual Pentane Emissions (@ 3%)	0.563 tons/year
Annual PM Emissions (@ 97%)	18.189 tons/year

[1] Factor from embossing emissions testing. Takes into consideration that the cut results more from softening and pushing aside the foam than removing foam mass from the kerf.

Densified Material Emissions Calculation

Atlas Molded Products
Reno, Nevada

Capacity: 4 tons / 24 hour period

Emissions for expansion were calculated by multiplying the potential throughput of densified material times amount of pentane that is emitted during densification. The incoming pentane percentage was assumed to be 15% of the raw bead pentane content. The post densification pentane content was developed from bead testing conducted at AMP's Byron Center, Michigan, facility in 2024.

4.00 tons densified / 24 hours	x	0.900 % pentane entering densification	=	72.000	lbs pentane entering densification per 24 hours
4.00 tons densified / 24 hours	x	0.372 % pentane after densification	=	29.760	lbs pentane after densification per 24 hours
				42.240	lbs pentane emitted per 24 hours
42.24 lbs pentane emitted per 24 hours	x	365.00 days/year	=	15417.60	pounds / year VOC emissions
15417.60 pounds / year VOC emissions	/	2000.00 lbs/ton	=	7.71	tons / year VOC emissions

Source Test Report

Atlas Molded Products
A Division of Atlas Roofing Corporation
13695 Mt. Anderson Street
Reno, NV 89506

Source Tested:
Pentane Emission Control System
Test Dates: August 3-5, 2021

AST Project No. 2021-1317R1

Prepared By
Alliance Source Testing, LLC
3683 W 2270 S, Suite E
West Valley City, UT 84120

Regulatory Information

Permit No.	Washoe AQMD Permit #AAIR19-0047

Source Information

Source Name	_Source ID_	_Target Parameter_
Pentane Emission Control System	PECS	VOC as Pentane

Contact Information

Test Location	_Test Company_	_Analytical Laboratory_
Atlas Molded Products A Division of Atlas Roofing Corporation 13695 Mt. Anderson Street Reno, NV 89506 Josh Livingston Atlas Molded Products A Division of Atlas Roofing Corporation 8700 Turnpike Drive, Suite 400 Westminster, CO 80031 jlivingston@atlasroofing.com (720) 648-3208	Alliance Source Testing, LLC 3683 W 2270 S, Suite E West Valley City, UT 84120 Project Manager Austin Keough austin.keough@stacktest.com (385) 722-6712 Field Team Leader Kyle Vaughan kyle.vaughan@stacktest.com (205) 603-7142 QA/QC Manager Heather Morgan heather.morgan@stacktest.com (256) 260-3972 Report Coordinator Alyssa Trujillo alyssa.trujillo@stacktest.com (801) 269-0550	Quantum Analytical Services Inc. 1210 E. 223rd St, Suite 314 Carson, CA 90745 www.quantumairla.com (310) 830-2226

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

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

This report is only considered valid once an authorized representative of AST has signed in the space provided below; any other version is considered draft. This document was prepared in portable document format (.pdf) and contains pages as identified in the bottom footer of this document.

	11/05/2021
Austin Keough, QSTI **Alliance Source Testing, LLC**	Date

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

Introduction

1.0 Introduction

Alliance Source Testing, LLC (AST) was retained by Atlas Molded Products, a Division of Atlas Roofing Corporation (Atlas) to conduct compliance testing at the Reno, Nevada facility. The facility operates under the Washoe County Air Quality Management District (AQMD) permit #AAIR19-0047. Testing was conducted to determine the volatile organic compounds (VOC) as pentane capture efficiency (CE) and destruction efficiency (DE) of the Pentane Emission Control System (PECS).

1.1 Source and Control System Descriptions

The facility produces expanded polystyrene (EPS) foam blocks, which are cut into various final products. EPS is produced by the expansion of polystyrene "raw beads" that contains a blowing agent, typically composed of one or more isomers of pentane at a concentration of 3.5% to 7% by weight. A portion of the blowing agent is emitted during the manufacturing process. A PECS is used to capture and destroy these VOC emissions.

During the first phase the raw polystyrene beads are partially expanded using steam in a pre-expander. After pre-expansion, the "pre-puff" beads are transferred to bags in the bead storage room where they are kept at elevated temperature for approximately 12-24 hours to allow excess blowing agent to diffuse from the beads. In the final step, the aged beads are transferred to a mold, where they are subjected to steam and vacuum cycles until they fuse into a solid block or shaped part.

1.2 Project Team

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

Table 1-1
Project Team

Atlas Personnel	Wayne Bell David Sykes
Regulatory Personnel	Genine Rosa – Washoe County
AST Personnel	Kyle Vaughan Noah Bauer Richard Delk Ian Wilmer

1.3 Site Specific Test Plan & Notification

Testing was conducted in accordance with the Site-Specific Test Plan (SSTP) submitted to Washoe County by Atlas.

1.4 Test Program Notes

During the 60-hour test run the FTIR lost signal overnight on August 3, 2021. The missing ALT-012 data was replaced with facility plant flow data for calculation purposes. When transferring the corresponding plant flow data (minute data) for the missing ALT-012 data points (minute data) it was found that there were some minutes missing in the plant flow data. To fill in the missing minute data, AST took the average of the prior and post minute data to calculate the one-minute average plant flow data for the missing minutes. Also, to ensure that the facility plant flow data was correct, a correlation study was run on the FTIR captured data in comparison to the facility data prior to the FTIR going down. This study is detailed in Appendix F.

This report was revised on November 1, 2021 to calculate the data based on a synchronization of flows and Method 25A on a minute by minute basis as opposed to using the average over the course of the testing period. This was done to be consistent with a similar unit tested at the Gainesville, GA facility. The re-calculations did not affect the DE results, but only the CE results.

Summary of Results

2.0 Summary of Results

AST conducted compliance testing at the Atlas facility in Reno, Nevada on August 3-5, 2021. Testing consisted of determining the emission rates of total hydrocarbon (THC) as pentane CE and DE of the PECS.

Tables 2-1 through 2-3 provide summaries of the emission testing results. Any difference between the summary results listed in the following table and the detailed results contained in appendices is due to rounding for presentation.

Table 2-1
Summary of Results – 60hr Emissions

Run Number	Run 1
Date	**8/3-5/2021**
Total Hydrocarbons Data	
Concentration (as propane), ppmvw	2,141.1
Emission Rate (as propane), lb/hr	15.1
Concentration (as pentane), ppmvd	1,383.1
Emission Rate (as pentane), lb/hr	16.0

Table 2-2
Summary of Results – Compliance

Run Number	Run 1	Run 2	Run 3	Average
Date	**8/4/21**	**8/4/21**	**8/4/21**	**–**
Total Hydrocarbons Data – Inlet				
Concentration (as propane), ppmvw	4,035.8	4,748.5	4,929.2	4,571.2
Emission Rate (as propane), lb/hr	36.2	54.0	31.7	40.6
Concentration (as pentane), ppmvd	2,684.5	3,158.6	3,278.9	3,040.7
Emission Rate (as pentane), lb/hr	39.4	58.8	34.5	44.2
Total Hydrocarbons Data – Outlet				
Concentration (as propane), ppmvw	0.15	0.0000	0.0025	0.052
Emission Rate (as propane), lb/hr	0.13	0.0000	0.0022	0.045
Concentration (as pentane), ppmvd	0.0012	0.0000	0.000019	0.00039
Emission Rate (as pentane), lb/hr	0.10	0.0000	0.0017	0.034
Reduction Efficiency (using as pentane lb/hr), %	99.997	100.000	100.000	99.999

Table 2-3
Summary of Results – Capture Efficiency

Parameter	Unit	Result
Total raw EPS expanded	lb	41,909.0
Total pentane is raw EPS	lb	2,112.9
Total Residual Pentane	lb	1,024.9
Total Collectable Pentane	lb	1.088.0
Total Collected Pentane	lb	954.12
Capture Efficiency	%	**87.69**
Destruction Efficiency	%	**99.999**
Overall Control Efficiency	%	**87.69**

Testing Methodology

3.0 Testing Methodology

The emission testing program was conducted in accordance with the test methods listed in Table 3-1. Method descriptions are provided below while quality assurance/quality control data is provided in Appendix D.

Table 3-1
Source Testing Methodology

Parameter	U.S. EPA Reference Test Methods	Notes/Remarks
Volumetric Flow Rate	1 & 2	Full Velocity Traverses
Volumetric Flow Rate	ALT-012 / 320	FTIR Traver Gas Calculations
Oxygen / Carbon Dioxide	3A	Instrumental Analysis
Moisture Content	4	Gravimetric Analysis
Total Hydrocarbons	25A	Instrumental Analysis
Pentane Content	SCAQMD 306-91	GC / FID
Gas Dilution System Certification	205	--

3.1 U.S. EPA Reference Test Methods 1 and 2 – Sampling/Traverse Points and Volumetric Flow Rate

The sampling location and number of traverse (sampling) points were selected in accordance with U.S. EPA Reference Test Method 1. To determine the minimum number of traverse points, the upstream and downstream distances were equated into equivalent diameters and compared to Figure 1-2 in U.S. EPA Reference Test Method 1.

Full velocity traverses were conducted in accordance with U.S. EPA Reference Test Method 2 to determine the average stack gas velocity pressure, static pressure and temperature. The velocity and static pressure measurement system consisted of a pitot tube and inclined manometer. The stack gas temperature was measured with a K-type thermocouple and pyrometer.

Stack gas velocity pressure and temperature readings were recorded before and after each test run. The data collected before and after each test run was averaged. The averages were utilized to calculate the volumetric flow rate in accordance with U.S. EPA Reference Test Method 2.

3.2 ALT-012 – Volumetric Flow Rate

Approved Alternate Method (ALT-012) was used to calculate the inlet flow rate using a tracer-gas dilution method. This method is based on the injection of a tracer gas into the sample stream at a known flow rate. The flow rate in the duct was directly calculated from the diluted concentration of the tracer gas in the sample stream. The tracer gas used was sulfur hexafluoride (SF_6). An EPA Method 320 FTIR analyzer was used to monitor the tracer gas concentrations and to measure the percent moisture in the gas stream. The flow rate calculated was measured on a wet basis and converted to a dry basis. The flow rate calculation was as follows:

$$Q_S = \frac{T_C \times IR}{T_S} \times \frac{1\ \text{ft}^3}{28{,}317\ cc}$$

Q_S	Stack Flow Rate	scfm
T_C	Tracer gas cylinder concentration	ppm
T_S	Tracer gas stack concentration	ppm
IR	Tracer gas injection rate	cc/min

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

The oxygen (O_2) and carbon dioxide (CO_2) testing was conducted in accordance with U.S. EPA Reference Test Method 3A. Data was collected online and reported in one-minute averages. The sampling system consisted of a stainless-steel probe, Teflon sample line(s), gas conditioning system and the identified gas analyzer. The gas conditioning system was a non-contact condenser used to remove moisture from the stack gas. If an unheated Teflon sample line was used, then a portable non-contact condenser was placed in the system directly after the probe. Otherwise, a heated Teflon sample line was used. The quality control measures are described in Section 3.9.

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

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

3.5 U.S. EPA Reference Test Method 25A – Total Hydrocarbons

The total hydrocarbons (THC) testing was conducted in accordance with U.S. EPA Reference Test Method 25A. Data was collected online and reported in one-minute averages. The sampling system consisted of a stainless-steel probe, heated Teflon sample line(s) and the identified gas analyzer consisting of Flame Ionization Detector (FID). The gas analyzer FID was calibrated using propane calibration standards. The measured concentration is on propane basis. A response factor study was performed by challenging the propane calibrated FID using a known concentration of pentane certified standard. The calculated response factor was applied to convert concentrations from propane to pentane basis. The reported results used in the destruction and capture calculation are reported in pentane basis. The quality control measures are described in Section 3.10.

3.6 SCQAMD Method 306-91 – Pentane Content

Samples from the raw EPS beads used, EPS resin, and from the EPS molded blocks and shapes were procured and sent to the identified analytical laboratory. The laboratory analysis determined the pentane content to be used in the capture efficiency calculations. The samples were analyzed by GC / FID.

3.7 Pentane Capture Efficiency, Reduction Efficiency, and Total Pentane Emitted

The capture efficiency, reduction efficiency, and total pentane emitted was determined through the series of following equations.

Calculation of total pentane in raw material:

$$MP_{Total} = \sum_{i=1}^{n} MR_i \bullet \frac{IP_i}{100}$$

MP_{Total}	*Total mass of pentane in raw material (lb)*
MR_i	*Mass of raw material used from lot i (lb)*
IP_i	*Initial pentane fraction in raw material lot i (% by weight)*

Calculation of residual pentane in finished product:

$$MP_{Residual} = \sum_{i=1}^{n} MR_i \bullet \frac{1 - \frac{IP_i}{100}}{1 - \frac{RP_i}{100}} \bullet RP_i$$

$MP_{Residual}$	Total mass of residual pentane in finished product (lb)
MR_i	*Mass of raw material used from lot i (lb)*
IP_i	*Initial pentane fraction in raw material lot i (% by weight)*
RP_i	*Residual pentane fraction in finished product lot i (% by weight)*

Calculation of total collectable pentane:

$$MP_{Collectable} = MP_{Total} - MP_{Residual}$$

$MP_{Collectable}$	*Total mass of collectable pentane (lb)*
MP_{Total}	*Total mass of pentane in raw material (lb)*
$MP_{Residual}$	*Total mass of residual pentane in finished product (lb)*

Calculation of captured pentane:

$$MP_{Captured} = \sum_{i=1}^{n} CP_i \bullet F_i \bullet T_i$$

$MP_{Captured}$	*Total mass of pentane captured by control system (lb)*
CPi	*Pentane concentration in boiler air feed for integration period i (lb/scf)*
F_i	*Flow rate of air feed to boiler for integration period i (scfm)*
T_i	*Duration of integration period i (minutes)*

Calculation of capture efficiency:

$$CE = \frac{MP_{Captured}}{MP_{Collectable}} \bullet 100$$

CE:	*Capture efficiency (%)*
$MP_{Captured}$	*Total mass of pentane captured by control system (lb)*
$MP_{Collectable}$	*Total mass of collectable pentane (lb)*

Calculation of destruction efficiency:

$$DE = \frac{MP_{Captured} - MP_{Stack}}{MP_{Captured}} \bullet 100$$

DE	*Boiler destruction efficiency (%)*
$MP_{Captured}$	*Total mass of pentane captured by control system during DE run (lb)*
MP_{Stack}	*Total mass of pentane emitted from boiler stack during DE run (lb)*

Calculation of total pentane during the test period:

$$MP_{Emitted} = MP_{Collectable} - \left(MP_{Collectable} \times \frac{CE}{100} \times \frac{DE}{100}\right)$$

$MP_{Emitted}$	*Total mass of pentane emitted during test period (lb)*
$MP_{Collectable}$	*Total mass of collectable pentane (lb)*
DE	*Boiler destruction efficiency (%)*
CE	*Capture efficiency (%)*

3.8 U.S. EPA Reference Test Method 205 – Gas Dilution System Certification

A calibration gas dilution system field check was conducted in accordance with U.S. EPA Reference Method 205. Multiple dilution rates and total gas flow rates were utilized to force the dilution system to perform two dilutions on each mass flow controller. The diluted calibration gases were sent directly to the analyzer, and the analyzer response recorded in an electronic field data sheet. The analyzer response agreed within 2% of the actual diluted gas concentration. A second Protocol 1 calibration gas, with a cylinder concentration within 10% of one of the gas divider settings described above, was introduced directly to the analyzer, and the analyzer response recorded in an electronic field data sheet. The cylinder concentration and the analyzer response agreed within 2%. These steps were repeated three (3) times. Copies of the Method 205 data can be found in the Quality Assurance/Quality Control Appendix.

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

Cylinder calibration gases used met EPA Protocol 1 (+/- 2%) standards. Copies of all calibration gas certificates can be found in the Quality Assurance/Quality Control Appendix.

Low Level gas was introduced directly to the analyzer. After adjusting the analyzer to the Low-Level gas concentration and once the analyzer reading was stable, the analyzer value was recorded. This process was repeated for the High-Level gas. For the Calibration Error Test, Low, Mid, and High Level calibration gases were sequentially introduced directly to the analyzer. All values were within 2.0 percent of the Calibration Span or 0.5% absolute difference.

High or Mid Level gas (whichever was closer to the stack gas concentration) was introduced at the probe and the time required for the analyzer reading to reach 95 percent or 0.5% (whichever was less restrictive) of the gas concentration was recorded. The analyzer reading was observed until it reached a stable value, and this value was recorded. Next, Low Level gas was introduced at the probe and the time required for the analyzer reading to decrease to a value within 5.0 percent or 0.5% (whichever was less restrictive) was recorded. If the Low-Level gas was zero gas, the response was 0.5% or 5.0 percent of the upscale gas concentration (whichever was less restrictive). The analyzer reading was observed until it reached a stable value and this value was recorded. The measurement system response time and initial system bias were determined from these data. The System Bias was within 5.0 percent of the Calibration Span or 0.5% absolute difference.

High or Mid Level gas (whichever was closer to the stack gas concentration) was introduced at the probe. After the analyzer response was stable, the value was recorded. Next, Low Level gas was introduced at the probe, and the analyzer value recorded once it reached a stable response. The System Bias was within 5.0 percent of the Calibration Span or 0.5% absolute difference or the data was invalidated and the Calibration Error Test and System Bias were repeated.

Drift between pre- and post-run System Bias was within 3 percent of the Calibration Span or 0.5% absolute difference. If the drift exceeded 3 percent or 0.5%, the Calibration Error Test and System Bias were repeated.

To determine the number of sampling points, a gas stratification check was conducted prior to initiating testing. The pollutant concentrations were measured at three points (16.7, 50.0 and 83.3 percent of the measurement line). Each traverse point was sampled for a minimum of twice the system response time. The pollutant concentration at each traverse point did not differ more than 5 percent or 0.3% (whichever was less restrictive) of the average pollutant concentration, therefore single point sampling was conducted during the test runs. Copies of stratification check data can be found in the Quality Assurance/Quality Control Appendix.

A Data Acquisition System with battery backup was used to record the instrument response in one (1) minute averages. The data was continuously stored as a *.CSV file in Excel format on the hard drive of a computer. At the completion of testing, the data was also saved to the AST server. All data was reviewed by the Field Team Leader before leaving the facility. Once arriving at AST's office, all written and electronic data was relinquished to the report coordinator and then a final review was performed by the Project Manager.

3.10 Quality Assurance/Quality Control – U.S. EPA Reference Test Method 25A

Cylinder calibration gases used met EPA Protocol 1 (+/- 2%) standards. Copies of all calibration gas certificates can be found in the Quality Assurance/Quality Control Appendix.

Within two (2) hours prior to testing, zero gas was introduced through the sampling system to the analyzer. After adjusting the analyzer to the Zero gas concentration and once the analyzer reading was stable, the analyzer value was recorded. This process was repeated for the High-Level gas, and the time required for the analyzer reading to reach 95 percent of the gas concentration was recorded to determine the response time. Next, Low and Mid-Level gases were introduced through the sampling system to the analyzer, and the response was recorded when it was stable. All values were less than +/- 5 percent of the calibration gas concentrations.

Mid Level gas was introduced through the sampling system. After the analyzer response was stable, the value was recorded. Next, Zero gas was introduced through the sampling system, and the analyzer value recorded once it reached a stable response. The Analyzer Drift was less than +/- 3 percent of the span value.

A Data Acquisition System with battery backup was used to record the instrument response in one (1) minute averages. The data was continuously stored as a *.CSV file in Excel format on the hard drive of a computer. At the completion of testing, the data was also saved to the AST server. All data was reviewed by the Field Team Leader before leaving the facility. Once arriving at AST's office, all written and electronic data was relinquished to the report coordinator and then a final review was performed by the Project Manager.

Appendix A

Alliance
SOURCE TESTING

Location	Atlas Molded Products - Reno, NV
Source	PECS Outlet
Project No.	2021-1317
Run No.	1
Parameter(s)	VFR

Meter Pressure (Pm), in. Hg

$$Pm = Pb + \frac{\Delta H}{13.6}$$

where,

Pb	25.35	= barometric pressure, in. Hg
ΔH	1.200	= pressure differential of orifice, in H_2O
Pm	25.44	= in. Hg

Absolute Stack Gas Pressure (Ps), in. Hg

$$Ps = Pb + \frac{Pg}{13.6}$$

where,

Pb	25.35	= barometric pressure, in. Hg
Pg	-0.05	= static pressure, in. H_2O
Ps	25.35	= in. Hg

Standard Meter Volume (Vmstd), dscf

$$Vmstd = \frac{17.636 \times Vm \times Pm\, x\, Y}{Tm}$$

where,

Y	0.992	= meter correction factor
Vm	41.769	= meter volume, cf
Pm	25.44	= absolute meter pressure, in. Hg
Tm	564.3	= absolute meter temperature, °R
Vmstd	32.943	= dscf

Standard Wet Volume (Vwstd), scf

$$Vwstd = 0.04716 \times Vlc$$

where,

Vlc	120.2	= Volume of H2O collected, ml
Vwstd	5.669	= scf

Moisture Fraction (BWSsat), dimensionless (theoretical at saturated conditions)

$$BWSsat = \frac{10^{6.37 - \left(\frac{2,827}{Ts + 365}\right)}}{Ps}$$

where,

Ts	328.9	= stack temperature, °F
Ps	25.3	= absolute stack gas pressure, in. Hg
BWSsat	7.7	= dimensionless

Moisture Fraction (BWS), dimensionless

$$BWS = \frac{Vwstd}{(Vwstd + Vmstd)}$$

where,

Vwstd	5.669	= standard wet volume, scf
Vmstd	32.943	= standard meter volume, dscf
BWS	0.147	= dimensionless

Moisture Fraction (BWS), dimensionless

$$BWS = BWSmsd \text{ unless } BWSsat < BWSmsd$$

where,

BWSsat	7.740	= moisture fraction (theoretical at saturated conditions)
BWSmsd	0.147	= moisture fraction (measured)
BWS	0.147	

Alliance
SOURCE TESTING

Location	Atlas Molded Products - Reno, NV
Source	PECS Outlet
Project No.	2021-1317
Run No.	1
Parameter(s)	VFR

Molecular Weight (DRY) (Md), lb/lb-mole

$$Md = (0.44 \times \% CO_2) + (0.32 \times \% O_2) + (0.28 (100 - \% CO_2 - \% O_2))$$

where,

CO2	8.1	= carbon dioxide concentration, %
O2	7.9	= oxygen concentration, %
Md	29.60	= lb/lb mol

Molecular Weight (WET) (Ms), lb/lb-mole

$$Ms = Md(1 - BWS) + 18.015(BWS)$$

where,

Md	29.60	= molecular weight (DRY), lb/lb mol
BWS	0.147	= moisture fraction, dimensionless
Ms	27.90	= lb/lb mol

Average Velocity (Vs), ft/sec

$$Vs = 85.49 \times Cp \times (\Delta P^{1/2})\,avg \times \sqrt{\frac{Ts}{Ps \times Ms}}$$

where,

Cp	0.84	= pitot tube coefficient
$\Delta P^{1/2}$	0.290	= average pre/post test velocity head of stack gas, (in. H2O)$^{1/2}$
Ts	788.5	= average pre/post test absolute stack temperature, °R
Ps	25.35	= absolute stack gas pressure, in. Hg
Ms	27.90	= molecular weight of stack gas, lb/lb mol
Vs	22.0	= ft/sec

Average Stack Gas Flow at Stack Conditions (Qa), acfm

$$Qa = 60 \times Vs \times As$$

where,

Vs	22.0	= stack gas velocity, ft/sec
As	1.72	= cross-sectional area of stack, ft^2
Qa	2,270	= acfm

Average Stack Gas Flow at Standard Conditions (Qs), dscfm

$$Qsd = 17.636 \times Qa \times (1 - BWS) \times \frac{Ps}{Ts}$$

where,

Qa	2,270	= average stack gas flow at stack conditions, acfm
BWS	0.147	= moisture fraction, dimensionless
Ps	25.35	= absolute stack gas pressure, in. Hg
Ts	788.5	= average pre/post test absolute stack temperature, °R
Qs	1,098	= dscfm

Dry Gas Meter Calibration Check (Yqa), dimensionless

$$Yqa = \frac{Y - \left(\frac{\Theta}{Vm} \sqrt{\frac{0.0319 \times Tm \times 29}{\Delta H@ \times \left(Pb + \frac{\Delta H\, avg.}{13.6} \right) \times Md}} \sqrt{\Delta H}\; avg. \right)}{Y} \times 100$$

where,

Y	0.992	= meter correction factor, dimensionless
Θ	60	= run time, min.
Vm	41.7693	= total meter volume, dcf
Tm	564.3	= absolute meter temperature, °R
ΔH@	1.606	= orifice meter calibration coefficient, in. H_2O
Pb	25.35	= barometric pressure, in. Hg
ΔH avg	1.200	= average pressure differential of orifice, in H_2O
Md	29.60	= molecular weight (DRY), lb/lb mol
$(\Delta H)^{1/2}$	1.095	= average squareroot pressure differential of orifice, (in. H_2O)$^{1/2}$
Yqa	-4.2	= dimensionless

Location Atlas Molded Products - Reno, NV
Source(s) Pentane Collection System (PECS) Exhaust
Project No. 21-1317
Date(s) 8/2/2021 - 8/5/2021

CTS Recovery Value (CTS_R), %

$$\frac{CTS_{avg}}{CTS_{cyl}} \times 100$$

Where,

CTS_{avg}	95.8	= average of all CTS calibration gas readings, ppm
CTS_{cyl}	96.2	= CTS bottle certified gas value, ppm
CTS_R	99.6%	= CTS recovery value, %

Spike Dilution Factor (F_d), %

$$\frac{SF6_{spike} - SF6_{nat}}{SF6_{dir}} \times 100$$

Where,

$SF6_{dir}$	5.0	= average of direct tracer gas value readings
$SF6_{nat}$	-0.0091	= average of native tracer gas value readings
$SF6_{spike}$	0.42	= average of dynamic spike tracer gas value readings
F_d	8.6%	= spike dilution factor, %

Calculated Spike ($Spike_{calc}$), ppm

$$(F_d \times Analyte_{dir}) + (Analyte_{nat} \times (1 - F_d))$$

Where,

F_d	0.086	= spike dilution factor, %
$Analyte_{dir}$	5.0	= average of direct analyte gas values, ppm
$Analyte_{nat}$	-0.0091	= average of native analyte gas values, ppm
$Spike_{calc}$	0.42	= calculated spike, ppm value, ppm

Spike Recovery Value ($Spike_R$), %

$$\frac{Analyte_{spike}}{Spike_{calc}} \times 100$$

Where,

$Spike_{calc}$	0.42	= calculated spike, ppm value, ppm
$Analyte_{spike}$	0.42	= average of spiked analyte gas values, ppm
$Spike_R$	99.81%	= spike recovery value, %

Appendix B

Alliance

Emissions Calculations

Location Atlas - Reno, NV
Source PECS Inlet/Outlet
Project No. 2021-1317

Run Number		Run 1	Run 2	Run 3	Average
Date		8/4/21	8/4/21	8/4/21	--
Start Time		15:25	16:35	17:47	--
Stop Time		16:25	17:35	18:47	--
Source Data					
Response Factor Inlet, dimensionless	Rfi	2	2	2	2
Response Factor, dimensionless	RF	2	2	2	2
Input Data - Inlet					
Volumetric Flow Rate (M1-4), scfm	QswI	1,307	1,656	938	1300
Input Data - Outlet					
Moisture Fraction, dimensionless	BWS	0.147	0.155	0.148	0.150
Volumetric Flow Rate (M1-4), dscfm	Qs	1,098	1,072	1,067	1,079
Calculated Data - Inlet					
THCi (as C3H8) Concentration, ppmvw	C_{THCiw}	4,035.8	4,748.5	4,929.2	4,571.2
THCi (as C3H8) Emission Rate, lb/hr	ER_{THCi}	36.2	54.0	31.7	40.6
THCi (as Pentane) Concentration, ppmvd	C_{THCic}	2,684.5	3,158.6	3,278.9	3,040.7
THCi (as Pentane) Concentration, lb/hr	EF_{THCic}	39.4	58.8	34.5	44.2
Calculated Data - Outlet					
O_2 Concentration, % dry	C_{O_2}	7.86	7.84	7.80	7.83
CO_2 Concentration, % dry	C_{CO_2}	8.05	8.06	8.12	8.08
THC (as C3H8) Concentration, ppmvd	C_{THC}	0.15	0.0000	0.0025	0.052
THC (as C3H8) Concentration, ppmvw	$C_{THC\,w}$	0.13	0.0000	0.0022	0.045
THC (as C3H8) Emission Rate, lb/hr	ER_{THC}	0.0012	0.0000	0.000019	0.00039
THC (as Pentane) Concentration, ppmvd	C_{THCc}	0.10	0.0000	0.0017	0.034
THC (as Pentane) Concentration, lb/hr	EF_{THCc}	0.0013	0.0000	0.000020	0.00042
Reduction Efficiency Data					
THC Inlet (as Pentane) Emission Rate, lb/hr		39.4	58.8	34.5	44.2
THC (as Pentane) Emission Rate, lb/hr		0.0013	0.00000	0.000020	0.00042
THC (as Pentane) Reduction Efficiency, %		99.997	100.000	100.000	99.999

Underlined values recorded negative results and have been zeroed for calculations puposes

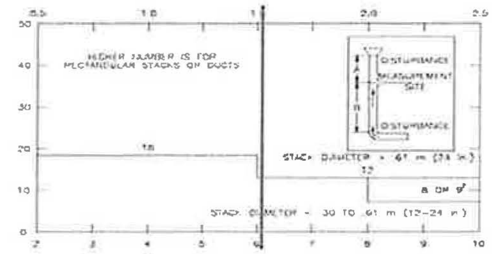
Alliance SOURCE TESTING

Method 1 Data

Location Atlas Molded Products - Reno, NV
Source PECS Outlet
Project No. 2021-1317
Date: 08/03/21

Stack Parameters

Duct Orientation:	Vertical	
Duct Design:	Circular	
Distance from Far Wall to Outside of Port:	20.75	in
Nipple Length:	3.00	in
Depth of Duct:	17.75	in
Cross Sectional Area of Duct:	1.72	ft^2
No. of Test Ports:	2	
Number of Readings per Point:	1	
Distance A:	12.5	ft
Distance A Duct Diameters:	8.5	(must be > 0.5)
Distance B:	9.0	ft
Distance B Duct Diameters:	6.1	(must be > 2)
Minimum Number of Traverse Points:	12	
Actual Number of Traverse Points:	16	
Measurer (Initial and Date):	RKD 8/3/21	
Reviewer (Initial and Date):	KMV 8/3/21	



CIRCULAR DUCT

LOCATION OF TRAVERSE POINTS

Number of traverse points on a diameter

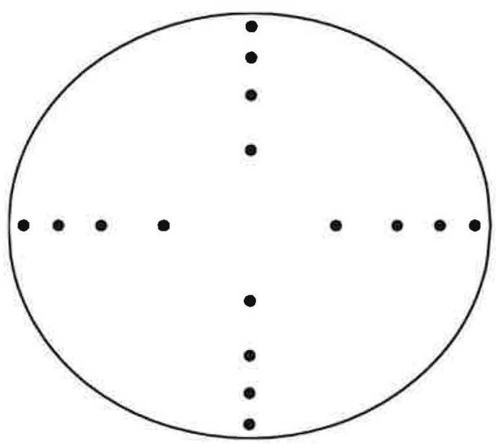
	2	3	4	5	6	7	8	9	10	11	12
1	14.6	–	6.7	–	4.4	–	3.2	–	2.6	–	2.1
2	85.4	–	25.0	–	14.6	–	10.5	–	8.2	–	6.7
3	–	–	75.0	–	29.6	–	19.4	–	14.6	–	11.8
4	–	–	93.3	–	70.4	–	32.3	–	22.6	–	17.7
5	–	–	–	–	85.4	–	67.7	–	34.2	–	25.0
6	–	–	–	–	95.6	–	80.6	–	65.8	–	35.6
7	–	–	–	–	–	–	89.5	–	77.4	–	64.4
8	–	–	–	–	–	–	96.8	–	85.4	–	75.0
9	–	–	–	–	–	–	–	–	91.8	–	82.3
10	–	–	–	–	–	–	–	–	97.4	–	88.2
11	–	–	–	–	–	–	–	–	–	–	93.3
12	–	–	–	–	–	–	–	–	–	–	97.9

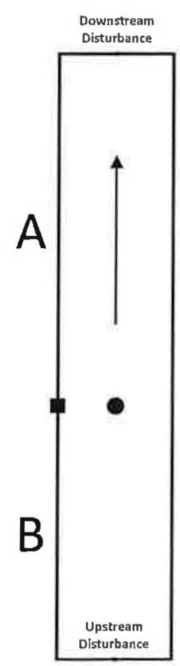
*Percent of stack diameter from inside wall to traverse point.

Traverse Point	% of Diameter	Distance from inside wall	Distance from outside of port
1	3.2	0.57	3.57
2	10.5	1.86	4.86
3	19.4	3.44	6.44
4	32.3	5.73	8.73
5	67.7	12.02	15.02
6	80.6	14.31	17.31
7	89.5	15.89	18.89
8	96.8	17.18	20.18
9	–	–	–
10	–	–	–
11	–	–	–
12	–	–	–

Stack Diagram
A = 12.5 ft.
B = 9 ft.
Depth of Duct = 17.75 in.

Cross Sectional Area





Alliance
SOURCE TESTING

Cyclonic Flow Check

Location Atlas Molded Products - Reno, NV
Source PECS Outlet
Project No. 2021-1317
Date 8/3/21

Sample Point	Angle (ΔP=0)
1	4
2	5
3	0
4	0
5	3
6	0
7	5
8	0
9	0
10	4
11	5
12	5
13	0
14	3
15	5
16	0
Average	2.4

Alliance
SOURCE TESTING

Method 2 Data

Location Atlas Molded Products - Reno, NV
Source PECS Outlet
Project No. 2021-1317

Traverse No.	1		2		3		4	
Date	8/4/21		8/4/21		8/4/21		8/4/21	
Status	VALID		VALID		VALID		VALID	
Start Time	13:29		16:38		17:50		18:35	
Stop Time	13:38		16:48		18:00		18:46	
Leak Check	Pass		Pass		Pass		Pass	
Traverse Point	Δ P (in. WC)	Ts (°F)	Δ P (in. WC)	Ts (°F)	Δ P (in. WC)	Ts (°F)	Δ P (in. WC)	Ts (°F)
A1	0.08	305	0.07	311	0.07	308	0.06	312
A2	0.09	331	0.09	326	0.08	321	0.07	321
A3	0.10	311	0.10	328	0.09	324	0.09	324
A4	0.10	320	0.08	330	0.09	324	0.10	326
A5	0.08	335	0.08	331	0.08	328	0.08	328
A6	0.07	339	0.08	332	0.08	329	0.08	331
A7	0.07	340	0.07	334	0.08	331	0.08	336
A8	0.08	339	0.07	335	0.07	334	0.07	337
B1	0.09	307	0.08	312	0.08	310	0.08	308
B2	0.07	315	0.07	314	0.08	316	0.07	314
B3	0.08	329	0.09	324	0.08	326	0.08	322
B4	0.09	336	0.09	330	0.07	329	0.08	327
B5	0.09	338	0.08	330	0.07	334	0.07	334
B6	0.10	340	0.10	336	0.09	337	0.09	341
B7	0.10	342	0.11	341	0.10	338	0.09	344
B8	0.08	342	0.08	341	0.07	338	0.09	346

Run No.		1	2	3	Average
Square Root of ΔP, (in. WC)$^{1/2}$	$(\Delta P)^{1/2}$	0.290	0.286	0.282	0.286
Average ΔP, in. WC	(ΔP)	0.08	0.08	0.08	0.08
Pitot Tube Coefficient	(Cp)	0.84	0.84	0.84	0.84
Barometric Pressure	(Pb)	25.35	25.35	25.35	25.35
Static Pressure, in. WC	(Pg)	-0.05	-0.05	-0.04	-0.05
Stack Pressure, in. Hg	(Ps)	25.35	25.35	25.35	25.35
Average Temperature, °F	(Ts)	328.9	327.6	327.4	328.0
Average Temperature, °R	(Ts)	788.5	787.2	787.1	787.6
Measured Moisture Fraction	(BWSmsd)	0.147	0.155	0.148	0.150
Moisture Fraction @ Saturation	(BWSsat)	7.740	7.604	7.590	7.645
Moisture Fraction	(BWS)	0.147	0.155	0.148	0.150
O2 Concentration, %	(O_2)	7.86	7.84	7.80	7.83
CO2 Concentration, %	(CO_2)	8.05	8.06	8.12	8.08
Molecular Weight, lb/lb-mole (dry)	(Md)	29.60	29.60	29.61	29.61
Molecular Weight, lb/lb-mole (wet)	(Ms)	27.90	27.80	27.89	27.87
Velocity, ft/sec	(Vs)	22.0	21.7	21.4	21.7
VFR at stack conditions, acfm	(Qa)	2,270	2,235	2,206	2,237
VFR at standard conditions, scfh	(Qsw)	77,220	76,138	75,167	76,175
VFR at standard conditions, scfm	(Qsw)	1,287	1,269	1,253	1,270
VFR at standard conditions, dscfm	(Qsd)	1,098	1,072	1,067	1,079

Alliance
SOURCE TESTING

Location Atlas Molded Products - Reno, NV
Source PECS Outlet
Project No. 2021-1317
Parameter(s): VFR
Console Type Meter Box

Run No.		1	2	3
Date		8/4/21	8/4/21	8/4/21
Status		VALID	VALID	VALID
Start Time		15:25	16:35	17:47
End Time		16:25	17:35	18:47
Run Time, min	(θ)	60	60	60
Meter ID		M5-12	M5-12	M5-12
Meter Correction Factor	(Y)	0.992	0.992	0.992
Orifice Calibration Value	(ΔH @)	1.606	1.606	1.606
Max Vacuum, in. Hg		5	5	5
Post Leak Check, ft3/min (at max vac.)		0.004	0.002	0.003
Meter Volume, ft3				
0		381.119	423.126	465.677
5		384.530	426.630	469.125
10		388.540	430.175	472.625
15		391.600	433.665	476.115
20		395.035	437.235	479.620
25		398.500	440.740	483.110
30		402.090	444.240	486.660
35		405.375	447.745	490.180
40		408.840	451.250	493.710
45		412.280	454.800	497.225
50		415.740	458.290	500.740
55		419.170	461.685	504.250
60		422.888	465.206	507.736
Total Meter Volume, ft3	(Vm)	41.769	42.080	42.059

Temperature, °F		Meter	Probe	Filter	Vacuum	Imp. Exit	Meter	Probe	Filter	Vacuum	Imp. Exit	Meter	Probe	Filter	Vacuum	Imp. Exit
0		101	--	--	5	64	107	--	--	5	63	111	--	--	5	64
5		101	--	--	5	58	108	--	--	5	53	111	--	--	5	54
10		101	--	--	5	55	109	--	--	5	53	111	--	--	5	52
15		102	--	--	5	56	109	--	--	5	54	112	--	--	5	52
20		102	--	--	5	56	110	--	--	5	55	112	--	--	5	52
25		104	--	--	5	54	111	--	--	5	57	113	--	--	5	53
30		105	--	--	5	54	111	--	--	5	58	113	--	--	5	53
35		106	--	--	5	55	111	--	--	5	58	113	--	--	5	52
40		107	--	--	5	56	111	--	--	5	59	114	--	--	5	54
45		107	--	--	5	57	111	--	--	5	59	113	--	--	5	55
50		108	--	--	5	57	112	--	--	5	60	113	--	--	5	54
55		108	--	--	5	57	112	--	--	5	61	113	--	--	5	56
60		108	--	--	5	58	112	--	--	5	62	113	--	--	5	57
Average Temperature, °F	(Tm)	105	--	--	--	--	110	--	--	--	--	112	--	--	--	--
Average Temperature, °R	(Tm)	564	--	--	--	--	570	--	--	--	--	572	--	--	--	--
Minimum Temperature, °F		101	--	--	--	--	107	--	--	--	--	111	--	--	--	--
Maximum Temperature, °F		108	--	--	--	64	112	--	--	--	63	114	--	--	--	64

		1	2	3
Barometeric Pressure, in. Hg	(Pb)	25.35	25.35	25.35
Meter Orifice Pressure , in. WC	(ΔH)	1.200	1.200	1.200
Meter Pressure, in. Hg	(Pm)	25.44	25.44	25.44
Standard Meter Volume, ft3	(Vmstd)	32.943	32.856	32.716

Analysis Type	Gravimetric				Gravimetric				Gravimetric			
Impinger 1, Pre/Post Test, g	H2O	751.1	835.7	84.6	H2O	755.0	853.8	98.8	H2O	733.6	834.7	101.1
Impinger 2, Pre/Post Test, g	H2O	780.9	800.2	19.3	H2O	688.4	702.9	14.5	H2O	702.9	713.7	10.8
Impinger 3, Pre/Post Test, g	Empty	644.2	649.4	5.2	Empty	649.4	654.4	5.0	Empty	654.4	656.6	2.2
Impinger 4, Pre/Post Test, g	Silica	957.3	968.4	11.1	Silica	968.4	978.2	9.8	Silica	978.2	984.8	6.6

		1	2	3
Volume Water Collected, mL	(Vlc)	120.2	128.1	120.7
Standard Water Volume, ft³	(Vwstd)	5.669	6.041	5.692
Moisture Fraction Measured	(BWS)	0.147	0.155	0.148
Gas Molecular Weight, lb/lb-mole (dry)	(Md)	29.60	29.60	29.61
DGM Calibration Check Value	(Yqa)	-4.2	-4.0	-4.2

Raw Bead Pentane Content									
Sample #	Name	Manufacturer	Type	Lot #	Bead Bag #	Total expanded (lbs)	Total Pentane Content (%)	Total Pentane Content (lbs)	Total Solids
1	Run# 1 Shape	STYROPEK	P440H	12A09389U	132	5292.0	5.19%	274.7	5017.3
2	Run# 1 Block	STYROPEK	BFL 395	30A146540	90	10584.0	3.60%	380.5	10203.5
3	Run#2 Shape	STYROPEK	R185C	BV401-9838	41	6615.0	5.56%	367.5	6247.5
4	Run#1 Block	STYROPEK	BF 395	40A14767P	136	7056.0	5.88%	414.9	6641.1
5	Run#1 Shape	STYROPEK	P440H	12A09389U	131	1764.0	5.49%	96.8	1667.2
6	Run#2 Shape	StyroChem	evC334H	47	17	4424.0	6.05%	267.4	4156.6
7	Run#3 Shape	STYROPEK	P440H	12A09389U	125	1764.0	5.54%	97.7	1666.3
8	Run#2 Block	Styropek	33MBHD	PVB-793-6993	22	4410.0	4.84%	213.4	4196.6
					Sum	41909.0		2112.9	39796.1

Residual Pentane									
Sample #	Name	Manufacturer	Type	Lot #	Bead Bag #	Total Product Molded (lbs)	Total Residual Pentane Content (%)	Total Residual Pentane Content (lbs)	Total Solids
1	Run# 1 Shape	STYROPEK	P440H	12A09389U	132	5292.0	2.74%	145.0	5147.0
2	Run# 1 Block	STYROPEK	BFL 395	30A146540	90	10584.0	1.89%	199.5	10384.5
3	Run#2 Shape	STYROPEK	R185C	BV401-9838	41	6615.0	2.29%	151.5	6463.5
4	Run#1 Block	STYROPEK	BF 395	40A14767P	136	7056.0	2.84%	200.4	6855.6
5	Run#1 Shape	STYROPEK	P440H	12A09389U	131	1764.0	2.86%	50.5	1713.5
6	Run#2 Shape	StyroChem	evC334H	47	17	4424.0	3.23%	142.9	4281.1
7	Run#3 Shape	STYROPEK	P440H	12A09389U	125	1764.0	2.36%	41.6	1722.4
8	Run#2 Block	Styropek	33MBHD	PVB-793-6993	22	4410.0	2.12%	93.5	4316.5
					Sum	41909.0		1024.9	40884.1

Capture Efficiency		
Parameter	**Unit**	**Result**
Total raw EPS expanded	lb	41,909.0
Total pentane in raw EPS	lb	2,112.9
Total residual pentane	lb	1,024.9
Total collectable pentane	lb	1,088.0
Total collected pentane	lb	954.12
Capture efficiency	%	**87.69**
Destruction efficiency	%	**99.999**
Overal control efficiency	%	**87.69**

Please note that the amount of beads leaving the system was assumed to be the same as going in. This accounts for not only the successful blocks and shapes molded, but any scrap that is not counted in the molding records.