

Environmental Protection Agency

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§ 98.73 Calculating GHG emissions.

You must calculate and report the annual process CO₂ emissions from each ammonia manufacturing process unit using the procedures in either paragraph (a) or (b) of this section.

(a) Calculate and report under this subpart the process CO₂ emissions by operating and maintaining CEMS according to the Tier 4 Calculation Methodology specified in § 98.33(a)(4) and all associated requirements for Tier 4 in

subpart C of this part (General Stationary Fuel Combustion Sources).

(b) Calculate and report under this subpart process CO₂ emissions using the procedures in paragraphs (b)(1) through (b)(6) of this section for gaseous feedstock, liquid feedstock, or solid feedstock, as applicable.

(1) *Gaseous feedstock.* You must calculate, from each ammonia manufacturing unit, the CO₂ process emissions from gaseous feedstock according to Equation G-1 of this section:

$$CO_{2,G,k} = \left(\sum_{n=1}^{12} \frac{44}{12} * Fdstk_{n,k} * CC_n * \frac{MW}{MVC} \right) * 0.001 \quad (\text{Eq. G-1})$$

Where:

CO_{2,G} = Annual CO₂ emissions arising from feedstock consumption (metric tons).
 Fdstk_n = Volume of the gaseous feedstock used in month n (scf of feedstock).
 CC_n = Carbon content of the gaseous feedstock, for month n (kg C per kg of feedstock), determined according to 98.74(c).
 MW = Molecular weight of the gaseous feedstock (kg/kg-mole).
 MVC = Molar volume conversion factor (849.5 scf per kg-mole at standard conditions).

44/12 = Ratio of molecular weights, CO₂ to carbon.
 0.001 = Conversion factor from kg to metric tons.
 k = Processing unit.
 n = Number of month.

(2) *Liquid feedstock.* You must calculate, from each ammonia manufacturing unit, the CO₂ process emissions from liquid feedstock according to Equation G-2 of this section:

$$CO_{2,L,k} = \left(\sum_{n=1}^{12} \frac{44}{12} * Fdstk_{n,k} * CC_n \right) * 0.001 \quad (\text{Eq. G-2})$$

Where:

CO_{2,L} = Annual CO₂ emissions arising from feedstock consumption (metric tons).
 Fdstk_n = Volume of the liquid feedstock used in month n (gallons of feedstock).
 CC_n = Carbon content of the liquid feedstock, for month n (kg C per gallon of feedstock) determined according to 98.74(c).
 44/12 = Ratio of molecular weights, CO₂ to carbon.

0.001 = Conversion factor from kg to metric tons.
 k = Processing unit.
 n = Number of month.

(3) *Solid feedstock.* You must calculate, from each ammonia manufacturing unit, the CO₂ process emissions from solid feedstock according to Equation G-3 of this section:

$$CO_{2,S,k} = \left(\sum_{n=1}^{12} \frac{44}{12} * Fdstk_{n,k} * CC_n \right) * 0.001 \quad (\text{Eq. G-3})$$

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Where:

CO_{2,S} = Annual CO₂ emissions arising from feedstock consumption (metric tons).

Fdstk_n = Mass of the solid feedstock used in month n (kg of feedstock).

CC_n = Carbon content of the solid feedstock, for month n (kg C per kg of feedstock), determined according to 98.74(c).

44/12 = Ratio of molecular weights, CO₂ to carbon.

0.001 = Conversion factor from kg to metric tons.

k = Processing unit.

n = Number of month.

(4) You must calculate the annual process CO₂ emissions from each ammonia processing unit k at your facility summing emissions, as applicable from Equation G-1, G-2, and G-3 of this section using Equation G-4.

$$E_{CO_2,k} = CO_{2,G} + CO_{2,S} + CO_{2,L} \quad (\text{Eq. G-4})$$

Where:

E_{CO_{2,k}} = Annual CO₂ emissions from each ammonia processing unit k (metric tons).

k = Processing unit.

(5) You must determine the combined CO₂ emissions from all ammonia processing units at your facility using Equation G-5 of this section.

$$CO_2 = \sum_{k=1}^n E_{CO_2,k} \quad (\text{Eq. G-5})$$

Where:

CO₂ = Annual combined CO₂ emissions from all ammonia processing units (metric tons).

E_{CO_{2,k}} = Annual CO₂ emissions from each ammonia processing unit (metric tons).

k = Processing unit.

n = Total number of ammonia processing units.

(6) If applicable, ammonia manufacturing facilities that utilize the waste recycle stream as a fuel must calculate emissions associated with the waste stream for each ammonia process unit according to Equation G-6 of this section:

$$CO_2 = \left(\sum_{n=1}^{12} \frac{44}{12} * \text{RecycleStream}_n * CC_n * \frac{MW}{MVC} \right) * 0.001 \quad (\text{Eq. G-6})$$

Where:

CO₂ = Annual CO₂ contained in waste recycle stream (metric tons).

RecycleStream_n = Volume of the waste recycle stream in month n (scf).

CC_n = Carbon content of the waste recycle stream, for month n (kg C per kg of waste recycle stream) determined according to 98.74(f).

MW = Molecular weight of the waste recycle stream (kg/kg-mole).

MVC = Molar volume conversion factor (849.5 scf per kg-mole at standard conditions).

44/12 = Ratio of molecular weights, CO₂ to carbon.

0.001 = Conversion factor from kg to metric tons.

n = Number of month

(c) If GHG emissions from an ammonia manufacturing unit are vented

through the same stack as any combustion unit or process equipment that reports CO₂ emissions using a CEMS that complies with the Tier 4 Calculation Methodology in subpart C of this part (General Stationary Fuel Combustion Sources), then the calculation methodology in paragraph (b) of this section shall not be used to calculate process emissions. The owner or operator shall report under this subpart the combined stack emissions according to the Tier 4 Calculation Methodology in §98.33(a)(4) and all associated requirements for Tier 4 in subpart C of this part.