

Adipic Acid Production

Subpart E, Greenhouse Gas Reporting Program

OVERVIEW

Subpart E of the Greenhouse Gas Reporting Program (GHGRP) (40 CFR 98.50 – 98.58) applies to any facility that contains an adipic acid ((CH₂)₄(COOH)₂) production facility and meets the Subpart E 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 98.51 and the GHGRP [Applicability Tool](#).

This Information Sheet is intended to help facilities reporting under Subpart E 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 adipic acid ((CH₂)₄(COOH)₂) production source category consists of all processes that use oxidation to produce (CH₂)₄(COOH)₂.



What GHGs Must Be Reported?

(CH₂)₄(COOH)₂ production facilities must report nitrous oxide (N₂O) process emissions from all (CH₂)₄(COOH)₂ production units combined.

If multiple Greenhouse Gas Reporting Program (GHGRP) source categories are co-located at a facility, the facility may need to report greenhouse gas (GHG) emissions under a different subpart. For example, facilities must report carbon dioxide (CO₂), N₂O, and methane (CH₄) emissions from each stationary combustion unit on site by following the requirements of Subpart C (Stationary Fuel Combustion) found at 40 CFR 98.30 – 98.38. 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?

(CH₂)₄(COOH)₂ production facilities must calculate N₂O emissions for each (CH₂)₄(COOH)₂ production unit using one of the following two options:

- Calculate N₂O process emissions from (CH₂)₄(COOH)₂ production using Equation E-4.
 - Perform an annual performance test to measure the N₂O concentration and volumetric flow rate from each oxidation process and the (CH₂)₄(COOH)₂ production rate recorded during the test.
 - Adjust the N₂O process emissions for the amount of N₂O removed, if applicable, using the appropriate equation (Equation E-3a, Equation E-3b, Equation E-3c, or Equation E-3d). Facilities that use N₂O abatement devices (such as nonselective catalytic reduction) after the test point must determine a destruction factor for the abatement device, the percent of time

the abatement device operated, and the percentage of the vent stream that was directed to the abatement device. The destruction efficiency (DE) can be determined through process knowledge or test data or it can be based on information specified by the abatement device manufacturer.

- Calculate the site-specific emission factor (EF) using the adjusted N₂O process emissions rate and the (CH₂)₄(COOH)₂ production rate measured during the performance test (Equation E-1).
- Directly measure N₂O emissions using an EPA-approved alternative method to the site-specific EF.
- All new alternative methods and any changes to a previously approved method must be approved by the Administrator prior to being used. Once approved an alternative method may be used in subsequent years provided no changes are made to the method.¹

A checklist for data that must be monitored is available here: [Subpart E 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 following must be reported:

- Annual process N₂O emissions (metric tons).
- Annual amount of process N₂O emissions from the (CH₂)₄(COOH)₂ production facility that is sold or transferred off-site (metric tons).
- Number of different abatement technologies (if applicable).
- Type(s) of abatement technology or technologies used (if applicable).
- Date of installation for each type of abatement technology used (if applicable).
- Abatement technology DE for each abatement technology (percent destruction).
- Abatement utilization factor for each abatement technology (fraction of annual production that abatement technology is operating).
- Number of times in the reporting year that missing data procedures were followed to measure (CH₂)₄(COOH)₂ production (months).
- Fraction control factor for each abatement technology (percent of total emissions from the production unit that are sent to the abatement technology), if equation E-3c is used.
- Annual amount of raw material(s) used to produce (CH₂)₄(COOH)₂, as applicable:
 - Annual quantity of cyclohexane (C₆H₁₂) (tons), or
 - Annual quantity of cyclohexanone (C₆H₁₀O) and cyclohexanol (C₆H₁₂O) mixture (tons).
- Annual percent N₂O emission reduction for all production units combined.

If a performance test was conducted and a site-specific EF calculated, the following information must also be reported for each (CH₂)₄(COOH)₂ process production unit:

- Test method used for performance test.
- N₂O concentration during performance test (parts per million (ppm) N₂O).
- Volumetric flow rate during performance test (dry standard cubic feet per hour (dscf/hr)).

¹ Prior to reporting year 2019, alternative methods were re-approved annually by the Administrator.

- Number of test runs.
- Number of times in the reporting year that a performance test had to be repeated (number).

If an Administrator approved an alternative method is used for determining N₂O emissions, each annual report must also contain the following information:

- Name of alternative method.
- Description of alternative method.
- Request date.
- Approval date.



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 E are listed at 40 CFR 98.57.



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(i)) and the [Subpart A Information Sheet](#).



For More Information

For additional information on Subpart E, please visit the [Subpart E 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 [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.