40 C.F.R. § 600.114-12

Vehicle-specific 5-cycle fuel economy and carbon-related exhaust emission calculations.

Paragraphs (a) through (f) of this section apply to data used for fuel economy labeling under subpart D of this part. Paragraphs (d) through (f) of this section are used to calculate 5-cycle carbon-related exhaust emission values for the purpose of determining optional credits for CO_2-reducing technologies under § 86.1866 of this chapter and to calculate 5-cycle CO_2 values for the purpose of fuel economy labeling under subpart D of this part.

(a) *City fuel economy.* For each vehicle tested under § 600.010-08(a), (b), or (c), as applicable, determine the 5-cycle city fuel economy using the following equation:

$$(1)\ \text{CityFE} = \frac{0.905}{(\text{StartFC} + \text{RunningFC})}$$

Where:

$$\text{StartFC} = 0.33 \times \left(\frac{(0.76 \times \text{StartFuel}_{75} + 0.24 \times \text{StartFuel}_{20})}{4.1} \right)$$

$$\text{StartFuel}_x = 3.6 \times \left[\frac{1}{\text{Bag1 FE}_x} - \frac{1}{\text{Bag3 FE}_x} \right]$$

$$\text{RunningFC} = 0.82 \times \left[\frac{0.48}{\text{Bag2 FE}_{75}} + \frac{0.41}{\text{Bag3 FE}_{75}} + \frac{0.11}{\text{US06 City FE}} \right] + 0.18 \times \left[\frac{0.5}{\text{Bag2 FE}_{20}} + \frac{0.5}{\text{Bag3 FE}_{20}} \right]$$
$$+ 0.133 \times 1.083 \times \left[\frac{1}{\text{SC03 FE}} - \left(\frac{0.61}{\text{Bag3 FE}_{75}} + \frac{0.39}{\text{Bag2 FE}_{75}} \right) \right]$$

(2) Terms used in the equations in this paragraph (a) are defined as follows:

Bag Y FE_X = the fuel economy in miles per gallon of fuel during bag Y of the FTP test conducted at an ambient temperature X of 75 °F or 20 °F. SC03 FE = fuel economy in mile per gallon over the SC03 test. US06 City FE = fuel economy in miles per gallon over the "city" portion of the US06 test.

(b) *Highway fuel economy.* (1) For each vehicle tested under § 600.010-08(a), (b), or (c), as applicable, determine the 5-cycle highway fuel economy using the following equation:

$$HighwayFE = \frac{0.905}{(StartFC + RunningFC)}$$

Where:

$$StartFC = 0.33 \times \left(\frac{(0.76 \times StartFuel_{75} + 0.24 \times StartFuel_{20})}{60} \right)$$

$$StartFuel_x = 3.6 \times \left[\frac{1}{Bag\,1\,FE_x} - \frac{1}{Bag\,3\,FE_x} \right]$$

$$RunningFC = 1.007 \times \left[\frac{0.79}{US06\,HighwayFE} + \frac{0.21}{HFETFE} \right] + 0.133 \times 0.377 \times \left[\frac{1}{SC03FE} - \left(\frac{0.61}{Bag\,3\,FE_{75}} + \frac{0.39}{Bag\,2\,FE_{75}} \right) \right]$$

(2) If the condition specified in § 600.115-08(b)(2)(iii)(B) is met, in lieu of using the calculation in paragraph (b)(1) of this section, the manufacturer may optionally determine the highway fuel economy using the following modified 5-cycle equation which utilizes data from FTP, HFET, and US06 tests, and applies mathematic adjustments for Cold FTP and SC03 conditions:

(i) Perform a US06 test in addition to the FTP and HFET tests.

(ii) Determine the 5-cycle highway fuel economy according to the following formula:

$$HighwayFE = \frac{0.905}{(StartFC + RunningFC)}$$

Where:

$$StartFC = 0.33 \times \frac{(0.005515 + 1.13637 \times StartFuel_{75})}{60}$$

$$StartFuel_{75} = 3.6 \times \left[\frac{1}{Bag\,1\,FE_{75}} - \frac{1}{Bag\,3\,FE_{75}} \right]$$

$$RunningFC = 1.007 \times \left[\frac{0.79}{US06\,Highway\,FE} + \frac{0.21}{HFET\,FE} \right] + \left[0.377 \times 0.133 \times \left(0.00540 + \frac{0.1357}{US06\,FE} \right) \right]$$

(3) Terms used in the equations in this paragraph (b) are defined as follows:

Bag Y FE_X = the fuel economy in miles per gallon of fuel during bag Y of the FTP test conducted at an ambient temperature X of 75 °F or 20 °F. HFET FE = fuel economy in miles per gallon over the HFET test. SC03 FE = fuel economy in mile per gallon over the SC03 test. US06 Highway FE = fuel economy in miles per gallon over the highway portion of the US06 test. US06 FE = fuel economy in miles per gallon over US06 test.

(c) *Fuel economy calculations for hybrid electric vehicles.* Test hybrid electric vehicles as described in SAE J1711 (incorporated by reference in § 600.011). For FTP testing, this generally involves emission sampling over four phases (bags) of the UDDS (cold-start, transient, warm-start, transient); however, these four phases may be combined into two phases (phases 1 + 2 and phases 3 + 4). Calculations for these sampling methods follow:

This document is only available to subscribers. Please log in or purchase access.

Purchase Login