Plantwide Emission Summary
Hormann LLC
Sparta, TN

Source	Description	Criteria Poluttant Emissions (tpy)							CO2eq	Hazardous Air Pollutant (HAP) Emissions		
		TSP[2]	PM10[2]	PM2.5[2]	NOx	VOC	SO2	CO		Methylene Diphenyl Diisocyanate (MDI) CAS:101-68-8	Styrene CAS:100-42-5	Total HAPs
001 (insignificant)	Forming Door Hardware	--	--	--	--	0.21	--	--	--	--	--	0.00
002	EPS Foam Panel Imprinting and Gluing Operation[1]	--	--	--	--	4.89	--	--	--	3.10	0.03	3.13
003	Polyurethane Foam Injection, Heat Tunnel, and Sawing Operation	2.57	2.57	2.57	0.26	25.87	0.002	0.22	318.37	0.001	--	0.001
004 (insignificant)	Custom Paint Application (Includes Paint Cure Oven Burner and Replacement Air Unit Combustion Emissions)	0.18	0.18	0.18	2.36	4.48	0.01	1.98	2,850.96	--	--	0.00
005 (insignificant)	12,000 gal Pentane (Blowing Agent) Tank Recirc Loop Components	--	--	--	--	0.58	--	--	--	--	--	0.00
	Totals =	**2.75**	**2.75**	**2.75**	**2.63**	**36.03**	**0.02**	**2.20**	**3,169.33**	**3.10**	**0.03**	**3.13**

Note:
1) Source 002 VOC emission calculations based on maximum garage door production of 80,000 Doors per Year
2) TSP, PM10 and PM2.5 include filterable and condensable particulate matter.

Hormann LLC
Source 001
Forming Door Hardware
VOC Emissions from Forming lubricant for galvanized coil forming (Insignificant Activity)

Operating Parameters
Hours of Operation 8,760 hrs/yr

Lubricant Name	Annual Usage (gal)	Material Density (lb/gal)	VOC Content (%)	VOC Emissions	
				lb/year	TPY
921 DS 1MO CANT RUST (M2)	55	7.089	90%	350.9	0.18
251 ROLL FILM	10	6.672	99%	66.1	0.03
				Total	**0.21**

Example Calculation:
VOC Emissions = Annual Usage (gal) x Material Density (lb/gal) x VOC Content (%)

Hormann LLC
Source 002
Summary

Source Summary	VOC		HAP (Styrene)		HAPs (MDI)		HAPs Total
	lb/hr	TPY	lb/hr	TPY	lb/hr	tpy	tpy
Emissions from EPS Panel	0.41	1.79	0.01	0.03	--	--	0.03
Emissions from Gluing EPS Foam	0.71	3.10	--	--	0.71	3.10	3.10
Total	1.12	4.89	0.01	0.03	0.71	3.10	3.13

Hormann LLC
Source 002
Imprinting Panel Shape in EPS Foam[1]
VOC Emissions from EPS Foam Loss during Imprinting Door Foam Panels.

EPS = Expanded Polystryene
Direct Data Entry

Operating Parameters

Hours of Operation	8,760	hrs/yr				
				Stack Dia.		Duct Exit Velocity
Ventilation Rate	10,600	CFM	(assumed)	2.12	ft	3000 fpm
						50 ft/s

Foam Loss Calculation:

Number of impressions	24	Impressions per average 12 ft by 7 ft Door
Production Rate[1]	80,000	Doors produced per year
Foam Loss Rate (Volume)	0.0334	Ft^3 of foam is burned away per impression
Annual Imprinting EPS Foam Loss (Volume)	64,128	Ft^3 of foam burned away per year (from imprinting)
Assumed additional Foam loss from window cutting and router	1.5%	Margin of Safety - from cutting panels with hot wire or routers for windows
Annual Total Foam Loss (volume)	65,090	Ft^3 of foam lost annually from imprinting and cutting

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Emission Calculation:

EPS Foam Density	1.0	pcf or lb/ft^3	Nominally 1pcf per EPS Foam Tech Sheet
Tolerance for Density Variance	10%		
EPS Foam VOC Content	5%	per EPS Foam SDS from Pentanes	
EPS Foam HAP Content	0.10%	Styrene content per EPS Foam SDS	

Source Summary	VOC[2]		HAP (Styrene)	
	lb/hr	TPY	lb/hr	TPY
Emissions from EPS Panel Imprinting and Cutting	0.41	1.79	0.01	0.03

Notes and Example Calculation:

1) VOC emission calculations based on maximum garage door production of 80,000 Doors per Year

2) VOC emissions (TPY) = [EPS Foam Density (pcf) x Annual EPS Foam Loss from Imprinting and cutting (ft^3) x EPS Foam VOC Content(%)]/2,000 lb/ton

Hormann LLC
Source 002
EPS Foam Panel Gluing Emissions
VOC and HAP Emissions from Annual Usage of PURMELT Adhesive

Direct Data Entry

Operating Parameters
Hours of Operation 8,760 hrs/yr

		HAP Content			
PURMELT 513C GLUE contains		5%	Percent Methylenebis(phenylisocyanate). Also known as MDI. CAS number 101-68-8		
				Input Rate	
Current Annual Usage of EPS Foam Panel Glue (PURMELT 513C)	61,920		Lbs per year	7.07	lb/hr
Multiplier for increased production	2		Assumed that at full capacity for 1 shift at the TN plant, production/glue usage doubles.		

Source Summary	HAPs (VOC) from MDI	
	lb/hr	tpy
Emissions from Gluing EPS Foam to Door Panels	0.71	3.10

Example Calculation:

HAP Emissions from MDI (tpy) = [Annual usage of PURMELT 513C (lbs/yr) x Multiplier for increased production x HAP Content (%)] / 2,000 lb/ton

Hormann LLC
Source 003
Summary

Emission Point	Source Summary	PM		NOx		VOC		SO2		CO		CO2eq	HAPs (MDI)
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	TPY	TPY
003-1	Polyurethane Foam Injection	--	--	--	--	5.79	25.35	--	--	--	--	--	0.001
	Heat Tunnel	0.00	0.02	0.06	0.26	0.00	0.01	0.00	1.58E-03	0.05	0.22	318.37	0.000
	Subtotal	0.00	0.02	0.06	0.26	5.79	25.36	0.00	1.58E-03	0.05	0.22	318.37	0.001
003-2	Sawing	0.58	2.55	--	--	--	--	--	--	--	--	--	--
	Sawing VOCs	--	--	--	--	0.12	0.51	--	--	--	--	--	--
	Subtotal	0.58	2.55	0.00	0.00	0.12	0.51	0.00	0.00E+00	0.00	0.00	0.00	0.000
	Source 003 Total	**0.59**	**2.57**	**0.06**	**0.26**	**5.91**	**25.87**	**0.00**	**1.58E-03**	**0.05**	**0.22**	**318.37**	**0.001**

Hormann LLC
Source 003
Polyurethane Foam Injection
VOC emissions from blowing agent, MDI

VOC (Pentane) Emissions

Development of Emission Factor

	Direct data entry	
Average Pentane (blowing agent) added	77.16	lb/hr
Assumed Pentane Released in Manufacturing	7.5%	Note 1
Average inlet mass to ATM	5.79	lb/hr
Emission Factor	0.075	lb VOC to ATM/lb Pentane added

VOC Emissions from Manufacturing

Maximum Annual Pentane Usage (Blowing Agent added to process) (lbs/yr)	Emission Factor	VOC Emissions (lbs/yr)	VOC Emissions (TPY)
675,930	0.075	50,695	25.35

Notes and Example Calculation:

1) Conservative Estimate based upon engineering judgement and testing results in similar industry processes.

2) VOC Emissions (TPY) = [Maximum Pentane Added(lbs/yr) x Emission Factor(lb VOC to ATM/lb Pentane added)]/2,000 lb/ton

Source 003
Polyurethane Foam Injection
VOC emissions from blowing agent, MDI

Fugitive Emissions MDI - HAPs

MDI Calculations RCAP Combined
Page 104 (App A) Vapor Pressure / Temperature chart
Page 109 (App B) Vapor Pressure Adjustment Factors (K)

Emission Calculation Development (MDI)

Average Foam Injection rate	3,741	lb/hr
MDI Introduced	2,282	lb/hr
L_c (MDI Emissions) =	0.9616	lb/yr
Margin of Compliance[1] =	15%	
L_c (MDI Emissions) =	1.1058	lb/yr

Per Production Data

	Consumption at max production kg/hr	lb/hr
Pentane	35	77.2
MDI	1,035	2281.8
Polyol	627	1382.3
Total	1,697	3,741.2

Equation for Calculating Stack Emissions of MDI from Doors
Section 10.0 page 5-25 of MDI Emissions Reporting Guidelines for the Polyurethanes Industry

Lc = Vair * (1 / 359) * (273.15 / Tproc) * (VPMDI / 760) * Mw * KMDI

Tproc =	158	˚F (or 70˚C in the polyurethane line heat tunnel)	
Tproc =	343.15	K	
VP_{MDI} =	1.36E-03	mm Hg	per App A MDI Emissions Reporting Guidelines…
Mw =	250.26	this is the molecular weight of MDI	
K_{MDI} =	0.659	adjustment factor (function of MDI Concentration in feedstock and temperature) App B MDI Emissions Reporting Guidelines…	
359	359	the molar volume of an ideal gas in ft^3/lb-mole @ 0˚C and 1-atmosphere	

Mixture = 61% MDI 61.0%

Vair (Annual Volume of Air Displaced)

Door Section Volume		
Avg. Section Height	21	inch
Avg. Section Thickness	1.75	inch
Avg. Section Width	12	ft

Volume per section	3.0625	ft^3
Average Door Number of sections	6	sections / garage door
Production rate Number of sections/yr	480,000	sections/year

Annual Volume of Air displaced = Vair =	1,470,000	ft^3

MDI Emissions Calculations

Max. MDI Usage (lbs/yr)	MDI Fugitive Emissions (lb/yr)	(tpy)
19,988,226	1.11	0.001

Notes:
(1) Based on process knowledge, variability is estimated at 10%. A conservative value of 15% is used in calculations. This value may be adjusted in the future as additional emissions data is obtained.

Hormann LLC
Source 003
Heat Tunnel For Polyurethane Foam Injection Line

Operating Parameters

Fuel Type Natural Gas

Unit Description	Maximum Firing Rate (MMBtu/hr)	
Heat Tunnel for Polyurethane Foam Injection	0.614	MMBtu/hr
Operating hours	8,760	hr/yr

Annual Fuel Usage	Natural Gas		Hourly Usage	
Heat Tunnel	5.27	MMCF/yr	602	Cu. Ft./hr

Emission Calculations

Emission Factors for Natural Gas Combustion [1,2]

	lb/10^6 scf	lb/MMBtu-HHV	
Particulate Matter (PM_{Total})	7.6	0.0075	AP-42
Particulate Matter (PM_{Cond})	5.7	0.0056	AP-42
Particulate Matter (PM_{Filter})[3]	1.9	0.0019	AP-42
Nitrogen Oxides (NO_x)	100	0.0980	AP-42
Carbon Monoxide (CO)	84	0.0820	AP-42
Sulfur Dioxide (SO_2)	0.6	0.0006	AP-42
VOC	5.5	0.0054	AP-42
Carbon Dioxide (CO_2)	120,000	117.65	AP-42
Methane (CH_4)	2.3	2.255E-03	AP-42
Nitrous Oxide (N_2O)	2.2	2.157E-03	AP-42

Natural Gas Emissions

Heat Tunnel

	lb/hr	Annual [4,5] ton/year
Particulate Matter (PM_{Total})[3]	0.00	0.02
Particulate Matter (PM_{10})[3]	0.00	0.02
Particulate Matter ($PM_{2.5}$)[3]	0.00	0.02
Nitrogen Oxides (NO_x)	0.06	0.26
Carbon Monoxide (CO)	0.05	0.22
Sulfur Dioxide (SO_2)	0.000	1.58E-03
Combustion VOC	0.00	0.01
Carbon Dioxide (CO_2)	72	316
Methane (CH_4)	0.00	0.01
Nitrous Oxide (N_2O)	1.32E-03	0.006
CO_2 Equivalent (CO_2eq)[7]	--	318

GWP[6]	
CH4	25
N2O	298

Example Calculations/Notes:

(1) Compilation of Air Pollutant Emission Factors, AP-42, Supplement D, Fifth Edition, Section 1.4, Tables 1.4-1 and 1.4-2, July 1998, Small Boilers < 100 MMBtu/hr

(2) Per AP-42, Table 1.4-1 and 1.4-2, to convert from lb/10^6 scf to kg/10^6 m^3, multiply by 16. To convert from lb/10^6 scf to lb/MMBtu, divide by 1,020.

(3) Assume $PM_{Total} = PM_{2.5} = PM_{10}$. (Includes filterable and condensable particulate matter)

(4) Maximum Emissions (lb/hr) = Emission Factor (lb/MMscf) * Natural Gas Usage (MMCF)

(5) Annual Emissions (tpy) = Average Emissions (lb/hr) * 8,760 (hr/yr) / 2,000 (lb/ton)

(6) GWP from 40 CFR 98 Subpart A Table A-1

(7) CO_2 Equivalent (CO_2eq) = CO_2 + [GWP_{CH4} * CH_4] + [GWP_{N2O} * N_2O]

Hormann LLC
Source 003
Polyurethane Foam Injection Line Sawing Operation: VOC released to Dust Collector

Operating Parameters		
Hours of Operation	8,760	hrs/yr

Maximum Potential to Emit - VOC

Maximum Annual Pentane Usage (lbs/yr)	VOC Loss at Manufacturing (lbs/yr)	VOC Available at Sawing[1] (lbs/yr)	Section Foam Trimmed[2,3] (%)	VOC Emissions[4,5] (lbs/yr)	VOC Emissions[4,5] (tpy)	
675,930	50,695	625,236	0.16%	1,026	0.51	lb/hr
						0.12

Notes:
(1) VOC Available at Sawing (lbs) = Max Blowing Agent VOC (lbs) - VOC Loss at Manufacturing (lbs)
(2) The maximum cut volume is determined first by calculating the trim from each side of the garage door section. As indicated, automated saws trim the edges of the doors, trimming approximately 3mm from each side. Average Garage door section width is 12 ft, average section height is 21 inch, and the average section thickness is 1.75 inch. All saw cut emissions are collected and routed to the baghouse dust collector. The table below contains a detailed calculation of the % volume cut during sawing.
(3) Assume that the mass of trimmed door section is proportional to volume (0.16%).
(4) VOC Emissions (lbs) = VOC Available at Sawing (lbs) * Section Foam Trimmed (%) / 100
(5) VOC Emissions (tons) = VOC Emissions (lbs) / 2000

Door Section Volume		
Avg. Section Height	21	inch
Avg. Section Thickness	1.75	inch
Avg. Section Width	12	ft
Volume of Untrimmed Section	3.06	ft^3
Volume of Section Trimmed		
Saw Kerf	3	mm
Volume Trimmed/cut	0.0025	ft^3
Number of cuts per section	2	cuts
Percentage of Total Volume	**0.16%**	

Hormann LLC
Source 003
Sawing Dust Collector Emissions

Operating Hours 8,760 hr/yr

Baghouse I.D.	Flow Rate (ACFM)	Exhaust Diameter (ft)	Exhaust Cross-Sectional Area (ft^2)	Exit Velocity (ft/sec)	Exit Velocity (ft/min)	Exit Temp (F)	Moisture Content %	Flow Rate[1] (DSCFM)	Exhaust PM Conc. (gr/dscf)	PM	
										lb/hr^2	tpy^3
Sawing DC	3,531	1.22	1.18	50.0	3000.0	80	2.0%	3,397	0.02	0.58	2.55

Example Calculations and Notes:
(1) Flow Rate (DSCFM) = (ACFM x ((460+70)/(460 + Exit Temp))) x (1 - Moisture Content)
(2) PM Emissions (lb/hr) = DSCFM x Exhaust PM Conc. x 60 (min/hr) x (1 lb / 7000 grains)
(3) PM Emissions (tpy) = (PM Emissions (lb/hr) x 8760 (hr/yr)) / (2000 (lb/ton))

Hormann LLC
Source 004
Summary

Emission Point	Source Summary	PM		NOx		VOC		SO2		CO		CO2eq	HAPs (MDI)
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	TPY	TPY
004-1	Custom Paint Application	2.54	3.05	--	--	3.63	4.35	--	--	--	--	--	0.001
004-2	Replacement Air	0.02	0.10	0.29	1.29	0.02	0.07	0.00	0.01	0.25	1.08	1555.07	--
004-3	Custom Paint Cure Oven	0.02	0.08	0.25	1.07	0.01	0.06	0.00	0.01	0.21	0.90	1295.89	--
	Subtotal	2.59	3.23	0.54	2.36	3.65	4.48	0.00	0.014	0.45	1.98	2850.96	0.001

Hormann LLC
Source 004
Custom Paint Application
VOC Emissions from Annual Usage of Custom Paint

Operating Parameters
Hours of Operation 8,760 hrs/yr

Potential Overspray	30%	
Material Density	11.7	lb/Gal
Solid Content	58%	by weight
Carbithane 11 Series Low VOC Coatings	2.9	lb VOC/gal per Product Data Sheet
Custom Paint Application Annual Usage	3,000	Gallons per year
Anticipated Actual Operation	2,400	hours/yr

Source Summary	PM		VOC	
	lb/hr[2]	TPY[1]	lb/hr[2]	TPY[1]
Emissions from Custom Paint Application	2.54	3.05	3.63	4.35

Example Calculation:
1. PM emissions (tpy) = Coating Annual Usage (gal/yr) x Material Density (lb/gal) x Solids Content (%) x Potential Overspray (%) / 2000 lb/ton
2. VOC emissions (tpy) = Coating VOC Content (lb/gal) x Coating Annual Usage (gal/yr) / 2,000 lb/ton

3. The Lb/hr emission rate is estimated based upon this source operating at just 2,400 hrs/year due to the anticipated actual operation. Though Hormann LLC does not wish to limit the operating hours for the source.

Hormann LLC
Source004
Insignificant Emissions Unit: Replacement (Make-up) Air Unit (Flash Tunnel)
004-2

Operating Parameters

Fuel Type Natural Gas

Unit Description	Maximum Firing Rate (MMBtu/hr)	
Replacement Make-up Air Unit	3.00	MMBtu/hr
Operating hours	8,760	hr/yr

Annual Fuel Usage	Natural Gas		Hourly Usage	
Replacement Make-up Air Unit	25.76	MMCF/yr	2,941	Cu. Ft./hr

Emission Calculations

Emission Factors for Natural Gas Combustion [1,2]

	lb/10^6 scf	lb/MMBtu-HHV	
Particulate Matter (PM_{Total})	7.6	0.0075	AP-42
Particulate Matter (PM_{Cond})	5.7	0.0056	AP-42
Particulate Matter (PM_{Filter})[3]	1.9	0.0019	AP-42
Nitrogen Oxides (NO_x)	100	0.0980	AP-42
Carbon Monoxide (CO)	84	0.0820	AP-42
Sulfur Dioxide (SO_2)	0.6	0.0006	AP-42
VOC	5.5	0.0054	AP-42
Carbon Dioxide (CO_2)	120,000	117.65	AP-42
Methane (CH_4)	2.3	2.255E-03	AP-42
Nitrous Oxide (N_2O)	2.2	2.157E-03	AP-42

Natural Gas Emissions

Replacement Air Make-up Unit

	lb/hr	Annual [4,5] ton/year
Particulate Matter (PM_{Total})[3]	0.02	0.10
Particulate Matter (PM_{10})[3]	0.02	0.10
Particulate Matter ($PM_{2.5}$)[3]	0.02	0.10
Nitrogen Oxides (NO_x)	0.29	1.29
Carbon Monoxide (CO)	0.25	1.08
Sulfur Dioxide (SO_2)	0.002	0.01
Combustion VOC	0.02	0.07
Carbon Dioxide (CO_2)	353	1,546
Methane (CH_4)	0.01	0.03
Nitrous Oxide (N_2O)	6.47E-03	0.028
CO_2 Equivalent (CO_2eq)[7]	--	1,555

GWP[6]	
CH4	25
N2O	298

Example Calculations/Notes:

(1) Compilation of Air Pollutant Emission Factors, AP-42, Supplement D, Fifth Edition, Section 1.4, Tables 1.4-1 and 1.4-2, July 1998, Small Boilers < 100 MMBtu/hr

(2) Per AP-42, Table 1.4-1 and 1.4-2, to convert from lb/10^6 scf to kg/10^6 m^3, multiply by 16. To convert from lb/10^6 scf to lb/MMBtu, divide by 1,020.

(3) Assume PM_{Total} = $PM_{2.5}$ = PM_{10}. (Includes filterable and condensable particulate matter)

(4) Maximum Emissions (lb/hr) = Emission Factor (lb/MMscf) * Natural Gas Usage (MMCF)

(5) Annual Emissions (tpy) = Average Emissions (lb/hr) * 8,760 (hr/yr) / 2,000 (lb/ton)

(6) GWP from 40 CFR 98 Subpart A Table A-1

(7) CO_2 Equivalent (CO_2eq) = CO_2 + [GWP_{CH4} * CH_4] + [GWP_{N2O} * N_2O]

Hormann LLC
Source 004
Custom Paint Cure Oven
004-3

Operating Parameters

Fuel Type Natural Gas

Unit Description	Maximum Firing Rate (MMBtu/hr)	
Custom Paint Cure Oven Burner	2.50	MMBtu/hr
Operating hours	8,760	hr/yr

Annual Fuel Usage	Natural Gas		Hourly Usage	
Custom Paint Cure Oven Burner	21.47	MMCF/yr	2,451	Cu. Ft./hr

Emission Calculations

Emission Factors for Natural Gas Combustion [1,2]

	lb/10^6 scf	lb/MMBtu-HHV	
Particulate Matter (PM_{Total})	7.6	0.0075	AP-42
Particulate Matter (PM_{Cond})	5.7	0.0056	AP-42
Particulate Matter (PM_{Filter})[3]	1.9	0.0019	AP-42
Nitrogen Oxides (NO_x)	100	0.0980	AP-42
Carbon Monoxide (CO)	84	0.0820	AP-42
Sulfur Dioxide (SO_2)	0.6	0.0006	AP-42
VOC	5.5	0.0054	AP-42
Carbon Dioxide (CO_2)	120,000	117.65	AP-42
Methane (CH_4)	2.3	2.255E-03	AP-42
Nitrous Oxide (N_2O)	2.2	2.157E-03	AP-42

Natural Gas Emissions

Custom Paint Cure Oven

	lb/hr	Annual [4,5] ton/year
Particulate Matter (PM_{Total})[3]	0.02	0.08
Particulate Matter (PM_{10})[3]	0.02	0.08
Particulate Matter ($PM_{2.5}$)[3]	0.02	0.08
Nitrogen Oxides (NO_x)	0.25	1.07
Carbon Monoxide (CO)	0.21	0.90
Sulfur Dioxide (SO_2)	0.001	0.01
Combustion VOC	0.01	0.06
Carbon Dioxide (CO_2)	294	1,288
Methane (CH_4)	0.01	0.02
Nitrous Oxide (N_2O)	5.39E-03	0.024
CO_2 Equivalent (CO_2eq)[7]	--	1,296

GWP[6]	
CH4	25
N2O	298

Example Calculations/Notes:

(1) Compilation of Air Pollutant Emission Factors, AP-42, Supplement D, Fifth Edition, Section 1.4, Tables 1.4-1 and 1.4-2, July 1998, Small Boilers < 100 MMBtu/hr

(2) Per AP-42, Table 1.4-1 and 1.4-2, to convert from lb/10^6 scf to kg/10^6 m^3, multiply by 16. To convert from lb/10^6 scf to lb/MMBtu, divide by 1,020.

(3) Assume PM_{Total} = $PM_{2.5}$ = PM_{10}. (Includes filterable and condensable particulate matter)

(4) Maximum Emissions (lb/hr) = Emission Factor (lb/MMscf) * Natural Gas Usage (MMCF)

(5) Annual Emissions (tpy) = Average Emissions (lb/hr) * 8,760 (hr/yr) / 2,000 (lb/ton)

(6) GWP from 40 CFR 98 Subpart A Table A-1

(7) CO_2 Equivalent (CO_2eq) = CO_2 + [GWP_{CH4} * CH_4] + [GWP_{N2O} * N_2O]

13. **Outage:** Average distance in feet from top of tank to liquid surface.	Average throughput (gallons/day)	Maximum number of tank turnovers per year

14. **Complete the following only if the tank is equipped with a floating roof:**				
A. Roof type:	Double deck ☐	Pontoon ☐	Pan ☐	Other (describe)
B. Seal type:	Single ☐	Double ☐		Other (describe)
C. Shell construction:	Riveted ☐	Welded ☐		Other (describe)

15. Comments

SIGNATURE

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

16. Signature		**Date** 17 Sept. 2018
Signer's name (type or print) Carson Rudd	**Title** President, Hörmann LLC	**Phone number with area code** 630-518-0623

Hormann LLC
Blowing Agent Component Fugitive Emissions
Source 005
The tank has a nitrogen blanket. Therefore, no emissions are calculated from the tank itself.

Operating Parameters
Hours of Operation 8,760 hrs/yr

The blowing agent tank has a recirculating pump and loop that runs continually. The process draws blowing agent off this loop as required for production. The loop fittings are included.
Fugitive blowing agent emissions from leaks in the transfer lines and the process piping were calculated using US EPAs publication
"Fugitive VOC Emissions in the Synthetic Organic Chemical Manufacturing Industry (SOCMI)", December 1984 (EPA-625/10-84-004) Emission Factors
The factors presented in the original publication were revised based on June 1994 guidance from the Texas Natural Resource Conservation Commission (TNRCC).
The most conservative factors (i.e. light liquids) were used to represent blowing agent. The emission factors are as follows:

Valves	0.0035	lb/hr/component			
Pump Seals	0.0386	lb/hr/component			
Flanges	0.0005	lb/hr/component			
Relief Valves**	0.22963	lb/hr/component	**	0	lb/hr/component

Hormann expects that the blowing agent transfer and process system will consist of a maximum of 2 pumps, 27 flanged connections, 12 valves, and 2 relief valves.
**Because each tank will operate under pressure, there are assumed to be no emissions from pressure relief valves.
Therefore, the minimum expected emissions from blowing agent transfer lines and process piping are:

Components	# of Components	% VOC in Blowing Agent	Emission Factor (lb/hr/component)	VOC Emissions[1,2] (lb/hr)	(lb/yr)	(tpy)
Valves	12	100%	0.0035	0.04	368	0.18
Pump Seals	2		0.0386	0.08	676	0.34
Flanges	27		0.0005	0.01	118.3	0.06
Relief Valves	5		0	0.00	0.0	0.00
			Total =	**0.13**	**1,162**	**0.58**

Notes:
(1) VOC Emissions (lbs) = # of Components * % VOC in Blowing Agent (%) * Emission Factor (lb/hr/component) / 100
(2) VOC Emissions (tpy) = VOC Emissions (lb/yr) / 2000 (lb/ton)