

TECHNICAL SUPPORT DOCUMENT
For
DRAFT/PROPOSED AIR EMISSION PERMIT NO. 14100038-007
Part 70 Reissuance

This technical support document (TSD) is intended for all parties interested in the draft/proposed permit and to meet the requirements that have been set forth by the federal and state regulations (40 CFR § 70.7(a)(5) and Minn. R. 7007.0850, subp. 1). The purpose of this document is to provide the legal and factual justification for each applicable requirement or policy decision considered in the preliminary determination to issue the draft/proposed permit.

1. General Information

1.1 Applicant and Stationary Source Location:

Table 1. Applicant and Source Address

Applicant/Address	Stationary Source/Address (SIC Code: 3086)
Plymouth Foam, Inc. 1800 Sunset Drive P.O. Box 407 Plymouth, WI 53073	Plymouth Foam, Inc. 13900 Industry Ave Becker Sherburne County
Contact: Steve Steinpreis, Director Phone: 952-892-3120	

1.2 Facility Description

Plymouth Foam manufactures expanded polystyrene (EPS) foam, producing insulation, packaging and flotation for dock systems. The process involves expanding polystyrene beads, aging the expanded beads and molding the beads with steam. The foam used for insulation is cut into boards with hot wires. During pre-expansion, aging of expanded beads and final product, and molding, pentane and styrene monomer, both volatile organic compounds (VOCs), are emitted. Steam is provided by natural gas boilers for heating and EPS bead molding.

1.3 Description of any Changes Allowed with this Permit Issuance

There are no new changes allowed in this permit reissuance. Installation of EU 013 (shape mold machine) and 014 (boiler) were authorized by the previous permit, but have not been installed to date. They are included in the reissuance application and the authorization to install these units is retained in this permit.

EU 015 through 024 (shape mold machines) have not been installed, but are included in the reissuance application. These ten machines are to replace EU 012 (shape mold machine), which has been removed. These units have been added to the permit and the Delta facility description and may be installed and operated under the pre-cap limits in the permit; because there is no increase in hourly emissions associated with this replacement, a permit amendment is not required for this change.

EU 025 (EPS bead pre-expander) has been installed and is included in the reissuance application. The machine is to replace EU 010 (EPS bead pre-expander) that has been removed. The unit has been added to the permit and the Delta facility description and may be operated under the pre-cap limits in the permit; because there is no increase in hourly emissions associated with this replacement, a permit amendment is not required for this change.

1.4 Facility Emissions:

Table 2. Total Facility Potential to Emit Summary

	PM tpy	PM ₁₀ tpy	PM _{2.5} tpy	SO ₂ tpy	NO _x tpy	CO tpy	CO _{2e} tpy	VOC tpy	Single HAP tpy	All HAPs tpy
Total Facility Limited Potential Emissions	0.49	0.49	0.49	1.09	9.48	5.27	8,980	241	4.07	4.19
Total Facility Actual Emissions (2011)	0.00	0.00	*	0.00	0.31	0.26	*	13.65	*	

*Not reported in MN emission inventory.

Table 3. Facility Classification

Classification	Major/Affected Source	Synthetic Minor/Area	Minor/Area
PSD		VOC	CO _{2e} , SO _x , NO _x , PM, CO
Part 70 Permit Program	X		
Part 63 NESHAP		X	

1.5 Changes to Permit

The MPCA has a combined operating and construction permitting program under Minnesota Rules Chapter 7007, and under Minn. R. 7007.0800, the MPCA has authority to include additional requirements in a permit. Under that authority, the following changes to the permit are also made through this permit action:

- Updated permit to reflect the current MPCA policy;
- Deadline set for installation of EU 013 and 014 to 18 months after permit issuance.
- Retired GP 004
- Building data was added to the facility description.
- Data has been updated for new units installed since the last permit amendment was issued.
- Updated insignificant activities to reflect recent changes to Minnesota rules.
- Stack draft estimated by MPCA staff and added to facility description.

2. Regulatory and/or Statutory Basis

New Source Review

The facility has previously accepted federally enforceable limits on VOC such that the facility is not considered a major source under the New Source Review regulations. The current limits and synthetic minor source status are maintained in this reissuance.

Part 70 Permit Program

This facility is an existing major source under the Part 70 permit program.

New Source Performance Standards (NSPS)

There are no New Source Performance Standards that apply to this facility.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

There are no National Emission Standards for Hazardous Air Pollutants that apply to this facility.

The boilers (EU 001, 005, 014) are not subject to 40 CFR 63 subp. JJJJJ because they are limited to burning natural gas or propane by design. The gas-fired boilers are not subject to this subpart (40 CFR 63.11195 (e)).

Compliance Assurance Monitoring (CAM)

Compliance assurance monitoring does not apply as there is no control equipment in use on any of the emission units.

Environmental Review & AERA

No environmental review was needed for this permit action.

Minnesota State Rules

Portions of the facility are subject to the following Minnesota Standards of Performance:

- Minn. R. 7011.0515 Standards of Performance for New Indirect Heating Equipment
- Minn. R. 7011.0715 Standards of Performance for Post-1969 Industrial Process Equipment

Table 4. Regulatory Overview of Facility

Level*	Applicable Regulations	Comments:
GP 001 (expanded foam processes)	40 CFR § 52.21 Minn. R. 7011.0715	Prevention of Significant Deterioration (PSD). Limits taken to avoid major source classification under PSD for all non-combustion emissions of VOC. The permit carries forward this limit that was established in the original Part 70 permit action. The VOC limit is a monthly rolling sum limit due to substantial and unpredictable variations in operation. The permit does not allow the Facility to get credit for VOCs shipped offsite as waste or product. All VOC used is assumed to be emitted on-site. Minnesota Standards of Performance for Post-1969 Industrial Equipment. All equipment in GP 001 is considered “new” under this rule.
GP 005 (indirect heating equipment)	Minn. R. 7011.0515	Standards of Performance for New Indirect Heating Equipment: Fuel limited to natural gas and propane. The facility has stated that they only use natural gas but the boilers can use propane if needed. Propane was included in the permit in the event that the facility

		<p>decides to use propane as a back-up fuel.</p> <p>Additional information:</p> <ul style="list-style-type: none"> • all units constructed after 1977, oldest boiler constructed in 1994; • the facility is located outside St. Paul, Minneapolis, and Duluth in Table I; • the total facility has less than 250 MMBtu/hr of indirect heating equipment.
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3. Technical Information

3.1 Calculations of Potential to Emit

Attachment 1 to the Technical Support Document contains a summary of PTE emissions. Attachment 2 contains the detailed emission calculations used to determine emission limits and the potential to emit.

The combustion emissions for boilers (GP 005) were calculated based on the capacity of the units, the allowable fuels, and EPA's published emissions factors.

The predominant source of VOC and HAP emissions are a result of the EPS bead processes (expanding, aging, cutting and storage). Pentane and styrene are the two VOCs produced during this process. Pentane makes up the majority of the VOC emissions. Styrene is the only HAP produced by the EPS bead processes. The amount of pentane and styrene released by the processes is assumed to be released entirely within the facility as there is no limit on the amount of time the product may be stored at the facility. The pentane and styrene content used in the PTE calculations can be found below.

Pentane

EPA document 450/3-90-020 states that 85% of the pentane contained in the EPS bead is emitted within 48 hours starting with the expansion process. The remaining pentane is released over time.

EPS beads typically contain 6% - 7% pentane by weight. Plymouth Foam has documentation from suppliers showing a pentane content ranging from 5.8% to 6.6%. Plymouth Foam Products is required to calculate pentane emissions monthly using the actual pentane content of the materials used, assuming 100% is emitted at the facility. In the event that the pentane content of a particular lot of EPS bead is unavailable, they shall base calculations on the highest pentane content seen over the past 12 months, or 6.80%, whichever is higher.

Styrene Monomer

Material Safety Data Sheets and Certificates of Analysis do not typically state styrene monomer content of EPS bead. According to the previous reissuance, several EPS bead suppliers were contacted during previous permitting processes of other EPS manufacturing facilities and it was established that EPS bead typically contains styrene monomer, 900 to 1000 ppm by weight. Plymouth Foam Products is required to include styrene monomer in the monthly VOC calculations. In the event that the styrene monomer content of a particular lot of EPS bead is unavailable, they shall base calculations on the highest styrene monomer content seen over the past 12 months, or 1000 ppm, whichever is higher.

VOC Foam Limits

The amount of EPS bead material that can be processed is based on the total VOC content of the material. The higher the content of VOCs in the material, the lower the amount that can be processed. The following calculation of the material use is based on the highest pentane content given.

Example:

$$\frac{VOC\ limit}{highest\ pentane\ +\ styrene\ content} = \frac{240\ tpy\ VOC}{6.80\% + 0.10\%} = 3478.26\ tpy\ of\ EPS\ bead$$

Based on the 240 ton per year of VOC by weight limit and the maximum given VOC content of 6.80% for pentane and 0.10% styrene content, the maximum amount of EPS bead that can be processed is 3478.26 tons per year. Individual calculations must still be done based on the known VOC content or the highest recorded manufacturers VOC content over the previous 12 months or 6.80% if the VOC content is unknown, whichever is highest. Due to manufacturing variations, amount of EPS bead available for processing may be higher or lower.

HAP Foam Limits

This part 70 reissuance does not specifically include a limit on HAP's to avoid major classification for this pollutant. The unrestricted PTE for a single HAP, in this case styrene, is 17.3 tons per year. This is over the 10 tons per year of a single HAP limit. The styrene emissions are limited by the VOC limit in the permit of 240 tons per year. To determine the largest styrene emission, the lowest recorded pentane content is used. The lower the pentane content, the more EPS bead can be processed before reaching the VOC limit. The following calculation is based on the lowest recorded pentane content of the material as provided.

Example:

$$\frac{VOC\ limit}{lowest\ pentane\ +\ styrene\ content} = \frac{240\ tpy\ VOC}{5.8\% + 0.1\%} = 4067.79\ tpy\ of\ EPS\ bead$$

The amount of material that can be processed before reaching the VOC limit as stated in the permit at the lowest VOC content received is 4067.79 tons per year resulting in a styrene emission of 4.07 tons per year. The calculations and records kept for styrene must use the lower pentane contents available to determine the potential to emit styrene emissions and verify that it remains below the threshold.

Bottle Neck Description for PTE calculations

A bottleneck for the facility exists as is seen in the process diagram. The bottleneck is created by the amount of material that can be processed by the 13 shape mold machines (EU 008, 009, 013, 015, 016, 017, 018, 019, 020, 021, 022, 023, 024). The combined processing capacity of these machines is 3945 pounds per hour. EU 025 has a processing capacity of 4000 pounds per hour and EU 006 has a processing capacity of 6000 pounds per hour but are both located before the shape mold machines. The

facility capacity was therefore is 3945 pounds per hour based on the total combined processing rate of the 13 shape mold machines. The bottleneck of 3945 pounds per hour was used in determining the PTE for GP 001 calculations.

3.2 Periodic Monitoring

In accordance with the Clean Air Act, it is the responsibility of the owner or operator of a facility to have sufficient knowledge of the facility to certify that the facility is in compliance with all applicable requirements.

In evaluating the monitoring included in the permit, the MPCA considered the following:

- The likelihood of the facility violating the applicable requirements;
- Whether add-on controls are necessary to meet the emission limits;
- The variability of emissions over time;
- The type of monitoring, process, maintenance, or control equipment data already available for the emission unit;
- The technical and economic feasibility of possible periodic monitoring methods; and
- The kind of monitoring found on similar units elsewhere.

Table 5 summarizes the periodic monitoring requirements for those emission units for which the monitoring required by the applicable requirement is nonexistent or inadequate.

Table 5. Periodic Monitoring

Level*	Requirement (basis)	Additional Monitoring	Discussion
GP 001 (expanded foam processes)	VOC = 240 tons per year, on a 12 month rolling basis (limit to avoid NSR) PM: varies with air flow Opacity: $\leq 20\%$ (Minn. R. 7011.0715)	Recordkeeping: Daily records of EPS bead usage; On-going supplier certification of EPS bead pentane content; Monthly calculations of emissions. None.	Records can be generated on a daily basis for all VOC usage based on materials. The EPS bead processing units are not reasonably expected to generate particulate matter. Cutting operation could generate particulate matter but the process occurs indoors and is vented inside the building. Testing is not feasible.
GP 005 (indirect heating equipment)	PM: ≤ 0.4 lb/MMBtu Opacity: $\leq 20\%$ with exceptions (Minn. R. 7011.0515)	Recordkeeping: Monthly fuel purchase records.	All units in GP 005 use natural gas or propane by design, so the likelihood of violating either the PM or opacity limit is minimal. The Permittee can demonstrate that the emission units are operating below these limits by only using the fuels the units were designed for. Design based PTE for each unit, using AP-42, is 0.0072 compared to the rule limit of 0.4 lb/MMBtu.

*Where the requirement appears in the permit (e.g., EU, SV, GP, etc.).

3.3 Insignificant Activities

Plymouth Foam has several operations that are classified as insignificant activities under the MPCA's permitting rules. These are listed in Appendix 1 to the permit.

The facility has several operations that qualify as insignificant operations. These are included in the Appendix to the permit, along with the applicable requirements. The five 250,000 Btu/hr space heaters previously qualified as insignificant under Minn. R. 7007.1300 subp. 3(A). The rule has since changed, excluding the heaters as insignificant under this item. The heaters still qualify as insignificant under Minn. R. 7007.1300 subp. 3(I). This change is reflected in the insignificant activities list in Appendix 1 of the permit.

The permit is required to include periodic monitoring for all emissions units, including insignificant activities per EPA guidance. The insignificant activities at this Facility are only subject to general applicable requirements. Using the criteria outlined earlier in this TSD, the following table documents the justification why no additional periodic monitoring is necessary for the current insignificant activities. See Attachment 2 of this TSD for the potential to emit of the insignificant activities.

Table 6. Insignificant Activities

Insignificant Activity	General Applicable Emission limit	Discussion
Individual units with potential emission less than 2000 lb/year of certain pollutants.	PM, variable depending on airflow Opacity \leq 20% (with exceptions) (Minn. R. 7011.0715)	This is a hot melt adhesive operation. It is not reasonably expected to generate particulate matter, so it is unlikely that it could violate the applicable requirement. It is operated and vented inside a building, so testing for PM or opacity is not feasible. The PTE for VOC is 52.6 pounds per year. The VOC content of the glue, as supplied by the manufacturer is .001 pounds VOC per pound of glue.
Individual units with potential emissions less than 2000 lb/year of certain pollutants.	PM \leq 0.4 lb/MMBtu, Opacity \leq 20% with exceptions (Minn. R. 7011.0510/515)	For the five 250,000 Btu/hr space heating units, based on the use of natural gas as the fuel, and EPA published emissions factors, it is unlikely that the applicable limits and requirements would be violated. In addition, these types of units are typically operated and vented inside a building, so testing for PM or opacity is not feasible.

3.4 Permit Organization

In general, the permit meets the MPCA Delta Guidance for ordering and grouping of requirements. One area where this permit deviates slightly from Delta guidance is in the use of appendices. While appendices are fully enforceable parts of the permit, in general, any requirement that the MPCA thinks should be tracked (e.g., limits, submittals, etc.), should be in Table A or B of the permit. The main reason

is that the appendices are word processing sections and are not part of the tracking system. Violation of the appendices can be enforced, but the computer system will not automatically generate the necessary enforcement notices or documents. Staff must identify and generate these enforcement notices and/or documents manually.

○ **Comments Received**

Notice start and end dates, as well as comments received will be added to this section.

4. Permit Fee Assessment

This permit action is the reissuance of an individual Part 70; therefore, no application fees apply under Minn. R. 7002.0016, subp. 1.

The new emission units were previously filed as a major amendment and later determined to be a notification. As a result, no additional charges apply for the changes made.

5. Conclusion

Based on the information provided by Plymouth Foam, Inc, the MPCA has reasonable assurance that the proposed operation of the emission facility, as described in the Air Emission Permit No. 14100038-007 and this TSD, will not cause or contribute to a violation of applicable federal regulations and Minnesota Rules.

Staff Members on Permit Team: Paul Bergstrom (permit writer/engineer)
 David Crowell (enforcement)
 Toni Volkmeier (peer reviewer)

AQ File No. 2303B; DQ 3868

Attachments: 1. PTE Summary
 2. Detailed PTE Spreadsheets
 3. Facility Description and CD-01 Forms
 4. Natural Draft Estimation Spreadsheet

Attachment 1:
Potential to Emit Summary
For
Plymouth Foam

Potential to Emit

Totals include permit limits.

Unit	Description	VOC		PM/PM ₁₀		Styrene		Total HAP	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
001	Boiler	0.037	0.162	0.024	0.106	0.000	0.000	0.006	0.026
005	Boiler	0.037	0.162	0.024	0.106	0.000	0.000	0.006	0.026
006	Pre-puff	51.7	227	0.0	0.0	0.75	3.28	0.75	3.28
007	Storage	117	240	0.0	0.0	1.70	7.43	1.70	7.43
008	Block Mold	3.04	13.3	0.0	0.0	0.044	0.193	0.044	0.193
009	Block Mold	3.04	13.3	0.0	0.0	0.044	0.193	0.044	0.193
013	Shape Mold	3.04	13.3	0.0	0.0	0.044	0.193	0.044	0.193
014	Boiler	0.092	0.405	0.061	0.265	0.000	0.000	0.015	0.066
015	Shape Mold	2.90	12.7	0.0	0.0	0.042	0.184	0.042	0.184
016	Shape Mold	2.90	12.7	0.0	0.0	0.042	0.184	0.042	0.184
017	Shape Mold	2.90	12.7	0.0	0.0	0.042	0.184	0.042	0.184
018	Shape Mold	2.90	12.7	0.0	0.0	0.042	0.184	0.042	0.184
019	Shape Mold	2.90	12.7	0.0	0.0	0.042	0.184	0.042	0.184
020	Shape Mold	2.90	12.7	0.0	0.0	0.042	0.184	0.042	0.184
021	Shape Mold	2.90	12.7	0.0	0.0	0.042	0.184	0.042	0.184
022	Shape Mold	2.90	12.7	0.0	0.0	0.042	0.184	0.042	0.184
023	Shape Mold	2.90	12.7	0.0	0.0	0.042	0.184	0.042	0.184
024	Shape Mold	2.90	12.7	0.0	0.0	0.042	0.184	0.042	0.184
025	Pre-expander	65.33	240.0	0.0	0.0	0.947	4.147	0.947	4.147
	total	178	241	0.109	0.478	2.58	4.07	2.6	4.19
IAs	various	0.014	0.062	0.009	0.040	0.000	0.000	0.0022	0.0098
	total w/IAs	178	241	0.118	0.517	2.58	4.07	2.6	4.20

Unit	Description	CO		SO ₂		NO _x	
		(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
001	Boiler	0.268	1.17	0.056	0.243	0.481	2.11
005	Boiler	0.268	1.17	0.056	0.243	0.48	2.11
014	Boiler	0.670	2.93	0.139	0.608	1.20	5.27
	total	1.21	5.28	0.250	1.094	2.16	9.48
IAs	various	0.100	0.438	0.001	0.003	0.119	0.521
	total w/IAs	1.31	5.72	0.250	1.097	2.28	10.00

Attachment 2:
Potential to Emit Detailed Calculations
For
Plymouth Foam

Calculations for PM_{2.5}

Table B1 - PM _{2.5} Emissions					
Parameter	Value	Unit	Source		
Fuel(s)	Natural gas Propane		Natural gas is primary fuel, propane is backup		
Heat Value of Natural Gas	1020	btu/scf	AP 42 Section 1.4		
Heat Value of Propane	91500	btu/gal	AP 42 Section 1.5		
Unlimited Annual Throughput	8760	hr			
PARAMETER	EU001	EU005	EU014	TOTAL	NOTES
Maximum Heat Input Rating (MMBtu/hr) →	3.35	3.35	8.37		A
Natural Gas Usage (MMSCF/hr)	0.0033	0.0033	0.0082		B
Natural Gas Emission Factor (lb/MMCF)	7.6	7.6	7.6		C
Natural Gas Emission Rate (lb/hr)	0.025	0.025	0.062	0.112	D
Natural Gas Emission Rate (tpy)	0.109	0.109	0.273	0.492	E
Propane Emission Factor (lb/1000 gal)	0.7	0.7	0.7		F
Propane Usage (1000 gal/hr)	0.037	0.037	0.091		B
Propane Emission Rate (lb/hr)	0.026	0.026	0.064	0.115	D
Propane Emission Rate (tpy)	0.112	0.112	0.280	0.505	E

NOTES

A

Maximum heat input capacity

Calculated from maximum heat input capacity and fuel heat value

B

C

AP-42 Table 1.4-2

D

(emission factor) * (fuel use)

E

(lb/hr) * (8760 hr/yr) / (2000 lb/ton)

F

AP-42 Table 1.5-1

Green House Gas Calculations

Attachment to Form CH-04c - Plymouth Foam Greenhousegas Calculations

Parameter	Value	Unit	Source						
Fuel(s)	Natural gas Propane		Natural gas is primary fuel, propane is backup						
Unlimited Annual Throughput	8760	hr							
				Unlimited Emission Rate (lb/hr)			Unlimited PTE	Limited PTE	NOTES
Pollutant	CAS	Emission Factor		EU001	EU005	EU014	(tpy)	(tpy)	
Maximum Heat Input Rating (MMBtu/hr) →				3.35	3.35	8.37			
Greenhouse Gas (CO2e)		61.71	kg/MMBtu	456	456	1,139	8,980	8,980	A
CO2		61.46	kg/MMBtu	454	454	1,134	8,944	8,944	D
CH4		3.00E-03	kg/MMBtu	2.22E-02	2.22E-02	5.54E-02	0.44	0.44	E
N2O		6.00E-04	kg/MMBtu	4.43E-03	4.43E-03	1.11E-02	0.09	0.09	E

NOTES

- CO₂e = (Global Warming Potential, GWP) * (Emission). GWP from 40 CFR Part 98 Table A-1.
- A
CO₂ = 1, CH₄ = 21, N₂O = 310
- B
40 CFR Part 98 Table C-1: Pipeline natural gas = 1028 btu/scf, CO₂ emission = 53.02 kg
CO₂/mmBtu = 120162 lb/MMscf
- C
40 CFR Part 98 Table C-2: Pipeline natural gas = 1028 btu/scf, CH₄ = 0.001 kg CH₄/mmBtu,
N₂O = 0.0001 kg N₂O / mmBtu
- D
40 CFR Part 98 Table C-1: Propane: CO₂ emission = 61.46 kg CO₂/mmBtu
40 CFR Part 98 Table C-2: Propane: CH₄ = 0.003 kg CH₄/mmBtu, N₂O = 0.0006 kg N₂O / mmBtu
- E

Note: Propane has higher emissions per Btu of CO₂, CH₄, and N₂O. These values were used to find 'worst case scenario.'

GP 001 Calculations

Volatile Organic Compounds

Permittee indicates that 6.6% is the maximum pentane content available from their suppliers, and that the maximum VOC emissions are 57% of the maximum available VOC. EPA Document No. 450/3-90-020 states that an

average of 85% of the available pentane is lost during the first 48 hours. The EPA document is silent on what happens after the first 48 hours, but one can assume that the pentane continues to be emitted until gone. Since nothing prohibits the facility from keeping the final product on site longer than 48 hours, the worst case assumption is that up to 100% of the pentane may be emitted while on the premises.

Assume a maximum pentane content of	6.80%	(maximum the company would accept from a supplier)
Maximum VOC content is	6.90%	(pentane + styrene, listed below)
VOC limit =	240	tons/year
Limited annual quantity of EPS bead based on highest VOC:	3478.260	9

For the unit by unit hourly emissions, the overall process bottleneck of molding (total capacity of 3945 lb/hr) is used to determine the amount of material that needs to be cut or stored. On an annual, monthly, weekly, and perhaps even daily basis, the molding step limits the amount of material that is pre-expanded and sent to pre-puff storage. However, on an hourly basis material can accumulate at these steps of the process - it is the MPCA's understanding that the steps are not physically connected, so that the hourly PTE for pre-expanding and pre-puff storage are based on the hourly capacities of those units. Even so, these PTEs are not used for any regulatory purpose and could be re-examined if their values were used in making any regulatory decision.

Styrene

The EPS bead has a small amount of free styrene monomer content. Several suppliers of other EPS bead users were contacted, and the content ranges from 900 to 1000 ppm. Use the maximum here.

Assume a maximum styrene content of 0.10%

The unit by unit unlimited styrene PTEs are shown below.

For the limited amount, we want to know the maximum amount of bead that could be processed given the total VOC limit. This is calculated assuming the lowest possible VOC content (gives the highest throughput).

From the Permittee's historical records, the lowest pentane content is 5.80%

Lowest VOC Content is 5.90% (pentane+styrene)

The limited annual quantity of EPS bead would be:	4068	ton/year
	8135593	pounds/year

Limited styrene emissions would be 0.1% of the annual bead usage = 4.07 tpy

Unlimited VOC and Styrene PTEs

EU	Description	emissions factor (%)	Capacity (lb/hr)	VOC lb/hr	VOC tpy	Styrene lb/hr	Styrene tpy
006	pre-puff storage bags	19.00%	3945	51.7	227	0.75	3.28
007	product cutting and storage*	43.00%	3945	117	513	1.70	7.43
008	shape mold	14.00%	315	3.04	13.3	0.0441	0.1932
009	shape mold	14.00%	315	3.04	13.3	0.0441	0.1932
013	shape mold	14.00%	315	3.04	13.3	0.0441	0.1932
015	future shape mold	14.00%	300	2.90	12.7	0.0420	0.1840
016	future shape mold	14.00%	300	2.90	12.7	0.0420	0.1840
017	future shape mold	14.00%	300	2.90	12.7	0.0420	0.1840
018	future shape mold	14.00%	300	2.90	12.7	0.0420	0.1840
019	future shape mold	14.00%	300	2.90	12.7	0.0420	0.1840
020	future shape mold	14.00%	300	2.90	12.7	0.0420	0.1840
021	future shape mold	14.00%	300	2.90	12.7	0.0420	0.1840
022	future shape mold	14.00%	300	2.90	12.7	0.0420	0.1840
023	future shape mold	14.00%	300	2.90	12.7	0.0420	0.1840
024	future shape mold	14.00%	300	2.90	12.7	0.0420	0.1840
025	replacement pre-expander	24.00%	3945	65.33	286.1	0.9468	4.1470
			total	272	1192	3.95	17.3

*capacity of EU 007 is based on the total molding capacity (current bottleneck)

** tpy for EUs 006 based on total molding capacity (current bottleneck) of 3945 lb/hr.

The bottleneck exists because of the 13 shape molders. The bottleneck capacity was determined by adding all adding the maximum design capacity of all of the shape mold machines.

Particulate Matter

The EPS bead operations are not reasonably expected to generate particulate matter. The hot wire cutters (part of EU 007)

generate an insignificant amount. The small amount of PM that is generated is exhausted within the building, and could

be considered insignificant under Minn. R. 7007.1300, subp. 2(D)(3) if it weren't for the VOC emitted during storage.

Because none of the GP 001 units are reasonably expected to generate particulate matter and is vented within the building making it infeasible to measure, no calculation of the IPER

(Minn. R. 7011.0715) PM allowable rates is provided.

Notes:

- 1 Updated amount of foam based on lowest pentane content to determine maximum styrene emissions.

Boilers

All three boilers only burn natural gas. However, most boilers that can burn natural gas can also burn propane, typically as a back up fuel. For this reason, the permit lists both of these as allowable fuels and the PTE is base on the worst-case factor for each pollutant (as listed below).

EU014 - New Gas Boiler								
	8370000	Btu/hr	Gas	7.332E+10	Btu/y	69829714	ft ³ /yr	
		Propane	90.5	MMBtu/Mgal		0.0925	Mgal/hour	
	PM	PM ₁₀	SO _x	NO _x	VOC	CO	Pb	
	0.0000076	0.0000076	--	--	--	0.000084	5E-10	lb/ft ³
gas	--	--	1.5	13	1	--	--	lb/Mgal
propane			0.60					
PTE	0.265	0.265	8	5.266	0.405	2.933	0.000	tpy
	0.061	0.061	0.139	1.202	0.092	0.670	0.000	lb/hr
	0.007							lb/MMBtu
Minn. R. 7011.0515	0.40							lb/MMBtu

EU005 - Gas Boiler								
	3350000	Btu/hr	Gas	2.935E+10	Btu/y	27948571	ft ³ /yr	
		Propane	90.5	MMBtu/Mgal		0.0370	Mgal/hour	
	PM	PM ₁₀	SO _x	NO _x	VOC	CO	Pb	
	0.0000076	0.0000076	--	--	--	0.000084	5E-10	lb/ft ³
gas	--	--	1.5	13	1	--	--	lb/Mgal
propane			0.24					
PTE	0.106	0.106	3	2.108	0.162	1.174	0.000	tpy
	0.024	0.024	0.056	0.481	0.037	0.268	0.000	lb/hr
	0.007							lb/MMBtu
Minn. R. 7011.0515	0.40							lb/MMBtu

EU001 - Gas Boiler								
	3350000	Btu/hr	Gas	2.935E+10	Btu/yr	27948571	ft ³ /yr	
		Propane	90.5	MMBtu/Mgal		0.0370	Mgal/hour	
	PM	PM ₁₀	SO _x	NO _x	VOC	CO	Pb	
gas	0.0000076	0.0000076	--	--	--	0.000084	5E-10	lb/ft ³
propane	--	--	1.5	13	1	--	--	lb/Mgal
PTE	0.106	0.106	0.243	2.108	0.162	1.174	0.000	tpy
	0.024	0.024	0.056	0.481	0.037	0.268	0.000	lb/hr
	0.007							lb/MMBtu
Minn. R. 7011.0515	0.40							lb/MMBtu

Factors from AP-42

HAP PTEs (no HAP factors for propane, so only natural gas is shown)

EU 005 and EU 001

Fuel Consumption Rate:				cf/hr per unit
				3190.5
HAP Name	CAS	Emission Factor lbs/MMscf	Emission Rate (lb/hr)	PTE (tpy)
POM*	NA	8.63E-05	2.75E-07	1.21E-06
Benzene	71-43-2	2.10E-03	6.70E-06	2.93E-05
Formaldehyde	50-00-0	7.50E-02	2.39E-04	1.05E-03
Hexane	110-54-3	1.80E+00	5.74E-03	2.52E-02
Naphthalene	91-20-3	6.10E-04	1.95E-06	8.52E-06
Toluene	108-88-3	3.40E-03	1.08E-05	4.75E-05
Arsenic	7440-38-2	2.00E-04	6.38E-07	2.79E-06
Beryllium	7440-41-7	1.20E-05	3.83E-08	1.68E-07
Cadmium	7440-43-9	1.10E-03	3.51E-06	1.54E-05
Chromium	7440-47-3	1.40E-03	4.47E-06	1.96E-05
Cobalt	7440-48-4	8.40E-05	2.68E-07	1.17E-06
Manganese	7439-96-5	3.80E-04	1.21E-06	5.31E-06
Mercury	7439-97-6	2.60E-04	8.30E-07	3.63E-06
Nickel	7440-02-0	2.10E-03	6.70E-06	2.93E-05
Selenium	7782-49-2	2.40E-05	7.66E-08	3.35E-07
Total HAP		1.89E+00	0.0060	0.0264
			max ind. HAP	0.0252

EU 014

Fuel Consumption Rate: 7971.4 cf/hr

HAP Name	CAS	Emission Factor lbs/MMscf	Emission Rate (lb/hr)	PTE (tpy)
POM*	NA	8.63E-05	6.88E-07	3.01E-06
Benzene	71-43-2	2.10E-03	1.67E-05	7.33E-05
Formaldehyde	50-00-0	7.50E-02	5.98E-04	2.62E-03
Hexane	110-54-3	1.80E+00	1.43E-02	6.28E-02
Naphthalene	91-20-3	6.10E-04	4.86E-06	2.13E-05
Toluene	108-88-3	3.40E-03	2.71E-05	1.19E-04
Arsenic	7440-38-2	2.00E-04	1.59E-06	6.98E-06
Beryllium	7440-41-7	1.20E-05	9.57E-08	4.19E-07
Cadmium	7440-43-9	1.10E-03	8.77E-06	3.84E-05
Chromium	7440-47-3	1.40E-03	1.12E-05	4.89E-05
Cobalt	7440-48-4	8.40E-05	6.70E-07	2.93E-06
Manganese	7439-96-5	3.80E-04	3.03E-06	1.33E-05
Mercury	7439-97-6	2.60E-04	2.07E-06	9.08E-06
Nickel	7440-02-0	2.10E-03	1.67E-05	7.33E-05
Selenium	7782-49-2	2.40E-05	1.91E-07	8.38E-07
Total HAP			0.0150 max ind. HAP	0.0659 0.0628

Total HAP (tpy) from EU 001, 005, 014:	0.118608
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*POM = Sum of pollutants identified as POM in AP-42 Table 1.4-3, dated 3/98:				
Acenaphthene	1.80E-06	Fluoranthene		3.00E-06
Acenaphthylene	1.80E-06	Fluorene		2.80E-06
Anthracene	2.40E-06	Indo(1,2,3-ed)pyrene		1.70E-06
Benz(a)anthracene	1.80E-06	2-Methylnaphthalene		2.40E-05
Benzo(a)pyrene	1.20E-06	3-Methylchloranthrene		1.80E-06
Benzo(b,k)fluoranthene	1.80E-06	Phenanthrene		1.70E-05
Benzo(g,h,i)perylene	1.20E-06	Pyrene		5.00E-06
Chrysene	1.80E-06		total	8.63E-05
Dibenzo(a,h)anthracene	1.20E-06			
7,12-Dimethylbenz(a)anthracene	1.60E-05			
POM does not include naphthalene				

Insignificant Activities

The following activities are treated as insignificant for this permit, as allowed under Minn. R. 7007.1300, subp. 3 (per the reissuance and amendment application submittals):

Subp.	Process Activity	PTE Provided?	Pollutants	Comments
3(I)	Space heaters	Yes	all criteria pollutants	PTE based on EPA emissions factors. See below.
3(I)	Hot melt adhesive	Yes	VOC	PTE estimate based on actual usage. See below.

For those activities that are treated as IAs, the PTE of these units should be evaluated if they could affect the applicability of regulations to the facility. The only pollutants for which this might be possible (given the limited PTE of the facility) are VOC and HAP.

Insignificant Combustion

Total of all insignificant combustion devices

For Natural gas space heaters:

MMBtu/hr 1.25

NG heating value 1050

	Natural Gas (<100 MMBtu/hr)		
	EF (lb/MMSCF)	lb/hr	tpy
PM	7.6	0.0090	0.0396
PM10	7.6	0.0090	0.0396
NO2	100	0.1190	0.5214
SO2	0.6	0.0007	0.0031
CO	84	0.1000	0.4380
VOC	5.5	0.0065	0.0287
Total HAP	1.89	0.0022	0.0098

In order to compare with Minn. R. 7011.515 limit (in lb/MMBtu), calculate PM PTE based on AP-42 (lb/hr divided by / MMBtu/hr)

PM	0.0072381	lb/MMBtu
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Hot Melt Adhesive

The Permittee's application estimated based on VOC content and usage rate. It was not clear if the hourly rate

was actual or potential. For this reason, a 25% safety factor is included here.

No HAPs are listed on the MSDS for the hot melt adhesive.

	lb/hr	tpy
VOC	0.0075	0.03285

Attachment 3:
Facility Description and CD-01
For
Plymouth Foam



COMPLIANCE PLAN **CD-01**

Facility Name: Plymouth Foam Inc

Permit Number: 14100038 - 007

Subject Item: Total Facility

	NC/ CA	Type	Citation	Requirement
1.0		CD	hdr	CONSTRUCTION AUTHORIZATION
2.0		CD	Minn. R. 7007.0800, subp. 2	<p>The Permittee is authorized to install two new emission units as authorized in the previous reissuance, EU 013 and EU 014. Both units shall meet the requirements of this permit (e.g. listed at GP 001, GP 005, EU 013, EU 014, etc.) and shall be limited in size to those specified in the permit application submitted for this permit.</p> <p>The construction authorization expires 18 months after permit issuance. The Permittee must keep a record of the dates of installation and start-up on site. The Permittee may apply for an extension of the construction authorization deadline by following the Administrative Amendment provisions in Minn. R. 7007.1400.</p>
3.0		CD	hdr	SOURCE-SPECIFIC REQUIREMENTS
4.0		CD	Minn. R. 7007.0800, subp. 2	Permit Appendices: This permit contains appendices as listed in the permit Table of Contents. The Permittee shall comply with all requirements contained in the appendices.
5.0		CD	Minn. R. 7007.0800, subp. 2	Equipment Labeling: The Permittee shall permanently affix a unique number to each emissions unit for tracking purposes. The numbers shall correlate the unit to the appropriate EU and GP numbers used in this permit. The number can be affixed by placard, stencil, or other means. The number shall be maintained so that it is readable and visible at all times from a safe distance. If equipment is added, it shall be given a new unique number; numbers from replaced or removed equipment shall not be reused.
6.0		CD	Minn. R. 7007.0800, subp. 2	<p>Equipment Inventory: The Permittee shall maintain a written list of all emissions units and control equipment on site. The Permittee shall update the list to include any replaced, modified, or new equipment prior to making the pre-authorized change.</p> <p>The list shall correlate the units to the numbers used in this permit (EU and GP) and shall include the data on Forms GI-04, GI-05B, and GI-05C. The date of construction shall be the date the change was made for replaced, modified, or new equipment.</p>
7.0		CD	Title I Condition: To avoid classification as major source or modification under 40 CFR Section 52.21; To avoid major source classification under 40 CFR Section 70.2, Minn. R. 7007.0200	This permit establishes limits on the facility to keep it a minor source under New Source Review. The Permittee cannot make any change at the source that would make the source a major source under New Source Review until a permit amendment has been issued. This includes changes that might otherwise qualify as insignificant modifications and minor or moderate amendments.
8.0		CD	hdr	OPERATIONAL REQUIREMENTS
9.0		CD	40 CFR pt. 50; Minn. Stat. Section 116.07, subds. 4a & 9; Minn. R. 7007.0100, subps. 7A, 7L & 7M; Minn. R. 7007.0800, subps. 1, 2 & 4; Minn. R. 7009.0010-7009.0080.	The Permittee shall comply with National Primary and Secondary Ambient Air Quality Standards, 40 CFR pt. 50, and the Minnesota Ambient Air Quality Standards, Minn. R. 7009.0010 to 7009.0080. Compliance shall be demonstrated upon written request by the MPCA.
10.0		CD	Minn. R. 7011.0020	Circumvention: Do not install or use a device or means that conceals or dilutes emissions, which would otherwise violate a federal or state air pollution control rule, without reducing the total amount of pollutant emitted.
11.0		CD	Minn. R. 7007.0800, subp. 2; Minn. R. 7007.0800, subp. 16(J)	Air Pollution Control Equipment: Operate all pollution control equipment whenever the corresponding process equipment and emission units are operated, unless otherwise noted in Table A. Note: At the time of issuance of this permit, this Facility has no air pollution control equipment nor is any required by the permit.
12.0		CD	Minn. R. 7007.0800, subps. 14 and 16(J)	Operation and Maintenance Plan: Retain at the stationary source an operation and maintenance plan for all air pollution control equipment. At a minimum, the O & M plan shall identify all air pollution control equipment and control practices and shall include a preventative maintenance program for the equipment and practices, a description of (the minimum but not necessarily the only) corrective actions to be taken to restore the equipment and practices to proper operation to meet applicable permit conditions, a description of the employee training program for proper operation and maintenance of the control equipment and practices, and the records kept to demonstrate plan implementation.



COMPLIANCE PLAN **CD-01**

Facility Name: Plymouth Foam Inc

Permit Number: 14100038 - 007

13.0		CD	Minn. R. 7019.1000, subp. 4	Operation Changes: In any shutdown, breakdown, or deviation the Permittee shall immediately take all practical steps to modify operations to reduce the emission of any regulated air pollutant. The Commissioner may require feasible and practical modifications in the operation to reduce emissions of air pollutants. No emissions units that have an unreasonable shutdown or breakdown frequency of process or control equipment shall be permitted to operate.
14.0		CD	Minn. R. 7011.0150	Fugitive Emissions: Do not cause or permit the handling, use, transporting, or storage of any material in a manner which may allow avoidable amounts of particulate matter to become airborne. Comply with all other requirements listed in Minn. R. 7011.0150.
15.0		CD	Minn. R. 7030.0010 - 7030.0080	Noise: The Permittee shall comply with the noise standards set forth in Minn. R. 7030.0010 to 7030.0080 at all times during the operation of any emission units. This is a state only requirement and is not enforceable by the EPA Administrator or citizens under the Clean Air Act.
16.0		CD	Minn. R. 7007.0800, subp. 9(A)	Inspections: The Permittee shall comply with the inspection procedures and requirements as found in Minn. R. 7007.0800, subp. 9(A).
17.0		CD	Minn. R. 7007.0800, subp. 16	The Permittee shall comply with the General Conditions listed in Minn. R. 7007.0800, subp. 16.
18.0		CD	hdr	MONITORING REQUIREMENTS
19.0		CD	Minn. R. 7007.0800, subp. 4(D)	Monitoring Equipment Calibration: The Permittee shall calibrate all required monitoring equipment at least once every 12 months (any requirements applying to continuous emission monitors are listed separately in this permit).
20.0		CD	Minn. R. 7007.0800, subp. 4(D)	Operation of Monitoring Equipment: Unless otherwise noted in Tables A, B, and/or C, monitoring a process or control equipment connected to that process is not necessary during periods when the process is shutdown, or during checks of the monitoring systems, such as calibration checks and zero and span adjustments. If monitoring records are required, they should reflect any such periods of process shutdown or checks of the monitoring system.
21.0		CD	hdr	RECORDKEEPING
22.0		CD	Minn. R. 7007.0800, subp. 5(C)	Recordkeeping: Retain all records at the stationary source for a period of five (5) years from the date of monitoring, sample, measurement, or report. Records which must be retained at this location include all calibration and maintenance records, all original recordings for continuous monitoring instrumentation, and copies of all reports required by the permit. Records must conform to the requirements listed in Minn. R. 7007.0800, subp. 5(A).
23.0		CD	Minn. R. 7007.0800, subp. 5(B)	Recordkeeping: Maintain records describing any insignificant modifications (as required by Minn. R. 7007.1250, subp. 3) or changes contravening permit terms (as required by Minn. R. 7007.1350, subp. 2), including records of the emissions resulting from those changes.
24.0		CD	Minn. R. 7007.1200, subp. 4	If the Permittee determines that no permit amendment or notification is required prior to making a change, the Permittee must retain records of all calculations required under Minn. R. 7007.1200. For expiring permits, these records shall be kept for a period of five years from the date the change was made or until permit reissuance, whichever is longer. The records shall be kept at the stationary source for the current calendar year of operation and may be kept at the stationary source or office of the stationary source for all other years. The records may be maintained in either electronic or paper format.
25.0		CD	hdr	REPORTING/SUBMITTALS
26.0		CD	Minn. R. 7019.1000, subp. 3	Shutdown Notifications: Notify the Commissioner at least 24 hours in advance of a planned shutdown of any control equipment or process equipment if the shutdown would cause any increase in the emissions of any regulated air pollutant. If the owner or operator does not have advance knowledge of the shutdown, notification shall be made to the Commissioner as soon as possible after the shutdown. However, notification is not required in the circumstances outlined in Items A, B and C of Minn. R. 7019.1000, subp. 3. At the time of notification, the owner or operator shall inform the Commissioner of the cause of the shutdown and the estimated duration. The owner or operator shall notify the Commissioner when the shutdown is over.



COMPLIANCE PLAN **CD-01**

Facility Name: Plymouth Foam Inc

Permit Number: 14100038 - 007

27.0		CD	Minn. R. 7019.1000, subp. 2	<p>Breakdown Notifications: Notify the Commissioner within 24 hours of a breakdown of more than one hour duration of any control equipment or process equipment if the breakdown causes any increase in the emissions of any regulated air pollutant. The 24-hour time period starts when the breakdown was discovered or reasonably should have been discovered by the owner or operator. However, notification is not required in the circumstances outlined in Items A, B and C of Minn. R. 7019.1000, subp. 2.</p> <p>At the time of notification or as soon as possible thereafter, the owner or operator shall inform the Commissioner of the cause of the breakdown and the estimated duration. The owner or operator shall notify the Commissioner when the breakdown is over.</p>
28.0		CD	Minn. R. 7019.1000, subp. 1	Notification of Deviations Endangering Human Health or the Environment: As soon as possible after discovery, notify the Commissioner or the state duty officer, either orally or by facsimile, of any deviation from permit conditions which could endanger human health or the environment.
29.0		CD	Minn. R. 7019.1000, subp. 1	<p>Notification of Deviations Endangering Human Health or the Environment Report: Within 2 working days of discovery, notify the Commissioner in writing of any deviation from permit conditions which could endanger human health or the environment. Include the following information in this written description:</p> <ol style="list-style-type: none"> 1. the cause of the deviation; 2. the exact dates of the period of the deviation, if the deviation has been corrected; 3. whether or not the deviation has been corrected; 4. the anticipated time by which the deviation is expected to be corrected, if not yet corrected; and 5. steps taken or planned to reduce, eliminate, and prevent reoccurrence of the deviation.
30.0		S/A	Minn. R. 7007.0800, subp. 6(A)(2)	Semiannual Deviations Report: due 30 days after end of each calendar half-year starting 05/02/2007. The first semiannual report submitted by the Permittee shall cover the calendar half-year in which the permit is issued. The first report of each calendar year covers January 1 - June 30. The second report of each calendar year covers July 1 - December 31. If no deviations have occurred, the Permittee shall submit the report stating no deviations.
31.0		CD	Minn. R. 7007.1150 through Minn. R. 7007.1500	Application for Permit Amendment: If a permit amendment is needed, submit an application in accordance with the requirements of Minn. R. 7007.1150 through Minn. R. 7007.1500. Submittal dates vary, depending on the type of amendment needed.
32.0		S/A	Minn. R. 7007.0400, subp. 2	Application for Permit Reissuance: due 180 days before expiration of Existing Permit
33.0		CD	Minn. R. 7007.1400, subp. 1(H)	Extension Requests: The Permittee may apply for an Administrative Amendment to extend a deadline in a permit by no more than 120 days, provided the proposed deadline extension meets the requirements of Minn. R. 7007.1400, subp. 1(H).
34.0		S/A	Minn. R. 7007.0800, subp. 6(C)	Compliance Certification: due 31 days after end of each calendar year starting 05/02/2007 (for the previous calendar year). The Permittee shall submit this report on a form approved by the Commissioner, both to the Commissioner and to the US EPA regional office in Chicago. This report covers all deviations experienced during the calendar year.
35.0		CD	Minn. R. 7019.3000 through Minn. R. 7019.3100	Emission Inventory Report: due on or before April 1 of each calendar year following permit issuance. This shall be submitted on a form approved by the Commissioner.
36.0		CD	Minn. R. 7002.0005 through Minn. R. 7002.0095	Emission Fees: due 60 days after receipt of an MPCA bill.
37.0		S/A	Minn. R. 7007.0800, subp. 2	Annual Report: due 31 days after end of each calendar year starting 05/02/2007. The Permittee shall submit an annual report by January 31st that describes the changes made at the facility during the previous calendar year using the latest MPCA application forms. The report shall include the emission unit, stack/vent, group, and control equipment data for any new or replaced units or control devices. The report shall document the VOC 12-month rolling sum calculations for the previous calendar year. The report shall be submitted with the annual Compliance Certification listed in Table B. As part of the Annual Report, the Permittee shall verify and certify that the facility has maintained minor source status for New Source Review.



COMPLIANCE PLAN **CD-01**

Facility Name: Plymouth Foam Inc

Permit Number: 14100038 - 007

Subject Item: GP 001 Expanded Foam Processes

Associated Items: EU 006 Pre-puff storage bags
EU 007 Product cutting and storage area
EU 008 Shape mold machine
EU 009 Shape mold machine
EU 013 Shape Mold Machine
EU 015 Shape Mold Machine
EU 016 Shape Mold Machine
EU 017 Shape Mold Machine
EU 018 Shape Mold Machine
EU 019 Shape Mold Machine
EU 020 Shape Mold Machine
EU 021 Shape Mold Machine
EU 022 Shape Mold Machine
EU 023 Shape Mold Machine
EU 024 Shape Mold Machine
EU 025 EPS bead pre-expander

	NC/ CA	Type	Citation	Requirement
1.0		CD	hdr	EMISSION AND OPERATIONAL LIMITS
2.0		CD	Title I Condition: To avoid classification as major source and modification under 40 CFR section 52.21 and Minn. R. 7007.3000; and to avoid major source classification under 40 CFR section 70.2, Minn. R. 7007.0200	The Permittee may replace or move listed emission units in GP 001, provided VOC and HAP emissions are tracked and calculated directly from material usage. All changes must meet the requirements of GP 001. If a proposed change triggers an applicable requirement that is not contained in this permit, the change must go through the appropriate procedure in Minn. R. ch. 7007.
3.0		LIMIT	Title I Condition: To avoid classification as major source and modification under 40 CFR Section 52.21 & Minn. R. 7007.3000; to avoid major source classification under 40 CFR Section 70.2 and Minn. R. 7007.0200	Volatile Organic Compounds: less than or equal to 240 tons/year using 12-month Rolling Sum to be calculated by the 15th day of each month for the previous 12-month period as described later in this permit. All emission units or stacks added to GP 001 as allowed in this permit shall be included in this calculation. VOC contents for each VOC-containing material shall be determined as described under the Material Content requirement in GP 001.
4.0		CD	Title I Condition: To avoid classification as major source and modification under 40 CFR Section 52.21 & Minn. R. 7007.3000; to avoid major source classification under 40 CFR Section 70.2 and Minn. R. 7007.0200	All VOC-emitting equipment at the Facility is subject to this limit. If the Permittee replaces any existing VOC-emitting equipment, adds new VOC-emitting equipment, or modifies the existing equipment, such equipment is subject to this permit limit as well as all of the requirements of GP 001. Prior to making such a change, the Permittee shall apply for and obtain the appropriate permit amendment, as applicable. The Permittee is not required to complete VOC calculations described in Minn. R. 7007.1200, subp. 2. A permit amendment will still be needed regardless of the emissions increase if the change will be subject to a new applicable requirement or requires revisions to the limits or monitoring and recordkeeping in this permit.
5.0		LIMIT	Minn. R. 7011.0715, subp. 1(A)	Total Particulate Matter: less than or equal to 0.3 grains/dry standard cubic foot of exhaust gas unless required to further reduce emissions to comply with the less stringent limit of either Minn. R. 7011.0730 or Minn. R. 7011. 0735.
6.0		LIMIT	Minn. R. 7011.0715, subp. 1(B)	Opacity: less than or equal to 20 percent opacity
7.0		CD	hdr	MONITORING AND RECORDKEEPING



COMPLIANCE PLAN **CD-01**

Facility Name: Plymouth Foam Inc

Permit Number: 14100038 - 007

8.0		CD	Title I Condition: To avoid classification as major source and modification under 40 CFR 52.21 and Minn. R. 7007.3000; to avoid major source classification under 40 CFR 70.2, Minn. R. 7007.0200, and 40 CFR 63.2; Minn. R. 7007.0800, subps. 4 and 5	Daily Recordkeeping: On each day of operation, the Permittee shall calculate, record, and maintain the pounds of each VOC-containing material used based on written usage records.
9.0		CD	Minn. R. 7007.0800, subp. 4 and 5	Monthly Recordkeeping -- VOC Emissions. By the 15th of the month, the Permittee shall calculate and record the following: 1) The total usage of VOC-containing materials for the previous calendar month using the daily usage records. This record shall also include the VOC and solids contents of each material as determined by the Material Content requirement of this permit; 2) The VOC emissions for the previous month using the formulas specified in this permit; and 3) The 12-month rolling sum VOC emissions for the previous 12-month period by summing the monthly VOC emissions data for the previous 12 months.
10.0		CD	Minn. R. 7007.0800, subp. 4 and 5	Monthly Calculation -- VOC Emissions The Permittee shall calculate monthly VOC emissions using the following equation: $\text{VOC (tons/month)} = (A1 \times V1) + (A2 \times V2) + (A3 \times V3) + \dots$ where: A# = amount of each VOC-containing material used during the previous month, in tons V# = weight percent of VOC in A#, as a fraction The 12-month rolling sum shall be calculated by summing the monthly VOC emissions from the previous 12 months.
11.0		CD	Minn. R. 7007.0800, subps. 4 and 5	VOC Content of EPS Bead: The Permittee shall use the Certificate of Analysis (COA) or Material Safety Data Sheet (MSDS) to determine the VOC content of each lot of EPS bead. If the COA or MSDS is not available or does not include the VOC content of a particular lot of EPS bead, then the Permittee shall assume that the pentane content is 6.8% by weight and/or the styrene monomer content is 0.1% by weight, as applicable. However, if in the preceding 12 months EPS bead with a pentane content of greater than 6.8% was used, then the Permittee shall assume that the pentane content is equivalent to the the highest pentane content of bead used in the preceding 12 months; likewise, if in the preceding 12 months EPS bead with a styrene monomer content of greater than 0.1% was used, then the Permittee shall assume that the styrene monomer content is equivalent to the highest styrene monomer content of bead used in the preceding 12 months.
12.0		CD	Minn. R. 7007.0800, subps. 4 and 5	(continued from above) Other alternative methods approved by the MPCA may be used to determine the VOC content of raw materials. The MPCA reserves the right to require the Permittee to take samples of VOC containing materials and to conduct analysis of VOC content as per EPA or ASTM reference methods. If the EPA or ASTM reference method is used, it shall supersede the COA or MSDS data.
13.0		CD	Minn. R. 7007.0800, subps. 4 and 5	Material Content of Other Materials: VOC contents in non-EPS Bead materials shall be determined by the MSDS provided by the supplier for each material used. If a material content range is given on the MSDS, the highest number in the range shall be used in all permit calculations. Other alternative methods approved by the MPCA may be used to determine the VOC content. The Commissioner reserves the right to require the Permittee to determine the VOC content of any material, according to EPA or ASTM reference methods. If an EPA or ASTM reference method is used for material content determination, the data obtained shall supersede the MSDS.



COMPLIANCE PLAN **CD-01**

Facility Name: Plymouth Foam Inc

Permit Number: 14100038 - 007

14.0		CD	Minn. R. 7005.0100, subp. 35a	<p>Maximum Contents of Materials: The Permittee assumed certain worst-case contents of materials when determining the short term potential to emit of units in GP001. These assumptions are listed in Appendix 2 of this permit. Changing to a material that has a higher content of any of the given pollutants is considered a change in method of operation that must be evaluated under Minn. R. 7007.1200, subp. 3 to determine if a permit amendment or notification is required under Minn. R. 7007.1150.</p> <p>HAP emissions increase with lower pentane content in EPS beads. Assumptions used in HAP emissions are listed in Appendix 2. Changing to a material that has a lower pentane content that results in an increase of HAP is considered a change in method of operation that must be evaluated under Minn. R. 7007.1200, subp. 3 to determine if a permit amendment or notification is required under Minn. R. 7007.1150.</p>
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COMPLIANCE PLAN **CD-01**

Facility Name: Plymouth Foam Inc

Permit Number: 14100038 - 007

Subject Item: GP 005 Indirect Heating Units

Associated Items: EU 001 Boiler #1

EU 005 Boiler #2

EU 014 Boiler #3

	NC/ CA	Type	Citation	Requirement
1.0		CD	hdr	OPERATIONAL REQUIREMENTS
2.0		LIMIT	Minn. R. 7011.0515, subp. 1	Total Particulate Matter: less than or equal to 0.4 lbs/million Btu heat input . Potential emissions of each boiler based on equipment design = 0.007 lb/million Btu heat input.
3.0		LIMIT	Minn. R. 7011.0515, subp. 2	Opacity: less than or equal to 20 percent opacity except for one six-minute period per hour of not more than 60 percent opacity.
4.0		CD	Minn. R. 7005.0100, subp. 35a	Fuel Types: Natural gas or propane only, by design.
5.0		CD	hdr	RECORDKEEPING
6.0		CD	Minn. R. 7007.0800, subp. 5	Fuel Records: The Permittee shall keep records of fuel purchases for the facility on a monthly basis.



COMPLIANCE PLAN **CD-01**

Facility Name: Plymouth Foam Inc

Permit Number: 14100038 - 007

Subject Item: EU 013 Shape Mold Machine

Associated Items: GP 001 Expanded Foam Processes

SV 010 Shape mold machine

	NC/ CA	Type	Citation	Requirement
1.0		S/A	Minn. R. 7007.0800, subp. 4 and 5	Notification of the Actual Date of Initial Startup: due 15 days after Initial Startup. The Permittee shall submit a written notification for EU 013. The notice shall include the EU number, the date that construction began, and the date of initial startup.



COMPLIANCE PLAN **CD-01**

Facility Name: Plymouth Foam Inc

Permit Number: 14100038 - 007

Subject Item: EU 014 Boiler #3

Associated Items: GP 005 Indirect Heating Units

SV 011 Boiler #3 stack

	NC/ CA	Type	Citation	Requirement
1.0		S/A	Minn. R. 7007.0800, subp. 4 and 5	Notification of the Actual Date of Initial Startup: due 15 days after Initial Startup. The Permittee shall submit a written notification for EU 014. The notice shall include the EU number, the date that construction began, and the date of initial start-up.



FACILITY DESCRIPTION: EMISSION UNIT (EU)

Show: Active and Pending Records

Action:

AQD Facility ID: 14100038

Facility Name: Plymouth Foam Inc

ID No.	Emission Unit Status	Added By (Action)	Retired By (Action)	Insignificant Activity	Operator ID for Item	Stack/Vent ID No(s).	Control Equip. ID No(s).	Operator Description	Manufacturer	Model Number	SIC	Max. Design Capacity	Maximum Design Capacity		Max Fuel Input (mil Btu)
													Materials	Units n	Units d
1 EU 001	Active	PER 005		<input type="checkbox"/>		SV 001 (M)		Boiler #1	Cleaver Brooks		3086	100	Energy	Hp	3.35
2 EU 001	Active	PER 007		<input type="checkbox"/>		SV 001 (M)		Boiler #1	Cleaver Brooks	CB200-100	3086	100	Energy	Hp	3.35
3 EU 002	Removed	EIS 007		<input type="checkbox"/>				EPS Bead Pre-Expander	Weisser		3086	3000		Lb	Hr
4 EU 003	Removed	PER 005		<input type="checkbox"/>				Kurtz Block Molding Machine	Kurtz		3086	2000		Lb	Hr
5 EU 004	Removed	EIS 007		<input type="checkbox"/>				Dingeldein Block Molding Machine	Dingeldein		3086	2000		Lb	Hr
6 EU 005	Active	PER 005		<input type="checkbox"/>		SV 005 (M)		Boiler #2	Cleaver Brooks		3086	100	Energy	Hp	3.35
7 EU 005	Active	PER 007		<input type="checkbox"/>		SV 005 (M)		Boiler #2	Cleaver Brooks	CB760-100	3086	100	Energy	Hp	3.35
8 EU 006	Active	PER 005		<input type="checkbox"/>		SV 006		Pre-puff storage bags	na		3086	6,000		Lb	Hr
9 EU 006	Active	PER 007		<input type="checkbox"/>		SV 006		Pre-puff storage bags	na		3086	6,000	Material	Lb	Hr
10 EU 007	Active	PER 005		<input type="checkbox"/>		SV 007		Product cutting and storage area	na		3086				
11 EU 007	Active	PER 007		<input type="checkbox"/>		SV 007		Product cutting and storage area	na		3086		Material		
12 EU 008	Active	PER 005		<input type="checkbox"/>		SV 008		Shape mold machine	Kurtz		3086	315		Lb	Hr
13 EU 008	Active	PER 007		<input type="checkbox"/>		SV 008		Shape mold machine	Kurtz	14512	3086	315	Material	Lb	Hr
14 EU 009	Active	PER 005		<input type="checkbox"/>		SV 009		Shape mold machine	Kurtz		3086	315		Lb	Hr
15 EU 009	Active	PER 007		<input type="checkbox"/>		SV 009		Shape mold machine	Hirsch	1400	3086	315	Material	Lb	Hr
16 EU 010	Active	PER 005		<input type="checkbox"/>		SV 002		EPS bead pre-expander	AMD		3086	4,000		Lb	Hr
17 EU 010	Removed	PER 007		<input type="checkbox"/>				EPS bead pre-expander	AMD		3086	4,000		Lb	Hr
18 EU 011	Removed	PER 005		<input type="checkbox"/>				Block mold machine	Dingeldein		3086	3,000		Lb	Hr
19 EU 012	Active	PER 005		<input type="checkbox"/>		SV 004		Block mold machine	Idro		3086	3,000		Lb	Hr
20 EU 012	Removed	PER 007		<input type="checkbox"/>				Block mold machine	Idro		3086	3,000		Lb	Hr
21 EU 013	Active	PER 005		<input type="checkbox"/>		SV 010		Shape Mold Machine	Kurtz		3086	315		Lb	Hr
22 EU 014	Active	PER 005		<input type="checkbox"/>		SV 011		Boiler #3	Cleaver Brooks		3086	200	Energy	BHp	8.37
23 EU 015	Active	PER 007		<input type="checkbox"/>		SV 012 (M)		Shape Mold Machine	Kurtz	1014	3086	300	Foam	Lb	Hr
24 EU 016	Active	PER 007		<input type="checkbox"/>		SV 013 (M)		Shape Mold Machine	Kurtz	1014	3086	300	Foam	Lb	Hr
25 EU 017	Active	PER 007		<input type="checkbox"/>		SV 014 (M)		Shape Mold Machine	Kurtz	1014	3086	300	Foam	Lb	Hr

FACILITY DESCRIPTION: EMISSION UNIT (EU)

ID No.	Emission Unit Status	Added By (Action)	Commence Const. Date	Initial Startup Date	Removal Date	Firing Method	Pct. Fuel/Space Heat	Bottleneck	Elevator Type
1	EU 001	Active	PER 005	01/01/1994	01/01/1995				
2	EU 001	Active	PER 007	01/01/1994	01/01/1995				
3	EU 002	Removed	EIS 007	01/01/1984	01/01/1993	02/01/2002			
4	EU 003	Removed	PER 005	01/01/1984	01/01/1996	09/10/2004			
5	EU 004	Removed	EIS 007	01/01/1993	01/01/1993	02/01/2002			
6	EU 005	Active	PER 005	08/01/1996	11/15/1996				
7	EU 005	Active	PER 007	08/01/1996	11/15/1996				
8	EU 006	Active	PER 005	01/01/1984	01/01/1993				
9	EU 006	Active	PER 007	01/01/1984	01/01/1993				
10	EU 007	Active	PER 005	01/01/1995	01/01/1995				
11	EU 007	Active	PER 007	01/01/1995	01/01/1995				
12	EU 008	Active	PER 005	03/07/2005	04/21/2005			Whole Facility	
13	EU 008	Active	PER 007	03/07/2005	04/21/2005			Whole Facility	
14	EU 009	Active	PER 005					Whole Facility	
15	EU 009	Active	PER 007	05/19/2008	06/16/2008			Whole Facility	
16	EU 010	Active	PER 005	01/01/2002	01/01/2002				
17	EU 010	Removed	PER 007	01/01/2002	12/01/2011				
18	EU 011	Removed	PER 005		09/10/2004				
19	EU 012	Active	PER 005	11/05/2003	09/13/2004			Whole Facility	
20	EU 012	Removed	PER 007	11/05/2003	09/13/2004	01/01/2009		Whole Facility	
21	EU 013	Active	PER 005					Whole Facility	
22	EU 014	Active	PER 005						
23	EU 015	Active	PER 007					Group of Sources	
24	EU 016	Active	PER 007					Group of Sources	
25	EU 017	Active	PER 007					Group of Sources	

FACILITY DESCRIPTION: EMISSION UNIT (EU)

Show: Active and Pending Records

Action:

AQD Facility ID: 14100038

Facility Name: Plymouth Foam Inc

ID No.	Emission Unit Status	Added By (Action)	Retired By (Action)	Insignif-icant Activity	Operator ID for Item	Stack/Vent ID No(s).	Control Equip. ID No(s).	Operator Description	Manufacturer	Model Number	SIC	Max. Design Capacity	Maximum Design Capacity		Max Fuel Input (mil Btu)
													Materials	Units n	Units d
26 EU 018	Active	PER 007		<input type="checkbox"/>		SV 015 (M)		Shape Mold Machine	Kurtz	1014	3086	300	Foam	Lb	Hr
27 EU 019	Active	PER 007		<input type="checkbox"/>		SV 016 (M)		Shape Mold Machine	Kurtz	1014	3086	300	Foam	Lb	Hr
28 EU 020	Active	PER 007		<input type="checkbox"/>		SV 017 (M)		Shape Mold Machine	Kurtz	1014	3086	300	Foam	Lb	Hr
29 EU 021	Active	PER 007		<input type="checkbox"/>		SV 018 (M)		Shape Mold Machine	Kurtz	1014	3086	300	Foam	Lb	Hr
30 EU 022	Active	PER 007		<input type="checkbox"/>		SV 019 (M)		Shape Mold Machine	Kurtz	1014	3086	300	Foam	Lb	Hr
31 EU 023	Active	PER 007		<input type="checkbox"/>		SV 020 (M)		Shape Mold Machine	Kurtz	1014	3086	300	Foam	Lb	Hr
32 EU 024	Active	PER 007		<input type="checkbox"/>		SV 021 (M)		Shape Mold Machine	Kurtz	1014	3086	300	Foam	Lb	Hr
33 EU 025	Active	PER 007		<input type="checkbox"/>		SV 022 (M)		EPS bead pre-expander	Hirsch	6000	3086	4000	Foam	Lb	Hr

FACILITY DESCRIPTION: EMISSION UNIT (EU)

	ID No.	Emission Unit Status	Added By (Action)	Commence Const. Date	Initial Startup Date	Removal Date	Firing Method	Pct. Fuel/ Space Heat	Bottleneck	Elevator Type
26	EU 018	Active	PER 007						Group of Sources	
27	EU 019	Active	PER 007						Group of Sources	
28	EU 020	Active	PER 007						Group of Sources	
29	EU 021	Active	PER 007						Group of Sources	
30	EU 022	Active	PER 007						Group of Sources	
31	EU 023	Active	PER 007						Group of Sources	
32	EU 024	Active	PER 007						Group of Sources	
33	EU 025	Active	PER 007	12/01/2011	01/01/2012				Group of Sources	

FACILITY DESCRIPTION: STACK/VENTS (SV)

Show: Active and Pending Records

Action:

AQD Facility ID: 14100038

Facility Name: Plymouth Foam Inc

ID No.	Stack/ Vent Status	Added By (Action)	Retired By (Action)	Operator ID for Item	Operators Description	Height of Opening From Ground (feet)	Inside Dimensions		Design Flow Rate at Top (ACFM)	Exit Gas Temperature at Top (°F)	Flow Rate/ Temperature Information Source	Discharge Direction
							Diameter or Length (feet)	Width (feet)				
1	SV 001	Active	PER 005		Boiler #1 stack	30.3	1.0		800	350	Estimate	Up, No Cap
2	SV 002	Active	PER 005		Pre-expander stack	26	0.25		1000	200	Estimate	Up, No Cap
3	SV 002	Removec	PER 007		Pre-expander stack	26	0.25		1000	200	Estimate	Up, No Cap
4	SV 003	Removec	PER 005		Block mold stack	30	1.7		1000	200	Estimate	Up, No Cap
5	SV 004	Active	PER 005		Block mold stack	34	1		1000	200	Manufacturer	Up, No Cap
6	SV 004	Removec	PER 007		Block mold stack	34	1		1000	200	Manufacturer	Up, No Cap
7	SV 005	Active	PER 005		Boiler #2 stack	30	1.0		800	350	Estimate	Up, No Cap
8	SV 006	Active	PER 005		Pre-puff storage bag exhaust	.8	1.5		1200	200	Estimate	Horizontal
9	SV 006	Active	PER 007		Pre-puff storage bag exhaust	0.8	1.5		1200	200	Estimate	Horizontal
10	SV 007	Active	PER 005		Product cutting/storage				1200	70	Estimate	Up, No Cap
11	SV 008	Active	PER 005		Shape mold machine	26	.5			200	Estimate	Up, No Cap
12	SV 008	Active	PER 007		Shape mold machine	26	0.5		140	200	Estimate	Up, No Cap
13	SV 009	Active	PER 005		Shape mold machine	26	.5		1000	200	Estimate	Up, No Cap
14	SV 009	Active	PER 007		Shape mold machine	26	0.5		1000	200	Estimate	Up, No Cap
15	SV 010	Active	PER 005		Shape mold machine	26	.5		1000	200	Estimate	Up, No Cap
16	SV 010	Active	PER 007		Shape mold machine	26	0.5		1000	200	Estimate	Up, No Cap
17	SV 011	Active	PER 005		Boiler #3 stack	30	1.5		1600	350	Manufacturer	Up, No Cap
18	SV 012	Active	PER 007		Kurtz Shape Mold	26	0.5		140	200	Estimate	Up, No Cap
19	SV 013	Active	PER 007		Kurtz Shape Mold	26	0.5		140	200	Estimate	Up, No Cap
20	SV 014	Active	PER 007		Kurtz Shape Mold	26	0.5		140	200	Estimate	Up, No Cap
21	SV 015	Active	PER 007		Kurtz Shape Mold	26	0.5		140	200	Estimate	Up, No Cap
22	SV 016	Active	PER 007		Kurtz Shape Mold	26	0.5		140	200	Estimate	Up, No Cap
23	SV 017	Active	PER 007		Kurtz Shape Mold	26	0.5		140	200	Estimate	Up, No Cap
24	SV 018	Active	PER 007		Kurtz Shape Mold	26	0.5		140	200	Estimate	Up, No Cap
25	SV 019	Active	PER 007		Kurtz Shape Mold	26	0.5		140	200	Estimate	Up, No Cap
26	SV 020	Active	PER 007		Kurtz Shape Mold	26	0.5		140	200	Estimate	Up, No Cap
27	SV 021	Active	PER 007		Kurtz Shape Mold	26	0.5		140	200	Estimate	Up, No Cap

FACILITY DESCRIPTION: STACK/VENTS (SV)

Show: Active and Pending Records

Action:

AQD Facility ID: 14100038

Facility Name: Plymouth Foam Inc

ID No.	Stack/ Vent Status	Added By (Action)	Retired By (Action)	Operator ID for Item	Operator's Description	Height of Opening From Ground (feet)	Inside Dimensions		Design Flow Rate at Top (ACFM)	Exit Gas Temperature at Top (°F)	Flow Rate/ Temperature Information Source	Discharge Direction
							Diameter or Length (feet)	Width (feet)				
28	SV 022	Active	PER 007		Pre-expander	26	0.25		35	200	Estimate	Up, No Cap

FACILITY DESCRIPTION: GROUPS (GP)

Show: Active and Pending Records

Action: PER 007

AQD Facility ID: 14100038

Facility Name: Plymouth Foam Inc

ID No.	Group Status	Added By (Action)	Retired By (Action)	Include in EI	Operator ID for Item	Group Description	Group Items
1 GP 001	Active	PER 005		<input type="checkbox"/>		Expanded Foam Processes	EU 006, EU 007, EU 008, EU 009, EU 010, EU 012, EU 013
2 GP 001	Active	PER 007		<input type="checkbox"/>		Expanded Foam Processes	EU 006, EU 007, EU 008, EU 009, EU 013, EU 015, EU 016, EU 017, EU 018, EU 019, EU 020, EU 021, EU 022, EU 023, EU 024, EU 025
3 GP 002	Retired	PER 005		<input type="checkbox"/>		Pre-approved changes/Aging Bags Limit	EU 007
4 GP 003	Removed	PER 005		<input type="checkbox"/>		Emission Units To Be Replaced	EU 011
5 GP 004	Active	PER 005		<input type="checkbox"/>		New Emissions Units	EU 013, EU 014
6 GP 004	Retired	PER 007		<input type="checkbox"/>		New Emissions Units	EU 014
7 GP 005	Active	PER 005		<input type="checkbox"/>		Indirect Heating Units	EU 001, EU 005, EU 014

FACILITY DESCRIPTION: BUILDINGS (BG)

Show: Active and Pending Records

Action:

AQD Facility ID: 14100038

Facility Name: Plymouth Foam Inc

	ID No.	Added By (Action)	Retired By (Action)	Operator ID for Item	Length (feet)	Width (feet)	Roof Height from Ground (feet)	Description/Comment	Building Status
1	BG 001	PER 007			200	200	20		Active
2	BG 002	PER 007			120.0	66.0	21.0		Active
3	BG 003	PER 007			80.0	66.0	28.0		Active

Attachment 4:

Natural Draft Estimation Spreadsheet

SV	Diameter (ft)	Diameter (m)	Height (ft)	Height (m)	Temp In (F)	Temp Out (F)	Temp In (K)	Temp Out (K)	Area (m^2)	Flow Rate (m^3/s)	Flow Rate (ACFM)
008	0.50	0.15	26.00	7.93	200.00	68.00	366.48	293.15	0.02	0.07	140.21
012	0.50	0.15	26.00	7.93	200.00	68.00	366.48	293.15	0.02	0.07	140.21
013	0.50	0.15	26.00	7.93	200.00	68.00	366.48	293.15	0.02	0.07	140.21
014	0.50	0.15	26.00	7.93	200.00	68.00	366.48	293.15	0.02	0.07	140.21
015	0.50	0.15	26.00	7.93	200.00	68.00	366.48	293.15	0.02	0.07	140.21
016	0.50	0.15	26.00	7.93	200.00	68.00	366.48	293.15	0.02	0.07	140.21
017	0.50	0.15	26.00	7.93	200.00	68.00	366.48	293.15	0.02	0.07	140.21
018	0.50	0.15	26.00	7.93	200.00	68.00	366.48	293.15	0.02	0.07	140.21
019	0.50	0.15	26.00	7.93	200.00	68.00	366.48	293.15	0.02	0.07	140.21
020	0.50	0.15	26.00	7.93	200.00	68.00	366.48	293.15	0.02	0.07	140.21
021	0.50	0.15	26.00	7.93	200.00	68.00	366.48	293.15	0.02	0.07	140.21
022	0.25	0.08	26.00	7.93	200.00	68.00	366.48	293.15	0.00	0.02	35.05

Notes:

Calculations based on buoyancy in temperature differences in the stack.

The coefficient typcally used is 0.65 and has been used here.

It has been assumed that the molar mass of the outside and inside air are the same.

This is a rough estimate and is not appropriate to use for modeling.

Calculations completed by permit staff at MPCA industrial division.

An outside air temperature of 68 degrees fahrenheit was used, the rate will be higher if the outside temperature decreases.