

1. Subpart K - Ferroalloy Production	2
1.1 Using e-GGRT to Prepare Your Subpart K Report	2
1.1.1 Subpart K Summary Information for this Facility	4
1.1.2 Subpart K Furnace Information for Furnaces NOT Monitored by CEMS	5
1.1.3 Subpart K Furnace Information for Furnaces Monitored by CEMS	8
1.1.4 Subpart K Emissions Information for Furnaces NOT Monitored by CEMS	10
1.1.5 Subpart K Emissions Information for Furnaces Monitored by CEMS	12
1.2 Using Subpart K Calculation Spreadsheets	16

# Subpart K - Ferroalloy Production

 A printer-friendly version (pdf) (18 pp, 8,213K) of GHG reporting instructions for this subpart

Please select a help topic from the list below:

- Using e-GGRT to Prepare Your Subpart K Report
  - Subpart K Summary Information for this Facility
  - Subpart K Furnace Information for Furnaces NOT Monitored by CEMS
  - Subpart K Furnace Information for Furnaces Monitored by CEMS
  - Subpart K Emissions Information for Furnaces NOT Monitored by CEMS
  - Subpart K Emissions Information for Furnaces Monitored by CEMS
- Using Subpart K Calculation Spreadsheets
- Carry forward of data from previous submissions into RY2011 forms
- Subpart K Rule Guidance
- Subpart K Rule Language (eCFR)

Additional Resources:

- Part 98 Terms and Definitions
- Frequently Asked Questions (FAQs)
- Webinar Slides

## Using e-GGRT to Prepare Your Subpart K Report

Subpart K consists of facilities that use pyrometallurgical techniques to produce any of the following metals: ferrochromium, ferromanganese, ferromolybdenum, ferronickel, ferrosilicon, ferrotitanium, ferrotungsten, ferrovanadium, silicomanganese, or silicon metal.

This page provides an overview of subtopics that are central to Subpart K reporting. This information is entered from the e-GGRT Subpart K Overview web form shown below. Each topic represents a key web form(s) you where you need to enter information:

If you previously reported for Reporting Year (RY) 2010, the Agency has carried some of your RY2010 data forward and entered it in your RY2011 forms to reduce reporting burden. It is still your responsibility to review and assure that all the information in your submission is correct, but the Agency believes that most of the data which is carried forward is unlikely to change significantly from year to year. For more information about carry forward data, please see the [Carry forward of data from previous submissions into RY2011 forms help content](#).

- Subpart K Summary Information for this Facility
- Subpart K Furnace Information
- Subpart K Emissions Information
- Subpart K Validation Report

Click image to expand



**Subpart K: Ferroalloy Production (2011)**  
Subpart Overview

**OVERVIEW OF SUBPART REPORTING REQUIREMENTS**  
Subpart K requires affected facilities to report carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) from each electric arc furnace. First, use this page to identify each electric arc furnace and then enter Greenhouse Gas (GHG) data required by Subpart K for each electric arc furnace and for your facility. For additional information about Subpart K reporting, please use the e-GGRT Help link(s) provided.

EPA has finalized a rule that defers the deadline for reporting data elements used as inputs to emission equations for direct emitters. See 76 FR 53057 published August 25, 2011, in accordance with the rule, e-GGRT is not currently collecting data used as inputs to emission equations.

**Subpart K: View Validation**

**SUBPART K SUMMARY INFORMATION FOR THIS FACILITY**

# of Furnaces	Ferroalloy product production capacity (tons)
0	

**ELECTRIC ARC FURNACES**

Name/ID	CO <sub>2</sub> (metric tons)	CH <sub>4</sub> (metric tons)	Status <sup>1</sup>	Delete
none entered				

**ELECTRIC ARC FURNACES (FURNACES MONITORED BY CEMS)**

Name/ID	CO <sub>2</sub> (metric tons)	Status <sup>1</sup>	Delete
none entered			

<sup>1</sup> A status of "incomplete" means that one or more required data elements are incomplete. For details, refer to the Data Completeness validation messages in your Validation Report by clicking the "View Validation" link above (Note: if there are no validation messages for this subpart you will not see this link).

The end of the page provides links you can use for more detailed information and instructions on entering required information related to each of these topics.

## Subpart K Summary Information for this Facility

Subpart K requires you to report the following data about your facility:

- The annual facility ferroalloy product production capacity (this value must be entered into e-GGRT, in short tons)
- Number of electric arc furnaces reported (this value is calculated by e-GGRT)

## Subpart K Furnace Information

The required electric arc furnace (EAF) information and the forms associated with required EAF information is entered into e-GGRT are different for EAFs that are monitored by a Continuous Emissions Monitoring System (CEMS) and EAFs that are NOT monitored by a CEMS.

As a result, separate help content has been created in this subpart for entering EAF information for EAFs monitored by CEMS and EAFs NOT monitored by CEMS.

For each EAF **NOT monitored by CEMS** at your facility, Subpart K requires you to report the following information:

- A unique name or identifier, plus optional description for this EAF (see also About Unique Unit Names)
- The following data for each input and output associated with the EAF:
  - A unique name or identifier
  - The general type of input or output

For each EAF **monitored by CEMS** at your facility, Subpart K requires you to report a unique name or identifier, plus optional description for the EAF (see also [About Unique Unit Names](#)).

## Subpart K Emissions Information

The required emissions information and the manner by which required emissions information is entered into e-GGRT is different for EAFs that are monitored by a Continuous Emissions Monitoring System (CEMS) and EAFs that are NOT monitored by a CEMS.

As a result, separate help content has been created in this subpart for entering emissions information for EAFs monitored by CEMS and EAFs NOT monitored by CEMS.

For each EAF that is **NOT monitored by CEMS** at your facility, Subpart K requires the following emissions information:

- The annual CO<sub>2</sub> process emissions (the output of Equation K-1, in metric tons)
- For each EAF used for the production of a ferroalloy listed in Table K-1, the annual CH<sub>4</sub> process emissions (the output of Equation K-3, in metric tons)\*
- For each Input and Output assigned to an electric arc furnace, Subpart K collects the following data:
  - The method used to determine carbon content (Provided by supplier, ASTM E1941-04, ASTM D5373-08, or ASTM C25-06)
  - An indication if a missing data procedure was used or analysis was repeated to determine carbon content
  - The procedure used to develop substitute data for monthly mass, if applicable (Purchase records or Other)
  - The number of months that missing data procedures were followed to determine monthly mass

*\*Note, reporting of CH<sub>4</sub> process emissions is only required for ferroalloy types listed in Table K-1. If you do not produce a ferroalloy type listed in this table, enter "0" for your emissions.*

For each **CEMS Monitoring Location**, provide the following information:

- A unique unit name or identifier for the CML (see also [About Unique Unit Names](#))
- An optional description or label for the CML
- The configuration of processes or process units that are monitored by the CML:
  - Single process or process unit that exhausts to a dedicated stack
  - Multiple processes or process units that share a common stack
  - Process or process unit that shares a common stack with one or more stationary fuel combustion units
- The name of each fuel combusted in the unit(s) monitored by the CEMS
- The Tier 4/CEMS methodology start and end dates
- The cumulative total of hourly CO<sub>2</sub> mass emissions for each quarter of the reporting year (metric tons) (*Do not cumulate emissions data between quarters*)
- The total annual CO<sub>2</sub> mass emissions measured by the CEMS (metric tons)
- An indication whether emissions reported for the CEMS include emissions calculated according to 98.33(a)(4)(viii) for a slipstream that bypassed the CEMS
- The total annual biogenic CO<sub>2</sub> emissions from the combustion of all biomass fuels combined (metric tons) (*if not applicable, enter '0'*)
- The total annual non-biogenic CO<sub>2</sub> emissions which includes fossil fuel, sorbent, and process CO<sub>2</sub> emissions (metric tons)
- The total annual CH<sub>4</sub> and N<sub>2</sub>O emissions associated with the combustion of all [Table C-2](#) fuels combusted in all processes/process units

monitored by the CEMS derived from application of [Equation C-10](#) (metric tons) (*if there are no combustion emissions in this CML, please enter '0'*)

- The total number of source operating hours in the reporting year
- The total operating hours in which a substitute data value was used in the emissions calculations for the CO<sub>2</sub> concentration parameter
- The total operating hours in which a substitute data value was used in the emissions calculations for the stack gas flow rate parameter
- If moisture correction is required and a continuous moisture monitor is used, the total operating hours in which a substitute data value was used in the emissions calculations for the stack gas moisture content parameter
- An indication of the process units monitored by the CML

## Subpart K Validation Report

You can use the Validation Report to assist with the completeness and quality of your reporting data.

You should use the Validation Report to check your work. The Validation Report performs two types of checks:

- Data Completeness: Data that are required for reporting are missing or incomplete.
- Data Quality: Data are outside of the expected range of values.

You may view the Validation Report at any time.



Note that the Validation Report is intended to assist users in entering data, but it is not an indication that the reporter has entered all necessary information, nor is it an indication that the reporter is in compliance with part 98. Furthermore a negative finding on the validation report is not a guarantee that a data element was entered incorrectly.

[Back to Top](#)

## See Also

[Screen Errors](#)

[Subpart K Summary Information for this Facility](#)

[Subpart K Furnace Information for Furnaces NOT Monitored by CEMS](#)

[Subpart K Furnace Information for Furnaces Monitored by CEMS](#)

[Subpart K Emissions Information for Furnaces NOT Monitored by CEMS](#)

[Subpart K Emissions Information for Furnaces Monitored by CEMS](#)

[Subpart Validation Report](#)

## Subpart K Summary Information for this Facility

This page provides a description of how to enter Subpart K Ferroalloy Production summary information about this facility.

### Adding or Updating Summary Information for this Facility

To add or update summary information for this facility, locate the SUBPART K SUMMARY INFORMATION FOR THIS FACILITY table on the Subpart Overview page and click OPEN.

*Click image to expand*

Subpart K requires you to report the following data about your facility:

- The annual facility ferroalloy product production capacity (this value must be entered into e-GGRT, in short tons)
- Number of electric arc furnaces reported (this value is calculated by e-GGRT)

When you have entered the required information, click SAVE. You should then return to the Subpart K Overview page.

*Click image to expand*

[Back to Top](#)

## See Also

### Screen Errors

[Using e-GGRT to Prepare Your Subpart K Report](#)

[Subpart K Furnace Information for Furnaces NOT Monitored by CEMS](#)

[Subpart K Furnace Information for Furnaces Monitored by CEMS](#)

[Subpart K Emissions Information for Furnaces NOT Monitored by CEMS](#)

[Subpart K Emissions Information for Furnaces Monitored by CEMS](#)

[Subpart Validation Report](#)

## Subpart K Furnace Information for Furnaces NOT Monitored by CEMS

This page provides step-by-step instructions on how to enter and edit Subpart K Ferroalloy Production furnace information.

### Step 1: Add an electric arc furnace (EAF)

To add an EAF that is NOT monitored by a CEMS, find the ELECTRIC ARC FURNACES table on the Subpart Overview page and click the link titled "ADD a Furnace."

To edit or update identification information for an EAF, click the edit icon or the Name/ID link located in the first column of the table.

To delete an EAF, click the delete icon or red "x" located in the last column of the table.

*Click image to expand*

## Step 2: Indicate CEMS utilization for a furnace

For each EAF, confirm whether or not the EAF utilizes CEMS.

*Note that when adding a new EAF you are prompted to answer the CEMS question immediately (the answer to this question will default to "No" for EAF added using the "ADD a Furnace" link and will default to "Yes" for units added using the "ADD a Furnace Monitored by CEMS" link).*

The CEMS response may be changed here and the EAF information will be relocated to the appropriate table on the Subpart Overview page.

When finished, click SAVE. You will then be directed to another Add/Edit a Unit form.

*Click image to expand*

## Step 3: Enter required furnace information

For each EAF NOT monitored by CEMS at your facility, Subpart K requires you to report the following information:

- A unique name or identifier, plus optional description for this EAF (see also [About Unique Unit Names](#))
- The inputs and outputs associated with the EAF

*Click image to expand*

United States Environmental Protection Agency | e-GGRT Electronic Greenhouse Gas Reporting Tool

HOME | FACILITY REGISTRATION | FACILITY MANAGEMENT | DATA REPORTING

Ferroalloy Production Company 1 (2010)  
**Subpart K: Ferroalloy Production**  
 Subpart Overview | [Add/Edit a Unit](#)

**ELECTRIC ARC FURNACE INFORMATION**  
 Subpart K requires a facility to uniquely identify each electric arc furnace and provide the information described below for each. For additional information about adding and editing an electric arc furnace, please use the e-GGRT Help link(s) provided. \* denotes a required field

UNIT INFORMATION

Name or ID \*  (40 characters maximum)

Description (optional)

Type

CONTINUOUS EMISSIONS MONITORING

Is this unit's emissions \*  Yes  No

Paperwork Reduction Act Burden Statement | Contact Us | e-GGRT/RY2010.R.45 | k(furnace)

#### Step 4: Enter required input/output information

To add an input or an output, click "Add an Input" or "Add an Output" below each respective table and enter the following required information:

- For each input add a unique name or identifier.
- Select from the dropdown table, the general type of input or output (Reducing Agent, Electrode, Ore, Flux, Product, or Non-Product Outgoing)

When you are finished entering the required information for an input or output, click SAVE. You will be directed back to the Add/Edit a Unit form.

*Click image to expand*

United States Environmental Protection Agency | e-GGRT Electronic Greenhouse Gas Reporting Tool

HOME | FACILITY REGISTRATION | FACILITY MANAGEMENT | DATA REPORTING

Ferroalloy Production Company 1 (2010)  
**Subpart K: Ferroalloy Production**  
 Subpart Overview | [Add/Edit a Furnace](#) | [Input/Output](#)

**ELECTRIC ARC FURNACE INPUT/OUTPUT INFORMATION**  
 Subpart K collects data regarding Inputs and Outputs for each electric arc furnace. For additional information about the data collected on this page, please use the e-GGRT Help link(s) provided. \* denotes a required field

FURNACE

Name or ID

INPUT OR OUTPUT DETAILS

Name \*

Input or Output?

Type \*

Paperwork Reduction Act Burden Statement | Contact Us | e-GGRT/RY2010.R.45 | k(furnace)

#### Step 5: Save all entered information for an EAF

When you are finished entering all required information for a EAF, click SAVE. You will then be directed to the Subpart Overview page. You should see the furnace you just entered listed in the ELECTRIC ARC FURNACE table.

*Click image to expand*

The screenshot shows the EPA e-GGRT interface for 'Ferroalloy Production Company 1 (2010)'. The main heading is 'Subpart K: Ferroalloy Production'. Below this is a section titled 'ELECTRIC ARC FURNACE INFORMATION' with a sub-heading 'ELECTRIC ARC FURNACE INFORMATION'. A note states: 'Subpart K requires a facility to uniquely identify each electric arc furnace and provide the information described below for each. For additional information about adding and editing an electric arc furnace, please use the e-GGRT Help link(s) provided.' A red asterisk indicates a required field. The form is divided into sections: 'UNIT INFORMATION' with a 'Name or ID' field containing 'Unit 3' (40 characters maximum) and a 'Description (optional)' field; 'Type' set to 'Electric Arc Furnace (EAF)'; and 'CONTINUOUS EMISSIONS MONITORING' with radio buttons for 'Is this unit's emissions monitored using a CEMS?' (Yes/No). 'CANCEL' and 'SAVE' buttons are at the bottom.

## Step 6: Repeat Steps 1-5

Repeat Steps 1-5 until all EAFs have been added for your facility. You should then see all EAFs at your facility listed in the ELECTRIC ARC FURNACE SUMMARY TABLE.

[Back to Top](#)

## See Also

[Screen Errors](#)

[Using e-GGRT to Prepare Your Subpart K Report](#)

[Subpart K Summary Information for this Facility](#)

[Subpart K Furnace Information for Furnaces Monitored by CEMS](#)

[Subpart K Emissions Information for Furnaces NOT Monitored by CEMS](#)

[Subpart K Emissions Information for Furnaces Monitored by CEMS](#)

[Subpart Validation Report](#)

## Subpart K Furnace Information for Furnaces Monitored by CEMS

This page provides step-by-step instructions on how to enter and edit Subpart K Ferroalloy Production furnace information.

### Step 1: Add an electric arc furnace (EAF)

To add an EAF that is monitored by a CEMS, find the ELECTRIC ARC FURNACES (Furnaces Monitored by CEMS) table on the Subpart Overview page and click the link titled "ADD a Furnace Monitored by CEMS."

To edit or update identification information for an EAF, click the edit icon or the blue hyperlinked Name/ID link located in the first column of the table.

To delete an EAF, click the delete icon or red "x" located in the last column of the table.

*Click image to expand*



## Step 2: Indicate CEMS utilization for a furnace

For each EAF, confirm whether or not the furnace utilizes CEMS.

*Note that when adding a new EAF you are prompted to answer the CEMS question immediately (the answer to this question will default to “No” for EAF added using the “ADD a Furnace” link and will default to “Yes” for units added using the “ADD a Furnace Monitored by CEMS” link).*

The CEMS response may be changed here and the EAF information will be relocated to the appropriate table on the Subpart Overview page.

When finished, click SAVE. You will then be directed to the next Add/Edit a Unit form.

*Click image to expand*

## Step 3: Enter required information for an EAF

For each EAF monitored by CEMS at your facility, Subpart K requires you to report a unique name or identifier, plus optional description for the EAF (see also [About Unique Unit Names](#)).

When you are finished entering the required information for an EAF, click SAVE. You will then be direct back to the Subpart Overview form. You should now see the furnace you just identified listed in the ELECTRIC ARC FURNACES (Furnaces Monitored by CEMS) table.

*Click image to expand*

United States Environmental Protection Agency | e-GGRT Electronic Greenhouse Gas Reporting Tool

HOME | FACILITY REGISTRATION | FACILITY MANAGEMENT | DATA REPORTING

ABC Ferroalloy Production Company 1 (2010)  
**Subpart K: Ferroalloy Production**  
 Subpart Overview | Add | Edit | Unit

**ELECTRIC ARC FURNACE INFORMATION**  
 Subpart K requires a facility to uniquely identify each electric arc furnace and provide the information described below for each. For additional information about adding and editing an electric arc furnace, please use the e-GGRT Help link(s) provided. \* denotes a required field

UNIT INFORMATION

Name or ID\* [Unit 3] (40 characters maximum)

Description (optional) [ ]

Type: Electric Arc Furnace (EAF)

CONTINUOUS EMISSIONS MONITORING

Is this unit's emissions\* monitored using a CEMS?  Yes  No

CANCEL SAVE

Paperwork Reduction Act Burden Statement | Contact Us | e-GGRT/RY2010.R.45 | K(Furnace)

#### Step 4: Repeat Steps 1-3

Repeat Steps 1-3 until all EAFs have been added for your facility and you see all EAFs monitored by CEMS listed in the ELECTRIC ARC FURNACES (Furnaces Monitored by CEMS) table.

[Back to Top](#)

#### See Also

[Screen Errors](#)

[Using e-GGRT to Prepare Your Subpart K Report](#)

[Subpart K Summary Information for this Facility](#)

[Subpart K Furnace Information for Furnaces NOT Monitored by CEMS](#)

[Subpart K Emissions Information for Furnaces NOT Monitored by CEMS](#)

[Subpart K Emissions Information for Furnaces Monitored by CEMS](#)

[Subpart Validation Report](#)

## Subpart K Emissions Information for Furnaces NOT Monitored by CEMS

This page provides step-by-step instructions on how to enter and edit Subpart K Ferroalloy emissions information for electric arc furnaces (EAFs) that are NOT monitored by a Continuous Emissions Monitoring System (CEMS).

#### Step 1: Select a unit

To select a unit for which to enter emissions data, find the unit in the ELECTRIC ARC FURNACES table and click OPEN.

*Click image to expand*

United States Environmental Protection Agency | e-GGRT Electronic Greenhouse Gas Reporting Tool

HOME | FACILITY REGISTRATION | FACILITY MANAGEMENT | DATA REPORTING

ABC Petroleum  
**Subpart K: Ferroalloy Production (2011)**  
 Subpart Overview

**OVERVIEW OF SUBPART REPORTING REQUIREMENTS**  
 Subpart K requires affected facilities to report carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) from each electric arc furnace. First, use this page to identify each electric arc furnace and then enter Greenhouse gas (GHG) data required by Subpart K for each electric arc furnace and for your facility. For additional information about Subpart K reporting, please use the e-GGRT Help link(s) provided.

EPA has finalized a rule that defers the deadline for reporting data elements used as inputs to emission equations for direct emitters. See 76 FR 53057 (published August 25, 2011). In accordance with the rule, e-GGRT is not currently collecting data used as inputs to emission equations.

**Subpart K: View Validation**

**SUBPART K SUMMARY INFORMATION FOR THIS FACILITY**

# of Furnaces	Ferroalloy product production capacity (tons)	
0		<a href="#">OPEN</a>

**ELECTRIC ARC FURNACES**

Name/ID	CO <sub>2</sub> (metric tons)	CH <sub>4</sub> (metric tons)	Status*	Delete
none entered				
<a href="#">+ ADD a Furnace</a>				

**ELECTRIC ARC FURNACES (#FURNACES MONITORED BY CEMS)**

Name/ID	CH <sub>4</sub> (metric tons)	Status*	Delete
none entered			
<a href="#">+ ADD a Furnace Monitored by CEMS</a>			

[Facility Overview](#)

\* A status of "Incomplete" means that one or more required data elements are incomplete. For details, refer to the Data Completeness validation messages in your Validation Report by clicking the "View Validation" link above (note: if there are no validation messages for this subpart you will not see this link).

Paperwork Reduction Act Burden Statement | Contact Us | e-GGRT/RY2011.R.12 | K(Ferroalloy)

## Step 2: Equation K-1 and K-3 Summary and Result

For each EAF that is NOT monitored by CEMS at your facility, Subpart K requires the following emissions information:

- The annual CO<sub>2</sub> process emissions (the output of Equation K-1, in metric tons)
- For each EAF used for the production of a ferroalloy listed in Table K-1, the annual CH<sub>4</sub> process emissions (the output of Equation K-3, in metric tons). Note, reporting of CH<sub>4</sub> process emissions is only required for ferroalloy types listed in Table K-1. If you do not produce a ferroalloy type listed in this table, enter "0" for your emissions.

For assistance in calculating CO<sub>2</sub> and CH<sub>4</sub> process emissions for an EAF, access the calculation spreadsheets for this subpart by clicking one of the links titled "Use K-1, K-3 spreadsheet to calculate," located below the red emissions data entry boxes, then follow the provided instructions.

## Step 3: Input and Output values

For each Input and Output assigned to an electric arc furnace, Subpart K collects the following data:

- The method used to determine carbon content (Provided by supplier, ASTM E1941-04, ASTM D5373-08, or ASTM C25-06)
- An indication if a missing data procedure was used or analysis was repeated to determine carbon content
- The procedure used to develop substitute data for monthly mass, if applicable (Purchase records or Other)
- The number of months that missing data procedures were followed to determine monthly mass

Click image to expand

The screenshot shows the EPA e-GGRT web application interface for Subpart K: Ferroalloy Production. The page is titled "Subpart K: Ferroalloy Production" and includes a "Subject Overview" link. The main content area is divided into several sections:

- GHG DATA AND ASSOCIATED INFORMATION:** This section displays the annual process CO<sub>2</sub> emissions (850000.0 metric tons) and annual process CH<sub>4</sub> emissions (150.00 metric tons). Below these values are links to "Use K-1, K-3 spreadsheet to calculate".
- EQUATION K-1 SUMMARY AND RESULT:** This section shows the equation for CO<sub>2</sub> emissions: 
$$E_{CO_2} = \frac{44}{12} \times \frac{2000}{2200} \times \sum_1^i (M_{reducing\ agent} \times C_{reducing\ agent}) + \frac{44}{12} \times \frac{2000}{2200} \times \sum_1^m (M_{electrode_{in}} \times C_{electrode_{in}}) + \frac{44}{12} \times \frac{2000}{2200} \times \sum_1^n (M_{ore} \times C_{ore}) + \frac{44}{12} \times \frac{2000}{2200} \times \sum_1^j (M_{flux} \times C_{flux}) - \frac{44}{12} \times \frac{2000}{2200} \times \sum_1^p (M_{product} \times C_{product}) - \frac{44}{12} \times \frac{2000}{2200} \times \sum_1^q (M_{non-product\ outgoing} \times C_{non-product\ outgoing})$$
- EQUATION K-3 SUMMARY AND RESULT:** This section shows the equation for CH<sub>4</sub> emissions: 
$$E_{CH_4} = \sum_1^i (M_{product} \times \frac{2000}{2200} \times EF_{product})$$
- 1 - (INPUT):** This section contains input data for determining carbon content. It includes a dropdown menu for "Method used to determine carbon content" (set to "Provided by supplier"), a checkbox for "A missing data procedure was used or analysis was repeated to determine carbon content" (unchecked), a dropdown menu for "The procedure used to develop substitute data for monthly mass, if applicable" (set to "Select"), and a text input field for "Number of months that missing data procedures were followed to determine monthly mass" (set to "0").
- 2 - (OUTPUT):** This section contains output data for determining carbon content. It includes a dropdown menu for "Method used to determine carbon content" (set to "Provided by supplier"), a checkbox for "A missing data procedure was used or analysis was repeated to determine carbon content" (unchecked), a dropdown menu for "The procedure used to develop substitute data for monthly mass, if applicable" (set to "Select"), and a text input field for "Number of months that missing data procedures were followed to determine monthly mass" (set to "0").

At the bottom of the page, there are "CANCEL" and "SAVE" buttons, and a footer with the text "Paperwork Reduction Act Burden Statement | Contact Us" and "e-GGRT (2010) R 02 | K Summary".

## Step 4: Save Your Data

When you have finished entering Equations K-1 and K-3 results and Input/Output data, click SAVE. You will then be directed back to the Subpart Overview page. The status of data entry for this furnace in the ELECTRIC ARC FURNACES table should now be "Complete" in the Status column.

After you save the data on this page, the next time you open the page, the calculator on the top of the page will display the CO<sub>2</sub> and CH<sub>4</sub> process emissions, rounded to the nearest 0.1 and 0.01 of a metric ton, respectively. The value displayed is for informational purposes only.

## Step 5: Repeat steps 1-4

Repeat Steps 1-4 until emissions and input/output data has been entered for all EAFs NOT monitored by a CEMS. Once you have entered the emissions information, that status of data entry for all furnaces in the ELECTRIC ARC FURNACES table should now be "Complete" in the Status column. If you have missed something, the validation report messages will help you identify any incomplete entries.

[Back to Top](#)

**See Also**


- [Screen Errors](#)
- [Using e-GGRT to Prepare Your Subpart K Report](#)
- [Subpart K Summary Information for this Facility](#)
- [Subpart K Furnace Information for Furnaces NOT Monitored by CEMS](#)
- [Subpart K Furnace Information for Furnaces Monitored by CEMS](#)
- [Subpart K Emissions Information for Furnaces Monitored by CEMS](#)
- [Subpart Validation Report](#)

## Subpart K Emissions Information for Furnaces Monitored by CEMS

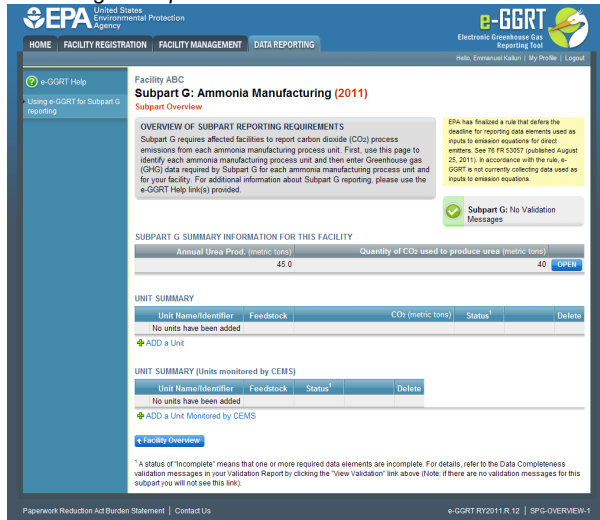
This page provides step-by-step instructions on how to enter and edit Subpart K Ferroalloy Production emissions information for process units (electric arc furnaces) that are monitored by a Continuous Emissions Monitoring System (CEMS). The CEMS MONITORING LOCATION (CML) Summary table will only appear on the Subpart Overview page when you have added an EAF that is monitored by CEMS in the ELECTRIC ARC FURNACES (Furnaces monitored by CEMS) table.

### Step 1: Add a CEMS Monitoring Location (CML)

To add a CML, click the "Add a CEMS Monitoring Location" link below the CEMS MONITORING LOCATION (CML) SUMMARY table on the Subpart Overview page

 The screenshot below is from Subpart G and is displayed as an example. The screen for other subparts may differ slightly.

*Click image to expand*



### Step 2: Define a CML and report emissions information

For each CEMS Monitoring Location, provide the following information:

- A unique unit name or identifier for the CML (see also [About Unique Unit Names](#))
- An optional description or label for the CML
- The configuration of processes or process units that are monitored by the CML:
  - Single process or process unit that exhausts to a dedicated stack
  - Multiple processes or process units that share a common stack
  - Process or process unit that shares a common stack with one or more stationary fuel combustion units
- The types of fuel combusted in the unit(s) monitored by the CEMS
- The Tier 4/CEMS methodology start and end dates
- The cumulative total of hourly CO<sub>2</sub> mass emissions for each quarter of the reporting year (metric tons) (*Do not cumulate emissions data*)

- *between quarters)*
- The total annual CO<sub>2</sub> mass emissions measured by the CEMS (metric tons)
- An indication whether emissions reported for the CEMS include emissions calculated according to 98.33(a)(4)(viii) for a slipstream that bypassed the CEMS
- The total annual biogenic CO<sub>2</sub> emissions from the combustion of all biomass fuels combined (metric tons) (*if not applicable, enter '0'*)
- The total annual non-biogenic CO<sub>2</sub> emissions which includes fossil fuel, sorbent, and process CO<sub>2</sub> emissions (metric tons)
- The total annual CH<sub>4</sub> and N<sub>2</sub>O emissions associated with the combustion of all [Table C-2](#) fuels combusted in all processes/process units monitored by the CEMS derived from application of [Equation C-10](#) (metric tons) (*if there are no combustion emissions in this CML, please enter '0'*)
- The total number of source operating hours in the reporting year
- The total operating hours in which a substitute data value was used in the emissions calculations for the CO<sub>2</sub> concentration parameter
- The total operating hours in which a substitute data value was used in the emissions calculations for the stack gas flow rate parameter
- If moisture correction is required and a continuous moisture monitor is used, the total operating hours in which a substitute data value was used in the emissions calculations for the stack gas moisture content parameter
- The total annual CO<sub>2</sub> emissions from the CEMS Monitoring Location (CML) Summary attributable to combustion (metric tons)

Do not leave any of these fields blank. If, for example, your facility has no biogenic CO<sub>2</sub> emissions, enter '0'.

For assistance in calculating annual CH<sub>4</sub> and N<sub>2</sub>O emissions using [Equation C-10](#), access the optional calculation spreadsheet by clicking one of the links titled "[Use Equation C-10 spreadsheet to calculate](#)" located below each of the red emissions information data entry boxes and follow the provided instructions

### Step 3: Identify process units monitored at a CML

To identify the process units monitored at a CML, first click the link titled "ADD/REMOVE a process unit that exhausts to this CEMS Monitoring Location" at the bottom of the page



The screenshot below is from Subpart G and is displayed as an example. The screen for other subparts may differ slightly.

*Click image to expand*

**Facility ABC (2010)**  
**Subpart G: Ammonia Manufacturing**  
 Subpart G Overview • [Add/Edit CEMS Monitoring Location](#)

**CONTINUOUS EMISSION MONITORING SYSTEM (CEMS) MONITORING LOCATION (CML) INFORMATION**  
 Use this page to uniquely identify each CEMS Monitoring Location (CML) Summary and provide the annual O&G emissions and other information described below. Use the "ADD/REMOVE" or "Process Unit" link at the bottom of the page to identify the process unit(s) monitored by this CEMS Monitoring Location (CML) Summary. For additional information about the data collected on this page, please use the e-GGRT Help link(s) provided.

**CONFIGURATION**  
 CEMS Monitoring Location Name ID:  (40 characters maximum)  
 Description (optional):   
 Configuration Type:  Select  
 Types of fuel combusted in the unit(s) monitored by the CEMS:  (200 characters maximum)

**PER 4 METHODOLOGY INFORMATION**  
 Calculation Methodology:  01/01/2010 Start Date  
 Calculation Methodology:  12/31/2010 End Date

**CUMULATIVE CO<sub>2</sub> EMISSIONS**  
 Quarter 1:  (metric tons)  
 Quarter 2:  (metric tons)  
 Quarter 3:  (metric tons)  
 Quarter 4:  (metric tons)

**ANNUAL CO<sub>2</sub> EMISSIONS**  
 Total annual CO<sub>2</sub> mass emissions (biogenic and non-biogenic) measured by the CEMS:  (metric tons)  
 Check this box to indicate that the emissions reported for the CEMS include emissions calculated according to 98.33(a)(1)(ii) for a slipstream that bypassed the CEMS:   
 Total annual biogenic CO<sub>2</sub> mass emissions:  (metric tons)  
 Total annual non-biogenic CO<sub>2</sub> mass emissions (includes fossil fuel, solvent, and process CO<sub>2</sub> emissions):  (metric tons)

**EQUATION C-10 SUMMARY AND RESULTS**  
 $CH_4 \text{ or } N_2O = 0.001 \times (H)_a \times EF$   
 Hover over an element in the equation above to reveal a definition of that element.  
 Enter CH<sub>4</sub> and N<sub>2</sub>O emissions from only combustion of Table C-2 Fuels directly below. If there are no combustion emissions from Table C-2 Fuels in this CEMS Monitoring Location, please enter 0.  
 Total CH<sub>4</sub> emissions:  (metric tons) [Use Equation C-10 spreadsheet to calculate](#)  
 Total N<sub>2</sub>O emissions:  (metric tons) [Use Equation C-10 spreadsheet to calculate](#)

**ADDITIONAL EMISSIONS INFORMATION**  
 Total number of source operating hours in the reporting year:  (hours)  
 The total operating hours in which a substitute data value was used in the emissions calculations for CO<sub>2</sub> concentration:  (hours)  
 The total operating hours in which a substitute data value was used in the emissions calculations for stack gas flow rate:  (hours)  
 The total operating hours in which a substitute data value was used in the emissions calculations for stack gas moisture content (if moisture correction is required and a continuous moisture monitor is used):  (hours)

**CEMS MONITORING LOCATION PROCESS UNITS**  
 Process Unit Name/Identifier:   
 There are no process units monitored by CEMS available for selection.  
[ADD/REMOVE/EDIT](#) a process unit that exhausts to this CEMS Monitoring Location

On the CML Process Units Selection page, use the check boxes to select the process unit(s) monitored at this CML. This will indicate that the unit(s) selected vent emission through the stack monitored by this CML.



The screenshot below is from Subpart G and is displayed as an example. The screen for other will differ slightly depending on the number of units with emissions monitored by a single CML at your facility.

Click image to expand

**SUBG 4 (2010)**  
**Subpart G: Ammonia Manufacturing**  
 Subpart G Overview • [Buster Ammonia](#) • [Add/Edit Process Units](#)

**IDENTIFY PROCESS UNIT(S)**  
 Use this page to select each process unit that is monitored by the CML. For additional information about this page, please use the e-GGRT Help link(s) provided. \* denotes a required field

**PROCESS UNIT: GASEOUS CEMS**  
 Is this process unit monitored by the CEMS Monitoring Location?  (check if true)

**Subpart Y** also collects the CO<sub>2</sub> emissions from this CEMS Monitoring Location that are attributable to process CO<sub>2</sub> emissions from this process unit (metric tons).

Click image to expand

The screenshot shows the EPA e-GGRT interface for adding or editing process units. The page title is 'Facility ABC (2010) Subpart Y: Petroleum Refineries'. A navigation bar at the top includes 'HOME', 'FACILITY REGISTRATION', 'FACILITY MANAGEMENT', and 'DATA REPORTING'. The main content area has a heading 'IDENTIFY PROCESS UNITS(S)' and a sub-heading 'Use this page to select each process unit that is monitored by the CEMS Monitoring Location (CML) Summary. For additional information about this page, please use the e-GGRT Help link(s) provided.' Below this is a table with three rows for process units CEMS1, CEMS3, and CEMS2. Each row has a checkbox for 'Is this process unit monitored by the CEMS Monitoring Location?' and a text input field for 'CO<sub>2</sub> emissions from this CEMS Monitoring Location that are attributable to process CO<sub>2</sub> emissions from this process unit'. The values in the input fields are 8000, 7100, and an empty field respectively. At the bottom of the form are 'CANCEL' and 'SAVE' buttons.

When finished selecting process unit for the CML and entering additional required information (if applicable), click SAVE. You should then be directed back to the Add/Edit a CML Location form and see the units you selected listed in the CEMS MONITORING LOCATION (CML) PROCESS UNITS table.

#### Step 4: Save entered data for a CML

When you have finished entering data for a CML, click SAVE. You will then return to the Subpart Overview page. You will see the status of data entry for the CML updated to "Complete" in the Status column in the CEMS MONITORING LOCATION (CML) SUMMARY table.

If you don't have all the data, you can enter some now, save it, and finish later by clicking on the hyperlinked name of the CML in the CEMS MONITORING LOCATION (CML) SUMMARY table.

After you save the data on this page, the next time you open the page, the calculator on the top of the page will display the CO<sub>2</sub> process emissions for the CML, rounded to the nearest 0.1 of a metric ton. The value displayed is for informational purposes only.



Note: the screenshot below is from Subpart G and is displayed as an example. The screen for other subparts will differ slightly.

Click image to expand

**Facility ABC (2010)**  
**Subpart G: Ammonia Manufacturing**  
 Subpart G Overview • [Add/Edit CEMS Monitoring Location](#)

**CONTINUOUS EMISSION MONITORING SYSTEM (CEMS) MONITORING LOCATION (CML) INFORMATION**  
 Use this page to uniquely identify each CEMS Monitoring Location (CML) Summary and provide the annual OGH emissions and other information described below. Use the "ADD/REMOVE a Process Unit" link at the bottom of the page to identify the process unit(s) monitored by this CEMS Monitoring Location (CML) Summary. For additional information about the data collected on this page, please use the e-GGRT Help link(s) provided.

**CONFIGURATION**  
 CEMS Monitoring Location Name ID: \_\_\_\_\_ (40 characters maximum)  
 Description (optional): \_\_\_\_\_  
 Configuration Type: Select  
 Types of fuel combusted in the unit(s) monitored by the CEMS: \_\_\_\_\_ (200 characters maximum)

**TIER 4 METHODOLOGY INFORMATION**  
 Calculation Methodology Start Date: 01/01/2010  
 Calculation Methodology End Date: 12/31/2010

**CUMULATIVE CO<sub>2</sub> EMISSIONS**  
 Quarter 1: \_\_\_\_\_ (metric tons)  
 Quarter 2: \_\_\_\_\_ (metric tons)  
 Quarter 3: \_\_\_\_\_ (metric tons)  
 Quarter 4: \_\_\_\_\_ (metric tons)

**ANNUAL CO<sub>2</sub> EMISSIONS**  
 Total annual CO<sub>2</sub> mass emissions (biogenic and non-biogenic) measured by the CEMS: \_\_\_\_\_ (metric tons)  
 Check this box to indicate that the emissions reported for the CEMS include emissions calculated according to 98.33(a)(1)(ii) for a slipstream that bypassed the CEMS.  
 Total annual biogenic CO<sub>2</sub> mass emissions: \_\_\_\_\_ (metric tons)  
 Total annual non-biogenic CO<sub>2</sub> mass emissions (includes fossil fuel, solvent, and process CO<sub>2</sub> emissions): \_\_\_\_\_ (metric tons)

**EQUATION C-10 SUMMARY AND RESULTS**  

$$CH_4 \text{ or } N_2O = 0.001 \times (H)_a \times EF$$
 Hover over an element in the equation above to reveal a definition of that element.  
 Enter CH<sub>4</sub> and N<sub>2</sub>O emissions from only combustion of Table C-2 Fuels directly below. If there are no combustion emissions from Table C-2 Fuels in this CEMS Monitoring Location, please enter 0.  
 Total CH<sub>4</sub> emissions: \_\_\_\_\_ (metric tons) [Use Equation C-10 spreadsheet to calculate](#)  
 Total N<sub>2</sub>O emissions: \_\_\_\_\_ (metric tons) [Use Equation C-10 spreadsheet to calculate](#)

**ADDITIONAL EMISSIONS INFORMATION**  
 Total number of source operating hours in the reporting year: \_\_\_\_\_ (hours)  
 The total operating hours in which a substitute data value was used in the emissions calculations for CO<sub>2</sub> concentration: \_\_\_\_\_ (hours)  
 The total operating hours in which a substitute data value was used in the emissions calculations for stack gas flow rate: \_\_\_\_\_ (hours)  
 The total operating hours in which a substitute data value was used in the emissions calculations for stack gas moisture content (if moisture correction is required and a continuous moisture monitor is used): \_\_\_\_\_ (hours)

**CEMS MONITORING LOCATION PROCESS UNITS**  
 Process Unit Name/Identifier: \_\_\_\_\_  
 There are no process units monitored by CEMS available for selection.  
[ADD/REMOVE/EDIT a process unit that exhausts to this CEMS Monitoring Location](#)

## Step 5: Repeat Steps 1-4

Repeat Steps 1-4 until emissions information has been entered for all CMLs. If you have missed something, the validation report messages will help you identify any incomplete entries.

[Back to Top](#)

## See Also

### Screen Errors

[Using e-GGRT to Prepare Your Subpart K Report](#)

[Subpart K Summary Information for this Facility](#)

[Subpart K Furnace Information for Furnaces NOT Monitored by CEMS](#)

[Subpart K Furnace Information for Furnaces Monitored by CEMS](#)

[Subpart K Emissions Information for Furnaces NOT Monitored by CEMS](#)

[Subpart Validation Report](#)

# Using Subpart K Calculation Spreadsheets





These optional spreadsheets are provided to assist reporters in calculating emissions and in keeping records of these calculations.

Reporters are required to keep records of these calculations under 40 CFR 98.3(g) and additional subpart-specific provisions, but are not required to use these spreadsheets or to submit any spreadsheets to EPA.

Spreadsheets may include inputs to emission equations, reporting of which EPA has deferred (See 76 FR 53057, published August 25, 2011, <http://www.gpo.gov/fdsys/pkg/FR-2011-08-25/pdf/2011-21727.pdf>).

## Overview

This help page provides guidance for working with the supplemental Subpart K Calculation Spreadsheet. The guidance provides step-by-step instructions for the following tasks:

- [Downloading the Calculation Spreadsheet](#)
- [General Information on Using a Calculation Spreadsheet](#)
- [Using the Equation K-1, K-3 Calculation Spreadsheet](#)

## Downloading the Calculation Spreadsheet

The calculation spreadsheet for Subpart K may be downloaded by clicking the link in the first column of the table below. Users may also jump to instructions for each calculation spreadsheet by clicking the link in the second column.

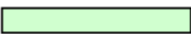



Calculation Spreadsheet (click to download)	Instructions (click to view)
<a href="#">Equation K-1, K-3 Calculation Spreadsheet.xls</a>	<a href="#">K-1, K-3 Help</a>

## General Information on Using a Calculation Spreadsheet

The guidance provided in this section applies to calculation spreadsheets for all subparts. Additional guidance specific to Subpart K is provided in the following section.

### Color coding

The calculation spreadsheets contain green input cells, gray informational cells, and red-bordered results cells filled with yellow or white. Users should use green input cells to enter all data specific to their facility, unit, or process. Gray informational cells contain parameter names, column and row headings, equation constants and subtotals. Calculation results are displayed in red-bordered results cells filled with yellow or white. For red-bordered, yellow-filled results cells, the values in these cells should be entered in the appropriate and separate calculation spreadsheet (as directed below cell) where additional calculations will be made. For red-bordered, white filled results cells, the values in these cells should be entered in e-GGRT for the appropriate process units. All cells that are not green input cells are locked and cannot be modified.

	Green input cell (data entry)
	Gray informational cells (locked)
	Red-bordered, yellow-filled results cells (enter in appropriate and separate calculation spreadsheet)
	Red-bordered, white filled results cells (enter in e-GGRT)

### Stop and Warning Messages

The calculation spreadsheets will display a stop message if the user enters a value that is invalid or a warning message if the user enters a value outside the EPA estimated range for a particular data element. For invalid data entries, the stop messages will not allow a user to proceed and the user must reenter valid data before moving forward. For data entries that are outside the EPA estimated range for a particular data element, the warning messages will allow a user to proceed if the user deems the entered value to be accurate.

## Using the Equation K-1, K-3 Calculation Spreadsheet

Use the Equation K-1, K-3 Calculation Spreadsheet to calculate the annual CO<sub>2</sub> and CH<sub>4</sub> process emissions from an electric arc furnace. A

separate spreadsheet is to be used for each furnace. Users should not use aggregated data from multiple furnaces in a single calculation spreadsheet. The Equation K-1, K-3 Calculation Spreadsheet performs the calculations using Equations K-1 and K-3, provided below (see calculation spreadsheet for definitions of variables).

(Equation K-1)

$$\begin{aligned}
 E_{CO_2} = & \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^i \left( M_{reducing\ agent_i} \times C_{reducing\ agent_i} \right) \\
 & + \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^m \left( M_{electrode_m} \times C_{electrode_m} \right) \\
 & + \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^h \left( M_{ore_h} \times C_{ore_h} \right) \\
 & + \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^j \left( M_{flux_j} \times C_{flux_j} \right) \\
 & - \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^k \left( M_{product\ outgoing_k} \times C_{product\ outgoing_k} \right) \\
 & - \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^l \left( M_{non-product\ outgoing_l} \times C_{non-product\ outgoing_l} \right)
 \end{aligned}$$

(Equation K-3)

$$E_{CH_4} = \sum_1^i \left( M_{product_i} \times \frac{2000}{2205} \times EF_{product_i} \right)$$

Begin by entering the facility name, your name, the furnace name or identifier, the reporting period and any additional comments in the green input cells of the General Information table located immediately below the equations in the calculation spreadsheet. This is for your records.

Facility Name:	
Reporter Name:	
Unit Name/ ID:	
Reporting Period:	
Comments:	
Unit Type:	EAF

Next, enter the requested information in the green input cells of the input data tables.

**Input Data for Reducing Agents**

Space for up to five materials is provided.

Use additional copies of this spreadsheet for additional materials (i.e, use multiple spreadsheets to calculate contributions to  $E_{CO_2}$  and  $E_{CH_4}$ , and add the contributions prior to entering in eGGRT).

	i=1	i=2	i=3	i=4	i=5
$[M_{\text{reducing agent } i}]$ = Annual mass of reducing agent i fed, charged, or otherwise introduced into the EAF (tons)					
$[C_{\text{reducing agent } i}]$ = Carbon content in reducing agent i (percent by weight, expressed as a decimal fraction)					

**Input Data for Electrodes**

Space for up to five materials is provided. Use additional copies of this spreadsheet for additional materials.

Use additional copies of this spreadsheet for additional materials (i.e, use multiple spreadsheets to calculate contributions to  $E_{CO_2}$  and  $E_{CH_4}$ , and add the contributions prior to entering in eGGRT).

	m=1	m=2	m=3	m=4	m=5
$[M_{\text{electrode } m}]$ = Annual mass of carbon electrode m consumed in the EAF (tons)					
$[C_{\text{electrode } m}]$ = Carbon content of the carbon electrode m (percent by weight, expressed as a decimal fraction)					

**Input Data for Ore**

Space for up to five materials is provided. Use additional copies of this spreadsheet for additional materials.

Use additional copies of this spreadsheet for additional materials (i.e, use multiple spreadsheets to calculate contributions to  $E_{CO_2}$  and  $E_{CH_4}$ , and add the contributions prior to entering in eGGRT).

	h=1	h=2	h=3	h=4	h=5
$[M_{\text{ore } h}]$ = Annual mass of ore h charged to the EAF (tons)					
$[C_{\text{ore } h}]$ = Carbon content in ore h (percent by weight, expressed as a decimal fraction)					

**Input Data for Flux**

Space for up to five materials is provided. Use additional copies of this spreadsheet for additional materials.

Use additional copies of this spreadsheet for additional materials (i.e, use multiple spreadsheets to calculate contributions to  $E_{CO_2}$  and  $E_{CH_4}$ , and add the contributions prior to entering in eGGRT).

	j=1	j=2	j=3	j=4	j=5
$[M_{\text{flux } j}]$ = Annual mass of flux material j fed, charged, or otherwise introduced into the EAF to facilitate slag formation (tons)					
$[C_{\text{flux } j}]$ = Carbon content in flux material j (percent by weight, expressed as a decimal fraction)					

**Input Data for Product**

Space for up to five materials is provided. Use additional copies of this spreadsheet for additional materials.

Use additional copies of this spreadsheet for additional materials (i.e, use multiple spreadsheets to calculate contributions to  $E_{CO_2}$  and  $E_{CH_4}$ , and add the contributions prior to entering in eGGRT).

	k=1 or i=1	k=2 or i=2	k=3 or i=3	k=4 or i=4	k=5 or i=5
$[M_{\text{product } k}]$ = Annual mass of alloy product k tapped from EAF (tons)					
$[C_{\text{product } k}]$ = Carbon content in alloy product k (percent by weight, expressed as a decimal fraction)					
$[EF_{\text{product } k}]$ = $CH_4$ emission factor for alloy product k from Table K-1 in this subpart (kg of $CH_4$ emissions per metric ton of alloy product k)					

**Input Data for non-Product Outgoing Material**

Space for up to five materials is provided. Use additional copies of this spreadsheet for additional materials.

Use additional copies of this spreadsheet for additional materials (i.e, use multiple spreadsheets to calculate contributions to  $E_{CO_2}$  and  $E_{CH_4}$ , and add the contributions prior to entering in eGGRT).

	l=1	l=2	l=3	l=4	l=5
$[M_{\text{non-product outgoing } l}]$ = Annual mass of non-product outgoing material l removed from EAF (tons)					
$[C_{\text{non-product outgoing } l}]$ = Carbon content in non-product outgoing material l (percent by weight, expressed as a decimal fraction)					

The calculation spreadsheet will then calculate the annual  $CO_2$  and  $CH_4$  process emissions from this electric arc furnace. The calculated values will be displayed in red-bordered cells in the K-1, K-3 Results tables at the bottom of the spreadsheet. This value should be entered in e-GGRT for this furnace.

**Annual  $CO_2$  Emissions (metric tons) from Equation K-1**

$[E_{CO_2}]$ = Annual process $CO_2$ emissions from an individual EAF (metric tons)	0.00
---	------

Enter this value in e-GGRT

**Annual  $CH_4$  Emissions (metric tons) from Equation K-3**

$[E_{CH_4}]$ = Annual process $CH_4$ emissions from an individual EAF (metric tons)	0.00
---	------

Enter this value in e-GGRT

