§ 98.421 Reporting threshold.

Any supplier of CO\textsubscript{2} who meets the requirements of §98.2(a)(4) of subpart A of this part must report the mass of CO\textsubscript{2} captured, extracted, imported, or exported.

§ 98.422 GHGs to report.

(a) Mass of CO\textsubscript{2} captured from production process units.

(b) Mass of CO\textsubscript{2} extracted from CO\textsubscript{2} production wells.

(c) Mass of CO\textsubscript{2} imported.

(d) Mass of CO\textsubscript{2} exported.

§ 98.423 Calculating CO\textsubscript{2} supply.

(a) Except as allowed in paragraph (b) of this section, calculate the annual mass of CO\textsubscript{2} captured, extracted, imported, or exported through each flow meter in accordance with the procedures specified in either paragraph (a)(1) or (a)(2) of this section. If multiple flow meters are used, you shall calculate the annual mass of CO\textsubscript{2} for all flow meters according to the procedures specified in paragraph (a)(3) of this section.

(1) For each mass flow meter, you shall calculate quarterly the mass of CO\textsubscript{2} in a CO\textsubscript{2} stream in metric tons by multiplying the mass flow by the concentration data, according to Equation PP–1 of this section. Mass flow and concentration data measurements shall be made in accordance with §98.424 of this subpart.

\[
\text{CO}_2,u = \sum_{p=1}^{4} Q_{p,u} * C_{\text{CO}_2,p,u} \quad (\text{Eq. PP–1})
\]

Where:

\( \text{CO}_2,u \) = Annual mass of CO\textsubscript{2} (metric tons) through flow meter \( u \).

\( C_{\text{CO}_2,p,u} \) = Quarterly CO\textsubscript{2} concentration measurement in flow for flow meter \( u \) in quarter \( p \) (wt. \% CO\textsubscript{2}).

\( Q_{p,u} \) = Quarterly mass flow rate measurement for flow meter \( u \) in quarter \( p \) (metric tons).

\( p \) = Quarter of the year.

\( u \) = Flow meter.

(2) For each volumetric flow meter, you shall calculate quarterly the mass of CO\textsubscript{2} in a CO\textsubscript{2} stream in metric tons by multiplying the volumetric flow by the concentration and density data, according to Equation PP–2 of this section. Volumetric flow, concentration, and density data measurements shall be made in accordance with §98.424 of this section.

\[
\text{CO}_2,u = \sum_{p=1}^{4} Q_p * D_p * C_{\text{CO}_2,p} \quad (\text{Eq. PP–2})
\]

Where:

\( \text{CO}_2,u \) = Annual mass of CO\textsubscript{2} (metric tons) through flow meter \( u \).

\( C_{\text{CO}_2,p} \) = Quarterly CO\textsubscript{2} concentration measurement in flow for flow meter \( u \) in quarter \( p \) (measured as either volume \% CO\textsubscript{2} or weight \% CO\textsubscript{2}).

\( Q_p \) = Quarterly volumetric flow rate measurement for flow meter \( u \) in quarter \( p \) (standard cubic meters).

\( D_p \) = Density of CO\textsubscript{2} in quarter \( p \) (metric tons CO\textsubscript{2} per standard cubic meter) for flow meter \( u \) if \( C_{\text{CO}_2,p} \) is measured as volume \% CO\textsubscript{2} or density of the whole CO\textsubscript{2} stream for flow meter \( u \) (metric tons per standard
(i) For facilities with production process units that capture a CO₂ stream and either measure it after segregation or do not segregate the flow, calculate the total CO₂ supplied in accordance with Equation PP-3a.

\[
\text{CO}_2 = \sum_{p=1}^{U} \text{CO}_2,u
\]

(Eq. PP-3a)

where:
\( \text{CO}_2 \) = Total annual mass of CO₂ (metric tons).
\( \text{CO}_2,u \) = Annual mass of CO₂ (metric tons) through flow meter \( u \).
\( u \) = Flow meter.

(ii) For facilities with production process units that capture a CO₂ stream and measure it ahead of segregation, calculate the total CO₂ supplied in accordance with Equation PP-3b.

\[
\text{CO}_2 = \sum_{p=1}^{U} \text{CO}_2,u - \sum_{p=1}^{V} \text{CO}_2,v
\]

(Eq. PP-3b)

where:
\( \text{CO}_2 \) = Total annual mass of CO₂ (metric tons).
\( \text{CO}_2,u \) = Annual mass of CO₂ (metric tons) supplied in containers delivered by CO₂ stream \( u \).
\( C_{\text{CO}_2,p,u} \) = Quarterly CO₂ concentration measurement of CO₂ stream \( u \) that delivers CO₂ to containers in quarter \( p \) (wt. %CO₂).
\( Q_{p,u} \) = Quarterly mass of contents supplied in all containers delivered by CO₂ stream \( u \) in quarter \( p \) (metric tons).
\( p \) = Quarter of the year.
\( u \) = Main flow meter.
\( v \) = Subsequent flow meter.

(b) As an alternative to paragraphs (a)(1) through (3) of this section for CO₂ that is supplied in containers, calculate the annual mass of CO₂ supplied in containers delivered by each CO₂ stream in accordance with the procedures specified in either paragraph (b)(1) or (b)(2) of this section. If multiple CO₂ streams are used to deliver CO₂ to containers, you shall calculate the annual mass of CO₂ supplied in containers delivered by all CO₂ streams according to the procedures specified in paragraph (b)(3) of this section.

(1) For each CO₂ stream that delivers CO₂ to containers, for which mass is measured, you shall calculate CO₂ supply in containers using Equation PP-1 of this section.

where:
\( \text{CO}_{2,u} \) = Annual mass of CO₂ (metric tons) supplied in containers delivered by CO₂ stream \( u \).
\( C_{\text{CO}_2,p,u} \) = Quarterly CO₂ concentration measurement of CO₂ stream \( u \) that delivers CO₂ to containers in quarter \( p \) (measured as either volume % CO₂ or weight % CO₂).
\( Q_{p,u} \) = Quarterly volume of contents supplied in all containers delivered by CO₂ stream \( u \) in quarter \( p \) (standard cubic meters).
\( D_{p,u} \) = Quarterly CO₂ density determination for CO₂ stream \( u \) in quarter \( p \) (metric tons per standard cubic meter) if CO₂ is measured as weight % CO₂, or (standard cubic meter) if \( C_{\text{CO}_2,p,u} \) is measured as weight % CO₂.

\( p \) = Quarter of the year.
\( u \) = Flow meter.

(3) To aggregate data, use either Equation PP-3a or PP-3b in this paragraph, as appropriate.
§ 98.424 Monitoring and QA/QC requirements.

(a) Determination of quantity.

(1) Reporters following the procedures in §98.423(a) shall determine quantity using a flow meter or meters located in accordance with this paragraph.

(i) If the CO₂ stream is segregated such that only a portion is captured for commercial application or for injection, you must locate the flow meter according to the following:

(A) For reporters following the procedures in §98.423(a)(3)(i), you must locate the flow meter(s) after the point of segregation.

(B) For reporters following the procedures in paragraph (a)(3)(ii) of §98.423, you must locate the main flow meter(s) on the captured CO₂ stream(s) prior to the point of segregation and the subsequent flow meter(s) on the CO₂ stream(s) for on-site use after the point of segregation. You may only follow the procedures in paragraph (a)(3)(ii) of §98.423 if the CO₂ stream(s) for on-site use is/are the only diversion(s) from the main, captured CO₂ stream(s) after the main flow meter location(s).

(ii) Reporters that do not have a mass flow meter or volumetric flow meter installed to measure the flow of a CO₂ stream that meets the requirements of paragraph (a)(1)(i) of this section shall base calculations in §98.423 of this subpart on the flow of gas transferred off site using a mass flow meter or a volumetric flow meter located at the point of off-site transfer.

(2) Reporters following the procedures in paragraph (b) of §98.423 shall determine quantity in accordance with this paragraph.

(i) Reporters that supply CO₂ in containers using weigh bills, scales, or load cells shall measure the mass of contents of each CO₂ container to which the CO₂ stream is delivered, sum the mass of contents supplied in all containers to which the CO₂ stream is delivered during each quarter, sample the CO₂ stream delivering CO₂ to containers on a quarterly basis to determine the composition of the CO₂ stream, and apply Equation PP-1.

\[
CO₂ = \sum_{p=1}^{i} Q
\]

where:

\( CO₂ \) = Annual mass of CO₂ (metric tons) supplied in containers delivered by CO₂ stream u.

\( Q \) = Annual mass in all CO₂ containers imported or exported during the reporting year (metric tons).

(3) To aggregate data, sum the mass of CO₂ supplied in containers delivered by all CO₂ streams in accordance with Equation PP-3a of this section.

The formula is:

\[
CO₂_{\text{ aggregate}} = \sum_{u=1}^{n} CO₂_{u}
\]

where:

\( CO₂_{\text{ aggregate}} \) = Annual mass of CO₂ (metric tons) supplied in containers delivered by all CO₂ streams.

\( CO₂_{u} \) = Annual mass of CO₂ (metric tons) supplied in containers delivered by CO₂ stream u.

\( u \) = CO₂ stream that delivers to containers.

\( p \) = Quarter of the year.

\( u \) = CO₂ stream that delivers to containers.

(c) Importers or exporters that import or export CO₂ in containers shall calculate the total mass of CO₂ imported or exported in metric tons based on summing the mass in each CO₂ container using weigh bills, scales, or load cells according to Equation PP-4 of this section.

\[
EQ. PP-4
\]

where:

\( CO₂ \) = Annual mass of CO₂ (metric tons).

\( Q \) = Annual mass in all CO₂ containers imported or exported during the reporting year (metric tons).