

Calcium Carbide Production

Subpart XX, Greenhouse Gas Reporting Program

OVERVIEW

Subpart XX of the Greenhouse Gas Reporting Program (GHGRP) (40 CFR 98.500 – 98.508) applies to any facility that produces calcium carbide (CaC₂) and meets the Subpart XX source category definition. Some subparts have thresholds that determine applicability for reporting, and some do not. To decide whether your facility must report under this subpart, please refer to 40 CFR 98.501 and the GHGRP [Applicability Tool](#).

This Information Sheet is intended to help facilities reporting under Subpart XX understand how the source category is defined, what greenhouse gases (GHGs) must be reported, how GHG emissions must be calculated and shared with EPA, and where to find more information.



How is This Source Category Defined?

The Subpart XX source category applies to facilities that produce calcium carbide (CaC₂).



What GHGs Must Be Reported?

Facilities that produce CaC₂ must report the following emissions:

- Carbon dioxide (CO₂) process emissions from each CaC₂ process unit or furnace used to produce CaC₂.
- CO₂, methane (CH₄), and nitrous oxide (N₂O) emissions from each stationary combustion unit on site under 40 CFR Part 98, Subpart C (General Stationary Fuel Combustion Sources), found at 40 CFR 98.30 – 98.38.

If multiple Greenhouse Gas Reporting Program (GHGRP) source categories are co-located at a facility, the facility may also need to report greenhouse gas (GHG) emissions under a different subpart. Please refer to the relevant information sheet for a summary of the rule requirements for any other source categories located at the facility.



How Must GHG Emissions Be Calculated?

If a CaC₂ process unit vents CO₂ process emissions through the same stack as any combustion unit or process equipment that reports CO₂ emissions using a continuous emissions monitoring system (CEMS) that complies with the Tier 4 Calculation Methodology in Subpart C, then the owner or operator must calculate and report under Subpart XX the combined stack emissions according to the Tier 4 Calculation Methodology specified in 40 CFR 98.33(a)(4) and all associated requirements for Tier 4 in Subpart C.

For other CaC₂ process units, owners or operators can either:

- Operate and maintain a CEMS according to the Tier 4 Calculation Methodology specified in 40 CFR 98.33(a)(4) to measure combined process and combustion CO₂ emissions and report these emissions under Subpart XX, or

- Calculate and report under Subpart XX the annual process CO₂ emissions from the CaC₂ process unit using the carbon (C) mass balance procedures specified below:
 - For each CaC₂ process unit, determine the annual mass of C in each C -containing input and output material for the CaC₂ process unit and estimate annual process CO₂ emissions from the CaC₂ process unit using Equation 1 of XX. C-containing input materials include C electrodes and carbonaceous reducing agents. If a specific input or output material contributes less than 1% of the total C into or out of the process, do not include the material in Equation 1 of XX.

Equation 1 of XX:

$$E_{CO_2} = \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^i (M_{reducing\ agent_i} \times C_{reducing\ agent_i}) + \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^m (M_{electrode_m} \times C_{electrode_m}) - \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^k (M_{product\ outgoing_k} \times C_{product\ outgoing_k}) - \frac{44}{12} \times \frac{2000}{2205} \times \sum_1^l (M_{non-product\ outgoing_l} \times C_{non-product\ outgoing_l})$$

E_{CO_2} = Annual process CO₂ emissions from an individual CaC₂ process unit (metric tons).

$\frac{44}{12}$ = Ratio of molecular weights, CO₂ to C.

$\frac{2000}{2205}$ = Conversion factor to convert tons to metric tons.

$M_{reducing\ agent_i}$ = Annual mass of reducing agent *i* fed, charged, or otherwise introduced into the CaC₂ process unit (tons).

$C_{reducing\ agent_i}$ = C content in reducing agent *i* (% by weight, expressed as a decimal fraction).

$M_{electrode_m}$ = Annual mass of C electrode *m* consumed in the CaC₂ process unit (tons).

$C_{electrode_m}$ = C content of the carbon electrode *m* (% by weight, expressed as a decimal fraction).

$M_{product\ outgoing_k}$ = Annual mass of alloy product *k* tapped from the CaC₂ process unit (tons).

$C_{product\ outgoing_k}$ = C content in alloy product *k* (% by weight, expressed as a decimal fraction).

$M_{non-product\ outgoing_l}$ = Annual mass of non-product outgoing material *l* removed from the CaC₂ unit (tons).

$C_{non-product\ outgoing_l}$ = C content in non-product outgoing material *l* (% by weight, expressed as a decimal fraction).

- Determine the combined annual process CO₂ emissions from the CaC₂ process units at the facility using Equation 2 of XX.

Equation 2 of XX: $CO_2 = \sum_1^k E_{CO_2k}$

CO_2 = Annual process CO₂ emissions from CaC₂ process units at a facility used to produce CaC₂ (metric tons).

E_{CO_2k} = Annual process CO₂ emissions calculated from CaC₂ process unit *k* calculated using Equation 1 of XX (metric tons).

k = Total number of CaC₂ process units at facility.

- Determine the annual mass for each material used for the calculations of annual process CO₂ emissions using Equation 1 of XX by summing the monthly mass for the material determined for each month of the calendar year. The monthly mass may be determined using plant instruments used for accounting purposes, including either direct measurement of the quantity of the material placed in the unit or by calculations using process operating information. For each material identified, determine the average C content of the material

consumed, used, or produced in the calendar year using the methods specified in Equations 1 and 2 of XX above. If a specific process input or output contributes less than 1% of the total mass of C into or out of the process, do not determine the monthly mass or annual C content of that input or output. In addition, facilities must collect:

- Information provided by the material supplier; and
- At least three representative samples of the material inputs and outputs each year and analyze the C content of the material at least annually using the following American Society for Testing and Materials (ASTM) standard methods, as applicable:
 - ASTM D5373-08 (see § 98.7), for analysis of carbonaceous reducing agents and C electrodes;
 - ASTM C25-06 (see § 98.7) for analysis of materials such as limestone or dolomite.

A checklist for data that must be monitored is available here: [Subpart XX Monitoring Checklist](#).



What Information Must Be Reported?

In addition to the information required by the General Provisions in Subpart A, found at 40 CFR 98.3(c), the CaC₂ production facility must report the following under Subpart XX:

- Annual facility CaC₂ production capacity (tons);
- The annual facility production of CaC₂ (tons);
- Total number of CaC₂ process units at facility used for production of CaC₂;
- Annual facility consumption of petroleum coke (tons);
- Each end use of any CaC₂ produced and sent off site;
- If the facility produces acetylene (C₂H₂) on site, provide the following information:
 - The annual production of C₂H₂ at the facility (tons);
 - The annual quantity of CaC₂ used to produce C₂H₂ at the facility (tons); and
 - Each end use of any C₂H₂ produced on-site.
- If a CEMS is used to measure CO₂ emissions, report under this subpart the information required by 40 CFR 98.36 for the Tier 4 Calculation Methodology, as well as the following information:
 - Annual CO₂ emissions (in metric tons) from each CEMS monitoring location measuring process emissions from the CaC₂ process unit; and
 - Identification number of each process unit.
- If a CEMS is not used to measure CO₂ process emissions, and the carbon mass balance procedure is used to determine CO₂ emissions using Equations 1 and 2 of XX, report the following information:
 - Annual process CO₂ emissions (in metric tons) from each CaC₂ process unit; and
 - List the method used for the determination of C content for each input and output material included in the calculation of annual process CO₂ emissions for each CaC₂ process unit (i.e., supplier provided information, analyses of representative samples you collected).

A complete record of all measured parameters used in GHG emissions calculations is required. Whenever a quality-assured value of a required parameter is unavailable, a substitute data value for the missing parameter must be used in the calculations.

- If using the C mass balance procedure contained in Equations 1 and 2 of XX to determine CO₂ emissions for a CaC₂ process unit, 100% data availability is required for the C content of the input

and output materials. Repeat the test for average C contents of inputs according to the procedures in 40 CFR 98.504(b) if data are missing.

- For missing records of the monthly mass of C-containing inputs and outputs, the substitute data value must be based on the best available estimate of the mass of the inputs and outputs from all available process data or data used for accounting purposes, such as purchase records.

Reporters must also document and keep records of the procedures used for all estimates using missing data procedures and report for each CaC₂ production process unit how monthly mass of C-containing inputs and outputs with missing data were determined and the number of months the missing data procedures were used.



What Records Must Be Maintained?

Reporters are required to retain records that pertain to their annual GHGRP report for at least three years after the date the report is submitted. Please see the [Subpart A Information Sheet](#) and 40 CFR 98.3(g) for general recordkeeping requirements. Specific recordkeeping requirements for Subpart XX are listed at 40 CFR 98.507.



When and How Must Reports Be Submitted?

Reporters must submit their annual GHGRP reports for the previous calendar year to the EPA by March 31st, unless the 31st falls on a Saturday, Sunday, or federal holiday, in which case reports are due on the next business day. Annual reports must be submitted electronically using the [electronic Greenhouse Gas Reporting Tool \(e-GGRT\)](#), the GHGRP's online reporting system.

Additional information on setting up user accounts, registering a facility, and submitting annual reports is available on the [GHGRP Help webpage](#).



When Can a Facility Stop Reporting?

A facility may discontinue reporting under several scenarios, which are summarized in Subpart A (found at 40 CFR 98.2(j)) and the [Subpart A Information Sheet](#).



For More Information

For additional information on Subpart XX, please visit the [Subpart XX webpage](#). For additional information on the GHGRP, please visit the [GHGRP website](#), which includes additional information sheets, [data](#) previously reported to the GHGRP, [training materials](#), and links to Frequently Asked Questions ([FAQs](#)). For questions that cannot be answered through the GHGRP website, please contact us at: GHGreporting@epa.gov.

This Information Sheet is provided solely for informational purposes. It does not replace the need to read and comply with the regulatory text contained in the rule. Rather, it is intended to help reporting facilities and suppliers understand key provisions of the GHGRP. It does not provide legal advice; have a legally binding effect; or expressly or implicitly create, expand, or limit any legal rights, obligations, responsibilities, expectations, or benefits with regard to any person or entity.