# Title V Emissions Inventory Instructions

(August 2024)

Iowa DNR - Air Quality Bureau
http://www.iowacleanair.gov

**Submit the Title V Emissions Inventory with relevant supporting documents in SLEIS by March 31.**

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## Online Resources

DNR Air Quality Bureau:
Air Quality Bureau Homepage

eAirServices
Access eAirServices - a secure portal for online business services. It is the entry point for the regulated community and consultants to electronically complete and file air emissions inventories and permit applications.

EPA Emission Factors

Latitude and Longitude
Google Maps
Latitude and Longitude Finder
Google Earth
GPS Visualizer

Facility Classification Systems
SIC Codes
NAICS Association

SCC Codes
For a list of SCC codes visit the Emissions Reporting/Guidance Documents & Reference Material webpage. Scroll down to "Classification Lists and Conversions" , and click on the link for "Updated Source Classification Codes ." Ethanol and Biodiesel plants should click on "Ethanol and Biodiesel Source Classification Code (SCC) List."

Calculation Spreadsheet and Tools
To access calculation spreadsheets for painting operations, haul roads, and asphalt, concrete and limestone processes visit the Emissions Reporting/Guidance Documents & Reference Material webpage. Scroll down to "Emissions Inventory Reporting Documents" then click on the spreadsheet of interest.

Iowa Administrative Code (IAC)
https://www.legis.iowa.gov/law/administrativeRules/agencies See section 567, Chapters 21-33.

# General Instructions/Purpose

### Introduction
This document contains information needed to complete a ***Title V emissions inventory***. Submitting a complete inventory is required by 21.1(3) of the Iowa Administrative Code. Some companies may be unfamiliar with air quality terms; therefore, a glossary is included in Appendix A. Terms included in the glossary are bolded and italicized. In addition, general air program definitions are found in 567 Iowa Administrative Code (IAC) at the beginning of Chapters 21, 22, 23, and 24. The IAC is available on the internet at https://www.legis.iowa.gov/law/administrativeRules/agencies.

The deadline for submitting a completed Title V Emissions Inventory is March 31.

### SLEIS
Emissions inventories are submitted using DNR's online emissions inventory reporting tool called the State & Local Emissions Inventory System (SLEIS). This web-based system has been populated with emissions data and facility equipment information and allows for streamlined reporting. In addition, SLEIS offers the option of importing emissions data via a spreadsheet template, significantly reducing data entry for facilities with a large number of emission processes. See page 7 for information on how to access SLEIS. SLEIS is located at https://programs.iowadnr.gov/sleis/.

SLEIS training sessions will be announced on the eAirServices website under the "Training" tab, and through the DNR's Air Quality listserv. DNR's air quality technical listserv is targeted to the regulated public and consultants to deliver timely regulatory news, program updates, and technical guidance. To subscribe, go to www.IowaCleanAir.gov, scroll down and click on "Sign up for Air Quality News Updates." For more information, please contact DNR's Wendy Walker at 515-250-7534 or wendy.walker@dnr.iowa.gov.

### Emissions Reporting
All regulated air pollutants including the seven ***Criteria Pollutants*** *(including **PM2.5**),* 188 ***Hazardous Air Pollutants*** (HAPs), and ***Ammonia*** are required to be reported in the inventory. On February 4, 2022, EPA added 1-bromopropane to the list of hazardous air pollutants. This pollutant is available for reporting in SLEIS. The definition of volatile organic compounds (VOC) can be found in Appendix A and a listing of all HAPs can be found in Appendix B. Please consult this list if you are unsure if a pollutant needs to be reported.

Emission estimates should be evaluated for all emission sources at your facility including ***fugitive emissions***.

Actual emissions need to be reported for each emission unit. ***Emissions units*** may be grouped for reporting actual emissions *only* if the emission units and their processes are identical, have identical control equipment, and they exhaust to the same release point. If an emission unit has multiple processes, each process should be reported separately.

### Actual Emissions
***Actual emissions*** are the actual rate of pollutant emissions from an emission unit. Actual emissions are calculated using the emission unit's actual operating hours, production rates, and quantities of materials processed, stored, or combusted for the calendar year.

### Emissions Estimation Methods
Emissions must be based on the best possible method. Do not use a less preferable method if a more preferable one is available. Using a less preferable or unacceptable method could result in your inventory being returned for revisions.

Regardless of the method used to calculate emissions, <u>supporting documentation must be included</u> with the inventory submittal. This documentation must be sufficient in order to allow DNR to evaluate the emissions calculations.

Methods of Calculating Emissions *(in order of preference):*

1. Continuous emissions monitoring
2. Valid stack sampling which represents maximum operating conditions
3. Material balance
4. EPA-approved emission factors
5. Vendor supplied emission factors
6. Engineering estimates based on best available process operating data

- **Continuous Emissions Monitoring** systems measure pollutant concentrations in the exhaust stack 24 hours per day. There is no better method for determining emissions, however, these systems are very expensive and most facilities do not use them.

- A **Stack Test** measures the concentration of pollutants in the exhaust stack during the test period. Test periods can vary from a couple of hours to an entire day. Stack test data that are representative of current conditions can provide an accurate emission rate for many different processes and pollutants.

- **Material Balance** can only be used on specific types of emission units. It is most commonly used for surface coating operations (paint booths, dip tanks, etc.). Information must first be gathered on process rates, materials used, and material properties (from **safety data sheets** (SDS), usually). By combining this information with the knowledge of the process, an estimation of actual emissions can be made.

- **EPA-Approved Emission Factors** are the basis for many calculations. These factors represent industry-wide averages and show the relationship between emissions and a measure of production. You will need to access EPA's emission factors. If you encounter problems finding emission factors for a source you may contact DNR for assistance. When using EPA or other emission factors, you must use the most recently approved version. Sources of emission factors are listed below.

- **Vendor Supplied Factors** may be used if a more preferred method is not available. Many manufacturers of industrial equipment provide emission information for their products. This data may be used to calculate emissions only if the manufacturer's data is based on approved stack testing and no significant changes have been made to the emission unit. Supporting documentation must be included in the submittal if vendor supplied factors are used to calculate emissions.

- **Engineering Estimation** is allowed if a more preferred method is not available. The DNR realizes some processes exist that have no published guidance regarding the estimation of emissions. In these cases, the estimation must be the best possible assessment given the amount of data available. Supporting documentation must be submitted to show how the estimation was made.

More information about emission factors can be found on the EPA's Air Emissions Factors website.

**Sources of Emission Factors**
**WebFIRE** is the internet version of FIRE and it has replaced the software application, FIRE version 6.25, and the Microsoft Access version of the database. An internet version of FIRE allows more frequent updates and easier access. Visit https://cfpub.epa.gov/webfire/ to access WebFIRE.

**AP-42 COMPILATION OF AIR POLLUTANT EMISSION FACTORS** is the recommended source of air pollutant emission factors, with descriptions of activities emitting criteria and hazardous air pollutants.

**TANKS** is the model that was developed using a software that is now outdated. Because of this, the model is not reliably functional on computers using certain operating systems such as Windows Vista or Windows 7. EPA anticipates that additional problems will arise as PCs switch to other operating systems. EPA and DNR can no longer provide assistance to users of TANKS 4.09d. The model will remain on the EPA website to be used at your discretion and at your own risk. EPA recommend the use of the equations/algorithms specified in AP-42 Chapter 7 for estimating VOC emissions from storage tanks. The equations specified in AP-42 Chapter 7 (https://www.epa.gov/ttn/chief/ap42/ch07/index.html) can

be employed with many current spreadsheet/software programs. The Tanks 4.09D software estimates VOCs and hazardous air pollutants from vertical and horizontal fixed-roof tanks, internal and external floating-roof tanks, domed external floating roof tanks and underground storage tanks. It is based on the emissions estimation procedures presented in Section 7.1 of AP-42, 5th Edition. If your facility intends to use TANKS 4.09d to estimate emissions, please provide copies of the print outs as an attachment to the emissions inventory and any other documentation used for inputs into the program.

**Tips to Avoid Common Mistakes when filling out your Emissions Inventory**
1. Use SLEIS.
2. Do not use outdated or old emission factors. The most up-to-date emission factors must be used for accurate emissions calculations. If you are referencing a previous inventory, double-check all emission factors as they may have changed since the last emissions inventory submittal.
3. Many HAPs are also Volatile Organic Compounds (VOCs). List such pollutants as both a HAP and a VOC when reporting emissions.
4. There are two ways to include calculations for reported pollutants in SLEIS:
   a. Using the comments field for the pollutant
   b. Attach a document using the report attachments button. Please include all supporting documentation used to estimate emissions. Supporting documentation includes but is not limited to SDS, stack test summaries and reports, AP-42 table citation, mass balance calculations, and any correspondence with DNR or other air pollution control agencies.
5. If reported control efficiencies are higher than what is given in the Control Efficiency Guidance Document (Appendix C), these control efficiencies must be verified by test data from an EPA-approved method. Please include supporting documentation of the test data, which confirms the reported control efficiency.
6. Make sure $PM_{2.5}$ and Ammonia emissions are included where applicable. If $PM_{10}$ emissions are being reported, remember to also include emissions estimates for $PM_{2.5}$.
7. Use correct units of measure for emission factors and annual throughput. Units of measure need to correspond between emission factors and the annual throughput.

**Confidentiality**
The DNR recognizes the need to keep certain information about facility operation confidential. If you have any questions about keeping submitted information confidential, contact Kelli Book, DNR legal staff at 515-210-3408 or at kelli.book@dnr.iowa.gov.

**SDS**
If using mass balance to estimate emissions, then copies of <u>all</u> safety data sheets (SDS) or technical data sheets for materials used at each emission unit during the previous calendar year <u>must be included</u> with the inventory submittal. Also, include the amount of each material used for each product. SDS are needed for a complete review of the submitted inventory. Facilities may submit a paint spreadsheet in lieu of the SDS.

# General SLEIS Overview
This document contains specific instructions for an electronic submittal of an emissions inventory in SLEIS starting on page 8.

**Accessing SLEIS**
To access SLEIS, users must complete the SLEIS Electronic Reporting Registration Form. Email the completed form to sleis@dnr.iowa.gov. You may also mail the form to the address in the form's upper left corner.

Facilities must have a designated Facility Signatory (Responsible Official). A new Facility Signatory must submit a paper copy of the SLEIS Electronic Subscriber Agreement Form to the Iowa DNR. This form is only necessary for users who will be submitting the emissions inventory. Please visit the DNR's Air Quality eAirServices website and click on the "Access Help" link under the SLEIS menu to download the SLEIS access forms.

## SLEIS Help Features

SLEIS has four different help features that ensure data being input into the database is accurate.

1. **Help Link:** Every SLEIS page has a help link in the upper right corner. This help link is unique to each page and provides a brief description of the information that can be viewed or edited on the screen.
2. **Tip Tool:** Each data entry field has a tip tool associated with it. The tip tool is a green circle with a question mark in it and is located above the data field. It contains specific information on where to find the data or equations to calculate the required information for the associated field.
3. **Required Data Elements:** Data elements that are required fields are indicated by a red bar on the left side of the required field. Fields without a red bar are optional.
4. **Data Validation Help Text:** SLEIS has multiple data validation checks. If the data entered does not meet validation requirements, the requirements will be shown near the data input field in red font. Pages may contain multiple tabs and all data on the tabs must meet the data validation requirements before a save can be executed for that record. Tabs with fields that do not meet the requirements will have an exclamation point. The fields that don't meet the requirements will have red help text near them.

## SLEIS Training

DNR provides multiple in-person SLEIS training sessions every year. Information on SLEIS training sessions as well as recorded sessions and video tutorials are available on the DNR's [eAirServices website](#). Click on the "Training" link under the SLEIS menu to view upcoming training opportunities.

# SLEIS Emissions Inventory Instructions

## Section Instructions: Facility

1. **Facility Tab:**
   a. **Facility Identifier:** This field is a unique number assigned to your plant and is not editable.
   b. **Facility Name:** This field is assigned by DNR. It can be changed after the inventory has been submitted. Please contact DNR if the official company plant designation for the facility submitting the emissions inventory should be changed.
   c. **Company/Owner Name:** This field is to be completed with the name of the parent company, company owner, or if those don't apply, the facility name may be entered.
   d. **Description:** Enter a brief business description of the facility.
   e. **Status:** Click in the box below and choose the status of the facility for the reporting year.
      i. If the facility operated as a minor source facility during the reporting year, choose "Operating as Minor Source."
      ii. If the facility operated as a Title V facility during the reporting year, choose "Operating as Title V."
      iii. If the facility operated as both a minor source and a Title V facility during the year and was required to submit the Title V emissions inventory, choose "Operating as Title V."
      iv. If the facility operated as both a minor source and a Title V facility during the year but was not required to submit the Title V emissions inventory, choose "Operating as Minor Source."
   f. **Status Year:** If the status is anything other than "Operating as Title V," enter the year that status became applicable. For example, for a minor source facility, choose the year the facility became a minor source, such as the year the facility began operating or the year the facility no longer operated as Title V.
   g. **NAICS:** Please enter the North American Industry Classification System (NAICS) code. Descriptions of the NAICS codes can be found at [https://www.census.gov/naics/](https://www.census.gov/naics/) or [https://www.naics.com/search/](https://www.naics.com/search/).
      i. If the facility has more than one industrial classification, secondary and tertiary NAICS codes may be added by clicking the plus button to the right of the primary NAICS code.
   h. **Comments:** Enter any information about the facility that may be useful to the DNR.

2. **Contacts Tab:**
   a. **Name:** Enter the name of the person who should answer any questions regarding the emissions inventory submitted for this facility.

b. **Contact:** Enter contact information where the contact person can be reached directly. Preferably enter both a phone number and an email address. To add lines to the contact section, click the plus button to the right of the contact field.

3. **Addresses Tab:**
   a. **Location**: Enter the street address of the physical location of the facility.
   b. **Mailing:** Enter the mailing address of the person responsible for submitting the emissions inventory.

4. **Location Tab:**
   a. **Latitude (decimal degrees):** This should be the latitude of approximately the center of your facility. If this is incorrect, please contact DNR.
   b. **Longitude (decimal degrees):** This should be the longitude of approximately the center of your facility.
   c. **UTM X, Y, and Zone:** This will be autopopulated once the Latitude and Longitude are entered.
   d. **Collection Method, Data Collection Date, Geographic Reference point, Geodetic Reference System:** These fields are not required and are populated by DNR if necessary.

5. **Additional Information Tab:** All fields on the additional information tab are not required. Some may have been populated by data from previous inventories or databases. Fields may be completed with any information that may be helpful to the facility or DNR.

6. **Saving the record:** Once all required data has been reviewed and completed, click "Save" in the bottom right corner of the screen to save the record. If the data entered does not meet validation requirements, the requirements will be shown near the data input field in red font. This record contains multiple tabs and all data on all tabs must meet the data validation requirements before a save can be executed for the record. Tabs with fields that do not meet the requirements will have an exclamation point. The fields that don't meet the requirements will have red help text near them.

## Section Instructions: Release Points

If the release point in question has a construction permit, most of the information asked for below can be found in the permit.

1. **Release Point Tab**
   a. **Identifier:** This value must be a unique number among release points at the facility and is not editable once it has been included as part of an emissions inventory submittal. This number should be consistent with the number assigned to the release point in the construction permit.
   b. **Type:** Click in the drop-down menu and select the type of release point venting the emission unit.
   c. **Description:** Provide a brief description of the release point (ex. Boiler Stack or Paint Booth Vent).
   d. **Status:** Select the status of the release point for the reporting year. If it operated any time during the year, choose "Operating."
   e. **Status Year:** Enter the year the status became applicable.
   f. **Stack Height:** Enter the distance above ground to the emissions discharge point in feet.
   g. **Stack Shape:** Click the radio button that best describes the shape of the stack opening. Changing the shape of the opening will clear data that has already been entered for the stack diameter or the stack opening length/width.
   h. **Stack Diameter:** If the stack shape is selected as "Circular," enter the inside diameter of the discharge point to the nearest tenth of a foot.
   i. **Stack Opening Length:** If the stack shape is selected as "Rectangular," enter the inside length of the rectangular opening of the discharge point to the nearest tenth of a foot.
   j. **Stack Opening Width:** If the stack shape is selected as "Rectangular," enter the inside width of the rectangular opening of the discharge point to the nearest tenth of a foot.
   k. **Exit Gas Temp:** Enter the gas temperature at the discharge point in degrees Fahrenheit under normal operating conditions.

l. **Exit Gas Flow Rate:** Enter the exit gas flow rate at the discharge point. The exit gas flow rate unit of measure is required and can be selected using the drop-down menu to the right of the exit gas flow rate.

m. **Exit Gas Velocity:** The exit gas velocity is populated and entered in SLEIS if the stack diameter and exit gas flow rate (using ACFM) are entered. This value measures the velocity of the discharged exit gas. The unit of measure is required and can be selected using the drop-down menu to the right of the exit gas velocity.

n. **Fence Line Distance:** The distance to the nearest property line measured in feet. This field is not required.

o. **Related Unit Processes:** A list of unit processes which are being vented to the atmosphere through the release point. This list is populated using data from the Unit Processes button.

p. **Comments:** Enter any information about the release point that may be useful to the DNR. This field is not required.

2. **Location Tab**

a. **Latitude (decimal degrees):** This should be the latitude of the release point. If this is incorrect, please contact DNR. This field is not required.

b. **Longitude (decimal degrees):** This should be the longitude of the release point. If this is incorrect, please contact DNR. This field is not required.

c. **UTM X, Y, and Zone:** These data fields will be populated once the Latitude and Longitude are entered.

d. **Collection Method, Data Collection Date, Geographic Reference point, Geodetic Reference System:** These fields are not required.

3. **Additional Information Tab:** All fields on the additional information tab are not required. Some may have been populated by data from previous inventories or databases. Fields may be completed with any information that is helpful to the facility or DNR.

4. **Saving the record:** Once all required data has been reviewed and completed, click "Save" in the bottom right corner of the screen to save the record. If the data entered does not meet validation requirements, the requirements will be shown near the data input field in red font. This record contains multiple tabs and all data on all tabs must meet the data validation requirements before a save can be executed for the record. Tabs with fields that do not meet the requirements will have an exclamation point. The fields that don't meet the requirements will have red help text near them.

## Section Instructions: Control Devices

1. **Control Device Tab**

a. **Identifier:** This value must be a unique number among control devices at the facility and is not editable once it has been included as part of an emissions inventory submittal. This number should be consistent with the number assigned to the control device in the construction permit.

b. **Description:** Provide a brief description of the control device (ex. Baghouse, Scrubber, Cyclone, etc.).

c. **Status:** Select the status of the control device for the reporting year. If it operated any time during the year, choose "Operating."

d. **Status Year:** Enter the year the status became applicable.

e. **Control Measure:** Select the control measure used to reduce emissions. This is a type-ahead field.

f. **Controlled Pollutants:** Enter pollutants controlled by the device. For every pollutant listed, a control percentage must also be listed. Click the add button to include another pollutant. Click the delete button to remove a pollutant.

a. **Related Unit Processes:** A list of unit processes which are being controlled by the device. This list is populated using data from the Unit Processes button.

g. **Comments:** Enter any information about the control device that may be useful to the DNR. This field is not required.

2. **Additional Information Tab:** All fields on the additional information tab are not required. Some may have been populated by data from previous inventories or databases. Fields may be completed with any information that is helpful to the facility or DNR.

3. **Saving the record:** Once all required data has been reviewed and completed, click "Save" in the bottom right corner of the screen to save the record. If the data entered does not meet validation requirements, the requirements will be shown near the data input field in red font. This record contains multiple tabs and all data on all tabs must meet the data validation requirements before a save can be executed for the record. Tabs with fields that do not meet the requirements will have an exclamation point. The fields that don't meet the requirements will have red help text near them.

## Section Instructions: Emission Units

1. **Emission Unit Tab**
   a. **Identifier:** This value must be a unique number among emission units at the facility and is not editable once it has been included as part of an emissions inventory submittal. This number should be consistent with the number assigned to the emission unit in the construction permit.
   b. **Type:** Select the type of emission unit. This is a type-ahead field.
   c. **Description:** Provide a brief description of the emission unit (ex. Boiler, Paint Booth, Welder, etc.).
   d. **Status:** Select the status of the emission unit for the reporting year. If it operated any time during the year, choose "Operating."
   e. **Status Year:** Enter the year the status became applicable.
   f. **Operation Start Date:** Enter the date the emission unit began operation. This field is not required.
   g. **Design Capacity:** Enter the maximum hourly design capacity of the emission unit. This is the true maximum hourly design capacity if it operated at 100% capacity. This is NOT the average hourly operating rate during the year. Remember to include the unit of measure field if the design capacity value is entered. These fields are not required.
   h. **Related Unit Processes:** A list of unit processes which are occurring at the emission unit. This list is populated using data from the Unit Processes button.
   i. **Comments:** Enter any information about the emission unit that may be useful to the DNR. This field is not required.

2. **Additional Information Tab:** All fields on the additional information tab are not required. Some may have been populated by data from previous inventories or databases. Fields may be completed with any information that is helpful to the facility or DNR.
3. **Saving the record:** Once all required data has been reviewed and completed, click "Save" in the bottom right corner of the screen to save the record. If the data entered does not meet validation requirements, the requirements will be shown near the data input field in red font. This record contains multiple tabs and all data on all tabs must meet the data validation requirements before a save can be executed for the record. Tabs with fields that do not meet the requirements will have an exclamation point. The fields that don't meet the requirements will have red help text near them.

## Section Instructions: Unit Processes

1. **Unit Process Tab**
   a. **Process Identifier:** This value must be a unique number among unit processes at the facility and is not editable once it has been included as part of an emissions inventory submittal.
   b. **Emission Unit Identifier:** Select the previously created identifier from the drop down menu that the unit process is associated with. If the emission unit identifier does not exist in the drop down menu, go back to the emission units button and create the identifier, save it, and then return to the unit processes button and make the connection between unit process and emission unit.
   c. **SCC Code:** There are two options of entering this code:
      i. Enter the 8-digit number into the "Code" field. A list of codes may be downloaded from Emissions Estimate Tools (iowadnr.gov). Scroll down to the "Classification Lists and Conversions" heading and click the "Updated Source Classification Codes" link.
      ii. Use the drop-down menus and select all four level descriptions that best describe the process. As each level description is selected, the SCC code will begin to populate. All four levels must be selected.

d. **Description:** Provide a brief description of the unit process (ex. natural gas combustion, surface coating etc.). This field is not required.
e. **Status:** Select the status of the unit process for the reporting year. If it operated any time during the year, choose "Operating."
f. **Status Year:** Enter the year the status became applicable.
g. **Related Process Emission:** A link to the unit process emissions contained in the emissions inventory. This list is populated using data from the Process Emissions button.
h. **Comments:** Enter any information about the unit process that may be useful to the DNR. This field is not required.

2. **Regulatory Programs Tab**
   a. **Regulatory Programs:** Enter the regulatory program the process is subject to. This is a type-ahead field. To add a regulatory program, click the add button on the right side of the screen. To remove a program, click the delete button on the right side of the screen. This field is not required.

3. **Control Approach Tab**
   a. **Not Controlled?:** Check the box if the process is not being controlled. If the process is being controlled, make sure to uncheck the box. This checkbox determines whether control efficiency is being applied when SLEIS auto-calculates emissions. This field is not required.
   b. **Control Approach Description:** Provide a brief description of the control approach associated with the unit process (ex. Baghouse, Scrubber, Cyclone, etc.). This field is not required.
   c. **Control Device:** If the "Not Controlled" checkbox is left unchecked, select the control device in the dropdown menu that is controlling emissions for the process.

4. **Release Point Apportionment Tab**
   a. **Release Point:** Select the release point identifier venting emissions from the unit process. To add a release point, click the add button on the right side of the screen. To remove a release point, click the delete button on the right side of the screen.
   b. **Apportionment Percentage:** Enter the percent of the emissions being vented to the release point selected. The total apportionment for all release points combined must equal 100%.

5. **Additional Information Tab:** All fields on the additional information tab are not required. Some may have been populated by data from previous inventories or databases. Fields may be completed with any information that is helpful to the facility or DNR.
6. **Saving the record:** Once all required data has been reviewed and completed, click "Save" in the bottom right corner of the screen to save the record. If the data entered does not meet validation requirements, the requirements will be shown near the data input field in red font. This record contains multiple tabs and all data on all tabs must meet the data validation requirements before a save can be executed for the record. Tabs with fields that do not meet the requirements will have an exclamation point. The fields that don't meet the requirements will have red help text near them.

## Section Instructions: Process Emissions

1. **Process Tab**
   a. **Process Identifier:** This value must be a unique number among unit processes at the facility and is not editable once it has been included as part of an emissions inventory submittal. The identifier is included in the Process Emissions listing if it has a status of operating or if the status year is greater than the year of the emissions report being submitted.
   b. **Emission Unit Identifier:** This value must be a unique number among emission units at the facility and is not editable once it has been included as part of an emissions inventory submittal. The connection between emission unit and unit process identifier is made in the Unit Processes button.
   c. **SCC:** The SCC number displayed on this screen is determined in the Unit Processes button when the unit process identifier is created.

d. **Process is Reported?:** This box is automatically checked. If the process is still present at the facility but not reporting emissions uncheck the box. Unchecking the box will delete all data from the record but will still allow for comments to be entered in the comments field. A pop-up box will appear when the box is unchecked asking if the user wants to permanently remove pollutants. If the record is saved, future inventories will not have the throughput unit of measure, throughput material, operations, pollutants, and emission factors pre-filled. To keep this data but report zero emissions, keep the checkbox checked and report the annual throughput as zero.

e. **Annual Throughput:** Enter the amount of material used or stored, fuel burned, vehicle miles traveled, or the amount of product produced during the emissions year.

f. **Throughput Unit of Measure:** Select the unit of measure for the annual throughput from the dropdown menu.

g. **Throughput Type:** Select the code indicating whether the material measured is an input to the process, an output of the process or a static count.

h. **Throughput Material:** Enter the material being processed. This is a type-ahead field.

i. **Supplemental Calculation Parameters:**
   i. %Ash: Enter the ash content of the material being processed. This field is not required but can be helpful when estimating emissions from combustion processes.
   ii. %Sulfur: Enter the sulfur content of the material being processed. This field is not required but can be helpful when estimating emissions from combustion processes.
   iii. Heat Content (MMBtu/Unit): Enter the heat content of the material being processed. This field is not required but can be helpful when estimating emissions from combustion processes.

j. **Comments:** Enter any information about the unit process that may be useful to the DNR. This field is not required.

2. **Operations Tab**
   a. **Average Hours/Day:** Enter the average hours per day the equipment operated during the emissions year.
   b. **Average Days/Week:** Enter the average days per week the equipment operated during the emissions year.
   c. **Average Weeks/Year:** Enter the average weeks per year the equipment operated during the emissions year.
   d. **Actual Hours/Year:** Enter the actual hours the equipment operated during the emissions year. This field can be manually entered but must be within +/- 0.5% of the calculated value when multiplying average hours/day, average days/week, and average weeks/year.
   e. **Seasonal Operations:**
      i. December-February: Enter the percentage of total throughput processed during the months of January, February, and December combined.
      ii. March-May: Enter the percentage of total throughput processed during the months of March, April, and May combined.
      iii. June-August: Enter the percentage of total throughput processed during the months of June, July, and August combined.
      iv. September-November: Enter the percentage of total throughput processed during the months of September, October, and November combined.

3. **Emissions Tab**
   a. **Pollutant Code:** To add a pollutant, click the "Add" button in the lower left corner of the screen. Then enter the pollutant(s) emitted from the process. This is a type-ahead field. At least one pollutant must be entered.
   b. **Calculation Method:** Select the code describing the type of emissions factor being used, including whether the emissions factor is pre-control or post-control. US EPA EF includes emission factors from WebFIRE and AP-42. For more complicated emissions estimates, select the calculation method code that does not include an emissions factor. These are indicated by "no EF" in parentheses. In that case, enter the emissions calculations in the comments field or attach them to the inventory under the "Report Attachments" button.
   c. **Emission Factor (Lbs/Unit):** If the selected calculation method code enables the "Emission Factor" field, enter the emission factor. The numerator unit of measure is always considered to be pounds.
   d. **Emission Factor Unit:** If the emission factor is enabled, the emission factor unit of measure must also be entered. The value entered should be the denominator.
   e. **Estimated Emissions (Tons):** If the calculation method allows an emissions factor to be entered and the emission factor unit entered is the same as the throughput unit of measure, this field will be automatically calculated by

SLEIS and not editable. If the calculation method does not allow an emission factor to be entered (i.e.: methods listed as "(no EF)") or the unit of measure does not match the throughput unit of measure, this is a required field and must be hand-entered. Please note the estimated emissions unit of measure is always tons.

f.   **Overall Control Efficiency (%):** This field will only be displayed if a control device is linked to the process (see above Section Instructions for Unit Processes – Control Approach Tab). To change the overall control efficiency for a pollutant, go to the Control Device button, select the Control Device tab, then change the control efficiency percentage for the pollutant. SLEIS will automatically include the control percentage when estimating emissions.

g.   **Comment:** Enter any calculations and supporting documentation for the estimated emissions value. This field is not required.

## Section Instructions: Report Attachment

1.   **Report Attachments Screen**
     a.   This screen contains all documents attached to the report. To attach a document to the report, click the "Add" button in the lower right corner of the screen. To download an attachment, click the "Download" button on the far right side of the document. To edit the document's description, click the "Edit" button next to the "Download" button.
     b.   To add a document to a report, after clicking the "Add" button described above, click the "Browse" button and a window will pop up. Browse your computer to locate the file you want to attach and click "Open." Then enter a description of the document in the field labeled "Description." Click the save button to complete the report attachment process.

# Example Calculations and SLEIS Screen Shots

## Introduction

This section provides example calculations and SLEIS screen shots to show how emission estimation methods are used to develop an emissions inventory for actual emissions. There are six basic approaches or methods used to develop emission estimates and inventories. These methods are:
- Continuous emissions monitoring
- Stack test data
- Material balance
- EPA-approved emission factors
- Vendor supplied factors
- Engineering estimates based on best available process operating data

Most sources will use material balance or EPA-approved emission factors for estimating emissions. These two methods will be the focus of this section. Each example calculation shows how the method may be used for a specific emissions source category. It is intended that the reader use the information to apply the methods to other applicable source categories.

## Actual Emissions

Actual emissions are the actual rate of air pollution from an emission unit. They are calculated using the emission unit's actual operating hours, production rates, and types of materials processed, stored, or combusted for the calendar year.

General equation for calculating actual emissions with control equipment:

(Annual Throughput) x (Emission Factor) x (Control Efficiency) x (conversion factor to tons) = tons per year

*Annual Throughput*: Amount of material actually used for the calendar year such as gallons per year, tons per year, million cubic feet per year, etc.

*Emission factors* are values based on the amount of pollution produced and the raw material processed such as lb/ton, lb/gal, or lb/MMcf.

*Control Efficiency* is the control equipment pollutant removal efficiency.

To convert to tons, see the conversion factors listed on page 91 in Appendix D.

## Example Calculations
The following examples show how calculations are performed and where data is reported in SLEIS.

ACME Corporation manufactures grain wagons and has three reportable emission units including a welding station, paint booth, and No. 2 fuel oil-fired boiler. Each emission unit has one release point associated with it. The release points, emission units, and control devices were identified and assigned a number.

ACME Hospital has four reportable emission units including a natural gas-fired boiler, two diesel-fired generators, and a dual-fuel fired generator.

For each release point, information was gathered on the stack opening, height, flow rate (fan rating), and temperature. Information gathered for each emission unit included a description of the process and raw materials used. If there is an air quality construction permit for the emission source, most of this information can be found in the permit.

The next step was finding emission factors in EPA documents for each pollutant produced by the boiler and welding station. A mass balance calculation was performed using Safety Data Sheets (SDS) information to estimate emission factors for the paint booth.

The following calculations were performed and entered in SLEIS for ACME Corporation and ACME Hospital:

# 2022 Emissions Report

**In Process** ↩

## Release Points

| **Release Point** | Location | Additional Information |

**❓ Identifier:**

EP-001

**❓ Type:**

Vertical ▾

**❓ Description:**

Diesel Generator Stack

**❓ Status:**

Operating ▾

**❓ Status Year:**

**❓ Stack Height:**

67.0                                          FEET

**❓ Stack Shape:**

🔘 Circular    ⚪ Rectangular

**❓ Stack Diameter:**

0.50        FEET

**❓ Exit Gas Temp:**

400                                          °F

**❓ Exit Gas Flow Rate:**

7795                              | ACFM - ACTUAL CUBIC FEET PER ▾

**❓ Exit Gas Velocity:**

39699.609                         | FPM - FEET PER MINUTE ▾

**❓ Fence Line Distance:**

                                              FEET

**❓ Related Unit Processes:**

EU-001 - Diesel Generator, EU-001 -1 - Diesel Generator

**❓ Comments:**

# 2022 Emissions Report

**In Process** ↩

## Emission Units

| **Emission Unit** | Additional Information |
|---|---|

**❓ Identifier:**

EU-001

**❓ Type:**

160 - Reciprocating IC Engine

**❓ Description:**

Diesel Generator

**❓ Status:**

OP - Operating ⌄

**❓ Status Year:**

**❓ Operation Start Date:**

01-01-2010 📅

**❓ Design Capacity**

⌄

**❓ Related Unit Processes:**

EU-001 -1 - Diesel Generator

**❓ Comments:**

🗑 Delete    ⊖ Cancel    💾 Save

# 2022 Emissions Report

In Process

## Unit Processes

| Unit Process | Regulatory Programs | Control Approach | Release Point Apportionment |

| Additional Information |

**? Process Identifier:**

EU-001 -1

**? Emission Unit Identifier:**

EU-001 - Diesel Generator

**? SCC:**

Internal Combustion Engines ⌄

Industrial ⌄

**Code:** ~ or ~ Distillate Oil (Diesel) ⌄

20200102

Reciprocating ⌄

**? Description:**

Diesel Generator

**? Status:**

OP - Operating ⌄

**? Status Year:**

**Related Process Emission:**

EU-001 -1 - Diesel Generator

---

# 2022 Emissions Report

In Process

## Unit Processes

| Unit Process | Regulatory Programs | Control Approach | **Release Point Apportionment** |

| Additional Information |

**? Release Point Apportionment:**                                                                        ⊕

| Release Point | % |

| ⚙ | EP-001 - Diesel Genera ⌄ | 100 | 🗑 |

# 2022 Emissions Report

**In Process** ↺

## Process Emissions

| **Process** | **Operations** | **Emissions** |

**Process Identifier:**
EU-001 -1 - Diesel Generator

**Emission Unit Identifier:**
EU-001 - Diesel Generator

**SCC:**
20200102
Internal Combustion Engines-Industrial-Distillate Oil (Diesel)-Reciprocating

**❓ Process is Reported?:**
☑ Uncheck this box if there are no reportable emissions for the reporting year

**❓ Annual Throughput:**

```
140
```

**❓ Throughput Unit of Measure:**

```
E6BTU - MILLION BTUS        ⌄
```

**❓ Throughput Type:**

```
I - Input                   ⌄
```

**❓ Throughput Material:**

```
44 - Diesel
```

**❓ Supplemental Calculation Parameters:**

| | | |
|---|---|---|
| % Ash | % Sulfur | Heat Content (MMBTU/Unit) |

**❓ Comments:**

```
1,000 gallons fuel used * 0.14 MMBtu/Gal = 140 MMBtu
```

Next ▶    ⊖ Cancel    💾 Save

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# 2022 Emissions Report

## Process Emissions

**Process** | **Operations** | **Emissions**

❓ **Average Hours/Day:**

1.06

❓ **Average Days/Week:**

1.00

❓ **Average Weeks/Year:**

8.00

❓ **Actual Hours/Year:**

8.5

**Seasonal Operations:**

❓ December-February     ❓ March-May     ❓ June-August

25.5 %     23.5 %     23.5 %

❓ September-November

27.5 %

---

# 2022 Emissions Report

## Process Emissions

**Process** | **Operations** | **Emissions**

Filter: [_____] ✕

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▸ PM25-PRI | 0.31 | E6BTU | 28 - USEPA EF (pre-control) | 0.0217 |
| ▸ PM10-PRI | 0.31 | E6BTU | 28 - USEPA EF (pre-control) | 0.0217 |
| ▸ SO2 | 0.29 | E6BTU | 28 - USEPA EF (pre-control) | 0.020299999999999 |
| ▸ NOX | 4.41 | E6BTU | 28 - USEPA EF (pre-control) | 0.308699999999999 |
| ▸ VOC | 0.35 | E6BTU | 28 - USEPA EF (pre-control) | 0.0245 |
| ▸ CO | 0.95 | E6BTU | 28 - USEPA EF (pre-control) | 0.0665 |

# 2022 Emissions Report

## Process Emissions

| Process | Operations | **Emissions** |

Filter: [            ] ✕

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ PM25-PRI | 0.31 | E6BTU | 28 - USEPA EF (pre-control) | 0.0217 |

**Pollutant Code:**
PM25-PRI - PM2.5 Primary (Filt + Cond)

**Calculation Method:**
28 - USEPA EF (pre-control)

**Emission Factor (Lbs/Unit):**
0.31

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.0217

**Overall Control Efficiency (%):**
0%

**Comment:**
0.31 lbs PM2.5/MMBtu diesel burned 0.31 lb/MMBtu * 140 MMBtu * 1 ton/2000 lbs = 0.02 tons PM2.5

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ PM10-PRI | 0.31 | E6BTU | 28 - USEPA EF (pre-control) | 0.0217 |

**Pollutant Code:**
PM10-PRI - PM10 Primary (Filt + Cond)

**Calculation Method:**
28 - USEPA EF (pre-control)

**Emission Factor (Lbs/Unit):**
0.31

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.0217

**Overall Control Efficiency (%):**
0%

**Comment:**
0.31 lbs PM10/MMBtu diesel burned 0.31 lb/MMBtu * 140 MMBtu * 1 ton/2000 lbs = 0.02 tons PM10

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ SO2 | 0.29 | E6BTU | 28 - USEPA EF (pre-control) | 0.020299999999999 |

**Pollutant Code:**
SO2 - Sulfur Dioxide

**Calculation Method:**
28 - USEPA EF (pre-control)

**Emission Factor (Lbs/Unit):**
0.29

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.020299999999999

**Overall Control Efficiency (%):**
0%

**Comment:**
0.29 lbs SO2/MMBtu diesel burned 0.29 lbs SO2/MMBtu * 140 MMBtu * 1 ton/2,000 lbs = 0.02 tons

## Individual pollutant calculations continued:

| | | | | |
|---|---|---|---|---|
| ▾ NOX | 4.41 | E6BTU | 28 - USEPA EF (pre-control) | 0.308699999999999 |

**Pollutant Code:**
NOX - Nitrogen Oxides

**Calculation Method:**
28 - USEPA EF (pre-control)

**Emission Factor (Lbs/Unit):**
4.41

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.308699999999999

**Overall Control Efficiency (%):**
0%

**Comment:**
4.41 lbs NOx/MMBtu diesel burned 4.41 lb/MMBtu * 140 MMBtu * 1 ton/2000 lbs = 0.31 tons NOx

| | | | | |
|---|---|---|---|---|
| ▾ VOC | 0.35 | E6BTU | 28 - USEPA EF (pre-control) | 0.0245 |

**Pollutant Code:**
VOC - Volatile Organic Compounds

**Calculation Method:**
28 - USEPA EF (pre-control)

**Emission Factor (Lbs/Unit):**
0.35

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.0245

**Overall Control Efficiency (%):**
0%

**Comment:**
0.35 lbs VOC/MMBtu diesel burned 0.35 lb/MMBtu * 140 MMBtu * 1 ton/2000 lbs = 0.02 tons VOC

| | | | | |
|---|---|---|---|---|
| ▾ CO | 0.95 | E6BTU | 28 - USEPA EF (pre-control) | 0.0665 |

**Pollutant Code:**
CO - Carbon Monoxide

**Calculation Method:**
28 - USEPA EF (pre-control)

**Emission Factor (Lbs/Unit):**
0.95

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.0665

**Overall Control Efficiency (%):**
0%

**Comment:**
0.95 lbs CO/MMBtu diesel burned 0.95 lb/MMBtu * 140 MMBtu * 1 ton/2000 lbs = 0.07 tons CO

Next ▶

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# 2022 Emissions Report

**In Process** ↵

**Release Points**

| **Release Point** | Location | Additional Information |
|---|---|---|

❓ **Identifier:**
EP-001

❓ **Type:**
[ Vertical with Rain Cap ▾ ]

❓ **Description:**
[ Boiler Stack ]

❓ **Status:**
[ Operating ▾ ]

❓ **Status Year:**
[ ]

❓ **Stack Height:**
[ 35.0 ] FEET

❓ **Stack Shape:**
🔘 Circular ⚪ Rectangular

❓ **Stack Diameter:**
[ 2.00 ] FEET

❓ **Exit Gas Temp:**
[ 350 ] °F

❓ **Exit Gas Flow Rate:**
[ 6100 ] [ ACFM - ACTUAL CUBIC FEET PER ▾ ]

❓ **Exit Gas Velocity:**
[ 1941.69031 ] [ FPM - FEET PER MINUTE ▾ ]

❓ **Fence Line Distance:**
[ ] FEET

❓ **Related Unit Processes:**
EU-001 - Fuel Oil Boiler, EU-001 -1 - Fuel Oil Combustion

❓ **Comments:**
[ ]

# 2022 Emissions Report

## Emission Units

| **Emission Unit** | Additional Information |
|---|---|

**❓ Identifier:**

EU-001

**❓ Type:**

100 - Boiler

**❓ Description:**

Fuel Oil Boiler

**❓ Status:**

OP - Operating ⌄

**❓ Status Year:**

**❓ Operation Start Date:**

📅

**❓ Design Capacity**

⌄

**❓ Related Unit Processes:**

EU-001 -1 - Fuel Oil Combustion

**❓ Comments:**

🗑 **Delete**    ⊖ **Cancel**    💾 **Save**

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# 2022 Emissions Report

## Unit Processes

| Unit Process | Regulatory Programs | Control Approach | Release Point Apportionment |

Additional Information

❓ **Process Identifier:**

EU-001 -1

❓ **Emission Unit Identifier:**

EU-001 - Fuel Oil Boiler

❓ **SCC:**

| | External Combustion ▾ |
| **Code:** | Industrial: Boilers ▾ |
| 10200502 ~ or ~ | Distillate Oil ▾ |
| | 10-100 Million BTU/hr ▾ |

❓ **Description:**

Fuel Oil Combustion

❓ **Status:**

OP - Operating ▾

❓ **Status Year:**

[ ]

**Related Process Emission:**

EU-001 -1 - Fuel Oil Combustion

❓ **Comments:**

---

# 2022 Emissions Report

## Unit Processes

| Unit Process | Regulatory Programs | Control Approach | **Release Point Apportionment** |

Additional Information

❓ **Release Point Apportionment:**

⊕

| | Release Point | % | |
| ⚙ | EP-001 - Boiler Stack ▾ | 100 | 🗑 |

# 2022 Emissions Report

## Process Emissions

| Process | Operations | Emissions |

**Process Identifier:**

EU-001 -1 - Fuel Oil Combustion

**Emission Unit Identifier:**

EU-001 - Fuel Oil Boiler

**SCC:**

10200502

External Combustion-Industrial: Boilers-Distillate Oil-10-100 Million BTU/hr

**❓ Process is Reported?:**

☑ Uncheck this box if there are no reportable emissions for the reporting year

**❓ Annual Throughput:**

5

**❓ Throughput Unit of Measure:**

E3GAL - 1000 GALLONS ⌄

**❓ Throughput Type:**

I - Input ⌄

**❓ Throughput Material:**

IA49 - FUEL OIL

**❓ Supplemental Calculation Parameters:**

| % Ash | % Sulfur | Heat Content (MMBTU/Unit) |

**❓ Comments:**

Next ⊙    ⊖ Cancel    🖫 Save

# 2022 Emissions Report

## Process Emissions

| Process | **Operations** | Emissions |

**Average Hours/Day:**

24.00

**Average Days/Week:**

7.00

**Average Weeks/Year:**

38.00

**Actual Hours/Year:**

6384.0

**Seasonal Operations:**

| December-February | March-May | June-August |
|---|---|---|
| 35.0 % | 21.7 % | 15.0 % |

**September-November**

28.3 %

---

# 2022 Emissions Report

## Process Emissions

| Process | Operations | **Emissions** |

Filter: _____ ×

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▸ PM25-PRI | 1.55 | E3GAL | 8 - USEPA EF (post-control) | 0.003874999999999 |
| ▸ PM10-PRI | 2.3 | E3GAL | 8 - USEPA EF (post-control) | 0.005749999999999 |
| ▸ SO2 | 142 | E3GAL | 8 - USEPA EF (post-control) | 0.354999999999999 |
| ▸ NOX | 20 | E3GAL | 8 - USEPA EF (post-control) | 0.05 |
| ▸ VOC | 0.2 | E3GAL | 8 - USEPA EF (post-control) | 0.0005 |
| ▸ CO | 5 | E3GAL | 8 - USEPA EF (post-control) | 0.0125 |
| ▸ NH3 | 0.8 | E3GAL | 8 - USEPA EF (post-control) | 0.002 |

# 2022 Emissions Report

**Process Emissions**

| Process | Operations | **Emissions** |

Filter: _____ ✕

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ PM25-PRI | 1.55 | E3GAL | 8 - USEPA EF (post-control) | 0.003874999999999 |

**Pollutant Code:**
PM25-PRI - PM2.5 Primary (Filt + Cond)

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
1.55

**Emission Factor Unit:**
E3GAL - 1000 GALLONS

**Estimated Emissions (Tons):**
0.003874999999999

**Comment:**
1.55 lbs PM2.5/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.004 tons PM 2.5

| ▾ PM10-PRI | 2.3 | E3GAL | 8 - USEPA EF (post-control) | 0.005749999999999 |

**Pollutant Code:**
PM10-PRI - PM10 Primary (Filt + Cond)

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
2.3

**Emission Factor Unit:**
E3GAL - 1000 GALLONS

**Estimated Emissions (Tons):**
0.005749999999999

**Comment:**
2.3 lbs PM10/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.006 tons PM 10

| ▾ SO2 | 142 | E3GAL | 8 - USEPA EF (post-control) | 0.354999999999999 |

**Pollutant Code:**
SO2 - Sulfur Dioxide

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
142

**Emission Factor Unit:**
E3GAL - 1000 GALLONS

**Estimated Emissions (Tons):**
0.354999999999999

**Comment:**
142 lbs SO2/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.35 tons SO2

| ▾ NOX | 20 | E3GAL | 8 - USEPA EF (post-control) | 0.05 |

**Pollutant Code:**
NOX - Nitrogen Oxides

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
20

**Emission Factor Unit:**
E3GAL - 1000 GALLONS

**Estimated Emissions (Tons):**
0.05

**Comment:**
20 lbs NOx/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.05 tons NOx

| ▾ VOC | 0.2 | E3GAL | 8 - USEPA EF (post-control) | 0.0005 |

**Pollutant Code:**
VOC - Volatile Organic Compounds

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.2

**Emission Factor Unit:**
E3GAL - 1000 GALLONS

**Estimated Emissions (Tons):**
0.0005

**Comment:**
0.2 lbs VOC/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.0005 tons VOC

| ▾ CO | 5 | E3GAL | 8 - USEPA EF (post-control) | 0.0125 |

**Pollutant Code:**
CO - Carbon Monoxide
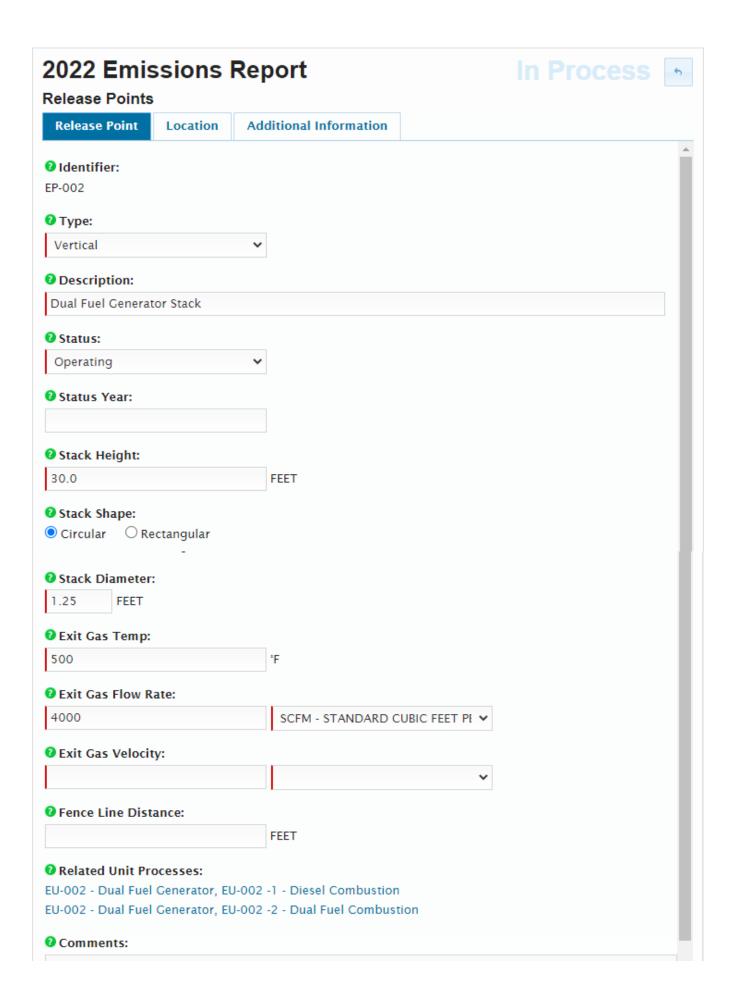
**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
5

**Emission Factor Unit:**
E3GAL - 1000 GALLONS

**Estimated Emissions (Tons):**
0.0125

**Comment:**
5 lbs CO/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.0125 tons CO

| ▾ NH3 | 0.8 | E3GAL | 8 - USEPA EF (post-control) | 0.002 |

**Pollutant Code:**
NH3 - Ammonia

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.8

**Emission Factor Unit:**
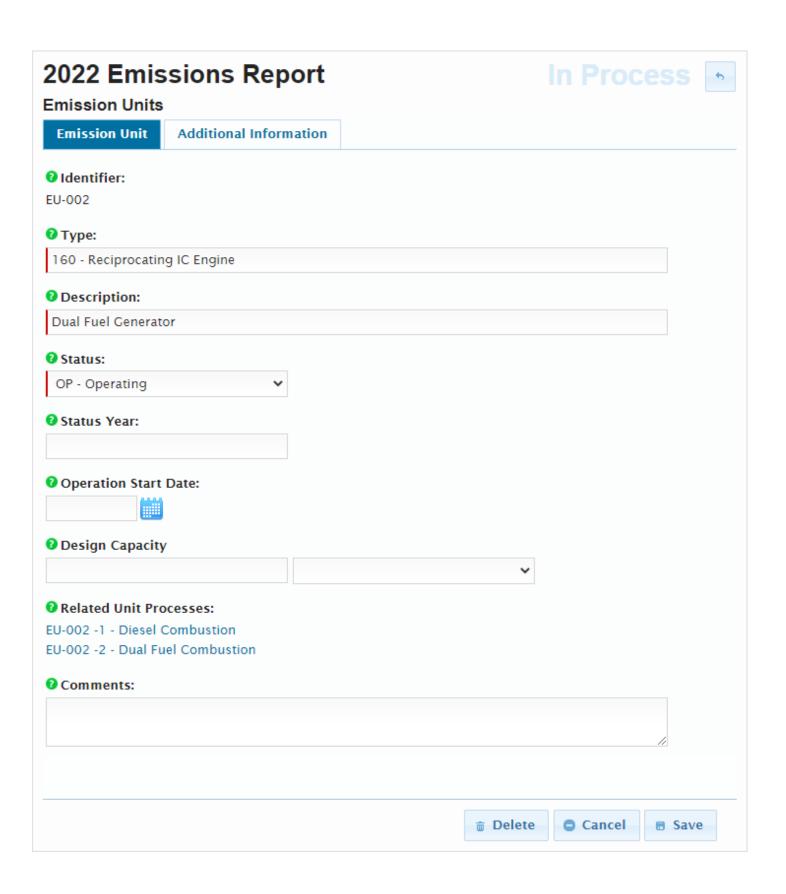E3GAL - 1000 GALLONS

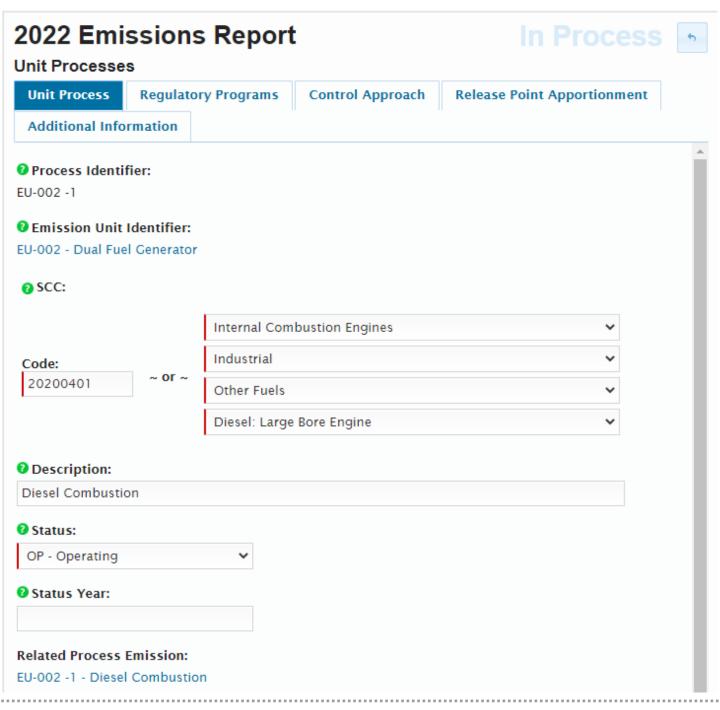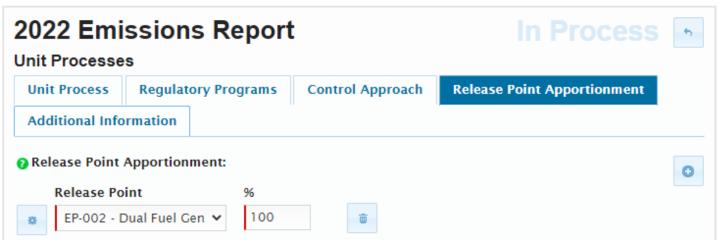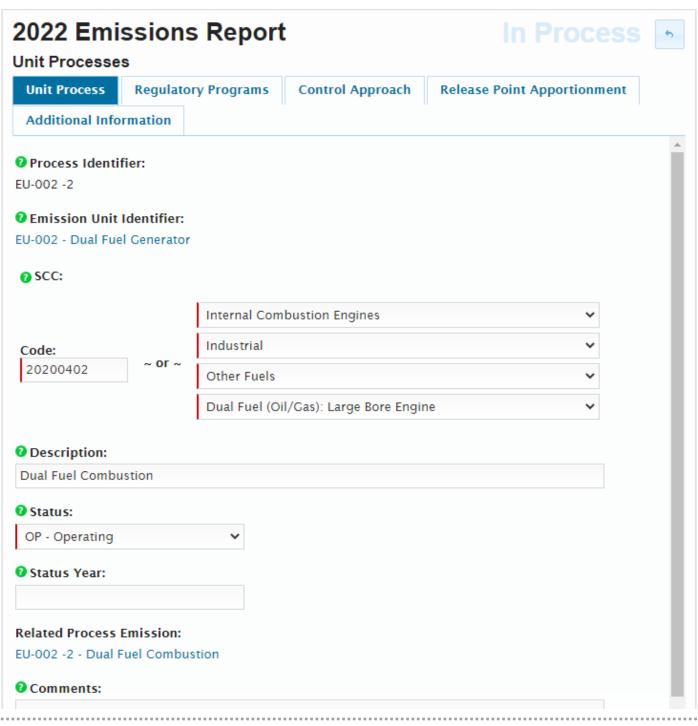**Estimated Emissions (Tons):**
0.002

**Comment:**
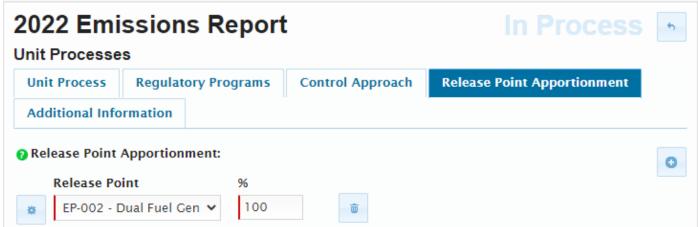0.8 lbs NH3/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.8 tons NH3

# 2022 Emissions Report

## Release Points

| **Release Point** | **Location** | **Additional Information** |

**❓ Identifier:**

EP-002

**❓ Type:**

Vertical ▾

**❓ Description:**

Dual Fuel Generator Stack

**❓ Status:**

Operating ▾

**❓ Status Year:**

**❓ Stack Height:**

30.0    FEET

**❓ Stack Shape:**

◉ Circular   ○ Rectangular
-

**❓ Stack Diameter:**

1.25    FEET

**❓ Exit Gas Temp:**

500    °F

**❓ Exit Gas Flow Rate:**

4000    SCFM - STANDARD CUBIC FEET PI ▾

**❓ Exit Gas Velocity:**

▾

**❓ Fence Line Distance:**

FEET

**❓ Related Unit Processes:**

EU-002 - Dual Fuel Generator, EU-002 -1 - Diesel Combustion

EU-002 - Dual Fuel Generator, EU-002 -2 - Dual Fuel Combustion

**❓ Comments:**

# 2022 Emissions Report

**In Process** ↺

## Emission Units

| **Emission Unit** | Additional Information |

**❓ Identifier:**

EU-002

**❓ Type:**

160 - Reciprocating IC Engine

**❓ Description:**

Dual Fuel Generator

**❓ Status:**

OP - Operating ⌄

**❓ Status Year:**

**❓ Operation Start Date:**

📅

**❓ Design Capacity**

⌄

**❓ Related Unit Processes:**

EU-002 -1 - Diesel Combustion
EU-002 -2 - Dual Fuel Combustion

**❓ Comments:**

🗑 Delete    ⊖ Cancel    💾 Save

# 2022 Emissions Report

In Process ↩

## Unit Processes

**Unit Process** | Regulatory Programs | Control Approach | Release Point Apportionment

Additional Information

---

**❓ Process Identifier:**

EU-002 -1

**❓ Emission Unit Identifier:**

EU-002 - Dual Fuel Generator

**❓ SCC:**

**Code:**

| 20200401 | ~ or ~ |

| Internal Combustion Engines | ⌄ |
| Industrial | ⌄ |
| Other Fuels | ⌄ |
| Diesel: Large Bore Engine | ⌄ |

**❓ Description:**

Diesel Combustion

**❓ Status:**

OP - Operating ⌄

**❓ Status Year:**

**Related Process Emission:**

EU-002 -1 - Diesel Combustion

---

# 2022 Emissions Report

In Process ↩

## Unit Processes

Unit Process | Regulatory Programs | Control Approach | **Release Point Apportionment**

Additional Information

---

**❓ Release Point Apportionment:**

⊕

| **Release Point** | **%** |
|---|---|
| ⚙ | EP-002 - Dual Fuel Gen ⌄ | 100 | 🗑 |

# 2022 Emissions Report

## Unit Processes

**Unit Process** | Regulatory Programs | Control Approach | Release Point Apportionment

Additional Information

❓ **Process Identifier:**

EU-002 -2

❓ **Emission Unit Identifier:**

EU-002 - Dual Fuel Generator

❓ **SCC:**

**Code:**

| 20200402 |    ~ or ~

| Internal Combustion Engines ⌄ |
| Industrial ⌄ |
| Other Fuels ⌄ |
| Dual Fuel (Oil/Gas): Large Bore Engine ⌄ |

❓ **Description:**

Dual Fuel Combustion

❓ **Status:**

OP - Operating ⌄

❓ **Status Year:**

**Related Process Emission:**

EU-002 -2 - Dual Fuel Combustion

❓ **Comments:**

---

# 2022 Emissions Report

## Unit Processes

Unit Process | Regulatory Programs | Control Approach | **Release Point Apportionment**

Additional Information

❓ **Release Point Apportionment:**                    ⊕

| **Release Point** | **%** |
| ⚙ EP-002 - Dual Fuel Gen ⌄ | 100 |    🗑

31

# 2022 Emissions Report

## Process Emissions

| **Process** | Operations | Emissions |

**Process Identifier:**

EU-002 -1 - Diesel Combustion

**Emission Unit Identifier:**

EU-002 - Dual Fuel Generator

**SCC:**

20200401

Internal Combustion Engines-Industrial-Other Fuels-Diesel: Large Bore Engine

❓ **Process is Reported?:**

☑ Uncheck this box if there are no reportable emissions for the reporting year

❓ **Annual Throughput:**

```
2100
```

❓ **Throughput Unit of Measure:**

```
E6BTU - MILLION BTUS                            ⌄
```

❓ **Throughput Type:**

```
I - Input                                       ⌄
```

❓ **Throughput Material:**

```
44 - Diesel
```

❓ **Supplemental Calculation Parameters:**

| | | |
|---|---|---|
| % Ash | % Sulfur | Heat Content (MMBTU/Unit) |

❓ **Comments:**

```
15,000 gallons diesel * 0.14 MMBtu/gal = 2,100 MMBtu
```

| ◀ Previous | Next ▶ | ⊖ Cancel | 🖬 Save |

# 2022 Emissions Report

## Process Emissions

**Process** | **Operations** | **Emissions**

❓ **Average Hours/Day:**

2.50

❓ **Average Days/Week:**

4.00

❓ **Average Weeks/Year:**

20.00

❓ **Actual Hours/Year:**

200.0

**Seasonal Operations:**

| ❓ December-February | ❓ March-May | ❓ June-August |
|---|---|---|
| 25.0 % | 25.0 % | 25.0 % |

❓ **September-November**

25.0 %

---

# 2022 Emissions Report

## Process Emissions

**Process** | **Operations** | **Emissions**

Filter: [        ] ✕

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▸ PM25-PRI | 0.05 | E6BTU | 8 - USEPA EF (post-control) | 0.052499999999999 |
| ▸ PM10-PRI | 0.14 | E6BTU | 8 - USEPA EF (post-control) | 0.146999999999999 |
| ▸ SO2 | 0.505 | E6BTU | 8 - USEPA EF (post-control) | 0.530249999999999 |
| ▸ NOX | 3.2 | E6BTU | 8 - USEPA EF (post-control) | 3.36 |
| ▸ VOC | 0.0819 | E6BTU | 8 - USEPA EF (post-control) | 0.085995 |
| ▸ CO | 0.85 | E6BTU | 8 - USEPA EF (post-control) | 0.892499999999999 |

# Individual pollutant calculations for Diesel Combustion (SCC 20200401):

## 2022 Emissions Report

**In Process** ↰

### Process Emissions

| Process | Operations | **Emissions** |

Filter: [                    ] ✕

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ PM25-PRI | 0.05 | E6BTU | 8 - USEPA EF (post-control) | 0.052499999999999 |

**Pollutant Code:**
PM25-PRI - PM2.5 Primary (Filt + Cond)

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.05

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.052499999999999

**Comment:**
0.05 lbs PM2.5/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 0.05 tons PM2.5

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ PM10-PRI | 0.14 | E6BTU | 8 - USEPA EF (post-control) | 0.146999999999999 |

**Pollutant Code:**
PM10-PRI - PM10 Primary (Filt + Cond)

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.14

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.146999999999999

**Comment:**
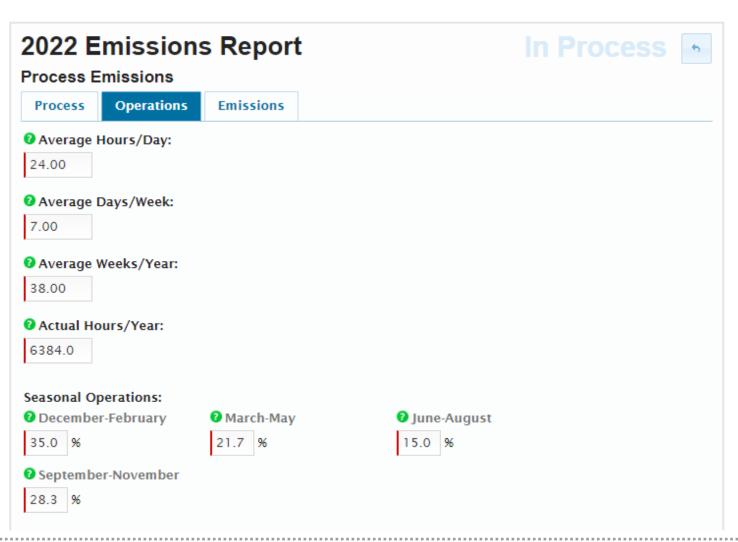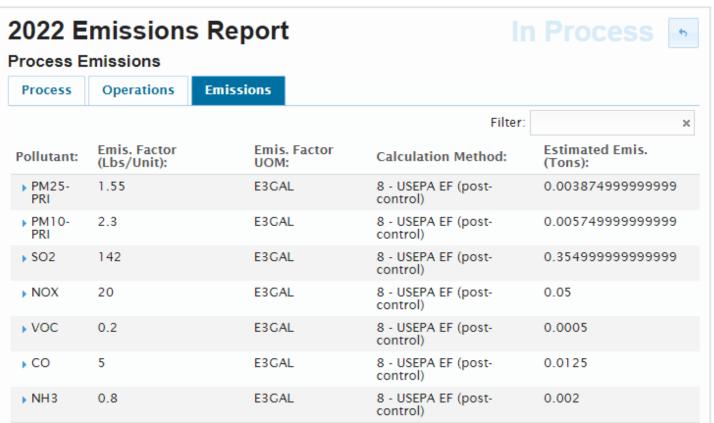0.14 lbs PM10/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 0.17 tons PM10

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ SO2 | 0.505 | E6BTU | 8 - USEPA EF (post-control) | 0.530249999999999 |

**Pollutant Code:**
SO2 - Sulfur Dioxide

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.505

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.530249999999999

**Comment:**
SO2 emissions factor is (1.01* % sulfur) lbs/MMBtu. Low sulfur diesel is 0.5% sulfur 1.01 * 0.5 = 0.505 lbs/MMBtu 0.505 lbs SO2/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 0.53 tons

# Individual pollutant calculations for Diesel Combustion (SCC 20200401) (cont'd):

| ▼ NOX | 3.2 | E6BTU | 8 - USEPA EF (post-control) | 3.36 |

**Pollutant Code:**
NOX - Nitrogen Oxides

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
3.2

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
3.36

**Comment:**
3.2 lbs NOx/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 3.36 tons NOx

| ▼ VOC | 0.0819 | E6BTU | 8 - USEPA EF (post-control) | 0.085995 |

**Pollutant Code:**
VOC - Volatile Organic Compounds

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.0819

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.085995

**Comment:**
0.0819 lbs VOC/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 0.09 tons VOC

| ▼ CO | 0.85 | E6BTU | 8 - USEPA EF (post-control) | 0.892499999999999 |

**Pollutant Code:**
CO - Carbon Monoxide

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.85

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.892499999999999

**Comment:**
0.85 lbs CO/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 0.89 tons CO

# 2022 Emissions Report

## Process Emissions

| **Process** | Operations | Emissions |

**Process Identifier:**
EU-002 -2 - Dual Fuel Combustion

**Emission Unit Identifier:**
EU-002 - Dual Fuel Generator

**SCC:**
20200402
Internal Combustion Engines-Industrial-Other Fuels-Dual Fuel (Oil/Gas): Large Bore Engine

**❓ Process is Reported?:**

☑ Uncheck this box if there are no reportable emissions for the reporting year

**❓ Annual Throughput:**

2100

**❓ Throughput Unit of Measure:**

E6BTU - MILLION BTUS ⌄

**❓ Throughput Type:**

I - Input ⌄

**❓ Throughput Material:**

827 - Dual Fuel (Gas/Oil)

**❓ Supplemental Calculation Parameters:**

|  |  |  |
|---|---|---|
| % Ash | % Sulfur | Heat Content (MMBTU/Unit) |

**❓ Comments:**

1,900,000 cubic feet natural gas * 0.00105 MMBtu/cubic feet = 1,995 MMBtu
750 gallons diesel * 0.140 MMBtu/gallon = 105 MMBtu
Total throughput of 1,995 MMBtu + 105 MMBtu = 2,100 MMBtu

| ◉ Previous | Next ◉ | ⊖ Cancel | 🖫 Save |

# 2022 Emissions Report

## Process Emissions

| Process | **Operations** | Emissions |
|---------|----------------|-----------|

**❓ Average Hours/Day:**

2.50

**❓ Average Days/Week:**

4.00

**❓ Average Weeks/Year:**

20.00

**❓ Actual Hours/Year:**

200.0

**Seasonal Operations:**

| ❓ December-February | ❓ March-May | ❓ June-August |
|---------------------|-------------|---------------|
| 10.0 % | 30.0 % | 40.0 % |

**❓ September-November**

20.0 %

---

# 2022 Emissions Report

## Process Emissions

| Process | Operations | **Emissions** |
|---------|------------|---------------|

Filter: [                    ] ✕

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|------------|--------------------------|-------------------|---------------------|-------------------------|
| ▸ PM25-PRI | 0.0556 | E6BTU | 8 - USEPA EF (post-control) | 0.058379999999999 |
| ▸ PM10-PRI | 0.0573 | E6BTU | 8 - USEPA EF (post-control) | 0.060164999999999 |
| ▸ SO2 | 0.025 | E6BTU | 8 - USEPA EF (post-control) | 0.026249999999999 |
| ▸ NOX | 2.7 | E6BTU | 8 - USEPA EF (post-control) | 2.835 |
| ▸ VOC | 0.2 | E6BTU | 8 - USEPA EF (post-control) | 0.209999999999999 |
| ▸ CO | 1.16 | E6BTU | 8 - USEPA EF (post-control) | 1.218 |
| ▸ Benzene | 0.00445 | E6BTU | 8 - USEPA EF (post-control) | 0.0046725 |
| ▸ Formaldehyde | 0.0054 | E6BTU | 8 - USEPA EF (post-control) | 0.005669999999999 |
| ▸ Toluene | 0.00523 | E6BTU | 8 - USEPA EF (post-control) | 0.005491499999999 |

**Individual pollutant calculations for Diesel Combustion (SCC 20200402):**

# 2022 Emissions Report

In Process

## Process Emissions

| Process | Operations | **Emissions** |

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ PM25-PRI | 0.0556 | E6BTU | 8 - USEPA EF (post-control) | 0.058379999999999 |

**Pollutant Code:**
PM25-PRI - PM2.5 Primary (Filt + Cond)

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.0556

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.058379999999999

**Comment:**
0.0556 lbs PM25/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 0.06 tons PM 2.5

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ PM10-PRI | 0.0573 | E6BTU | 8 - USEPA EF (post-control) | 0.060164999999999 |

**Pollutant Code:**
PM10-PRI - PM10 Primary (Filt + Cond)

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.0573

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.060164999999999

**Comment:**
0.0573 lbs PM10/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 0.06 tons PM 10

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ SO2 | 0.025 | E6BTU | 8 - USEPA EF (post-control) | 0.026249999999999 |

**Pollutant Code:**
SO2 - Sulfur Dioxide

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.025

**Emission Factor Unit:**
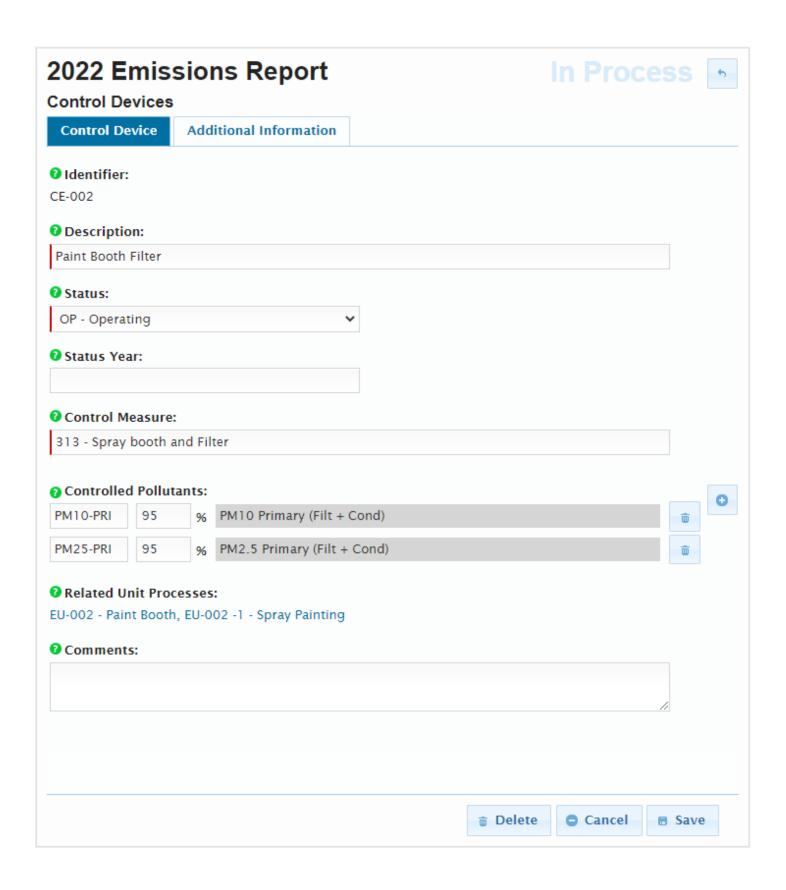E6BTU - MILLION BTUS
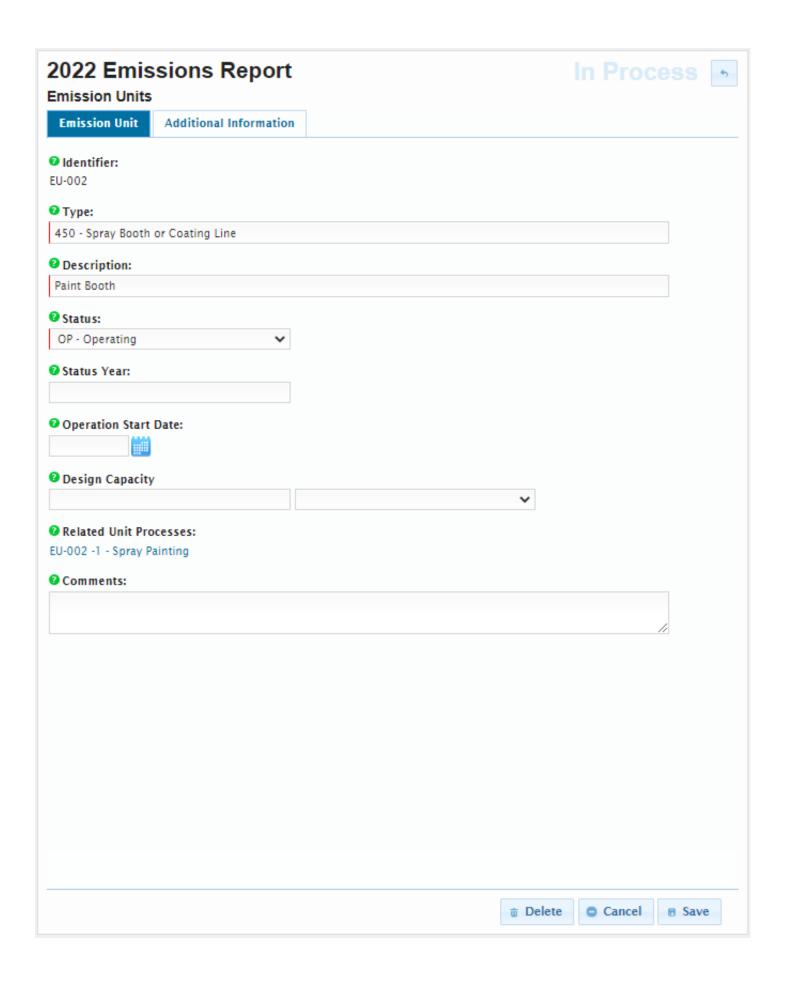
**Estimated Emissions (Tons):**
0.026249999999999

**Comment:**
EPA emissions factor is (0.05 * % sulfur) lbs/MMBtu. Low sulfur diesel is up to 0.5% sulfur 0.05 * 0.5 = 0.025 lbs/MMBtu 0.025 lbs/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 0.03 tons

## Individual pollutant calculations for Diesel Combustion (SCC 20200402) (cont'd):

| ▼ NOX | 2.7 | E6BTU | 8 - USEPA EF (post-control) | 2.835 |

**Pollutant Code:**
NOX - Nitrogen Oxides

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
2.7

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
2.835

**Comment:**
2.7 lbs/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 2.84 tons

| ▼ VOC | 0.2 | E6BTU | 8 - USEPA EF (post-control) | 0.209999999999999 |

**Pollutant Code:**
VOC - Volatile Organic Compounds

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.2

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.209999999999999

**Comment:**
0.2 lbs/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 0.21 tons

| ▼ CO | 1.16 | E6BTU | 8 - USEPA EF (post-control) | 1.218 |

**Pollutant Code:**
CO - Carbon Monoxide

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
1.16

**Emission Factor Unit:**
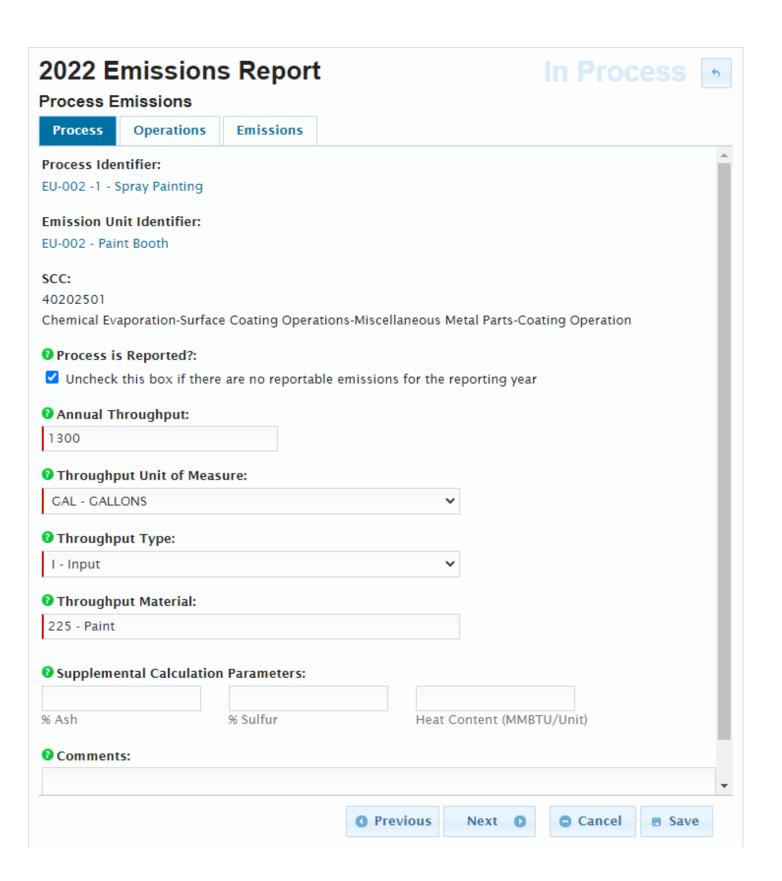E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
1.218

**Comment:**
1.16 lbs/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 1.22 tons

## Individual pollutant calculations for Diesel Combustion (SCC 20200402) (cont'd):

| | | | | |
|---|---|---|---|---|
| ▾ Benzene | 0.00445 | E6BTU | 8 - USEPA EF (post-control) | 0.0046725 |

**Pollutant Code:**
71432 - Benzene

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.00445

**Emission Factor Unit:**
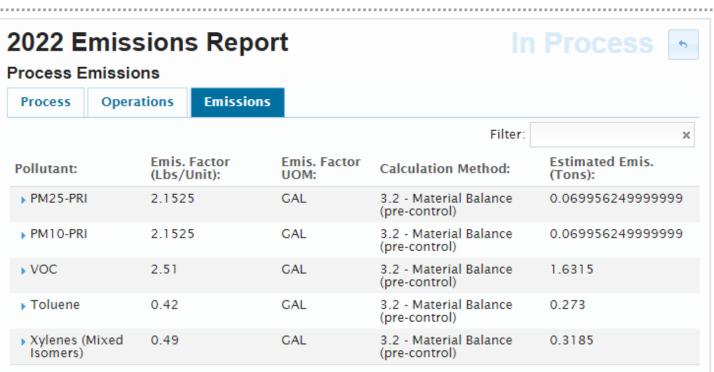E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.0046725

**Comment:**
0.00445 lbs/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 0.00 tons benzene

| | | | | |
|---|---|---|---|---|
| ▾ Formaldehyde | 0.0054 | E6BTU | 8 - USEPA EF (post-control) | 0.005669999999999 |

**Pollutant Code:**
50000 - Formaldehyde

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.0054

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.005669999999999

**Comment:**
0.0054 lbs/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 0.01 tons formaldehyde

| | | | | |
|---|---|---|---|---|
| ▾ Toluene | 0.00523 | E6BTU | 8 - USEPA EF (post-control) | 0.005491499999999 |

**Pollutant Code:**
108883 - Toluene

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.00523

**Emission Factor Unit:**
E6BTU - MILLION BTUS

**Estimated Emissions (Tons):**
0.005491499999999

**Comment:**
0.00523 lbs/MMBtu * 2,100 MMBtu * 1 ton/2,000 lbs = 0.01 tons toluene

# 2022 Emissions Report

In Process ↺

**Release Points**

| **Release Point** | Location | Additional Information |

**❓ Identifier:**
EP-001

**❓ Type:**
Vertical with Rain Cap ⌄

**❓ Description:**
Boiler Stack

**❓ Status:**
Operating ⌄

**❓ Status Year:**

**❓ Stack Height:**
35.0                                FEET

**❓ Stack Shape:**
🔘 Circular      ⭕ Rectangular

**❓ Stack Diameter:**
2.00       FEET

**❓ Exit Gas Temp:**
350                               ℉

**❓ Exit Gas Flow Rate:**
6100                              ACFM - ACTUAL CUBIC FEET PER ⌄

**❓ Exit Gas Velocity:**
1941.69031                        FPM - FEET PER MINUTE ⌄

**❓ Fence Line Distance:**
                                  FEET

**❓ Related Unit Processes:**
EU-001 - Fuel Oil Boiler, EU-001 -1 - Fuel Oil Combustion

**❓ Comments:**

# 2022 Emissions Report

In Process

## Emission Units

| Emission Unit | Additional Information |

**? Identifier:**

EU-001

**? Type:**

100 - Boiler

**? Description:**

Fuel Oil Boiler

**? Status:**

OP - Operating

**? Status Year:**

**? Operation Start Date:**

**? Design Capacity**

**? Related Unit Processes:**

EU-001 -1 - Fuel Oil Combustion

**? Comments:**

🗑 Delete        ⊖ Cancel        💾 Save

# 2022 Emissions Report

In Process

## Unit Processes

| Unit Process | Regulatory Programs | Control Approach | Release Point Apportionment |

Additional Information

**❓ Process Identifier:**

EU-001 -1

**❓ Emission Unit Identifier:**

EU-001 - Fuel Oil Boiler

**❓ SCC:**

Code:

10200502

~ or ~

| External Combustion | ▾ |
| Industrial: Boilers | ▾ |
| Distillate Oil | ▾ |
| 10-100 Million BTU/hr | ▾ |

**❓ Description:**

Fuel Oil Combustion

**❓ Status:**

OP - Operating ▾

**❓ Status Year:**

**Related Process Emission:**

EU-001 -1 - Fuel Oil Combustion

**❓ Comments:**

---

# 2022 Emissions Report

In Process

## Unit Processes

| Unit Process | Regulatory Programs | Control Approach | **Release Point Apportionment** |

Additional Information

**❓ Release Point Apportionment:**

⊕

| | Release Point | % | |
| --- | --- | --- | --- |
| ⚙ | EP-001 - Boiler Stack ▾ | 100 | 🗑 |

# 2022 Emissions Report

In Process

## Process Emissions

| **Process** | Operations | Emissions |

**Process Identifier:**

EU-001 -1 - Fuel Oil Combustion

**Emission Unit Identifier:**

EU-001 - Fuel Oil Boiler

**SCC:**

10200502

External Combustion-Industrial: Boilers-Distillate Oil-10-100 Million BTU/hr

❓ **Process is Reported?:**

☑ Uncheck this box if there are no reportable emissions for the reporting year

❓ **Annual Throughput:**

5

❓ **Throughput Unit of Measure:**

E3GAL - 1000 GALLONS ⌄

❓ **Throughput Type:**

I - Input ⌄

❓ **Throughput Material:**

IA49 - FUEL OIL

❓ **Supplemental Calculation Parameters:**

| | | |
|---|---|---|
| % Ash | % Sulfur | Heat Content (MMBTU/Unit) |

❓ **Comments:**

Next ▶    ⊖ Cancel    💾 Save

# 2022 Emissions Report

## Process Emissions

| Process | **Operations** | Emissions |
|---------|----------------|-----------|

**Average Hours/Day:**

24.00

**Average Days/Week:**

7.00

**Average Weeks/Year:**

38.00

**Actual Hours/Year:**

6384.0

**Seasonal Operations:**

| December-February | March-May | June-August |
|-------------------|-----------|-------------|
| 35.0 % | 21.7 % | 15.0 % |

**September-November**

28.3 %

---

# 2022 Emissions Report

## Process Emissions

| Process | Operations | **Emissions** |
|---------|------------|---------------|

Filter: ☒

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|------------|--------------------------|-------------------|---------------------|-------------------------|
| ▸ PM25-PRI | 1.55 | E3GAL | 8 - USEPA EF (post-control) | 0.003874999999999 |
| ▸ PM10-PRI | 2.3 | E3GAL | 8 - USEPA EF (post-control) | 0.005749999999999 |
| ▸ SO2 | 142 | E3GAL | 8 - USEPA EF (post-control) | 0.354999999999999 |
| ▸ NOX | 20 | E3GAL | 8 - USEPA EF (post-control) | 0.05 |
| ▸ VOC | 0.2 | E3GAL | 8 - USEPA EF (post-control) | 0.0005 |
| ▸ CO | 5 | E3GAL | 8 - USEPA EF (post-control) | 0.0125 |
| ▸ NH3 | 0.8 | E3GAL | 8 - USEPA EF (post-control) | 0.002 |

# 2022 Emissions Report

In Process

## Process Emissions

| Process | Operations | **Emissions** |
| --- | --- | --- |

Filter: [                    ] ✕

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
| --- | --- | --- | --- | --- |
| ▼ PM25-PRI | 1.55 | E3GAL | 8 - USEPA EF (post-control) | 0.003874999999999 |

**Pollutant Code:**
PM25-PRI - PM2.5 Primary (Filt + Cond)

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
1.55

**Emission Factor Unit:**
E3GAL - 1000 GALLONS

**Estimated Emissions (Tons):**
0.003874999999999

**Comment:**
1.55 lbs PM2.5/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.004 tons PM 2.5

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
| --- | --- | --- | --- | --- |
| ▼ PM10-PRI | 2.3 | E3GAL | 8 - USEPA EF (post-control) | 0.005749999999999 |

**Pollutant Code:**
PM10-PRI - PM10 Primary (Filt + Cond)

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
2.3

**Emission Factor Unit:**
E3GAL - 1000 GALLONS

**Estimated Emissions (Tons):**
0.005749999999999

**Comment:**
2.3 lbs PM10/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.006 tons PM 10

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
| --- | --- | --- | --- | --- |
| ▼ SO2 | 142 | E3GAL | 8 - USEPA EF (post-control) | 0.354999999999999 |

**Pollutant Code:**
SO2 - Sulfur Dioxide

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
142

**Emission Factor Unit:**
E3GAL - 1000 GALLONS

**Estimated Emissions (Tons):**
0.354999999999999

**Comment:**
142 lbs SO2/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.35 tons SO2

## Individual pollutant calculations (cont'd):

| NOX | 20 | E3GAL | 8 - USEPA EF (post-control) | 0.05 |

**Pollutant Code:**
NOX - Nitrogen Oxides

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
20

**Emission Factor Unit:**
E3GAL - 1000 GALLONS

**Estimated Emissions (Tons):**
0.05

**Comment:**
20 lbs NOx/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.05 tons NOx

| VOC | 0.2 | E3GAL | 8 - USEPA EF (post-control) | 0.0005 |

**Pollutant Code:**
VOC - Volatile Organic Compounds

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.2

**Emission Factor Unit:**
E3GAL - 1000 GALLONS

**Estimated Emissions (Tons):**
0.0005

**Comment:**
0.2 lbs VOC/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.0005 tons VOC

| CO | 5 | E3GAL | 8 - USEPA EF (post-control) | 0.0125 |

**Pollutant Code:**
CO - Carbon Monoxide

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
5

**Emission Factor Unit:**
E3GAL - 1000 GALLONS

**Estimated Emissions (Tons):**
0.0125

**Comment:**
5 lbs CO/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.0125 tons CO

| NH3 | 0.8 | E3GAL | 8 - USEPA EF (post-control) | 0.002 |

**Pollutant Code:**
NH3 - Ammonia

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.8

**Emission Factor Unit:**
E3GAL - 1000 GALLONS

**Estimated Emissions (Tons):**
0.002

**Comment:**
0.8 lbs NH3/1,000 gal * 5 1,000 gal * 1 ton/2,000 lbs = 0.8 tons NH3

# 2022 Emissions Report

**In Process**

## Release Points

| **Release Point** | Location | Additional Information |

**❓ Identifier:**

EP-003

**❓ Type:**

Vertical ▾

**❓ Description:**

Boiler Stack

**❓ Status:**

Operating ▾

**❓ Status Year:**

**❓ Stack Height:**

20.0    FEET

**❓ Stack Shape:**

◉ Circular    ○ Rectangular

**❓ Stack Diameter:**

1.50    FEET

**❓ Exit Gas Temp:**

300    °F

**❓ Exit Gas Flow Rate:**

3600    ACFM - ACTUAL CUBIC FEET PER ▾

**❓ Exit Gas Velocity:**

2037.18327    FPM - FEET PER MINUTE ▾

**❓ Fence Line Distance:**

FEET

**❓ Related Unit Processes:**

EU-003 - Natural Gas Boiler, EU-003 -1 - Natural Gas Combustion

**❓ Comments:**

# 2022 Emissions Report

## Emission Units

| **Emission Unit** | Additional Information |
|---|---|

❓ **Identifier:**

EU-003

❓ **Type:**

100 - Boiler

❓ **Description:**

Natural Gas Boiler

❓ **Status:**

OP - Operating ⌄

❓ **Status Year:**

❓ **Operation Start Date:**

📅

❓ **Design Capacity**

⌄

❓ **Related Unit Processes:**

EU-003 -1 - Natural Gas Combustion

❓ **Comments:**

🗑 Delete   ⊖ Cancel   💾 Save

# 2022 Emissions Report

**Unit Processes**

| Unit Process | Regulatory Programs | Control Approach | Release Point Apportionment |
| --- | --- | --- | --- |

**Additional Information**

**Process Identifier:**

EU-003 -1

**Emission Unit Identifier:**

EU-003 - Natural Gas Boiler

**SCC:**

Code:

10200602    ~ or ~

External Combustion ⌄

Industrial: Boilers ⌄

Natural Gas ⌄

10-100 Million BTU/hr ⌄

**Description:**

Natural Gas Combustion

**Status:**

OP - Operating ⌄

**Status Year:**

**Related Process Emission:**

EU-003 -1 - Natural Gas Combustion

**Comments:**

---

# 2022 Emissions Report

**Unit Processes**

| Unit Process | Regulatory Programs | Control Approach | Release Point Apportionment |
| --- | --- | --- | --- |

**Additional Information**

**Release Point Apportionment:**

| Release Point | % |
| --- | --- |
| EP-003 - Boiler Stack ⌄ | 100 |

# 2022 Emissions Report

## Process Emissions

| Process | Operations | Emissions |

**Process Identifier:**

EU-003 -1 - Natural Gas Combustion

**Emission Unit Identifier:**

EU-003 - Natural Gas Boiler

**SCC:**

10200602

External Combustion-Industrial: Boilers-Natural Gas-10-100 Million BTU/hr

**❓ Process is Reported?:**

☑ Uncheck this box if there are no reportable emissions for the reporting year

**❓ Annual Throughput:**

24.5

**❓ Throughput Unit of Measure:**

E6FT3 - MILLION CUBIC FEET ⌄

**❓ Throughput Type:**

I - Input ⌄

**❓ Throughput Material:**

209 - Natural Gas

**❓ Supplemental Calculation Parameters:**

| % Ash | % Sulfur | Heat Content (MMBTU/Unit) |

**❓ Comments:**

⊖ Cancel    🖫 Save

51

# 2022 Emissions Report

## Process Emissions

| Process | **Operations** | Emissions |
|---|---|---|

**❓ Average Hours/Day:**

8.00

**❓ Average Days/Week:**

5.00

**❓ Average Weeks/Year:**

52.00

**❓ Actual Hours/Year:**

2080.0

**Seasonal Operations:**

| ❓ December-February | ❓ March-May | ❓ June-August |
|---|---|---|
| 25.0 % | 25.0 % | 25.0 % |

**❓ September-November**

25.0 %

---

# 2022 Emissions Report

## Process Emissions

| Process | Operations | **Emissions** |
|---|---|---|

Filter: [          ] ×

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▸ PM25-PRI | 7.6 | E6FT3 | 8 - USEPA EF (post-control) | 0.093099999999999 |
| ▸ PM10-PRI | 7.6 | E6FT3 | 8 - USEPA EF (post-control) | 0.093099999999999 |
| ▸ SO2 | 0.6 | E6FT3 | 8 - USEPA EF (post-control) | 0.007349999999999 |
| ▸ NOX | 100 | E6FT3 | 8 - USEPA EF (post-control) | 1.225 |
| ▸ VOC | 5.5 | E6FT3 | 8 - USEPA EF (post-control) | 0.067375 |
| ▸ CO | 84 | E6FT3 | 8 - USEPA EF (post-control) | 1.029 |
| ▸ NH3 | 3.2 | E6FT3 | 8 - USEPA EF (post-control) | 0.0392 |
| ▸ Hexane | 1.8 | E6FT3 | 8 - USEPA EF (post-control) | 0.02205 |

# 2022 Emissions Report

## Process Emissions

| Process | Operations | **Emissions** |

Filter: [                    ] ✕

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
| --- | --- | --- | --- | --- |
| ▾ PM25-PRI | 7.6 | E6FT3 | 8 - USEPA EF (post-control) | 0.093099999999999 |

**Pollutant Code:**
PM25-PRI - PM2.5 Primary (Filt + Cond)

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
7.6

**Emission Factor Unit:**
E6FT3 - MILLION CUBIC FEET

**Estimated Emissions (Tons):**
0.093099999999999

**Comment:**
7.6 lbs PM2.5/MMBtu natural gas * 24.5 MMBtu * 1 ton/2,000 lbs = 0.09 tons PM 2.5

| ▾ PM10-PRI | 7.6 | E6FT3 | 8 - USEPA EF (post-control) | 0.093099999999999 |

**Pollutant Code:**
PM10-PRI - PM10 Primary (Filt + Cond)

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
7.6

**Emission Factor Unit:**
E6FT3 - MILLION CUBIC FEET

**Estimated Emissions (Tons):**
0.093099999999999

**Comment:**
7.6 lbs PM10/MMBtu natural gas * 24.5 MMBtu * 1 ton/2,000 lbs = 0.09 tons PM 10

| ▾ SO2 | 0.6 | E6FT3 | 8 - USEPA EF (post-control) | 0.007349999999999 |

**Pollutant Code:**
SO2 - Sulfur Dioxide

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.6

**Emission Factor Unit:**
E6FT3 - MILLION CUBIC FEET

**Estimated Emissions (Tons):**
0.007349999999999

**Comment:**

## Individual pollutant calculations (cont'd):

| NOX | 100 | E6FT3 | 8 - USEPA EF (post-control) | 1.225 |

**Pollutant Code:**
NOX - Nitrogen Oxides

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
100

**Emission Factor Unit:**
E6FT3 - MILLION CUBIC FEET

**Estimated Emissions (Tons):**
1.225

**Comment:**

| VOC | 5.5 | E6FT3 | 8 - USEPA EF (post-control) | 0.067375 |

**Pollutant Code:**
VOC - Volatile Organic Compounds

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
5.5

**Emission Factor Unit:**
E6FT3 - MILLION CUBIC FEET

**Estimated Emissions (Tons):**
0.067375

**Comment:**

| CO | 84 | E6FT3 | 8 - USEPA EF (post-control) | 1.029 |

**Pollutant Code:**
CO - Carbon Monoxide

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
84

**Emission Factor Unit:**
E6FT3 - MILLION CUBIC FEET

**Estimated Emissions (Tons):**
1.029

**Comment:**

# 2022 Emissions Report

In Process ↺

**Release Points**

| **Release Point** | Location | Additional Information |

❓ **Identifier:**

EP-002

❓ **Type:**

Vertical with Rain Cap ▾

❓ **Description:**

Paint Booth Stack

❓ **Status:**

Operating ▾

❓ **Status Year:**

❓ **Stack Height:**

18.0        FEET

❓ **Stack Shape:**

🔘 Circular    ⭘ Rectangular

❓ **Stack Diameter:**

2.50      FEET

❓ **Exit Gas Temp:**

68        °F

❓ **Exit Gas Flow Rate:**

18000        ACFM - ACTUAL CUBIC FEET PER ▾

❓ **Exit Gas Velocity:**

3666.92989        FPM - FEET PER MINUTE ▾

❓ **Fence Line Distance:**

FEET

❓ **Related Unit Processes:**

EU-002 - Paint Booth, EU-002 -1 - Spray Painting

❓ **Comments:**

# 2022 Emissions Report

**In Process** ↺

## Control Devices

| **Control Device** | **Additional Information** |
|---|---|

❓ **Identifier:**

CE-002

❓ **Description:**

Paint Booth Filter

❓ **Status:**

OP - Operating ⌄

❓ **Status Year:**

❓ **Control Measure:**

313 - Spray booth and Filter

❓ **Controlled Pollutants:** ⊕

| PM10-PRI | 95 | % | PM10 Primary (Filt + Cond) | 🗑 |
| PM25-PRI | 95 | % | PM2.5 Primary (Filt + Cond) | 🗑 |

❓ **Related Unit Processes:**

EU-002 - Paint Booth, EU-002 -1 - Spray Painting

❓ **Comments:**

🗑 **Delete**    ⊖ **Cancel**    💾 **Save**

# 2022 Emissions Report

**In Process** ↰

## Emission Units

**Emission Unit** | Additional Information

❓ **Identifier:**
EU-002

❓ **Type:**
450 - Spray Booth or Coating Line

❓ **Description:**
Paint Booth

❓ **Status:**
OP - Operating ▾

❓ **Status Year:**

❓ **Operation Start Date:**
📅

❓ **Design Capacity**
▾

❓ **Related Unit Processes:**
EU-002 -1 - Spray Painting

❓ **Comments:**

🗑 Delete    ⊖ Cancel    💾 Save

# 2022 Emissions Report

## Unit Processes

| Unit Process | Regulatory Programs | Control Approach | Release Point Apportionment |
| --- | --- | --- | --- |

**Additional Information**

**❓ Process Identifier:**

EU-002 -1

**❓ Emission Unit Identifier:**

EU-002 - Paint Booth

**❓ SCC:**

**Code:**

| 40202501 | ~ or ~ | Chemical Evaporation ⌄ |
| | | Surface Coating Operations ⌄ |
| | | Miscellaneous Metal Parts ⌄ |
| | | Coating Operation ⌄ |

**❓ Description:**

Spray Painting

**❓ Status:**

OP - Operating ⌄

**❓ Status Year:**

**Related Process Emission:**

EU-002 -1 - Spray Painting

# 2022 Emissions Report

In Process ↩

## Unit Processes

| Unit Process | Regulatory Programs | **Control Approach** | Release Point Apportionment |
|---|---|---|---|

| Additional Information |
|---|

❓ Not Controlled?:

☐

❓ Control Approach Description :

[                                        ]

**Control Devices**

⊕

❓ Control Device:

⚙ [ CE-002 - Paint Booth Filter      ⌄ ]  🗑

---

# 2022 Emissions Report

In Process ↩

## Unit Processes

| Unit Process | Regulatory Programs | Control Approach | **Release Point Apportionment** |
|---|---|---|---|

| Additional Information |
|---|

❓ Release Point Apportionment:

⊕

| | Release Point | % | |
|---|---|---|---|
| ⚙ | [ EP-002 - Paint Booth St ⌄ ] | [ 100 ] | 🗑 |

# 2022 Emissions Report

**In Process** ↩

## Process Emissions

| Process | Operations | Emissions |
|---|---|---|

**Process Identifier:**

EU-002 -1 - Spray Painting

**Emission Unit Identifier:**

EU-002 - Paint Booth

**SCC:**

40202501

Chemical Evaporation-Surface Coating Operations-Miscellaneous Metal Parts-Coating Operation

**? Process is Reported?:**

☑ Uncheck this box if there are no reportable emissions for the reporting year

**? Annual Throughput:**

1300

**? Throughput Unit of Measure:**

GAL - GALLONS ⌄

**? Throughput Type:**

I - Input ⌄

**? Throughput Material:**

225 - Paint

**? Supplemental Calculation Parameters:**

| | | |
|---|---|---|
| % Ash | % Sulfur | Heat Content (MMBTU/Unit) |

**? Comments:**

◀ Previous  Next ▶  ⊖ Cancel  🖫 Save

# 2022 Emissions Report

**In Process** ↩

## Process Emissions

| Process | **Operations** | Emissions |

**❓ Average Hours/Day:**

8.00

**❓ Average Days/Week:**

5.00

**❓ Average Weeks/Year:**

52.00

**❓ Actual Hours/Year:**

2080.0

**Seasonal Operations:**

| ❓ December-February | ❓ March-May | ❓ June-August |
|---|---|---|
| 25.0 % | 25.0 % | 25.0 % |

**❓ September-November**

25.0 %

---

# 2022 Emissions Report

**In Process** ↩

## Process Emissions

| Process | Operations | **Emissions** |

Filter: ⬚ ✕

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▸ PM25-PRI | 2.1525 | GAL | 3.2 - Material Balance (pre-control) | 0.069956249999999 |
| ▸ PM10-PRI | 2.1525 | GAL | 3.2 - Material Balance (pre-control) | 0.069956249999999 |
| ▸ VOC | 2.51 | GAL | 3.2 - Material Balance (pre-control) | 1.6315 |
| ▸ Toluene | 0.42 | GAL | 3.2 - Material Balance (pre-control) | 0.273 |
| ▸ Xylenes (Mixed Isomers) | 0.49 | GAL | 3.2 - Material Balance (pre-control) | 0.3185 |

# 2022 Emissions Report

## Process Emissions

| Process | Operations | **Emissions** |

Filter: [ ] ✕

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ PM25-PRI | 2.1525 | GAL | 3.2 - Material Balance (pre-control) | 0.069956249999999 |

**Pollutant Code:**
PM25-PRI - PM2.5 Primary (Filt + Cond)

**Calculation Method:**
3.2 - Material Balance (pre-control)

**Emission Factor (Lbs/Unit):**
2.1525

**Emission Factor Unit:**
GAL - GALLONS

**Estimated Emissions (Tons):**
0.069956249999999

**Overall Control Efficiency (%):**
95%

**Comment:**
PM2.5 emissions factor includes 65% transfer efficiency 6.15 lbs solids/gal * (1-0.65 transfer efficiency) = 2.1525 lbs/gal 2.1525 lbs/gal * 1,300 gal * (1-0.95 control efficiency) * 1 ton/2,000 lbs = 0.07 tons PM 2.5

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ PM10-PRI | 2.1525 | GAL | 3.2 - Material Balance (pre-control) | 0.069956249999999 |

**Pollutant Code:**
PM10-PRI - PM10 Primary (Filt + Cond)

**Calculation Method:**
3.2 - Material Balance (pre-control)

**Emission Factor (Lbs/Unit):**
2.1525

**Emission Factor Unit:**
GAL - GALLONS

**Estimated Emissions (Tons):**
0.069956249999999

**Overall Control Efficiency (%):**
95%

**Comment:**
PM10 emissions factor includes 65% transfer efficiency 6.15 lbs solids/gal * (1-0.65 transfer efficiency) = 2.1525 lbs/gal 2.1525 lbs/gal * 1,300 gal * (1-0.95 control efficiency) * 1 ton/2,000 lbs = 0.07 tons PM 10

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ VOC | 2.51 | GAL | 3.2 - Material Balance (pre-control) | 1.6315 |

**Pollutant Code:**
VOC - Volatile Organic Compounds

**Calculation Method:**
3.2 - Material Balance (pre-control)

**Emission Factor (Lbs/Unit):**
2.51

**Emission Factor Unit:**
GAL - GALLONS

**Estimated Emissions (Tons):**
1.6315

**Overall Control Efficiency (%):**
0%

**Comment:**
There are no controls for VOC 2.51 lbs VOC/gal * 1,300 gal * 1 ton/2,000 lbs = 1.63 tons

## Individual pollutant calculations (cont'd):

| ▼ Toluene | 0.42 | GAL | 3.2 - Material Balance (pre-control) | 0.273 |
|---|---|---|---|---|

**Pollutant Code:**
108883 - Toluene

**Calculation Method:**
3.2 - Material Balance (pre-control)

**Emission Factor (Lbs/Unit):**
0.42

**Emission Factor Unit:**
GAL - GALLONS

**Estimated Emissions (Tons):**
0.273

**Overall Control Efficiency (%):**
0%

**Comment:**

| ▼ Xylenes (Mixed Isomers) | 0.49 | GAL | 3.2 - Material Balance (pre-control) | 0.3185 |
|---|---|---|---|---|

**Pollutant Code:**
1330207 - Xylenes (Mixed Isomers)

**Calculation Method:**
3.2 - Material Balance (pre-control)

**Emission Factor (Lbs/Unit):**
0.49

**Emission Factor Unit:**
GAL - GALLONS

**Estimated Emissions (Tons):**
0.3185

**Overall Control Efficiency (%):**
0%

**Comment:**

# 2022 Emissions Report

**In Process** ↩

## Release Points

| **Release Point** | Location | Additional Information |
|---|---|---|

❓ **Identifier:**

EP-003

❓ **Type:**

Horizontal ▾

❓ **Description:**

Welding Vent

❓ **Status:**

Operating ▾

❓ **Status Year:**

❓ **Stack Height:**

12.0    FEET

❓ **Stack Shape:**

○ Circular    ◉ Rectangular

❓ **Stack Opening Length:**    ❓ **Stack Opening Width:**

0.67      0.83

FEET      FEET

**Equivalent Diameter:**

0.84 FEET

❓ **Exit Gas Temp:**

68    °F

❓ **Exit Gas Flow Rate:**

900    ACFM - ACTUAL CUBIC FEET PER ▾

❓ **Exit Gas Velocity:**

1624.03003    FPM - FEET PER MINUTE ▾

❓ **Fence Line Distance:**

   FEET

❓ **Related Unit Processes:**

EU-003 - Welding, EU-003 -1 - GMAW

# 2022 Emissions Report

## Emission Units

**Emission Unit** | Additional Information

**❓ Identifier:**

EU-003

**❓ Type:**

690 - Other process equipment

**❓ Description:**

Welding

**❓ Status:**

OP - Operating

**❓ Status Year:**

**❓ Operation Start Date:**

**❓ Design Capacity**

**❓ Related Unit Processes:**

EU-003 -1 - GMAW

**❓ Comments:**

🗑 Delete  ⊖ Cancel  💾 Save

65

# 2022 Emissions Report

## Unit Processes

**Unit Process** | Regulatory Programs | Control Approach | Release Point Apportionment

Additional Information

**❓ Process Identifier:**
EU-003 -1

**❓ Emission Unit Identifier:**
EU-003 - Welding

**❓ SCC:**

| Code: | ~ or ~ | Industrial Processes ⌄ |
|---|---|---|
| 30905212 | | Fabricated Metal Products ⌄ |
| | | Gas Metal Arc Welding (GMAW) ⌄ |
| | | E308l Electrode ⌄ |

**❓ Description:**
GMAW

**❓ Status:**
OP - Operating ⌄

**❓ Status Year:**

**Related Process Emission:**
EU-003 -1 - GMAW

---

# 2022 Emissions Report

## Unit Processes

Unit Process | Regulatory Programs | Control Approach | **Release Point Apportionment**

Additional Information

**❓ Release Point Apportionment:** ⊕

| | Release Point | % | |
|---|---|---|---|
| ⚙ | EP-003 - Welding Vent ⌄ | 100 | 🗑 |

# 2022 Emissions Report

## Process Emissions

| Process | Operations | Emissions |

**Process Identifier:**

EU-003 -1 - GMAW

**Emission Unit Identifier:**

EU-003 - Welding

**SCC:**

30905212

Industrial Processes-Fabricated Metal Products-Gas Metal Arc Welding (GMAW)-E308l Electrode

❓ **Process is Reported?:**

☑ Uncheck this box if there are no reportable emissions for the reporting year

❓ **Annual Throughput:**

40

❓ **Throughput Unit of Measure:**

E3LB - 1000 POUNDS ⌄

❓ **Throughput Type:**

I - Input ⌄

❓ **Throughput Material:**

77 - Electrode

❓ **Supplemental Calculation Parameters:**

|  |  |  |
| % Ash | % Sulfur | Heat Content (MMBTU/Unit) |

❓ **Comments:**

Electrode E308

⊖ Cancel | 🖫 Save

# 2022 Emissions Report

## Process Emissions

| Process | **Operations** | Emissions |
|---------|----------------|-----------|

❓ **Average Hours/Day:**

8.00

❓ **Average Days/Week:**

6.00

❓ **Average Weeks/Year:**

52.00

❓ **Actual Hours/Year:**

2496.0

**Seasonal Operations:**

| ❓ December-February | ❓ March-May | ❓ June-August |
|---|---|---|
| 25.0 % | 25.0 % | 25.0 % |

❓ **September-November**

25.0 %

---

# 2022 Emissions Report

## Process Emissions

| Process | Operations | **Emissions** |
|---------|------------|---------------|

Filter: [_____] ✕

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▸ PM25-PRI | 5.4 | E3LB | 8 - USEPA EF (post-control) | 0.107999999999999 |
| ▸ PM10-PRI | 5.4 | E3LB | 8 - USEPA EF (post-control) | 0.107999999999999 |
| ▸ Chromium Compounds | 0.524 | E3LB | 8 - USEPA EF (post-control) | 0.010479999999999 |
| ▸ Manganese Compounds | 0.346 | E3LB | 8 - USEPA EF (post-control) | 0.006919999999999 |
| ▸ Nickel | 0.184 | E3LB | 8 - USEPA EF (post-control) | 0.003679999999999 |

# 2022 Emissions Report

## Process Emissions

| Process | Operations | **Emissions** |

Filter: [                ] ✕

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ PM25-PRI | 5.4 | E3LB | 8 - USEPA EF (post-control) | 0.107999999999999 |

**Pollutant Code:**
PM25-PRI - PM2.5 Primary (Filt + Cond)

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
5.4

**Emission Factor Unit:**
E3LB - 1000 POUNDS

**Estimated Emissions (Tons):**
0.107999999999999

**Comment:**
5.4 lbs PM2.5/1,000 lbs electrode * 40 1,000 lbs * 1 ton/2,000 lbs = 0.11 tons PM 2.5

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ PM10-PRI | 5.4 | E3LB | 8 - USEPA EF (post-control) | 0.107999999999999 |

**Pollutant Code:**
PM10-PRI - PM10 Primary (Filt + Cond)

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
5.4

**Emission Factor Unit:**
E3LB - 1000 POUNDS

**Estimated Emissions (Tons):**
0.107999999999999

**Comment:**
5.4 lbs PM10/1,000 lbs electrode * 40 1,000 lbs * 1 ton/2,000 lbs = 0.11 tons PM 10

| Pollutant: | Emis. Factor (Lbs/Unit): | Emis. Factor UOM: | Calculation Method: | Estimated Emis. (Tons): |
|---|---|---|---|---|
| ▾ Chromium Compounds | 0.524 | E3LB | 8 - USEPA EF (post-control) | 0.010479999999999 |

**Pollutant Code:**
7440473 - Chromium Compounds

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.524

**Emission Factor Unit:**
E3LB - 1000 POUNDS

**Estimated Emissions (Tons):**
0.010479999999999

**Comment:**

## Individual pollutant calculations (cont'd):

| Manganese Compounds | 0.346 | E3LB | 8 - USEPA EF (post-control) | 0.006919999999999 |
|---|---|---|---|---|

**Pollutant Code:**
7439965 - Manganese Compounds

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.346

**Emission Factor Unit:**
E3LB - 1000 POUNDS

**Estimated Emissions (Tons):**
0.006919999999999

**Comment:**

| Nickel | 0.184 | E3LB | 8 - USEPA EF (post-control) | 0.003679999999999 |
|---|---|---|---|---|

**Pollutant Code:**
7440020 - Nickel

**Calculation Method:**
8 - USEPA EF (post-control)

**Emission Factor (Lbs/Unit):**
0.184

**Emission Factor Unit:**
E3LB - 1000 POUNDS

**Estimated Emissions (Tons):**
0.003679999999999

**Comment:**

## Appendices

**APPENDIX A: Air Quality Glossary**

***ACFM*** Actual cubic feet per minute. A measurement of exhaust rate from a release point.

***Act*** refers to the 1990 Clean Air Act Amendments

***Actual Emissions*** are the actual rate of emissions of a pollutant from an emission unit calculated using the emission unit's actual operating hours, production rates, and types of materials processed, stored, or combusted for the calendar year.

***Annual Throughput*** is the quantity of raw material processed, handled, or used in an emission unit, such as fuels, solvents, coatings, or quantity of dust-producing material processed, handled, or transferred.

***Air Pollutant*** is generally any substance in the air not part of the naturally occurring makeup of ambient air or that occurs in un-natural concentrations. In Iowa, this usually refers to hazardous air pollutants and criteria air pollutants.

***Allowable Emissions*** is the emissions rate that represents a limit on the emissions that can occur from an emissions unit. This limit may be based on a federal, state, or local regulatory emission limit determined from state or local regulations and/or 40 Code of Federal Regulations (CFR).

***Ambient Standards*** limit the concentration of a given pollutant in the ambient air. Ambient standards are not emissions limitations on sources, but usually result in such limits being placed on source operation as part of a control strategy to achieve or maintain an ambient standard.

***Ammonia*** is a colorless gas with a very distinct odor. Ammonia emissions are important to air quality analyses because ammonia is involved in the formation of sulfate and nitrate, which are precursors for $PM_{2.5}$. Only primary ammonia needs to be reported. Primary ammonia means it is in the same chemical form as when it was emitted into the atmosphere. Secondary ammonia, such as ammonium sulfate and ammonium nitrate, is formed by chemical reactions in the atmosphere.

***Attainment Area*** is an area considered to have air quality as good as or better than the National Ambient Air Quality Standards (NAAQS) as defined in the Act. An area may be in attainment for one or more pollutants but be a nonattainment area for one or more other pollutants.

***Capture Efficiency*** is the percentage of pollutant emitted from an emission unit that is caught or captured by a pickup hood or other collection mechanism. An example is a fume hood.

***Carbon Monoxide (CO)*** is a colorless, odorless gas that depletes the oxygen-carrying capacity of blood. Example sources of CO emissions include industrial boilers, incinerators, and motor vehicles.

***CAS Number*** refers to the Chemical Abstract Services number. CAS numbers are often found on Safety Data Sheets and are sometimes used as a way to identify air pollutants.

***CFR*** is the Code of Federal Regulations. This is a book of rules published by the federal government. Title 40 of the CFR pertains to Protection of the Environment.

***Continuous Emissions Monitoring*** Equipment that measures the concentration or emission rate of a gas or particulate matter using analyzer measurements and a conversion equation, graph, or computer program. Installation and operation of a CEM may be required by EPA or DNR in order to determine compliance with specific standards. Operation

of a CEM must meet performance specifications, certification procedures, and recordkeeping and reporting requirements as specified in applicable regulations.

*Construction Permits* are permits required before installing or altering equipment or control equipment, with a goal of prevention of significant deterioration or degrading of clean air areas from new industrial development or expansion.

*Control Efficiency* is the emission reduction efficiency, and is a percentage value representing the amount of emissions that are controlled by a control device.

*Criteria Pollutant* refers to a pollutant for which a National Ambient Air Quality Standard has been set. Criteria pollutants are carbon monoxide, lead, nitrogen oxides, ozone, particulate matter with aerodynamic diameter less than or equal to 10 micrometers or less than or equal to 2.5 micrometers, and sulfur dioxide.

*Dual Fuel* refers to fuel burned at a ratio of 95% natural gas and 5% diesel fuel.

*Emergency Generator* …any generator of which the sole function is to provide emergency backup power during an interruption of electrical power from the electrical utility. An emergency generator does not include peaking units at electrical utilities, generators at industrial facilities that typically operate at low rates, but are not confined to emergency purposes; or any standby generators that are used during times when power is available from the electric utility. An emergency is an unforeseeable condition that is beyond the control of the owner or operator.

*Emission* means pollution discharged into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities; from residential chimneys; and from motor vehicle, locomotive, aircraft, or other nonroad engines.

*Emission Factors* The relationship between the amount of pollution produced and the amount of raw material processed. For example – pounds of CO per ton of coal fired.

*Emission Inventory* is a listing, by source, of the amount of air pollutants discharged into the atmosphere.

*Emission Limits* are limits on emissions that may be federally enforceable and exist in a permit. Such limits are usually expressed as a rate, generally in pounds per hour of emissions or as a concentration such as grains per dry standard cubic foot (7,000 grains is one pound).

*Emission point* is the point where emissions enter the atmosphere such as stacks, vents and ventilation exhausts. The term emission point is used interchangeably with release point.

*Emission Unit* is a piece of equipment where emissions are generated. Emission units may have one or more processes with actual emissions. Some examples of an emission unit with one or more processes are boilers (the ability to burn both natural gas and fuel oil), generators (the ability to burn both fuel oil and dual fuel), and grain dryers (the ability to dry grain and burn natural gas).

*Engineering Estimate* is a term commonly applied to the best approximation that can be made when the specific emission estimation techniques such as stack testing, material balance, or emission factors are not available. This estimation is usually made by an engineer familiar with the specific process, and is based on process information.

*Federally Enforceable* means all limitations and conditions that are enforceable by the administrator including, but not limited to, the requirements of new source performance standards, national emission standards for hazardous air pollutants, state rules, administrative orders, construction permits, and operating permits.

*Fugitive Emissions* are emissions that cannot reasonably pass through a stack, chimney, duct, vent or other opening. Fugitive emission sources can include haul roads, exposed storage piles, and wastewater retention ponds, etc.

*HAP or Hazardous Air Pollutants* are any of the 188 pollutants listed in Section 112 of the 1990 Clean Air Act Amendments. HAPs are known or suspected of being toxic or carcinogenic.

*Indirect Heating* occurs when the material being heated does not come in direct contact with the combustion gas, such as a hot water boiler.

*Iowacleanair.gov* is the web site for the DNR's Air Quality Bureau with forms, assistance and guidance data.

*MMcf* equals 1,000,000 cubic feet. This unit of measure is most typically associated with the amount of natural gas combusted.

*Material Balance or Mass Balance* A process of estimating emissions using knowledge of the process, process rate, material used, and material properties.

*Manually Operated Equipment* means a machine or tool that is hand-held, such as a hand-held circular saw or compressed air chisel; a machine or tool for which the work piece is held or manipulated by hand, such as a bench grinder; a machine or tool for which the tool or bit is manipulated by hand, such as a lathe or drill press; any dust collection system which is part of such machine or tool; but not including any machine or tool for which the extent of manual operation is to control power to the machine or tool and not including any central dust collection system serving more than one machine or tool.

*MACT or Maximum Achievable Control Technology* are standards set under Title III of the 1990 Clean Air Act Amendments with an emphasis on control of hazardous air pollutants.

*Maximum Hourly Design Rate* is the highest amount of raw material processed or production achieved per hour based on manufacturer's data.

*Maximum True Vapor Pressure* means the equilibrium partial pressure of the material considering 1) for a material stored at ambient temperature, the maximum monthly average temperature as reported by the National Weather Service, or 2) for a material stored above or below the ambient temperature, the temperature equal to the highest calendar-month average of the material storage temperature.


*National Ambient Air Quality Standards (NAAQS)* are the ambient standards for the following six criteria pollutants: carbon monoxide, lead, nitrogen oxides, ozone, sulfur dioxide, and particulate matter with an aerodynamic diameter less than or equal to 10 micrometers or less than or equal to 2.5 micrometers.

*National Emission Standards for Hazardous Air Pollutants (NESHAP)* are health-based standards set under the 1970 Clean Air Act for beryllium, mercury, vinyl chloride, benzene, arsenic, asbestos, radon, radionuclides and other HAPs. Under the 1990 Act, roughly 170 source categories are identified for eventual MACT regulations. See MACT definition on this page above. The NESHAPs are published in 40 CFR Parts 61 and 63.

*New Source Performance Standards (NSPS)* are promulgated for criteria, hazardous, and other pollutant emissions from new, modified, or reconstructed sources that the U.S. EPA determines contribute significantly to air pollution. These are typically emission standards, but may be expressed in other forms such as concentration and opacity. The NSPS are published in 40 CFR Part 60.

*Nitrogen Oxides (NOx)* are a class of compounds that are respiratory irritants that react with volatile organic compounds (VOC's) in the presence of sunlight to form Ozone. NOx compounds are also precursors to acid rain. Motor vehicles, power plants, and other stationary combustion facilities emit large quantities of NOx.

*North American Industrial Classification System (NAICS)* A North American system for classifying industries by a six-digit code. This six-digit hierarchical structure allows greater coding flexibility than the four-digit structure of the SIC.

***Opacity*** means the degree to which emissions reduce the transmission of light and obscure the view of an object in the background. Opacity can be measured by properly trained observers. The validity of such measurements has been well established in the courts, including the U.S. Supreme Court. DNR field inspectors often take opacity readings during inspections.

***Operating Permits*** are permits required by Title V of the 1990 Act for major sources. Operating permits are for the facility as a whole and differ from construction permits, which are issued for individual release points.

***Overall Control Efficiency*** is obtained by multiplying the capture efficiency by the control equipment's control efficiency to provide the overall control efficiency for reporting emissions.

***Ozone (O3)*** is a colorless gas that damages lungs and can damage materials and vegetation. It is the primary constituent of smog, and is formed primarily when nitrogen oxides (NOx) and volatile organic compounds (VOCs) react in the presence of sunlight.

***Particulate Matter of aerodynamic diameter less than or equal to 10 micrometers (PM10)*** is a measure of small solid matter suspended in the atmosphere. Small particles can penetrate deeply into the lung where they can cause respiratory problems. Emissions of PM-10 are significant from fugitive dust, power plants, commercial boilers, metallurgical industries, mineral industries, fires, and motor vehicles.

***Particulate Matter of aerodynamic diameter less than or equal to 2.5 micrometers (PM2.5)*** is another measure of small solid matter suspended in the atmosphere. Primary PM-2.5 results largely from combustion of fossil fuels or biomass, although selected industrial processes can also be significant in some areas. The sources of PM-2.5 include, but are not limited to, gasoline and diesel exhaust, wood stoves and fireplaces, land clearing, wildland prescribed burning, and wild fires. Sources of primary particulate including fugitive emissions from paved and unpaved roads, dust from ore processing and refining, and to a lesser extent, crustal material from construction activities, agricultural tilling, wind erosion and other crustal sources are less important based on their relatively small contribution to ambient PM-2.5 concentrations. The condensable components are largely made up of semi-volatile organic compounds that condense at ambient temperature to form aerosol.

***Release Point*** is the point where emissions enter the atmosphere such as stacks, vents and ventilation exhausts. The term release point is used interchangeably with emission point.

***Reported Emissions*** are emissions estimates that are submitted to a regulatory agency. Emissions inventories are used for a variety of purposes such as planning pollution control programs, promoting compliance with laws and regulations, and conducting permit reviews.

***SDS or Safety Data Sheets*** are an information source with details about chemical substances such as chemical composition and other environmental information. SDS can be a useful source of emissions information and are available for all chemical substances from the supplier of the material.

***Source Classification Codes (SCCs)*** are codes defined by EPA that classify air emissions sources by individual processes and/or operations.

***Stack Tests*** A test that measures the concentration of pollutants in the exhaust stack. Measurements are performed following procedures specified and developed by the US EPA and/or DNR. Such testing is required by DNR to be conducted by various stationary sources to determine compliance with applicable air emissions limits.

***SCFM*** Standard cubic feet per minute. A measurement of exhaust rate from a release point.

***Standard Industrial Classification (SIC)*** A United States government system for classifying industries by a four-digit code.

***SLEIS*** State and Local Emissions Inventory System. SLEIS is the online emissions inventory reporting tool.

***State Implementation Plan (SIP)*** is a state plan approved by EPA for the establishment, regulation, and enforcement of air pollution standards.

***Stationary Source*** is any building, structure, facility or installation that emits or may emit any air pollutant subject to regulation under the Clean Air Act. It includes all pollutant-emitting activities which belong in the same major industrial grouping as identified by the first two digits in the facilities SIC code, are located on one or more contiguous or adjacent properties and are under common ownership or control. Mobile sources such as cars, trains, and forklifts are not regulated by DNR.

***Sulfur Oxides (SOx)*** are a class of colorless, pungent gases that are respiratory irritants and precursors to acid rain. Sulfur oxides are emitted from various combustion or incineration sources, particularly from coal combustion.

***Tertiary-Butyl Acetate (TBAC)*** is a pollutant common to surface coating operations that is neither a VOC nor a HAP. However, EPA still requires that TBAC emissions be reported on the emissions inventory as an "additional pollutant."

***Threshold*** is a level of emissions that once reached, triggers requirements to obtain a permit or report emissions.

***Transfer Efficiency*** is the percentage of sprayed material such as paint or solvent that is actually adhered to the intended surface.

***Twelve-Month Rolling Period*** is a period of 12 consecutive months determined on a rolling basis.

***Volatile Organic Compounds (VOCs)*** are organic compounds that contribute to ground-level ozone or smog formation. Ground level ozone is a strong lung oxidant. Large amounts of VOCs are emitted from fuel distribution, chemical manufacturing, motor vehicles, and a wide variety of industrial, commercial, and consumer solvent uses.

***1000gal*** equals 1,000 gallons. This unit of measure is most typically associated with the amount of fuel oil or LPG combusted.

**APPENDIX B: List of Criteria Pollutants, Chemicals Not Considered VOCs, and Hazardous Air Pollutants**

## Criteria Pollutants

$PM_{2.5}$........................................ Particulate Matter less than or equal to 2.5 micrometers in diameter
$PM_{10}$ ....................................... Particulate Matter less than or equal to 10 micrometers in diameter
$SO_2$........................................... Sulfur Dioxide
$NO_x$.......................................... Nitrogen Oxides
VOC ......................................... Volatile Organic Compound
CO .......................................... Carbon Monoxide
Pb ........................................... Lead

Chemicals Not Considered Volatile Organic Compounds (VOCs) – from paragraphs 40 CFR 51.100 (s):

(1) This includes any such organic compound other than the following, which have been determined to have negligible photochemical reactivity: Methane; ethane; methylene chloride (dichloromethane); 1,1,1-trichloroethane (methyl chloroform); 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113); trichlorofluoromethane (CFC-11); dichlorodifluoromethane (CFC-12); chlorodifluoromethane (HCFC-22); trifluoromethane (HFC-23); 1,2-dichloro 1,1,2,2-tetrafluoroethane (CFC-114); chloropentafluoroethane (CFC-115); 1,1,1-trifluoro 2,2-dichloroethane (HCFC-123); 1,1,1,2-tetrafluoroethane (HFC-134a); 1,1-dichloro 1-fluoroethane (HCFC-141b); 1-chloro 1,1-difluoroethane (HCFC-142b); 2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124); pentafluoroethane (HFC-125); 1,1,2,2-tetrafluoroethane (HFC-134); 1,1,1-trifluoroethane (HFC-143a); 1,1-difluoroethane (HFC-152a); parachlorobenzotrifluoride (PCBTF); cyclic, branched, or linear completely methylated siloxanes; acetone; perchloroethylene (tetrachloroethylene); 3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca); 1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb); 1,1,1,2,3,4,4,5,5,5-decafluoropentane (HFC 43-10mee); difluoromethane (HFC-32); ethylfluoride (HFC-161); 1,1,1,3,3,3-hexafluoropropane (HFC-236fa); 1,1,2,2,3-pentafluoropropane (HFC-245ca); 1,1,2,3,3-pentafluoropropane (HFC-245ea); 1,1,1,2,3-pentafluoropropane (HFC-245eb); 1,1,1,3,3-pentafluoropropane (HFC-245fa); 1,1,1,2,3,3-hexafluoropropane (HFC-236ea); 1,1,1,3,3-pentafluorobutane (HFC-365mfc); chlorofluoromethane (HCFC-31); 1 chloro-1-fluoroethane (HCFC-151a); 1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a); 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-butane ($C_4F_9OCH_3$ or HFE-7100); 2-(difluoromethoxymethyl)-1,1,1,2,3,3,3-heptafluoropropane (($CF_3$)$_2$CFCF$_2$OCH$_3$); 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane ($C_4F_9OC_2H_5$ or HFE-7200); 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane (($CF_3$)$_2$CFCF$_2$OC$_2$H$_5$); methyl acetate; 1,1,1,2,2,3,3-heptafluoro-3-methoxy-propane (n-C3F7OCH3, HFE-7000); 3-ethoxy-1,1,1,2,3,4,4,5,6,6,6-dodecafluoro-2-(trifluoromethyl) hexane (HFE-7500); 1,1,1,2,3,3,3-heptafluoropropane (HFC 227ea); methyl formate (HCOOCH3); 1,1,1,2,2,3,4,5,5,5-decafluoro-3-methoxy-4-trifluoromethyl-pentane (HFE-7300); propylene carbonate; dimethyl carbonate; *trans*-1,3,3,3-tetrafluoropropene; HCF$_2$OCF$_2$H (HFE-134); HCF$_2$OCF$_2$OCF$_2$H (HFE-236cal2); HCF$_2$OCF$_2$CF$_2$OCF$_2$H (HFE-338pcc13); HCF$_2$OCF$_2$OCF$_2$CF$_2$OCF$_2$H (H-Galden 1040x or H-Galden ZT 130 (or 150 or 180)); *trans* 1-chloro-3,3,3-trifluoroprop-1-ene; 2,3,3,3-tetrafluoropropene; 2-amino-2-methyl-1-propanol; t-butyl acetate; 1,1,2,2- Tetrafluoro -1-(2,2,2-trifluoroethoxy) ethane; and perfluorocarbon compounds which fall into these classes:
(i) Cyclic, branched, or linear, completely fluorinated alkanes;
(ii) Cyclic, branched, or linear, completely fluorinated ethers with no unsaturations;
(iii) Cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations; and
(iv) Sulfur containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine.

The following chemicals have been added to the definition of chemicals not considered VOC:
- HFE-7300 - January 18, 2007
- Propylene carbonate (108-32-7) - January 21, 2009
- Dimethyl carbonate (616-38-6) - January 21, 2009
- HFO-1234ze - July 23, 2012HCF2OCF2H (HFE-134) - March 14, 2013
- HCF2OCF2OCF2H (HFE-236cal2) - March 14, 2013
- HCF2OCF2CF2OCF2H (HFE-338pcc13) - March 14, 2013
- HCF2OCF2OCF2CF2OCF2H (H-Galden 1040X or H-Galden ZT 130 (or 150 or 180)) - March 14, 2013

- Trans 1-chloro-3,3,3-trifluoroprop-1-ene (Solstice<sup>TM</sup> 1233zd(E)) - September 27, 2013
- 2,3,3,3-tetrafluoropropene (HFO-1234yf) - November 21, 2013
- 2-amino-2-methyl-1-propanol (AMP) - March 27, 2014
- 1,1,2,2-Tetrafluoro-1-(2,2,2-trifluoroethooxy) Ethane (HFE-347pcf2) - September 30, 2016
- cis-1,1,1,4,4,4-hexafluorobut-2-ene (HFO-1336mzz-Z) - January 28, 2019

# Hazardous Air Pollutants – alphabetical listing

Note: 1-Bromopropane was added to the list of HAPs on 2/4/22.

| CAS Number | Chemical Name | CAS Number | Chemical Name |
| --- | --- | --- | --- |
| **A** | | 532-27-4 | 2-Chloroacetophenone |
| 75-07-0 | Acetaldehyde | 108-90-7 | Chlorobenzene |
| 60-35-5 | Acetamide | 510-15-6 | Chlorobenzilate |
| 75-05-8 | Acetonitrile | 75-00-3 | Chloroethane (Ethyl chloride) |
| 98-86-2 | Acetophenone | 67-66-3 | Chloroform |
| 53-96-3 | 2-Acetylaminofluorene | 74-87-3 | Chloromethane (Methyl chloride) |
| 107-02-8 | Acrolein | 107-30-2 | Chloromethyl methyl ether |
| 79-06-1 | Acrylamide | 126-99-8 | Chloroprene |
| 79-10-7 | Acrylic acid | 0 | Chromium Compounds |
| 107-13-1 | Acrylonitrile | 0 | Cobalt Compounds |
| 107-05-1 | Allyl chloride | 0 | Coke Oven Emissions |
| 92-67-1 | 4-Aminobiphenyl | 1319-77-3 | Cresol/Cresylic acid (isomers/mixtures) |
| 62-53-3 | Aniline | | |
| 90-04-0 | o-Anisidine | 108-39-4 | m-Cresol |
| 0 | Antimony Compounds | 95-48-7 | o-Cresol |
| 0 | Arsenic Compounds | 106-44-5 | p-Cresol |
| 1332-21-4 | Asbestos (friable) | 98-82-8 | Cumene |
| | | 0 | Cyanide Compounds |
| **B** | | | |
| 71-43-2 | Benzene | **D** | |
| 92-87-5 | Benzidine | 94-75-7 | 2,4-D, salts and esters |
| 98-07-7 | Benzoic trichloride | 3547-04-4 | DDE |
| 100-44-7 | Benzyl chloride | 117-81-7 | Di(2-ethylhexyl) phthalate (DEHP) |
| 0 | Beryllium Compounds | 334-88-3 | Diazomethane |
| 92-52-4 | Biphenyl | 132-64-9 | Dibenzofuran |
| 111-44-4 | Bis(2-chloroethyl) ether | 96-12-8 | 1,2-Dibromo-3-chloropropane |
| 542-88-1 | Bis(chloromethyl) ether | 106-93-4 | 1,2-Dibromoethane (Ethylene dibromide) |
| 75-25-2 | Bromoform | | |
| 74-83-9 | Bromomethane (Methyl Bromide) | 84-74-2 | Dibutyl phthalate |
| 106-94-5 | 1-Bromopropane | 106-46-7 | 1,4-Dichlorobenzene(p) |
| 106-99-0 | 1,3-Butadiene | 91-94-1 | 3,3'-Dichlorobenzidine |
| 106-88-7 | 1,2-Butylene oxide (1,2-Epoxybutane) | 75-34-3 | 1,1-Dichloroethane (Ethylidene dichloride) |
| | | 107-06-2 | 1,2-Dichloroethane (Ethylene dichloride) |
| **C** | | | |
| 0 | Cadmium Compounds | 75-09-2 | Dichloromethane (Methylene chloride) |
| 156-62-7 | Calcium cyanamide | | |
| 133-06-2 | Captan | 78-87-5 | 1,2-Dichloropropane (Propylene dichloride) |
| 63-25-2 | Carbaryl | | |
| 75-15-0 | Carbon disulfide | 542-75-6 | 1,3-Dichloropropylene |
| 56-23-5 | Carbon tetrachloride | 62-73-7 | Dichlorvos |
| 463-58-1 | Carbonyl sulfide | 111-42-2 | Diethanolamine |
| 120-80-9 | Catechol | 121-69-7 | N,N-Dimethylaniline |
| 133-90-4 | Chloramben | 64-67-5 | Diethyl sulfate |
| 57-74-9 | Chlordane | 119-90-4 | 3,3'-Dimethoxybenzidine |
| 7782-50-5 | Chlorine | 60-11-7 | 4-Dimethylaminoazobenzene |
| 79-11-8 | Chloroacetic acid | 119-93-7 | 3,3'-Dimethylbenzidine |

| CAS Number | Chemical Name | CAS Number | Chemical Name |
|---|---|---|---|
| 68-12-2 | Dimethyl formamide | 74-88-4 | Methyl iodide |
| 57-14-7 | 1,1-Dimethyl hydrazine | 108-10-1 | Methyl isobutyl ketone |
| 534-52-1 | 4,6-Dinitro-o-cresol | 624-83-9 | Methyl isocyanate |
| 51-28-5 | 2,4-Dinitrophenol | 80-62-6 | Methyl methacrylate |
| 121-14-2 | 2,4-Dinitrotoluene | 1634-04-4 | Methyl tert-butyl ether |
| | | 101-14-4 | 4,4'-Methylenebis(2-chloroaniline) |
| **E** | | | |
| 106-89-8 | Epichlorohydrin | 101-68-8 | Methylenebis (phenylisocyanate) |
| 140-88-5 | Ethyl acrylate | 101-77-9 | 4,4'-Methylenedianiline |
| 100-41-4 | Ethylbenzene | | |
| 107-21-1 | Ethylene glycol | **N** | |
| 75-21-8 | Ethylene oxide | 91-20-3 | Naphthalene |
| 96-45-7 | Ethylene thiourea | 0 | Nickel Compounds |
| 151-56-4 | Ethyleneimine | 98-95-3 | Nitrobenzene |
| | | 92-93-3 | 4-Nitrobiphenyl |
| | | 100-02-7 | 4-Nitrophenol |
| **F** | | 79-46-9 | 2-Nitropropane |
| 0 | Fine Mineral Fibers | 62-75-9 | N-Nitrosodimethylamine |
| 50-00-0 | Formaldehyde | 59-89-2 | N-Nitrosomorpholine |
| | | 684-93-5 | N-Nitroso-N-methylurea |
| **G** | | **P** | |
| Glycol Ethers (See page 85) | | 56-38-2 | Parathion |
| | | 87-86-5 | Pentachlorophenol |
| **H** | | 108-95-2 | Phenol |
| 76-44-8 | Heptachlor | 106-50-3 | p-Phenylenediamine |
| 87-68-3 | Hexachloro-1,3-butadiene | 75-44-5 | Phosgene |
| 118-74-1 | Hexachlorobenzene | 7803-51-2 | Phosphine |
| 77-47-4 | Hexachlorocyclopentadiene | 7723-14-0 | Phosphorus (yellow or white) |
| 67-72-1 | Hexachloroethane | 85-44-9 | Phthalic anhydride |
| 822-06-0 | Hexamethylene-1,6-diisocyanate | 85-44-9 | Phthalic anhydride |
| 680-31-9 | Hexamethylphosphoramide | 1336-36-3 | Polychlorinated biphenyls |
| 110-54-3 | Hexane | 0 | Polycyclic Organic Matter |
| 302-01-2 | Hydrazine | 1120-71-4 | Propane sultone |
| 7647-01-0 | Hydrochloric acid | 123-38-6 | Propionaldehyde |
| 7664-39-3 | Hydrogen fluoride | 57-57-8 | beta-Propiolactone |
| 123-31-9 | Hydroquinone | 114-26-1 | Propoxur |
| | | 75-56-9 | Propylene oxide |
| **I** | | 75-55-8 | Propyleneimine |
| 78-59-1 | Isophorone | | |
| | | **Q** | |
| **L** | | 91-22-5 | Quinoline |
| 0 | Lead Compounds | 106-51-4 | Quinone |
| 58-89-9 | Lindane | 82-68-8 | Quintozene |
| | | | |
| **M** | | **R** | |
| 108-31-6 | Maleic anhydride | 0 | Radionuclides (including Radon) |
| 0 | Manganese Compounds | | |
| 0 | Mercury Compounds | **S** | |
| 67-56-1 | Methanol | 0 | Selenium Compounds |
| 72-43-5 | Methoxychlor | 100-42-5 | Styrene |
| 60-34-4 | Methyl hydrazine | | |

| CAS Number | Chemical Name | CAS Number | Chemical Name |
|---|---|---|---|
| 96-09-3 | Styrene oxide | 88-06-2 | 2,4,6-Trichlorophenol |
|  |  | 121-44-8 | Triethylamine |
| **T** |  | 1582-09-8 | Trifluralin |
| 1746-01-6 | 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) | 540-84-1 | 2,2,4-Trimethylpentane |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | **U** |  |
| 127-18-4 | Tetrachloroethylene | 51-79-6 | Urethane |
| 7550-45-0 | Titanium tetrachloride |  |  |
| 108-88-3 | Toluene | **V** |  |
| 95-80-7 | 2,4-Toluene diamine (2,4-Diaminotoluene) | 108-05-4 | Vinyl acetate |
|  |  | 593-60-2 | Vinyl bromide |
| 584-84-9 | 2,4-Toluene diisocyanate | 75-01-4 | Vinyl chloride |
| 95-53-4 | o-Toluidine | 75-35-4 | Vinylidene chloride |
| 800-135-2 | Toxaphene |  |  |
| 120-82-1 | 1,2,4-Trichlorobenzene | **X** |  |
| 71-55-6 | 1,1,1-Trichloroethane | 1330-20-7 | Xylene (mixed isomers) |
| 79-00-5 | 1,1,2-Trichloroethane | 108-38-3 | m-Xylene |
| 79-01-6 | Trichloroethylene | 95-47-6 | o-Xylene |
| 95-95-4 | 2,4,5-Trichlorophenol | 106-42-3 | p-Xylene |

# Hazardous Air Pollutants - by CAS Number

Note: Methyl ethyl ketone (MEK) is no longer considered to be a HAP as of 12/19/05. 1-Bromopropane added to the list of HAPs on 2/4/22.

| CAS Number | Chemical Name | CAS Number | Chemical Name |
|---|---|---|---|
| 0 | Antimony Compounds | 75-01-4 | Vinyl chloride |
| 0 | Arsenic Compounds | 75-05-8 | Acetonitrile |
| 0 | Beryllium Compounds | 75-07-0 | Acetaldehyde |
| 0 | Cadmium Compounds | 75-09-2 | Dichloromethane (Methylene |
| 0 | Chromium Compounds | | chloride) |
| 0 | Cobalt Compounds | 75-15-0 | Carbon disulfide |
| 0 | Coke Oven Emissions | 75-21-8 | Ethylene oxide |
| 0 | Cyanide Compounds | 75-25-2 | Bromoform |
| 0 | Fine Mineral Fibers | 75-34-3 | 1,1-Dichloroethane (Ethylidene |
| 0 | Glycol Ethers (See page 85) | | dichloride) |
| 0 | Lead Compounds | 75-35-4 | Vinylidene chloride |
| 0 | Manganese Compounds | 75-44-5 | Phosgene |
| 0 | Mercury Compounds | 75-55-8 | Propyleneimine |
| 0 | Nickel Compounds | 75-56-9 | Propylene oxide |
| 0 | Polycyclic Organic Matter | 76-44-8 | Heptachlor |
| 0 | Radionuclides (including Radon) | 77-47-4 | Hexachlorocyclopentadiene |
| 0 | Selenium Compounds | 77-78-1 | Dimethyl sulfate |
| 50-00-0 | Formaldehyde | 78-59-1 | Isophorone |
| 51-28-5 | 2,4-Dinitrophenol | 78-87-5 | 1,2-Dichloropropane (Propylene |
| 51-79-6 | Urethane | | dichloride) |
| 53-96-3 | 2-Acetylaminofluorene | 79-00-5 | 1,1,2-Trichloroethane |
| 56-23-5 | Carbon tetrachloride | 79-01-6 | Trichloroethylene |
| 56-38-2 | Parathion | 79-06-1 | Acrylamide |
| 57-14-7 | 1,1-Dimethyl hydrazine | 79-10-7 | Acrylic acid |
| 57-57-8 | beta-Propiolactone | 79-11-8 | Chloroacetic acid |
| 57-74-9 | Chlordane | 79-34-5 | 1,1,2,2-Tetrachloroethane |
| 58-89-9 | Lindane | 79-44-7 | Dimethylcarbamyl chloride |
| 59-89-2 | N-Nitrosomorpholine | 79-46-9 | 2-Nitropropane |
| 60-11-7 | 4-Dimethylaminoazobenzene | 80-62-6 | Methyl methacrylate |
| 60-34-4 | Methyl hydrazine | 82-68-8 | Quintozene |
| 60-35-5 | Acetamide | 84-74-2 | Dibutyl phthalate |
| 62-53-3 | Aniline | 85-44-9 | Phthalic anhydride |
| 62-73-7 | Dichlorvos | 87-68-3 | Hexachloro-1,3-butadiene |
| 62-75-9 | N-Nitrosodimethylamine | 87-86-5 | Pentachlorophenol |
| 63-25-2 | Carbaryl | 88-06-2 | 2,4,6-Trichlorophenol |
| 64-67-5 | Diethyl sulfate | 90-04-0 | o-Anisidine |
| 67-56-1 | Methanol | 91-20-3 | Naphthalene |
| 67-66-3 | Chloroform | 91-22-5 | Quinoline |
| 67-72-1 | Hexachloroethane | 91-94-1 | 3,3'-Dichlorobenzidine |
| 68-12-2 | Dimethyl formamide | 92-52-4 | Biphenyl |
| 71-43-2 | Benzene | 92-67-1 | 4-Aminobiphenyl |
| 71-55-6 | 1,1,1-Trichloroethane | 92-87-5 | Benzidine |
| 72-43-5 | Methoxychlor | 92-93-3 | 4-Nitrobiphenyl |
| 74-83-9 | Bromomethane (Methyl Bromide) | 94-75-7 | 2,4-D, salts and esters |
| 74-87-3 | Chloromethane (Methyl chloride) | 95-47-6 | o-Xylene |
| 74-88-4 | Methyl iodide | 95-48-7 | o-Cresol |
| 75-00-3 | Chloroethane (Ethyl chloride) | 95-53-4 | o-Toluidine |

| CAS Number | Chemical Name | CAS Number | Chemical Name |
| --- | --- | --- | --- |
| 95-80-7 | 2,4-Toluene diamine (2,4-Diaminotoluene) | 119-90-4 | 3,3'-Dimethoxybenzidine |
| | | 119-93-7 | 3,3'-Dimethylbenzidine |
| 95-95-4 | 2,4,5-Trichlorophenol | 120-82-1 | 1,2,4-Trichlorobenzene |
| 96-09-3 | Styrene oxide | 121-14-2 | 2,4-Dinitrotoluene |
| 96-12-8 | 1,2-Dibromo-3-chloropropane | 121-44-8 | Triethylamine |
| 96-45-7 | Ethylene thiourea | 121-69-7 | N,N-Dimethylaniline |
| 98-07-7 | Benzoic trichloride | 122-66-7 | 1,2-Diphenylhydrazine |
| 98-82-8 | Cumene | 123-31-9 | Hydroquinone |
| 98-86-2 | Acetophenone | 123-38-6 | Propionaldehyde |
| 98-95-3 | Nitrobenzene | 123-91-1 | 1,4-Dioxane |
| 100-02-7 | 4-Nitrophenol | 126-99-8 | Chloroprene |
| 100-41-4 | Ethylbenzene | 127-18-4 | Tetrachloroethylene |
| 100-42-5 | Styrene | 131-11-3 | Dimethyl phthalate |
| 100-44-7 | Benzyl chloride | 132-64-9 | Dibenzofuran |
| 101-14-4 | 4,4'-Methylenebis(2-chloroaniline) | 133-06-2 | Captan |
| | | 133-90-4 | Chloramben |
| 101-68-8 | Methylenebis (phenylisocyanate) | 140-88-5 | Ethyl acrylate |
| 101-77-9 | 4,4'-Methylenedianiline | 151-56-4 | Ethyleneimine |
| 106-42-3 | p-Xylene | 156-62-7 | Calcium cyanamide |
| 106-44-5 | p-Cresol | 302-01-2 | Hydrazine |
| 106-46-7 | 1,4-Dichlorobenzene(p) | 334-88-3 | Diazomethane |
| 106-50-3 | p-Phenylenediamine | 463-58-1 | Carbonyl sulfide |
| 106-51-4 | Quinone | 510-15-6 | Chlorobenzilate |
| 106-88-7 | 1,2-Butylene oxide (1,2-Epoxybutane) | 532-27-4 | 2-Chloroacetophenone |
| | | 534-52-1 | 4,6-Dinitro-o-cresol |
| 106-89-8 | Epichlorohydrin | 540-84-1 | 2,2,4-Trimethylpentane |
| 106-93-4 | 1,2-Dibromoethane (Ethylene dibromide) | 542-75-6 | 1,3-Dichloropropylene |
| | | 542-88-1 | Bis(chloromethyl) ether |
| 106-94-5 | 1-Bromopropane | 584-84-9 | 2,4-Toluene diisocyanate |
| 106-99-0 | 1,3-Butadiene | 593-60-2 | Vinyl bromide |
| 107-02-8 | Acrolein | 624-83-9 | Methyl isocyanate |
| 107-05-1 | Allyl chloride | 680-31-9 | Hexamethylphosphoramide |
| 107-06-2 | 1,2-Dichloroethane (Ethylene dichloride) | 684-93-5 | N-Nitroso-N-methylurea |
| | | 822-06-0 | Hexamethylene-1,6-diisocyanate |
| 107-13-1 | Acrylonitrile | 1120-71-4 | Propane sultone |
| 107-21-1 | Ethylene glycol | 1319-77-3 | Cresol/Cresylic acid (isomers and mixture) |
| 107-30-2 | Chloromethyl methyl ether | | |
| 108-05-4 | Vinyl acetate | 1330-20-7 | Xylene (mixed isomers) |
| 108-10-1 | Methyl isobutyl ketone | 1332-21-4 | Asbestos (friable) |
| 108-31-6 | Maleic anhydride | 1336-36-3 | Polychlorinated biphenyls |
| 108-38-3 | m-Xylene | 1582-09-8 | Trifluralin |
| 108-39-4 | m-Cresol | 1634-04-4 | Methyl tert-butyl ether |
| 108-88-3 | Toluene | 1746-01-6 | 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) |
| 108-90-7 | Chlorobenzene | | |
| 108-95-2 | Phenol | 3547-04-4 | DDE |
| 110-54-3 | Hexane | 7550-45-0 | Titanium tetrachloride |
| 111-42-2 | Diethanolamine | 7647-01-0 | Hydrochloric acid |
| 111-44-4 | Bis(2-chloroethyl) ether | 7664-39-3 | Hydrogen fluoride |
| 114-26-1 | Propoxur | 7723-14-0 | Phosphorus (yellow or white) |
| 117-81-7 | Di(2-ethylhexyl) phthalate (DEHP) | 7782-50-5 | Chlorine |
| 118-74-1 | Hexachlorobenzene | 7803-51-2 | Phosphine |

| CAS Number | Chemical Name |
|---|---|
| 8001-35-2 | Toxaphene |
| 120-80-9 | Catechol |

**Glycol Ethers***

| Chemical Name | CAS Number |
|---|---|
| Diethylene glycol dimethyl ether | 111-96-6 |
| Diethylene glycol monobutyl ether acetate | 124-17-4 |
| Diethylene glycol monobutyl ether | 112-34-5 |
| Diethylene glycol monoethyl ether acetate | 112-15-2 |
| Diethylene glycol monoethyl ether | 111-90-0 |
| Diethylene glycol monohexyl ether | 112-59-4 |
| Diethylene glycol monomethyl ether acetate | 629-38-9 |
| Diethylene glycol monomethyl ether | 111-77-3 |
| Ethylene glycol dibutyl ether | 112-48-1 |
| Ethylene glycol diethyl ether | 629-14-1 |
| Ethylene glycol dimethyl ether | 110-71-4 |
| Ethylene glycol monoacetate | 542-59-6 |
| Ethylene glycol monobutyl ether acetate | 112-07-2 |
| Ethylene glycol monoethyl ether acetate | 111-15-9 |
| Ethylene glycol monoethyl ether | 110-80-5 |
| Ethylene glycol monohexyl ether | 112-25-4 |
| Ethylene glycol monomethyl ether acetate | 110-49-6 |
| Ethylene glycol monomethyl ether | 109-86-4 |
| Ethylene glycol monooctyl ether | 10020-43-6 |
| Ethylene glycol monophenyl ether | 122-99-6 |
| Ethylene glycol monopropyl ether | 2807-30-9 |
| Triethylene glycol | 112-27-6 |
| Triethylene glycol dimethyl ether | 112-49-2 |
| Triethylene glycol monoethyl ether | 112-50-5 |
| Triethylene glycol monomethyl ether | 112-35-6 |

*This is a partial list of common glycol ethers. A complete listing can be found on line at
https://www3.epa.gov/ttn/atw/glycol2000.pdf

## APPENDIX C: Iowa DNR Control Efficiency Guidance

**Details**

Facilities can control the amount of pollutants emitted to the atmosphere by installing air pollution control equipment. The level of control depends on various factors. These include: the type of equipment used; the design of the equipment; the process involved; temperature; air flow rates; raw materials; combustion products, etc.; as well as the pollutant(s) targeted for control. Control efficiency is contaminant specific.

DNR staff has prepared a general guidance document identifying typical control efficiencies achieved by different generic types of control equipment. The control efficiency values identified in the table represent single pieces of control equipment. Multiple pieces of control equipment in series should be evaluated on a case-by-case basis.

This control efficiency guidance document is used in reviewing emission inventories by comparing the facility's claimed control efficiency with the guidance document's value. If the facility claims higher control efficiency for a particular piece of equipment, DNR staff will request supporting information to substantiate the facility's claim. This supporting information would consist of test results either from a previous stack test, continuous emission monitoring, or from any other verifiable source of information.

The $PM_{2.5}$ control efficiency is currently assumed equal to the $PM_{10}$ control efficiency due to a lack of documentation. If a facility has any questions regarding $PM_{2.5}$ control efficiency, please call the emissions inventory staff.

## Control Efficiency Table

| Control Device or Practice | Control Efficiency (%) | | | | | | |
|---|---|---|---|---|---|---|---|
| | TSP | PM$_{10}$ | SOx | NOx | VOC | CO | Pb |
| Wet Scrubber - high efficiency | note 1 | | note 2 | | | | |
| Wet Scrubber - med efficiency | note 1 | | note 2 | | | | |
| Wet Scrubber - low efficiency | note 1 | | note 2 | | | | |
| Gravity Collector | 3[a] | -- | -- | -- | -- | -- | 2[a] |
| Centrifugal Collector (cyclone)-high efficiency* | 95[c] | 80[a] | -- | -- | -- | -- | 65[a] |
| Centrifugal Collector (cyclone)-med efficiency* | 75[c] | 50[a] | -- | -- | -- | -- | 40[a] |
| Centrifugal Collector (cyclone)-low efficiency* | 35[c] | 10[a] | -- | -- | -- | -- | 8[a] |
| Electrostatic Precipitator-high efficiency** | 95[a] | 95[a] | -- | -- | -- | -- | 75[a] |
| Electrostatic Precipitator-medium efficiency** | 80[a] | 80[a] | -- | -- | -- | -- | 65[a] |
| Electrostatic Precipitator-low efficiency** | 70[a] | 70[a] | -- | -- | -- | -- | 55[a] |
| Fabric Filter | 99[a] | 95[c] | -- | -- | -- | -- | 80[a] |
| Catalytic Afterburner | -- | -- | -- | -- | 95[c] | -- | -- |
| Direct Flame Afterburner | -- | -- | -- | -- | 95[c] | -- | -- |
| Flaring | -- | -- | -- | -- | 90[a] | -- | -- |
| Low NOx Burners | -- | -- | -- | note 3 | -- | -- | -- |
| Staged Combustion | -- | -- | -- | 40[a] | -- | -- | -- |
| Flue Gas Recirculation | -- | -- | -- | 50[a] | -- | -- | -- |
| Reduced Combustion Air Preheat | -- | -- | -- | note 4 | -- | -- | -- |
| Steam or Water Injection | -- | -- | -- | 65[a] | -- | -- | -- |
| Low Excess Air Firing | -- | -- | -- | 30[a] | -- | -- | -- |
| Fuel with low Nitrogen Content | -- | -- | -- | 50[a] | -- | -- | -- |
| Sulfuric Acid Plant-Single Contact Process | -- | -- | 50[a] | -- | -- | -- | -- |
| Sulfuric Acid Plant-Double Contact Process | -- | -- | 95[a] | -- | -- | -- | -- |
| Vapor Recovery System (Condensers) | -- | -- | -- | -- | note 5 | -- | -- |
| Activated Carbon Adsorption | -- | -- | note 6 | | | | -- |
| Gas Absorption Column-packed | 90[a] | 90[a] | note 2 | | | | -- |
| Gas Absorption Column-tray type | 25[a] | 25[a] | note 2 | | | | -- |
| Spray Tower | 20[a] | 20[a] | note 2 | | | | -- |
| Venturi Scrubber | 90[a] | 90[a] | note 2 | | | | -- |
| Impingement Plate Scrubber | note 7 | | -- | -- | -- | -- | -- |
| Mat or Panel Filter | 90[c] | 90[c] | -- | -- | -- | -- | -- |
| Dust Suppression by Water Spray | 40[a] | 40[a,d] | -- | -- | -- | -- | -- |
| Dust Suppression by Chemical or Wetting Agents | 40[a] | 40[a,d] | -- | -- | -- | -- | -- |
| Catalytic Reduction | -- | -- | -- | note 8 | -- | -- | -- |
| Wet Lime Slurry Scrubbing | -- | -- | 85[c] | -- | -- | -- | -- |
| Multiple Cyclone w/o Fly Ash Reinjection | 80[a] | 80[a] | -- | -- | -- | -- | 65[a] |
| Multiple Cyclone with Fly Ash Reinjection | 50[a] | 50[a] | -- | -- | -- | -- | 40[a] |
| Water Curtain | 50[c] | 10[a] | -- | -- | -- | -- | -- |

[a]Control efficiency was taken from a literature review and developmental work by the Minnesota Pollution Control Agency
[b]Control efficiency was taken from AP-42
[c]Control efficiency was developed from the combination of a literature review and developmental work by the Minnesota Pollution Control Agency, AP-42, and staff judgment
[d]Unless a higher efficiency is required as an operating condition of a DNR construction permit

*Low, medium, and high efficiency cyclones will be defined based on pressure drop. The ranges of pressure drops are as follows:

| | |
|---|---|
| Low-efficiency cyclones | 2-4 inches water |
| Medium-efficiency cyclones | 4-7 inches water |
| High-efficiency cyclones | 7-10 inches water |

** Low, medium, and high efficiency electrostatic precipitators (ESP) will be defined based on the specific collection area (SCA). The SCA is the total collector plate area divided by the gas volume flow rate. It is usually expressed in terms of square feet per 1000 acfm of gas flow. For example, the SCA of an ESP with a gas flow rate of 250,000 acfm and collection plate area of 100,000 square feet is:

$$100,000 \text{ ft}^2 / 250,000 \text{ acfm} \times 0.001 = 400 \text{ ft}^2/\text{thousand acfm}$$

The ranges of SCA for low, medium, and high efficiency ESPs are as follows:

| | |
|---|---|
| Low-efficiency ESP | < 400 |
| Medium-efficiency ESP | 400 - 700 |
| High-efficiency ESP | > 700 |

Typical control efficiencies were not assigned to all control devices because some efficiencies strongly depend on source specific parameters. In these instances, the table will refer to one of the notes listed below for additional information.

Note 1. Particulate control equipment represented by these classifications should be included in the other, more specific categories (i.e., venturi scrubbers or packed bed absorption columns).

Note 2. The achievable gaseous pollutant control efficiencies for these types of control equipment will depend on the pollutant solubility, the solvent used, the vapor-liquid contact time, and the contact area. These devices are normally designed to achieve a promulgated control efficiency rather than the maximum achievable reduction. Control efficiencies for these devices should be evaluated on a case-by-case basis.

Note 3. Low NOx burners (LNB) have been developed by many boiler and burner manufacturers for both new and retrofit applications. Low NOx burners limit NOx formation by controlling both the stoichiometric and temperature profiles of the combustion process. This control is achieved with design features that regulate the aerodynamic distribution and mixing of the fuel and air, yielding one or more of the following conditions:
1. Reduced $O_2$ in the primary combustion zone, which limits fuel NOx formation;
2. Reduced flame temperature, which limits thermal NOx formation; and
3. Reduced residence time at peak temperature, which limits thermal NOx formation.

The amount of NOx reduction achievable is dependent upon the combustion system and burner design, actual operating practices, and fuel characteristics. The amount of reduction should be based on the manufacturer's demonstration.

Note 4. The amount of NOx reduction achievable from reducing preheating of combustion air will vary according to the temperatures before and after the modification. Therefore, efficiencies for this process should be evaluated on a case-by-case basis.

Note 5. Control efficiencies for a particular condenser will vary for different VOC compounds and depends on both the partial pressure of the pollutant and the operating parameters of the condenser. Efficiencies should be evaluated on a case-by-case basis.

Note 6. Since the overall control efficiency will depend on source specific parameters such as the physical characteristics of the absorbent bed and gaseous stream, the temperature, and the choice of regeneration technique, efficiencies should be evaluated on a case-by-case basis.

Note 7. Depending on the application, control efficiencies may range from 25-99%. Efficiencies should be evaluated on a case-by-case basis.

Note 8. Generic classification; recommend specific technologies be addressed on an individual basis. Two widely used NOx control technologies include Selective Catalytic Reduction (SCR) and Selective Noncatalytic Reduction (SNCR). SCR can obtain reductions of 60-90%. Urea based SNCR can achieve reductions of 30-80% and ammonia based 55-85%.

**APPENDIX D: Abbreviations, Conversion Factors, and Spray Painting Transfer Efficiencies**

**Abbreviations**

| | |
|---|---|
| ACFM | Actual cubic feet per minute |
| CAA | Clean Air Act |
| CAS | Chemical Abstract Service Registry number |
| CFR | Code of Federal Regulation |
| CHIEF | Clearinghouse for Inventories and Emission Factors |
| CO | Carbon Monoxide |
| DNR | Iowa Department of Natural Resources |
| gr./dscf | grains per dry standard cubic foot |
| HAP | Hazardous Air Pollutant |
| IAC | Iowa Administrative Code |
| lbs/hr | pounds per hour |
| lbs/MMBtu | pounds per million British thermal units |
| lbs/MMcf | pounds per million cubic feet |
| MACT | Maximum Achievable Control Technology |
| NAAQS | National Ambient Air Quality Standards |
| NAICS | North American Industrial Classification System |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| NOx | Nitrogen Oxides |
| NSPS | New Source Performance Standards |
| NSR | New Source Review |
| ˚F | degrees Fahrenheit |
| PM10 | Particulate Matter less than or equal to 10 micrometers in diameter |
| PM2.5 | Particulate Matter less than or equal to 2.5 micrometers in diameter |
| ppmv | parts per million by volume |
| SCC | Source Classification Code |
| SCFM | Standard cubic feet per minute |
| SDS | Safety Data Sheet |
| SIC | Standard Industrial Classification |
| SLEIS | State and Local Emissions Inventory System |
| SO2 | Sulfur Dioxide |
| TPY | Tons per year |
| TSP | Total Suspended Particulates |
| USEPA | United States Environmental Protection Agency |
| VOCs | Volatile Organic Compounds |

**Conversion Factors***

*\*Additional conversion factors are located in [AP-42, Appendix A.](#)*

- 1,050 Btu per ft$^3$ (Natural Gas)
- 0.0905 MMBtu per gallon (Propane)
- 0.140 MMBtu per gallon (No.2 Fuel Oil)
- 0.140 MMBtu per gallon (Diesel Fuel)
- 1 pound is equal to 7,000 grains
- 1 ton is equal to 2,000 pounds
- 1 gallon is equal to 3.785 liters
- 1 gallon of water is equal to 8.345 pounds
- To convert ounces into pounds multiply by 0.0625
- 56 pounds per bushel (corn)
- 60 pounds per bushel (soybeans)
- To convert g/L to lbs/gal: lbs/gal = (g/L) x .008345
- To convert scfm to acfm at standard pressure:
  Acfm = (actual temp. (°F) + 460) x scfm (standard temp. (°F) + 460)
- standard temperature = 70 °F

**Spray Painting Transfer Efficiencies**

Transfer Efficiency as a function of Spraying Method and Sprayed

| Method of Spraying | Flat Surface (%) | Table Leg Surface (%) | Bird Cage Surface (%) |
|---|---|---|---|
| Air atomized | 50 | 15 | 10 |
| Airless | 75-80 | 10 | 10 |
| Electrostatic: | | | |
|     Disk | 95 | 90-65 | 90-95 |
|     Airless | 80 | 70 | 70 |
|     Air atomized | 75 | 65 | 65 |

*Source*: Air Pollution Engineering Manual (1992), Table 2, pg. 362

## APPENDIX E: SLEIS Completeness Checklist

SLEIS Completeness Checklist
Have you updated…

Facility Reports Screen
☐ The list of facility users
☐ Information in your user profile

Facility Button
☐ The company/owner name if applicable
☐ The emissions contact name and contact information
☐ The mailing address of the facility
☐ Your statewide company employee count

Release Points Button
☐ Stack characteristics to match the most recent construction permit issued

Control Devices Button
☐ The list of controlled pollutants

Unit Processes Button
☐ The list of release points venting emissions from the process

Process Emissions Button
☐ The annual throughput for each process
☐ The actual operating schedule
☐ PM-2.5 and Ammonia emissions where applicable

Report Attachments Button
☐ All safety data sheets, if applicable
☐ For paint booths, a list containing the amount of each paint and solvent used
☐ All calculations shown in full, including engineering estimates

Other Reminders
☐ Are your control efficiencies acceptable according to the control efficiency guidance document?
☐ Did you use the most recent emission factors available?