composite (NMHC+NO\textsubscript{X}) and optional composite CO standards shall be computed by the following formulas.

(i) \( Y_{WSFTP} = 0.72(Y_{FTP}) + 0.28(Y_{US06}) \)

Where:

(A) \( Y_{WSFTP} \) = Mass emissions per mile for a particular pollutant weighted in terms of the contributions from the FTP and US06 schedules. Values of \( Y_{WSFTP} \) are obtained for each of the exhaust emissions of NMHC, NO\textsubscript{X} and CO.

(B) \( Y_{FTP} \) = Weighted mass emissions per mile \((Ywm)\) based on the measured driving distance of the FTP test schedule.

(C) \( Y_{US06} \)= Calculated mass emissions per mile based on the measured driving distance of the US06 test schedule; or,

(ii) Composite (NMHC+NO\textsubscript{X}) = \( Y_{WSFTP} \) (NMHC) + \( Y_{WSFTP} \) (NO\textsubscript{X})

Where:

(A) \( Y_{WSFTP} \) (NMHC) = results of paragraph (c)(2)(i) of this section for NMHC.

(B) \( Y_{WSFTP} \) (NO\textsubscript{X}) = results of paragraph (c)(2)(i) of this section for NO\textsubscript{X}.

(d) The NO\textsubscript{X} humidity correction factor for adjusting NO\textsubscript{X} test results to the environmental test cell air conditioning ambient condition of 100 grains of water/pound of dry air is:

\[ K_{H} \textsubscript{NOX} (100) = 0.8825/[1-0.0047(H-75)] \]

Where:

\( H \) = measured test humidity in grains of water/pound of dry air.

[71 FR 77922, Dec. 27, 2006, as amended at 74 FR 61548, Nov. 25, 2009]
periods longer than two hours, precondition the vehicle using one full Urban Dynamometer Driving Schedule. Ensure that the vehicle has stabilized at test cell ambient conditions such that the vehicle interior temperature is not substantially different from the external test cell temperature. Windows may be opened during preconditioning to achieve this stabilization.

(3) Immediately after the preconditioning, turn off any cooling fans, if present, close the vehicle’s hood, fully close all the vehicle’s windows, ensure that all the vehicle’s air conditioning systems are set to full off, start the CO₂ sampling system, and then idle the vehicle for not less than 1 minute and not more than 5 minutes to achieve normal and stable idle operation.

(4) Measure and record the continuous CO₂ concentration for 600 seconds. Measure the CO₂ concentration continuously using raw or dilute sampling procedures. Multiply this concentration by the continuous (raw or dilute) flow rate at the emission sampling location to determine the CO₂ flow rate. Calculate the CO₂ cumulative flow rate continuously over the test interval. This cumulative value is the total mass of the emitted CO₂. Alternatively, CO₂ may be measured and recorded using a constant velocity sampling system as described in §§ 86.106–96(a)(2) and 86.109.

(5) Within 60 seconds after completing the measurement described in paragraph (d)(4) of this section, turn on the vehicle’s air conditioning system. Set automatic air conditioning systems to maximum cooling with recirculation turned off, except that recirculation shall be enabled if the air conditioning system automatically defaults to a recirculation mode when set to maximum cooling and maintains recirculation with the low fan speed, then recirculation shall continue to be enabled. After the fan speed has been set, continue idling the vehicle while measuring and recording the continuous CO₂ concentration for a total of 600 seconds as described in paragraph (d)(4) of this section.

(e) Calculations. (1) For the measurement with no air conditioning operation, calculate the CO₂ emissions (in grams per minute) by dividing the total mass of CO₂ from paragraph (d)(4) of this section by 10.0 (the duration in minutes for which CO₂ is measured). Round this result to the nearest tenth of a gram per minute.

(ii) For the measurement with air conditioning in operation for automatic air conditioning systems, calculate the CO₂ emissions (in grams per minute) by dividing the total mass of CO₂ from paragraph (d)(5) of this section by 10.0. Round this result to the nearest tenth of a gram per minute.

(iii) For the measurement with air conditioning in operation for manually controlled air conditioning systems, calculate the CO₂ emissions (in grams per minute) by summing the total mass of CO₂ from paragraphs (d)(5) and (d)(6) of this section and dividing by 20.0. Round this result to the nearest tenth of a gram per minute.

(3) Calculate the increased CO₂ emissions due to air conditioning (in grams per minute) by subtracting the results of paragraph (e)(1) of this section from the results of paragraph (e)(2)(i) or (ii) of this section, whichever is applicable.

(f) The Administrator may prescribe procedures other than those in this section for air conditioning systems and...
§ 86.166–12 Method for calculating emissions due to air conditioning leakage.

This section describes procedures used to determine a refrigerant leakage rate in grams per year from vehicle-based air conditioning units. The results of this test are used to determine air conditioning leakage credits according to § 86.1866–12(b).

(a) Emission totals. Calculate an annual rate of refrigerant leakage from an air conditioning system using the following equation:

\[
\text{Grams/YR}_{\text{TOT}} = \text{Grams/YR}_{\text{RP}} + \text{Grams/YR}_{\text{SP}} + \text{Grams/YR}_{\text{FH}} + \text{Grams/YR}_{\text{MC}} + \text{Grams/YR}_{\text{C}}
\]

Where:
- \(\text{Grams/YR}_{\text{TOT}}\) = Total air conditioning system emission rate in grams per year and rounded to the nearest tenth of a gram per year.
- \(\text{Grams/YR}_{\text{RP}}\) = Emission rate for rigid pipe connections as described in paragraph (b) of this section.
- \(\text{Grams/YR}_{\text{SP}}\) = Emission rate for service ports and refrigerant control devices as described in paragraph (c) of this section.
- \(\text{Grams/YR}_{\text{FH}}\) = Emission rate for flexible hoses as described in paragraph (d) of this section.
- \(\text{Grams/YR}_{\text{MC}}\) = Emission rate for heat exchangers, mufflers, receiver/driers, and accumulators as described in paragraph (e) of this section.
- \(\text{Grams/YR}_{\text{C}}\) = Emission rate for compressors as described in paragraph (f) of this section.

(b) Rigid pipe connections. Determine the grams per year emission rate for rigid pipe connections using the following equation:

\[
\text{Grams/YR}_{\text{RP}} = 0.00522 \times (125 \times SO) + (75 \times SCO) + (50 \times MO) + (10 \times SW) + (5 \times SWO) + (MG)
\]

Where:
- \(\text{Grams/YR}_{\text{RP}}\) = Total emission rate for rigid pipe connections in grams per year.
- \(SO\) = The number of single O-ring connections.
- \(SCO\) = The number of single captured O-ring connections.
- \(MO\) = The number of multiple O-ring connections.
- \(SW\) = The number of seal washer connections.
- \(SWO\) = The number of seal washer with O-ring connections.
- \(MG\) = The number of metal gasket connections.

(c) Service ports and refrigerant control devices. Determine the grams per year emission rate for service ports and refrigerant control devices using the following equation:

\[
\text{Grams/YR}_{\text{SP}} = 0.522 \times (0.3 \times HSSP) + (0.2 \times LSSP) + (0.2 \times STV) + (0.2 \times TXV)
\]

Where:
- \(\text{Grams/YR}_{\text{SP}}\) = The emission rate for service ports and refrigerant control devices, in grams per year.
- \(HSSP\) = The number of high side service ports.
- \(LSSP\) = The number of low side service ports.
- \(STV\) = The total number of switches, transducers, and pressure relief valves.
- \(TXV\) = The number of refrigerant control devices.

(d) Flexible hoses. Determine the permeation emission rate in grams per year for each segment of flexible hose using the following equation, and then sum the values for all hoses in the system to calculate a total flexible hose emission rate for the system. Hose end connections shall be included in the calculations in paragraph (b) of this section.

\[
\text{Grams/YR}_{\text{FH}} = 0.00522 \times (3.14159 \times ID \times L \times ER)
\]

Where:
- \(\text{Grams/YR}_{\text{FH}}\) = Emission rate for a segment of flexible hose in grams per year.
- \(ID\) = Inner diameter of hose, in millimeters.
- \(L\) = Length of hose, in millimeters.
- \(ER\) = Emission rate per unit internal surface area of the hose, in g/mm². Select the appropriate value for \(ER\) from the following table: