

§ 98.424

Where:

- CO_{2,u} = Annual mass of CO₂ (metric tons) through flow meter u.
- C_{CO₂,p} = Quarterly CO₂ concentration measurement in flow for flow meter u in quarter p (wt. % CO₂).
- Q_p = Quarterly volumetric flow rate measurement for flow meter u in quarter p (standard cubic meters).
- D_p = Quarterly CO₂ stream density measurement for flow meter u in quarter p (metric tons per standard cubic meter).
- p = Quarter of the year.
- u = Flow meter.

(3) To aggregate data, sum the mass of CO₂ for all flow meters in accordance with Equation PP-3 of this section.

$$CO_2 = \sum_{p=1}^U CO_{2,u} \quad (\text{Eq. PP-3})$$

Where:

- CO₂ = Annual mass of CO₂ (metric tons) through all flow meters.
- CO_{2,u} = Annual mass of CO₂ (metric tons) through flow meter u.
- u = Flow meter.

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

$$CO_2 = \sum_{p=1}^I Q \quad (\text{Eq. PP-4})$$

Where:

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

§ 98.424 Monitoring and QA/QC requirements.

(a) *Determination of quantity.* (1) Reporters that have a mass flow meter or volumetric flow meter installed to measure the flow of a CO₂ stream shall base calculations in § 98.423 of this subpart on the installed mass flow or volumetric flow meters.

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

CO₂ stream 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.

(3) Importers or exporters that import or export CO₂ in containers shall measure the mass in each CO₂ container using weigh bills, scales, or load cells and sum the mass in all containers imported or exported during the reporting year.

(4) All flow meters, scales, and load cells used to measure quantities that are reported in § 98.423 of this subpart shall be operated and calibrated according to the following procedure:

(i) You shall use an appropriate standard method published by a consensus-based standards organization if such a method exists. Consensus-based standards organizations include, but are not limited to, the following: ASTM International, the American National Standards Institute (ANSI), the American Gas Association (AGA), the American Society of Mechanical Engineers (ASME), the American Petroleum Institute (API), and the North American Energy Standards Board (NAESB).

(ii) Where no appropriate standard method developed by a consensus-based standards organization exists, you shall follow industry standard practices.

(iii) You must ensure that any flow meter calibrations performed are NIST traceable.

(5) Reporters using Equation PP-2 of this subpart shall measure the density of the CO₂ stream on a quarterly basis in order to calculate the mass of the CO₂ stream according to the following procedure:

(i) You shall use an appropriate standard method published by a consensus-based standards organization to measure density if such a method exists. Consensus-based standards organizations include, but are not limited to, the following: ASTM International, the American National Standards Institute (ANSI), the American Gas Association (AGA), the American Society of Mechanical Engineers (ASME), the American Petroleum Institute (API), and the North American Energy Standards Board (NAESB).

(ii) Where no appropriate standard method developed by a consensus-based standards organization exists, you shall follow industry standard practices.

(b) *Determination of concentration.* (1) Reporters using Equation PP-1 or PP-2 of this subpart shall sample the CO₂ stream on a quarterly basis to determine the composition of the CO₂ stream.

(2) Methods to measure the composition of the CO₂ stream must conform to applicable chemical analytical standards. Acceptable methods include U.S. Food and Drug Administration food-grade specifications for CO₂ (see 21 CFR 184.1250) and ASTM standard E1747-95 (Reapproved 2005) Standard Guide for Purity of Carbon Dioxide Used in Supercritical Fluid Applications (incorporated by reference, see §98.7 of subpart A of this part).

§ 98.425 Procedures for estimating missing data.

(a) Whenever the quality assurance procedures in §98.424(a) of this subpart cannot be followed to measure quarterly mass flow or volumetric flow of CO₂, the most appropriate of the following missing data procedures shall be followed:

(1) A quarterly CO₂ mass flow or volumetric flow value that is missing may be substituted with a quarterly value measured during another quarter of the current reporting year.

(2) A quarterly CO₂ mass flow or volumetric flow value that is missing may be substituted with a quarterly value measured during the same quarter from the past reporting year.

(3) If a mass or volumetric flow meter is installed to measure the CO₂ stream, you may substitute data from a mass or volumetric flow meter measuring the CO₂ stream transferred for any period during which the installed meter is inoperable.

(4) The mass or volumetric flow used for purposes of product tracking and billing according to the reporter's established procedures may be substituted for any period during which measurement equipment is inoperable.

(b) Whenever the quality assurance procedures in §98.424(b) of this subpart cannot be followed to determine con-

centration of the CO₂ stream, the most appropriate of the following missing data procedures shall be followed:

(1) A quarterly concentration value that is missing may be substituted with a quarterly value measured during another quarter of the current reporting year.

(2) A quarterly concentration value that is missing may be substituted with a quarterly value measured during the same quarter from the previous reporting year.

(3) The concentration used for purposes of product tracking and billing according to the reporter's established procedures may be substituted for any quarterly value.

(c) Missing data on density of the CO₂ stream shall be substituted with quarterly or annual average values from the previous calendar year.

§ 98.426 Data reporting requirements.

In addition to the information required by §98.3(c) of subpart A of this part, the annual report shall contain the following information, as applicable:

(a) If you use Equation PP-1 of this subpart, report the following information for each mass flow meter:

(1) Annual mass in metric tons of CO₂.

(2) Quarterly mass flow of CO₂.

(3) Quarterly concentration of the CO₂ stream.

(4) The standard used to measure CO₂ concentration.

(b) If you use Equation PP-2 of this subpart, report the following information for each volumetric flow meter:

(1) Annual mass in metric tons of CO₂.

(2) Quarterly volumetric flow of CO₂.

(3) Quarterly concentration of the CO₂ stream.

(4) Quarterly density of the CO₂ stream.

(5) The method used to measure density.

(6) The standard used to measure CO₂ concentration.

(c) If you use Equation PP-3 of this subpart, report the annual CO₂ mass in metric tons from all flow meters.

(d) If you use Equation PP-4 of this subpart, report at the corporate level the annual mass of CO₂ in metric tons