



DELAWARE DEPARTMENT OF
**NATURAL RESOURCES AND
ENVIRONMENTAL CONTROL**

Division of Air Quality
Air Contaminant Equipment Registration Instructions

September 20, 2023

*These instructions should be used to Register equipment pursuant to 7 DE Admin.
Code 1102 Section 2.1.1 and Section 9*

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

Delaware Department of Natural Resources and Environmental Control
Division of Air Quality

100 W. Water Street, Suite 6A
Dover, DE 19904
(302) 739-9402

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

Table of Contents

Table of Contents	1
I. Introduction.....	2
II. Am I Eligible to Register?	2
III. Two Registration Options.....	2
A. Self-Registration	3
1. Advantage	3
2. Disadvantage	3
B. Registration Processed by Department	3
1. Advantage	3
2. Disadvantage	3
IV. What Tools do I need to Register and How Can I Obtain Them?	3
V. Instructions for Completing the Air Contaminant Equipment Registration Form.....	4
A. Part 1: Company and Site Information.....	4
B. Part 2: Emission Source Description	4
C. Part 3: Emission Source Information	5
D. Part 4: Air Contaminant Information.....	5
E. Part 4: NAAQS Evaluation, Toxicological Data, and Dispersion Model Results.....	5
Pre-identified Contaminants (i.e., CO, NO _x , SO ₂ , PM ₁₀ and PM _{2.5})	5
Additional Contaminants	6
F. Conditions of Registration and Certification	6
VI. Registration Examples.....	6
A. Point Source Example.....	6
B. Area Source Example	11
C. Volume Source Example.....	16

I. Introduction

The Air Contaminant Equipment Registration procedure described in this document was established pursuant to 7 DE Admin. Code 1102 (Regulation 1102). It is designed to provide flexibility to industry by allowing the owner or operator of equipment to either choose to self-register or to register and request that the Department evaluate the fulfillment of all registration criteria.

This document describes the registration criteria, details the registration process, and presents three registration examples. This document refers to sections in the “Air Contaminant Equipment Registration Form.” If you have any questions regarding the registration of equipment, call the Division of Air Quality at (302) 323-4542 in New Castle or (302) 739-9402 in Dover for assistance.

II. Am I Eligible to Register?

The eligibility criteria for registration are outlined in Section 2.1.1 of 7 DE Admin. Code 1102. Equipment is eligible for registration if it meets the following three criteria:

1. The equipment to be registered is not considered a major modification to a major source as defined in 7 DE Admin. Code 1125: Requirements for Preconstruction Review.
2. The equipment meets all applicable State and Federal emission limitations and standards (commonly referred to as “applicable requirements”) **without an air contaminant control device**. Examples of air contaminant control devices include baghouses, cyclones, settling chambers, filters, scrubbers, condensers, and thermal oxidizers. The source may have an air contaminant control device, but it must not be required.
3. The equipment emits greater than or equal to 0.2 lb/day¹ but less than 10 lbs/day² of total combined air contaminants, to the atmosphere, **before controls**.

III. Two Registration Options

Those who own or operate equipment that meets the above three criteria may either choose to (1) self-register, or (2) register and request that the Department evaluate the fulfillment of all registration criteria.

A main component of the registration process is a demonstration that the emissions from the equipment will not cause adverse effects to the public’s health, safety, and welfare. If the registrant chooses the self-registration option, the registrant must perform this demonstration. If the registrant chooses to register and allow the Department to evaluate the fulfillment of the registration criteria, then the Department will perform the demonstration.

Public health, safety and welfare effects are evaluated by computing the maximum downwind concentration (MDC) of each air contaminant to be emitted using a computer program developed by EPA

¹ If the equipment emits less than 0.2 lb/day of air contaminants in the aggregate to the atmosphere before controls and is not subject to 7 DE Admin. Code 1125: Requirements for Preconstruction Review, then the equipment is exempt from the 7 DE Admin. Code 1102 registration and permit process (See Sections 2.2.1 and 2.2.2 of 7 DE Admin. Code 1102). Permitting and/or registration is also not required for the equipment listed in Appendix A of 7 DE Admin. Code 1102.

² If the equipment emits 10 or more lbs/day of air contaminants in the aggregate to the atmosphere before controls, then the equipment may not be registered. The owner and/or operator of the equipment must submit an air emissions permit application and secure a permit prior to any construction, installation, modification, or operation of the equipment (see Section 2.1.3 of 7 DE Admin. Code 1102).

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

called AERSCREEN. The MDC is compared to the Significant Impact Level (SIL), National Ambient Air Quality Standard (NAAQS), and/or Threshold Limit Value (TLV) for each air contaminant.

The TLV is a concentration of a chemical that a worker can be exposed to over an eight-hour shift without adverse effects. A demonstration that public health, safety, and welfare are not adversely affected is shown when the published TLV for each air contaminant is at least 100 times greater than the MDC at the nearest property line and beyond.

In addition to comparing the MDC to the TLV, the applicant must demonstrate that NAAQS concentrations are not exceeded, utilizing the criteria in the document, "Stationary Source Impact Analysis". To demonstrate compliance, the applicant may calculate the MDC for the NAAQS contaminants (CO, NO₂, SO₂, and PM) using the modeling steps described in this document, then refer to the "Stationary Source Impact Analysis" document to complete the demonstration of NAAQS compliance.

A. Self-Registration

1. Advantage

Self-Registration is quick. Immediately after you have completed and submitted the registration form to the Department, the Company may construct, install, modify, and/or operate the equipment.

2. Disadvantage

You must complete additional portions of the registration form to demonstrate that the air emissions from your equipment will not adversely affect public health, safety, and welfare. To do this requires:

- Toxicological data on each identified contaminant to be emitted.
- The ability to accurately perform mathematical calculations.
- The ability to execute the AERSCREEN air dispersion model program and complete the screening analysis.

B. Registration Processed by Department

1. Advantage

The registrant is not required to:

- Apply any air dispersion model,
- Obtain toxicological data, or
- Complete additional portions of the registration form.

2. Disadvantage

The process takes longer, sometimes up to two months. The registrant will have to wait for written approval from the Department before commencing construction, installation, modification and/or operation of the equipment.

If there are no immediate time constraints and/or you do not feel comfortable applying the air dispersion model or performing the mathematical calculations, this option is best for you.

IV. What Tools do I need to Register and How Can I Obtain Them?

You will need the following tools to register:

1. The State of Delaware 7 DE Admin. Code 1100 Division of Air Quality Regulations

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

2. A Department of Natural Resources and Environmental Control (DNREC) Air Contaminant Equipment Registration form

If you choose to self-register, you will also need the following:

1. Toxicological data (i.e., TLVs) for each identified air contaminant to be emitted.
2. SILs, NAAQs, and background concentrations for criteria pollutants.
3. The AERSCREEN air dispersion model. The AERSCREEN program calculates the 1-hour, 3-hour, 8-hour, 24-hour, and annual MDC of an air pollutant in $\mu\text{g}/\text{m}^3$.
4. A copy of the screening analysis spreadsheet. The screening analysis spreadsheet uses the MDC calculated from the AERSCREEN program and the TLV to determine the 8-hour TLV:MDC ratio. This ratio must be at least 100 to satisfy Department criteria that the pollutant will not adversely affect public health, safety, and welfare.
5. The document "Stationary Source Impact Evaluation," to demonstrate compliance with the NAAQS contaminants.

The State of Delaware 7 DE Admin. Code 1100 Division of Air Quality Regulations can be found at: <https://regulations.delaware.gov/AdminCode/title7/1000/1100/index.shtml>. Instructions on how to obtain TLVs are discussed on page 6 of this document. This instruction manual, the registration application form, and the TLV/MDC spreadsheet are located at: <https://dnrec.alpha.delaware.gov/air/permitting/equipment-registration/>.

V. Instructions for Completing the Air Contaminant Equipment Registration Form

If you choose to self-register, complete the entire registration form, including the TLV/MDC information in Part 4. If you choose to register and request that the Department evaluate the fulfillment of the registration criteria, you may omit the TLV and MDC information as noted on the application form.

Data may be entered in the AERSCREEN program in English or Metric units. No conversions are necessary except for exit gas temperature. If you have an exit gas temperature in degrees Celsius, you must convert to degrees Kelvin using the following equation:

$$^{\circ}\text{C} + 273.15 = ^{\circ}\text{K}$$

A. Part 1: Company and Site Information

The requested information in this section describes the facility and the location of the equipment to be registered.

B. Part 2: Emission Source Description

Describe the type of equipment that you are registering. For example, if a reactor vessel under a laboratory fume hood is to be registered, indicate that the equipment is a reactor vessel, briefly describe the reaction that takes place within the vessel, and specify the building or the site where it is located. Provide the maximum number of hours the equipment will be operated each day. Indicate whether the equipment is equipped with an air contaminant control device and whether or not other equipment or activities emit air contaminants to the exhaust system associated with the fume hood.

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

C. Part 3: Emission Source Information

Provide the distance to the nearest property line from the emission release point and the stack height in feet. **(Part 3.21-22)**

You must determine whether your equipment is considered a point source, area source, or volume source.

1. **Point Source:** Air contaminants are released through a single, small opening by a forced airflow. Examples include stacks, vents, and exhaust fans. **(Part 3.23-25)**
2. **Area Source:** Air contaminants emit from a flat, broad surface area. Examples include floating roof storage tanks and equipment that releases air contaminants in a building that disperses to the atmosphere passively through several roof vents (air contaminants emit from the surface area of the roof). **(Part 3.26-28)**
3. **Volume Source:** Air contaminants emit outward from a three-dimensional object. Examples include fugitive emissions in a building with windows and no singular emission point or equipment that releases air contaminants within a building with windows and no singular emission point. **(Part 3.29-31)**

Each specific AERSCREEN input is described in the registration examples in Section VI of this manual.

D. Part 4: Air Contaminant Information

1. **Contaminant Name:** Identify the name of each air contaminant that will be emitted from the equipment you are registering. If more space is needed, attach additional information to the registration form and note on the registration form that additional information is attached.
2. **Maximum Emission Rate at Design Capacity:** Provide the maximum emission rate at design capacity for the equipment you are registering in both lbs/day and lbs/hr. This calculation should be based upon the maximum number of hours that the equipment will be operating in one day.
3. **Short Term Emission Rate:** Provide the maximum short term emission rate at design capacity in grams/second for the equipment you are registering.

When completing Part 4, emission rate information must be completed for the pre-identified contaminants (i.e., CO, NO_x, SO₂, PM₁₀ and PM_{2.5}), as well as for each additional contaminant that is emitted. If the emission rate of a pre-identified contaminant is 0, indicate this on in the appropriate cell on the form.

E. Part 4: NAAQS Evaluation, Toxicological Data, and Dispersion Model Results

These columns should only be completed if you are self-registering. The AERSCREEN program and the TLV/MDC spreadsheet must be completed before you can complete some of these columns.

Pre-identified Contaminants (i.e., CO, NO_x, SO₂, PM₁₀ and PM_{2.5})

Refer to the document "Stationary Source Impact Evaluation," for information.

1. **Maximum Downwind Concentration (MDC):** This value represents the maximum downwind concentration, for the specified exposure time, in mg/m³.

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

2. **NAAQS Concentration:** This value represents the NAAQS background concentration and is obtained from the Table “NAAQS Background Concentrations in Delaware,” in the document “Stationary Source Impact Analysis.”
3. **MDC + Background:** This is the sum of the MDC and the NAAQS Background Concentration. If this value exceeds the Significant Impact Level (SIL) for the contaminant, the equipment is not eligible for registration; contact the Division of Air Quality to discuss.

Additional Contaminants

1. **Threshold Limit Value (TLV):** For the TLV, enter the 8-hour time-weighted average (TWA) in mg/m³ on the registration application form and in the TLV:MDC spreadsheet. You can convert between ppm and mg/m³ using the following equations:

$$TLV \text{ in ppm} = \frac{(TLV \text{ in } mg/m^3)(24.45)}{(\text{gram molecular weight of substance})}$$

$$TLV \text{ in } mg/m^3 = \frac{(TLV \text{ in ppm})(\text{gram molecular weight of substance})}{(24.45)}$$

TLVs are published the American Council of Governmental Industrial Hygienists (ACGIH):

<https://www.acgih.org/publications/acgih-signature-publications>.

If a TLV has not been published for any air contaminant that is emitted from the equipment, please contact the Division of Air Quality for guidance.

2. **TLV Source:** Please document the source from which you obtained the TLV including the publication year.
3. **Maximum Downwind Concentration (MDC):** This value represents the maximum downwind concentration for an 8-hour exposure in mg/m³.
4. **TLV:MDC Ratio:** Enter the TLV/MDC ratio from the TLV/MDC ratio spreadsheet. All values must be greater than or equal to 100. If any value is less than 100, the equipment is not eligible for registration. Contact the Division of Air Quality immediately to discuss the situation.

F. Conditions of Registration and Certification

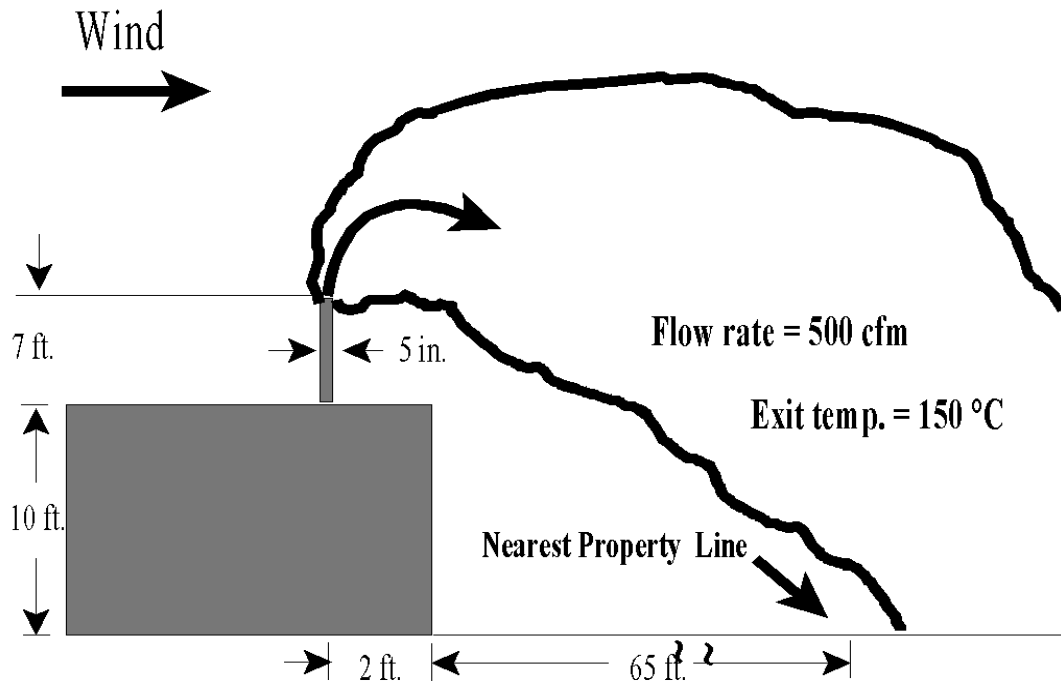
Carefully read the conditions of registration. Contact the Division of Air Quality with any questions.

VI. Registration Examples

A. Point Source Example

A small research laboratory plans to operate a new reactor vessel under an existing fume hood exhaust system. The reactor vessel will emit small amounts of ammonia, acetonitrile, and acrylonitrile to the fume hood for a maximum of three hours a day. The owner of the research laboratory believes that this piece of equipment may not need an air emissions permit and may be eligible for registration.

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.



Step One: Emissions Estimation

From a mass balance of the reactants and products of the chemical reaction to take place inside the reactor vessel, a maximum of 2.4 lb/day each of ammonia, acetonitrile, and acrylonitrile will be emitted. Total combined daily emissions are estimated to be 7.2 lb/day. The operation will occur for three hours per day.

Step Two: Registration Eligibility

Once the emissions are estimated, the owner/operator uses this information to determine whether all of the registration eligibility criteria in Section 2.1.1 of 7 DE Admin. Code 1102 are met. Below is a checklist of registration eligibility criteria evaluated by the owner/operator:

- ✓ The emissions from the equipment do not trigger any requirements specified in 7 DE Admin. Code 1125.
- ✓ No Federal and/or State emission limitation or standard requires the reactor vessel to be equipped with an air contaminant control device.
- ✓ Total combined air emissions are greater than or equal to 0.2 lb/day but less than 10 lb/day.

All three of the above registration eligibility criteria are met. The owner/operator of the equipment may begin the registration process.

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

Step Three: Company and Site Information and Source Description

The owner/operator of the equipment next completes **Part 1, “Company and Site Information”** and **Part 2, “Emission Source Description”** of the DNREC Air Contaminant Equipment Registration Form following the instructions provided in Sections V.A and V.B of this document.

Step Four: Source Type

The registrant must determine whether the emissions from the equipment are best represented as a point source, area source, or volume source as described in Section V.C of this document. In this case, since the equipment will emit air contaminants to a fume hood equipped with an exhaust fan that directs fumes to a single stack on the roof of the building, the emissions are best represented as a point source.

Step Five: Emission Source Information

The information required in **Part 3** of the registration application includes the location of the nearest property line (**Part 3.21**), the stack dimensions (**Part 3.22-23**), the stack exit gas flow rate (**Part 3.24**), and the stack exit gas temperature, (**Part 3.25**). You must use the units noted on the application form.

The stack height is 17 feet from ground level.

The stack inside diameter is 5 inches.

The exhaust fan’s flow rate of 500 cubic feet per minute (cfm) is provided by the manufacturer.

The stack exit gas temperature is determined to be 150 °C from the reaction specifications that will occur within the reactor vessel. It must be converted to °F before it is entered on the form. See the calculation below for the conversion:

$$150\text{ }^{\circ}\text{C} * \left(\frac{9}{5}\right) + 32.0 = 302\text{ }^{\circ}\text{F}$$

Step Six: Air Contaminant Information

The information required in Part 4 (*Point Source*) identifies the contaminants and the rate at which they are emitted. Include the contaminant name, the maximum emission rate at design capacity in pounds/day and pounds/hour, and the short-term emission rate in grams/second. You will have to convert each of the lb/day emission rates into lb/hour and grams/second. See the calculation below for the conversion:

$$2.4 \frac{\text{lb}}{\text{day}} \left(\frac{1 \text{ day}}{3 \text{ hours}}\right) = 0.80 \frac{\text{lb}}{\text{hr}}$$

$$2.4 \frac{lb}{day} \left(\frac{1 \text{ day}}{3 \text{ hours}} \right) \left(\frac{1 \text{ hour}}{3,600 \text{ seconds}} \right) \left(\frac{453.59 \text{ grams}}{1 \text{ lb}} \right) = 0.1008 \frac{\text{gram}}{\text{second}}$$

Insert the emissions information into Part 4 *Point Source*, columns 1 through 3.

Step Seven (and final step if registering with Department assistance): Sign and Date

If you are registering with Department assistance, the final step is to sign and date the form and submit the completed form to the Dover address on the front of this document. The owner/operator must then wait for Department approval prior to installing and operating the reactor vessel.

Step Seven (if Self-Registering): Run AERSCREEN Air Dispersion Model

Provide the TLV (8-hour time weighted average) in mg/m³ and the source of the TLV value.

Use the data entered in Parts 3 and 4 of the registration application form to run the AERSCREEN air dispersion model. Table A.1 below presents the series of inputs requested by the AERSCREEN air dispersion model for the point source example.

Table A.1: Input Parameters for AERSCREEN – Point Source Example

Parameter	Input
Choose English or metric	English
Enter source type	point
Enter emission rate (lb/hr)	0.80 lb/hr
Enter stack height (ft)	17 ft
Enter stack inside diameter (in)	5.0 in
Enter stack exit temperature (°F)	302°F
Enter stack gas exit flow rate (3 options)	500 acfm
Choose urban or rural option	rural
Minimum distance to ambient air (ft)	Default (3.3 ft)
Option for NO ₂ Chemistry (3 options)	1 (not NO ₂)
Building downwash (Y or N)	N
Include terrain heights (Y or N)	N
Maximum distance to probe (m)	Default (5000 m)
Include up to 10 discrete receptors (Y or N)	N

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

Use flagpole receptor (Y or N)	N
Source elevation	Default (0 m)
Min and Max Ambient Temperature (F)	Default (-10, 100 F)
Minimum wind speed (m/s)	Default (0.5 mf/s)
Anemometer height (m)	Default (10.0 m)
Surface characteristics (3 options)	2 (AERMET seasonal tables)
Dominant Surface Profile	5 (cultivated land)
Dominant Climate Profile	2 (wet conditions)
Surface friction adjustment u* (Y or N)	N

Step Eight: Calculate the Maximum Downwind Concentration and the TLV:MDC Ratio

When all the data in Table A.1 is entered into the AERSCREEN program, the model will compute the MDC in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), in 1-hour , 3-hour, 8-hour, 24-hour and annual averaging times. Since the ACGIH is expressed as an 8-hour TWA, the model’s 8-hour MDC will be utilized.

The remainder of Part 4 *Point Source*, Air Contamination Information, is now completed by entering the MDC (8-hour average) and the TLV:MDC ratio for the three contaminants.

In this example, the MDC is identical for each contaminant because the emission rates are assumed to be the same.

Table A.2 Data Entered in Part 4 - Air Contaminant Information

<i>Point Source</i>			<i>Complete these columns for self-registration only</i>			
<u>Contaminant Name</u>	<u>Maximum Emission Rate at Design Capacity</u>	<u>Short Term Emission Rate</u>	<u>Threshold Limit Value (TLV)</u>	<u>TLV Source</u>	<u>Maximum Downwind Concentration (MDC)</u>	<u>TLV:MDC Ratio</u>

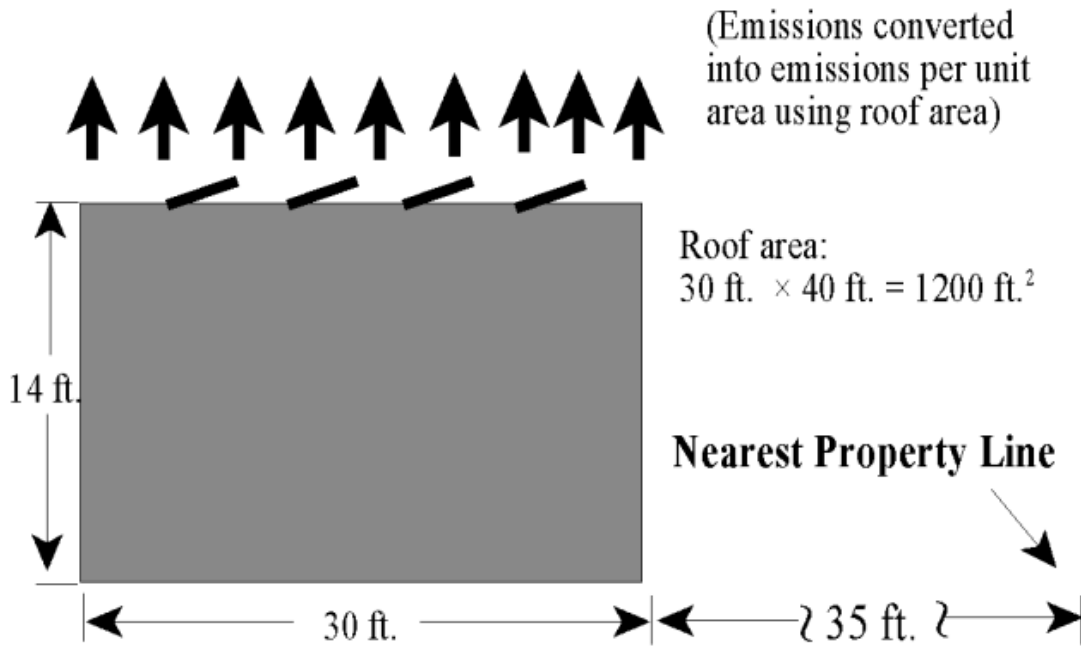
					(8-Hour Average)	
Ammonia	2.4 lbs/day and 0.8 lb/hour	0.1008 grams/second	17 mg/m ³	ACGIH 2023	0.0702 mg/m ³	242
Acetonitrile	2.4 lbs/day and 0.8 lb/hour	0.1008 grams/second	33 mg/m ³	ACGIH 2023	0.0702 mg/m ³	470
Acrylonitrile	2.4 lbs/day and 0.8 lb/hour	0.1008 grams/second	4.3 mg/m ³	ACGIH 2023	0.0702 mg/m ³	61

The TLV:MDC for acrylonitrile is less than 100. This example does not demonstrate that the emissions will not adversely affect the public's health, welfare, and safety. For this reason, assistance from the Division of Air Quality is required prior to installation and operation of this piece of equipment. A 7 DE Admin. Code 1102 permit may be required.

B. Area Source Example

A food packaging manufacturer is proposing to move into an existing building where they intend to install and operate one food packaging manufacturing line. The food manufacturing line will emit small amounts of methyl ethyl ketone (MEK) and toluene. The owner/operator evaluates the emissions from this piece of equipment to determine whether it requires an air emissions permit, an air contaminant equipment registration, or if it is exempt from the requirements of 7 DE Admin. Code 1102.

The food packaging manufacturing line does not have a specific emissions point out of the building. The building that will house the equipment does not have windows but does have a series of skylights on the roof that ventilate the surface area of the roof. The building is 40 feet long, 30 feet wide, and 14 feet tall. The nearest property line to the building is 35 feet away.



Step One: Emission Estimation

Based on the maximum amount of volatile product to be used in this process equipment in one day, the Company has estimated that the maximum emission rates of MEK and toluene are 7 lb/day and 1.5 lb/day, respectively. The emissions will occur during the 4 hours that the equipment will operate each day. Total maximum daily emissions of air contaminants are estimated to be 8.5 lb/day.

Step Two: Registration Eligibility

Once the emissions are estimated, the owner/operator must use this information to determine whether all registration eligibility criteria in Section 2.1.1 of 7 DE Admin. Code 1102 are met. Below is the checklist of registration eligibility criteria evaluated by the owner/operator:

- ✓ The emissions do not trigger any requirements specified in Regulation 1125 (Minor New Source Review, Requirements for Pre-construction Review) of Delaware's "Regulation Governing the Control of Air Pollution."
- ✓ No Federal and/or State emission limitation or standard requires the food packaging manufacturing line to be equipped with an air contaminant control device.
- ✓ Total combined air emissions are greater than or equal to 0.2 lb/day and less than 10 lb/day (maximum daily emissions are estimated to be 8.5 lb/day).

Step Three: Company and Site Information and Source Description

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

The owner/operator of the equipment next completes **Part 1, “Company and Site Information”** and **Part 2, “Emission Source Description “** of the DNREC Air Contaminant Equipment Registration Form following the instructions provided in Sections V.A and V.B of this document.

Step Four: Source Type

The registrant must determine whether the emissions from the equipment are best represented as a point source, area source, or volume source as described in Section V(C) of this document. Because the emissions are ventilated through the rooftop skylights, the emissions are best represented as an area source (roof area).

Step Five: Emission Source Information

The distance to the nearest property line, **Part 3.21**, is given in the problem description as 35 ft. **Part 3.26-28** requires the source height and the lengths of larger and smaller sides of the source. The source height refers to the air contaminant release height. Because the air contaminants are released from the roof, the source height is equivalent to the height of the building (14 ft). The lengths of the larger and smaller sides of the source are required to obtain the total surface area of the emissions. These dimensions refer to the roof area or length and width of the building which are given as 40 ft. and 30 ft., respectively.

Step Six: Air Contaminant Information

The information required in Part 4 (*Area Source*) identifies the contaminants and the rate at which they are emitted. Include the contaminant name, the maximum emission rate at design capacity in pounds/day and pounds /hour, and the short-term emission rate in grams/second. You will have to convert each of the lb/day emission rates into lb/hour and grams/second. See the calculation below for the conversion:

For MEK:

$$7.0 \frac{lb}{day} \left(\frac{1 day}{4 hours} \right) = 1.75 \frac{lb}{hr}$$

$$7.0 \frac{lb}{day} \left(\frac{1 day}{4 hours} \right) \left(\frac{1 hour}{3,600 seconds} \right) \left(\frac{453.59 grams}{1 lb} \right) = 0.2205 \frac{gram}{second}$$

For Toluene:

$$1.5 \frac{lb}{day} \left(\frac{1 day}{4 hours} \right) = 0.375 \frac{lb}{hr}$$

$$1.5 \frac{lb}{day} \left(\frac{1 day}{4 hours} \right) \left(\frac{1 hour}{3,600 seconds} \right) \left(\frac{453.59 grams}{1 lb} \right) = 0.0472 \frac{gram}{second}$$

Insert the emissions information into Part 4 *Area Source*, columns 1 through 3.

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

Step Seven (and final step if registering with Department assistance): Sign and Date

If you are registering with Department assistance, the final step is to sign and date the form and submit the completed form to the Dover address on the front of this document. The owner/operator of the food packaging manufacturing line is required to wait for Department approval prior to installing and operating the piece of equipment.

Step Seven (if Self-Registering): Run AERSCREEN Air Dispersion Model

Provide the TLV (8-hour time weighted average) in mg/m^3 and the source of the TLV value.

Use the data entered in Parts 3 and 4 of the Registration Application form to run the AERSCREEN air dispersion model. Table B.1 below presents the series of inputs requested by the AERSCREEN air dispersion model for the area source example.

Table B.1: Input Parameters for AERSCREEN – Area Source Example

Parameter	Input
Choose English or metric	English
Enter source type	area
Enter emission rate (lb/hr)	1.75 lb/hr (MEK); 0.375 lb/hr (toluene)
Enter release height (ft)	14
Enter maximum horizontal dimension of area source (ft)	40
Enter minimum horizontal dimension of area source (ft)	30
Enter Initial Vertical Dimension (ft) [<i>structure height divided by 2.15</i>]*	6.51
Choose urban or rural option	rural
Minimum distance to ambient air (ft)	Default (3.3 ft)
Option for NO ₂ Chemistry (3 options)	1 (not NO ₂)
Maximum distance to probe (m)	Default (5000 m)
Include up to 10 discrete receptors (Y or N)	N
Use Flagpole receptors (Y or N)	N
Source elevation	Default (0 m)
Min and Max Ambient Temperature (F)	Default (-10, 100 F)

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

Minimum wind speed (m/s)	Default (0.5 mf/s)
Anemometer height (m)	Default (10.0 m)
Surface characteristics (3 options)	2 (AERMET seasonal tables)
Dominant Surface Profile	5 (cultivated land)
Dominant Climate Profile	2 (wet conditions)
Surface friction adjustment u* (Y or N)	N

* For information on determining the Initial Vertical Dimension, refer to the EPA document "User's Guide for the AMS/EPA Regulatory Model (AERMOD)"

Step Eight: Calculate the Maximum Downwind Concentration and the TLV:MDC Ratio

When all the data in Table B.1 is entered into the AERSCREEN program, the model will compute the MDC in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), in 1-hour, 3-hour, 8-hour, 24-hour and annual averaging times. Since the ACGIH is expressed as an 8-hour TWA, the model's 8-hour MDC will be utilized.

The remainder of Part 4 *Area Source*, Air Contaminant Information, is now completed by entering the MDC (8-hour average) and the TLV:MDC ratio for both MEK and Toluene.

Table B.2 Data Entered in Part 4 Air Contaminant Information

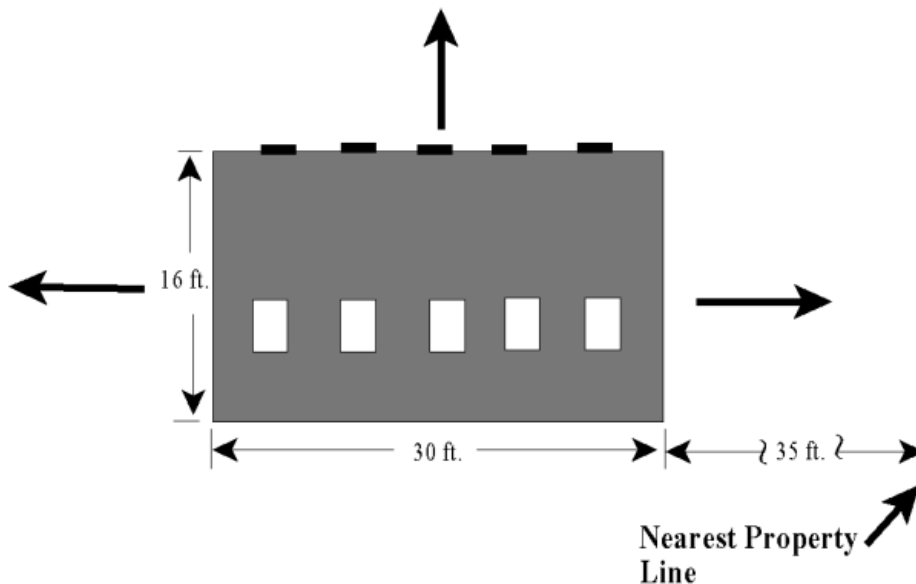
<i>Area Source</i>			<i>Complete these columns for self-registration only</i>			
Contaminant Name	<u>Maximum Emission Rate at Design Capacity</u>	<u>Short Term Emission Rate</u>	<u>Threshold Limit Value (TLV)</u>	<u>TLV Source</u>	<u>Maximum Downwind Concentration (MDC) (8-Hour Average)</u>	<u>TLV:MDC Ratio</u>
Methyl Ethyl Ketone (MEK)	7.0 lbs/day and 1.75 lb/hour	0.2205 grams/second	590 mg/m^3	ACGIH 1992	4.325 mg/m^3	136
Toluene	1.5 lbs/day and 0.375 lb/hour	0.0472 grams/second	75 mg/m^3	ACGIH 2006	0.926 mg/m^3	80

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

The TLV:MDC ratio for Toluene is less than 100. This example does not demonstrate that the emissions will not adversely affect the public's health, welfare, and safety. For this reason, assistance from the Division of Air Quality is required prior to installation and operation of the food package manufacturing line. A 7 DE Admin. Code 1102 permit may be required.

C. Volume Source Example

A facility proposes to recycle aerosol cans. As part of the process, they plan to purchase and operate an aerosol can puncturing machine inside one of their buildings on site. The emissions from the equipment do not have a single emissions point. Emissions are released from the building from windows and roof vents. Building dimensions are 30 ft x 40 ft x 16 ft. Chemicals in the aerosol cans to be recycled at this facility include: ethylbenzene and methyl isobutyl ketone. The nearest property line to the building is 35 ft away. This information is illustrated below in Figure C.1.



Step One: Emission Estimation

Ethylbenzene and methyl isobutyl ketone are each conservatively assumed to be emitted at the maximum rate of 4.125 lb/day. Total combined daily emissions are estimated to be 8.25 lb/day. The emissions will occur during the 12 hours that the equipment runs each day.

Step Two: Registration Eligibility

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

Once the emissions are estimated, the owner/operator must use this information to determine whether all registration eligibility criteria in Section 2.1.1 of 7 DE Admin. Code 1102 are met. Below is the checklist of registration eligibility criteria evaluated by the owner/operator:

- ✓ The emissions do not trigger any requirements specified in Regulation 1125 (Minor New Source Review, Requirements for Pre-construction Review) of Delaware's "Regulation Governing the Control of Air Pollution."
- ✓ No Federal and/or State emission limitation or standard requires the aerosol can puncturing machine to be equipped with an air contaminant control device.
- ✓ Total combined air emissions are greater than or equal to 0.2 lb/day and less than 10 lb/day (maximum daily emissions are estimated to be 8.25 lb/day).

Step Three: Company and Site Information and Source Description

The owner/operator of the equipment next completes **Part 1, "Company and Site Information"** and **Part 2, "Emission Source Description"** of the DNREC Air Contaminant Equipment Registration Form following the instructions provided in Sections V.A and V.B of this document.

Step Four: Determination of Emission Source Type

The registrant must determine whether the emissions from the equipment are best represented as a point source, area source, or volume source as described in Section V(C) of this document. Because the emissions are ventilated through windows and roof vents throughout the building, the emissions are best represented as a volume source emitting from the building in three dimensions as described in Section V(C) of this document.

Step Five: Emission Source Information

The distance to the nearest property line, Part 3(A), is given in the problem description as 35 ft **Part 3.21**. The release height in Part 3(D) is half of the source height (8 ft), and the initial horizontal and vertical dimensions are computed by using the formulas supplied in Table C.1. Table C.1 below presents the data that will be entered into Part 3 of the registration form for the aerosol can puncturing machine. **Part 3.29-31** of the registration form must be completed.

Step Six: Air Contaminant Information

The information required in Part 4 (*Volume Source*) identifies the contaminants and the rate at which they are emitted. Include the contaminant name, the maximum emission rate at design capacity in pounds/day and pounds/hour, and the short-term emission rate in grams/second. You will have to convert each of the lb/day emission rates into lb/hour and grams/second. See the calculation below for the conversion:

For Ethylbenzene and Methyl Isobutyl Ketone:

$$4.125 \frac{lb}{day} \left(\frac{1 \text{ day}}{12 \text{ hours}} \right) = 0.34 \frac{lb}{hr}$$

$$4.125 \frac{lb}{day} \left(\frac{1 \text{ day}}{12 \text{ hours}} \right) \left(\frac{1 \text{ hour}}{3,600 \text{ seconds}} \right) \left(\frac{453.59 \text{ grams}}{1 \text{ lb}} \right) = 9.4E - 05 \frac{gram}{second}$$

The maximum emission of the ethylbenzene and the isobutyl ketone is 4.125 lb/day or 0.34 lb/hr. Insert the emissions information into Part 4 *Volume Source*, columns 1 through 3.

Step Seven (and final step if registering with Department assistance): Sign and Date

If you are registering with Department assistance, the final step is to sign and date the form and submit the form to the Dover address on the front of this document. The owner/operator of the aerosol can puncturing machine is required to wait for Department approval prior to installing and operating this piece of equipment.

Step Seven (if Self-Registering): Run AERSCREEN Air Dispersion Model

Provide the TLV (8-hour time weighted average) in mg/m³ and the source of the TLV value.

Use the data entered in Parts 3 and 4 of the Registration Application form to run the AERSCREEN air dispersion model. Table C.1 below presents the series of inputs requested by the AERSCREEN air dispersion model for the point source example.

Table C.1: Input Parameters for AERSCREEN – Volume Source Example

Parameter	Input
Choose English or metric	English
Enter source type	volume
Enter emission rate (lb/hr)	0.34 lb/hr ethylbenzene; 0.34 lb/hr methyl isobutyl ketone
Enter center of volume height (ft) [Total volume height/2]	8
Initial Lateral Dimension* (ft) [square root of area of base]	34.6
Enter Initial Vertical Dimension** (ft) [structure height divided by 2.15]	7.44
Choose urban or rural option	rural
Minimum distance to ambient air (ft)	Default (77.67ft)
Option for NO2 Chemistry (3 options)	1 (not NO2)
Include terrain heights (Y or N)	N
Maximum distance to probe (m)	Default (5000 m)

This document is being shared with the public to assist them in understanding some aspects of permitting within the Division of Air Quality. This document is only guidance and is not binding on either the applicant or the Division. Actual permitting outcomes will result from the application of all applicable law to specific factual circumstances.

Include up to 10 discrete receptors (Y or N)	N
Use Flagpole receptors (Y or N)	N
Source elevation	Default (0 m)
Min and Max Ambient Temperature (F)	Default (-10, 100 F)
Minimum wind speed (m/s)	Default (0.5 mf/s)
Anemometer height (m)	Default (10.0 m)
Surface characteristics (3 options)	2 (AERMET seasonal tables)
Dominant Surface Profile	5 (cultivated land)
Dominant Climate Profile	2 (wet conditions)
Surface friction adjustment u* (Y or N)	N

* The base of the volume source must be square. If the source is not square, model the source as a series of adjacent volume sources. For relatively uniform sources, determine the "Equivalent Square" by taking the square root of the area of the length and width of the volume base.

** For information on determining the Initial Vertical Dimension, refer to the EPA document "User's Guide for the AMS/EPA Regulatory Model (AERMOD)"

Step Eight: Calculate the Maximum Downwind Concentration and the TLV:MDC Ratio

When all the data in Table C.1 is entered into the AERSCREEN program, the model will compute the MDC in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), in 1-hour, 3-hour, 8-hour, 24-hour and annual averaging times. Since the ACGIH is expressed as an 8-hour TWA, the model's 8-hour MDC will be utilized.

The remainder of Part 4 *Volume Source*, Air Contaminant Information, is now completed by entering the MDC (8-hour average) and the TLV:MDC ratio for both the Ethylbenzene and the Methyl isobutyl ketone.

Table C.2 Data Entered in Part 4 Air Contaminant Information

<i>Volume Source</i>			<i>Complete these columns for self-registration only</i>			
<u>Contaminant Name</u>	<u>Maximum Emission Rate at Design Capacity</u>	<u>Short Term Emission Rate</u>	<u>Threshold Limit Value (TLV)</u>	<u>TLV Source</u>	<u>Maximum Downwind Concentration (MDC) (8-Hour Average)</u>	<u>TLV:MDC Ratio</u>
34.1. Ethylbenzene	4.125 lbs/day and 0.34 lb/hour	9.4E-05 grams/second	87 mg/m³	ACGIH 2021	0.412 mg/m³	211
34.2 Methyl Isobutyl Ketone	4.125 lbs/day and 0.34 lb/hour	9.4E-05 grams/second	82 mg/m³	ACGIH 2009	0.412 mg/m³	199

The TLV:MDC for both the ethylbenzene and methyl isobutyl ketone is greater than 100. This example satisfies the Department’s criteria that that the emissions will not adversely affect the public’s health, welfare, and safety. Submit the completed Registration Form and TLV/MDC spreadsheet to DNREC. The company is permitted to install and operate the aerosol puncturing machine.