§ 98.421 Reporting threshold.

Any supplier of CO₂ who meets the requirements of § 98.2(a)(4) of subpart A of this part must report the mass of CO₂ captured, extracted, imported, or exported.

§ 98.422 GHGs to report.

(a) Mass of CO₂ captured from production process units.

(b) Mass of CO₂ extracted from CO₂ production wells.

(c) Mass of CO₂ imported.

(d) Mass of CO₂ exported.

§ 98.423 Calculating CO₂ supply.

(a) Except as allowed in paragraph (b) of this section, calculate the annual mass of CO₂ 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 CO₂ 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 CO₂ in a CO₂ stream in metric tons by multiplying the mass flow by the composition data, according to Equation PP–1 of this section. Mass flow and composition data measurements shall be made in accordance with § 98.424 of this subpart.

\[
CO_{2,u} = \sum_{p=1}^{4} Q_{p,u} \cdot C_{CO_2,p,u} \quad \text{(Eq. PP-1)}
\]

Where:

\(CO_{2,u}\) = Annual mass of CO₂ (metric tons) through flow meter \(u\).

\(C_{CO_2,p,u}\) = Quarterly CO₂ concentration measurement in flow for flow meter \(u\) in quarter \(p\) (wt. % CO₂).

\(Q_{p,u}\) = 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 CO₂ in a CO₂ 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 subpart.

\[
CO_{2,u} = \sum_{p=1}^{4} Q_{p} \cdot D_{p} \cdot C_{CO_2,p} \quad \text{(Eq. PP-2)}
\]

Where:

\(CO_{2,u}\) = Annual mass of CO₂ (metric tons) through flow meter \(u\).

\(C_{CO_2,p}\) = Quarterly CO₂ concentration measurement in flow for flow meter \(u\) in quarter \(p\) (measured as either volume % CO₂ or weight % CO₂).

\(Q_{p}\) = Quarterly volumetric flow rate measurement for flow meter \(u\) in quarter \(p\) (standard cubic meters).
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\[ D_p = \text{Density of CO}_2 \text{ in quarter } p \text{ (metric tons CO}_2 \text{ per standard cubic meter) for flow meter } u \text{ if } C_{CO_2,p} \text{ is measured as volume } \% \text{ CO}_2 \text{, or density of the whole CO}_2 \text{ stream for flow meter } u \text{ (metric tons per standard cubic meter) if } C_{CO_2,p} \text{ is measured as weight } \% \text{ CO}_2 \text{.} \]

\( p = \text{Quarter of the year.} \)

\( u = \text{Flow meter.} \)

(3) To aggregate data, use either Equation PP-3a or PP-3b in this paragraph, as appropriate.

(i) For facilities with production process units that capture a CO\(_2\) stream and either measure it after segregation or do not segregate the flow, calculate the total CO\(_2\) supplied in accordance with Equation PP-3a.

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

(Eq. PP-3a)

where:

\( \text{CO}_2 = \text{Total annual mass of CO}_2 \text{ (metric tons).} \)

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

\( u = \text{Flow meter.} \)

(ii) For facilities with production process units that capture a CO\(_2\) stream and measure it ahead of segregation, calculate the total CO\(_2\) 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:

\( \text{CO}_2 = \text{Total annual mass of CO}_2 \text{ (metric tons).} \)

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

\( u = \text{Main flow meter.} \)

\( \text{CO}_2,v = \text{Annual mass of CO}_2 \text{ (metric tons) through subsequent flow meter } v \text{ for use on site.} \)

\( v = \text{Subsequent flow meter.} \)

(b) As an alternative to paragraphs (a)(1) through (3) of this section for CO\(_2\) that is supplied in containers, calculate the annual mass of CO\(_2\) supplied in containers delivered by each CO\(_2\) stream in accordance with the procedures specified in either paragraph (b)(1) or (b)(2) of this section. If multiple CO\(_2\) streams are used to deliver CO\(_2\) to containers, you shall calculate the annual mass of CO\(_2\) supplied in containers delivered by all CO\(_2\) streams according to the procedures specified in paragraph (b)(3) of this section.

(1) For each CO\(_2\) stream that delivers CO\(_2\) to containers, for which mass is measured, you shall calculate CO\(_2\) supplied in containers using Equation PP-1 of this section.

\[ \text{CO}_2 = \text{Total annual mass of CO}_2 \text{ (metric tons)} \]

where:

\( \text{CO}_2,u = \text{Annual mass of CO}_2 \text{ (metric tons) supplied in containers delivered by CO}_2 \text{ stream } u. \)

\( C_{CO_2,p,u} = \text{Quarterly CO}_2 \text{ concentration measurement of CO}_2 \text{ stream } u \text{ that delivers CO}_2 \text{ to containers in quarter } p \text{ (wt. } \%\text{CO}_2\). \)

\( Q_{p,u} = \text{Quarterly mass of contents supplied in all containers delivered by CO}_2 \text{ stream } u \text{ in quarter } p \text{ (metric tons).} \)

\( p = \text{Quarter of the year.} \)

\( u = \text{CO}_2 \text{ stream that delivers to containers.} \)

(2) For each CO\(_2\) stream that delivers to containers, for which volume is measured, you shall calculate CO\(_2\) supply in containers using Equation PP-2 of this section.

where:

\( \text{CO}_2,u = \text{Annual mass of CO}_2 \text{ (metric tons) supplied in containers delivered by CO}_2 \text{ stream } u. \)

\( C_{CO_2,p} = \text{Quarterly CO}_2 \text{ concentration measurement of CO}_2 \text{ stream } u \text{ that delivers CO}_2 \text{ to containers in quarter } p \text{ (measured wt. } \%\text{CO}_2). \)

\( p = \text{Quarter of the year.} \)
§ 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 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 installed mass flow or volumetric flow meters.

(iii) Reporters that do not have a mass flow meter or volumetric flow meter installed to measure the flow of the 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 where:

\[
\text{CO}_2 = \sum_{p=1}^{J} Q
\]

(Eq. PP-4)

where:

\( \text{CO}_2 \) = Annual mass of CO₂ (metric tons) supplied in containers delivered by all CO₂ streams.

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