\[ E_{PV} = \sum_{p=1}^{n} \left( \frac{PR_p}{PR_T} \right) \times l_p \times 10^{-3} \]  

(Eq. O-7)

Where:

- \( E_{PV} \): Mass of HFC–23 emitted annually from process vents (metric tons).
- \( ER_T \): The HFC–23 emission rate from the process vents during the period of the most recent test (kg/hr).
- \( PR_p \): The HCFC–22 production rate during the period \( p \) (kg/hr).
- \( PR_T \): The HCFC–22 production rate during the most recent test period (kg/hr).
- \( l_p \): The length of the period \( p \) (hours).
- \( n \): The number of periods in a year.

The total mass of HFC–23 emitted from destruction devices shall be estimated by using Equation O–8 of this section:

\[ E_D = F_D - D_{23} \]  

(Eq. O-8)

Where:

- \( E_D \): Mass of HFC–23 emitted annually from the destruction device (metric tons).
- \( F_D \): Mass of HFC–23 fed into the destruction device annually (metric tons).
- \( D_{23} \): Mass of HFC–23 destroyed annually (metric tons).

The total mass of HFC–23 destroyed shall be estimated by using Equation O–9 of this section:

\[ D_{23} = F_D \times DE \]  

(Eq. O-9)

Where:

- \( D_{23} \): Mass of HFC–23 destroyed annually (metric tons).
- \( F_D \): Mass of HFC–23 fed into the destruction device annually (metric tons).
- \( DE \): Destruction Efficiency of the destruction device (fraction).

§ 98.154 Monitoring and QA/QC requirements.

These requirements apply to measurements that are reported under this subpart or that are used to estimate reported quantities pursuant to §98.153.

(a) The concentrations (fractions by weight) of HFC–23 and HCFC–22 in the product stream shall be measured at least weekly using equipment and methods (e.g., gas chromatography) with an accuracy and precision of 5 percent or better at the concentrations of the process samples.

(b) The mass flow of the product stream containing the HFC–23 shall be measured at least weekly using weigh scales, flowmeters, or a combination of volumetric and density measurements with an accuracy and precision of 1.0 percent of full scale or better.

(c) The mass of HCFC–22 or HCl coming out of the production process shall be measured at least weekly using weigh scales, flowmeters, or a combination of volumetric and density measurements with an accuracy and precision of 1.0 percent of full scale or better.

(d) For facilities that destroy HFC–23, the total mass of HFC–23 destroyed shall be estimated by using Equation O–9 of this section:

\[ D_{23} = F_D \times DE \]  

(Eq. O-9)

Section 98.154

§ 98.154 Monitoring and QA/QC requirements.

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(a) The concentrations (fractions by weight) of HFC–23 and HCFC–22 in the product stream shall be measured at least weekly using equipment and methods (e.g., gas chromatography) with an accuracy and precision of 5 percent or better at the concentrations of the process samples.

(b) The mass flow of the product stream containing the HFC–23 shall be measured at least weekly using weigh scales, flowmeters, or a combination of volumetric and density measurements with an accuracy and precision of 1.0 percent of full scale or better.

(c) The mass of HCFC–22 or HCl coming out of the production process shall be measured at least weekly using weigh scales, flowmeters, or a combination of volumetric and density measurements with an accuracy and precision of 1.0 percent of full scale or better.

(d) For facilities that destroy HFC–23, the total mass of HFC–23 destroyed shall be estimated by using Equation O–9 of this section:

\[ D_{23} = F_D \times DE \]  

(Eq. O-9)

Where:

- \( D_{23} \): Mass of HFC–23 destroyed annually (metric tons).
- \( F_D \): Mass of HFC–23 fed into the destruction device annually (metric tons).
- \( DE \): Destruction Efficiency of the destruction device (fraction).

(e) The loss factor LF in Equation O–3 of this subpart for the mass of HCFC–22 produced shall have the value 1.015 or another value that can be demonstrated, to the satisfaction of the Administrator, to account for losses of HCFC–22 between the reactor and the point of measurement at the facility where production is being estimated.

(f) The mass of HCFC–22 added back into the production process upstream of the output measurement in paragraph (c) of this section shall be measured (when being added) using flowmeters, weigh scales, or a combination of volumetric and density measurements with an accuracy and precision of 1.0 percent of full scale or better. If the mass in paragraph (c) of this section is measured by weighing containers that include returned heels as well as newly produced fluorinated GHGs, the returned heels shall be considered used fluorinated HCFC–22 for purposes of this paragraph (d) of this section and §98.153(b).

(g) The mass of HFC–23 sent off site for sale shall be measured at least weekly (when being packaged) using flowmeters, weigh scales, or a combination of volumetric and density measurements with an accuracy and precision of 1.0 percent of full scale or better.

(h) The mass of HFC–23 sent off site for destruction shall be measured at
least weekly (when being packaged) using flowmeters, weigh scales, or a combination of volumetric and density measurements with an accuracy and precision of 1.0 percent of full scale or better. If the measured mass includes more than trace concentrations of materials other than HFC–23, the concentration of the fluorinated GHG shall be measured at least weekly using equipment and methods (e.g., gas chromatography) with an accuracy and precision of 5 percent or better at the concentrations of the process samples. This concentration (mass fraction) shall be multiplied by the mass measurement to obtain the mass of the HFC–23 sent to another facility for destruction.

(h) The masses of HFC–23 in storage at the beginning and end of the year shall be measured using flowmeters, weigh scales, or a combination of volumetric and density measurements with an accuracy and precision of 1.0 percent of full scale or better.

(i) The number of sources of equipment type t with screening values greater than or equal to 10,000 ppmv shall be determined using EPA Method 21 at 40 CFR part 60, appendix A–7, and defining a leak as follows:

1) A leak source that could emit HFC–23, and

2) A leak source at whose surface a concentration of fluorocarbons equal to or greater than 10,000 ppm is measured.

(j) The number of sources of equipment type t with screening values less than 10,000 ppmv shall be the difference between the number of leak sources of equipment type t that could emit HFC–23 and the number of sources of equipment type t with screening values greater than or equal to 10,000 ppmv as determined under paragraph (h) of this section.

(k) The mass of HFC–23 emitted from process vents shall be estimated at least monthly by incorporating the results of the most recent emissions test into Equation O–7 of this subpart. HCFC–22 production facilities that use a destruction device connected to the HCFC–22 production equipment shall conduct emissions tests at process vents at least once every five years or after significant changes to the process. Emissions tests shall be conducted in accordance with EPA Method 18 at 40 CFR part 60, appendix A–6, under conditions that are typical for the production process at the facility. The sensitivity of the tests shall be sufficient to detect an emission rate that would result in annual emissions of 200 kg of HFC–23 if sustained over one year.

(l) For purposes of Equation O–9 of this subpart, the destruction efficiency must be equated to the destruction efficiency determined during a new or previous performance test of the destruction device. HFC–23 destruction facilities shall conduct annual measurements of HFC–23 concentrations at the outlet of the destruction device in accordance with EPA Method 18 at 40 CFR part 60, appendix A–6. Three samples shall be taken under conditions that are typical for the production process and destruction device at the facility, and the average concentration of HFC–23 shall be determined. The sensitivity of the concentration measurement shall be sufficient to detect an outlet concentration equal to or less than the outlet concentration determined in the destruction efficiency performance test. If the concentration measurement indicates that the HFC–23 concentration is less than or equal to that measured during the performance test that is the basis for the destruction efficiency, continue to use the previously determined destruction efficiency. If the concentration measurement indicates that the HFC–23 concentration is greater than that measured during the performance test that is the basis for the destruction efficiency, facilities shall either:

1) Substitute the higher HFC–23 concentration for that measured during the destruction efficiency performance test and calculate a new destruction efficiency, or

2) Estimate the mass emissions of HFC–23 from the destruction device based on the measured HFC–23 concentration and volumetric flow rate determined by measurement of volumetric flow rate using EPA Method 2, 2A, 2C,2D, or 2F at 40 CFR part 60, appendix A–1, or Method 26 at 40 CFR part 60, appendix A–2. Determine the mass rate of HFC–23 into the destruction device by measuring the HFC–23
§ 98.155 Procedures for estimating missing data.

(a) A complete record of all measured parameters used in the GHG emissions calculations is required. Therefore, whenever a quality-assured value of a required parameter is unavailable (e.g., if a meter malfunctions during unit operation or if a required process sample is not taken), a substitute data value for the missing parameter shall be used in the calculations, according to the following requirements:

(1) For each missing value of the HFC-23 or HCFC-22 concentration, the substitute data value shall be the arithmetic average of the quality-assured values of that parameter immediately preceding and immediately following the missing data incident. If, for a particular parameter, no quality-assured data are available prior to the missing data incident, the substitute data value shall be the first quality-assured value obtained after the missing data period.

(2) For each missing value of the product stream mass flow or product mass, the substitute value of that parameter shall be a secondary product measurement where such a measurement is available. If that measurement is taken significantly downstream of the usual mass flow or mass measurement (e.g., at the shipping dock rather than near the reactor), the measurement shall be multiplied by 1.015 to compensate for losses. Where a secondary mass measurement is not available, the substitute value of the parameter shall be an estimate based on a related parameter. For example, if a flowmeter measuring the mass fed into a destruction device is rendered inoperable, then the mass fed into the destruction device may be estimated at least monthly through analysis of certified standards (or of calibration gases prepared from a high-concentration certified standard using a gas dilution system that meets the requirements specified in Method 205 at 40 CFR part 51, appendix M) with known HFC-23 concentrations that are in the same range (fractions by mass) as the process samples.