40 C.F.R. § 86.1869-12

CO2 credits for off-cycle CO2 reducing technologies.

This section describes how manufacturers may generate credits for off-cycle CO_2-reducing technologies. The provisions of this section do not apply for non-MDPV heavy-duty vehicles, except that § 86.1819−14(d)(13) describes how to apply paragraphs (c) and (d) of this section for those vehicles.

(a) Manufacturers may generate credits for CO_2-reducing technologies where the CO_2 reduction benefit of the technology is not adequately captured on the Federal Test Procedure and/or the Highway Fuel Economy Test such that the technology would not be otherwise installed for purposes of reducing emissions (directly or indirectly) over those test cycles for compliance with the GHG standards. These technologies must have a measurable, demonstrable, and verifiable real-world CO_2 reduction that occurs outside the conditions of the Federal Test Procedure and the Highway Fuel Economy Test. These optional credits are referred to as "off-cycle" credits. The technologies must not be integral or inherent to the basic vehicle design, such as engine, transmission, mass reduction, passive aerodynamic design, and tire technologies. Technologies installed for non-off-cycle emissions related reasons are also not eligible as they would be considered part of the baseline vehicle design. The technology must not be inherent to the design of occupant comfort and entertainment features except for technologies related to reducing passenger air conditioning demand and improving air conditioning system efficiency. Notwithstanding the provisions of this paragraph (a), off-cycle menu technologies included in paragraph (b) of this section remain eligible for credits. Off-cycle technologies used to generate emission credits are considered emission-related components subject to applicable requirements and must be demonstrated to be effective for the full useful life of the vehicle. Unless the manufacturer demonstrates that the technology is not subject to in-use deterioration, the manufacturer must account for the deterioration in their analysis. Durability evaluations of off-cycle technologies may occur at any time throughout a model year, provided that the results can be factored into the data provided in the model year report. Off-cycle credits may not be approved for crash-avoidance technologies, safety critical systems or systems affecting safety-critical functions, or technologies designed for the purpose of reducing the frequency of vehicle crashes. Off-cycle credits may not be earned for technologies installed on a motor vehicle to attain compliance with any vehicle safety standard or any regulation set forth in Title 49 of the Code of Federal Regulations. The manufacturer must use one of the three options specified in this section to determine the CO_2 gram per mile credit applicable to an off-cycle technology. Note that the option provided in paragraph (b) of this section applies only to the 2014 and later model years. The manufacturer should notify EPA in their pre-model year report of their intention to generate any credits under this section.

(b) *Credit available for certain off-cycle technologies.* The provisions of this paragraph (b) are applicable only to 2014 and later model year vehicles. EPA may request data, engineering analyses, or other information that supports a manufacturer's use of the credits in this paragraph (b).

(1) The manufacturer may generate a CO_2 gram/mile credit for certain technologies as specified in this

paragraph (b)(1). Technology definitions are in paragraph (b)(4) of this section. Calculated credit values shall be rounded to the nearest 0.1 grams/mile.

(i) *Waste heat recovery.* The credit shall be calculated using the following formula, rounded to the nearest 0.1 grams/mile:

$$Credit \left(\frac{g}{mi}\right) = ELR \times 0.007$$

Where:

ELR = the electrical load reduction of the waste heat recovery system, in Watts, calculated as an average over 5-cycle testing.

(ii) *High efficiency exterior lights.* Credits may be accrued for high efficiency lighting as defined in paragraph (b)(4) of this section based on the lighting locations with such lighting installed. Credits for high efficiency lighting are the sum of the credits for the applicable lighting locations in the following table (rounded to the nearest 0.1 grams/mile), or, if all lighting locations in the table are equipped with high efficiency lighting, the total credit for high efficiency lighting shall be 1.0 grams/mile. Lighting components that result in credit levels less than those shown in the following table are not eligible for credits.

Lighting Component	Credit (grams/mile)
Low beam	0.38
High beam	0.05
Parking/position	0.10
Turn signal, front	0.06
Side marker, front	0.06
Tail	0.10
Turn signal, rear	0.06
Side marker, rear	0.06
License plate	0.08

(iii) *Solar panels.* (A) Credits for solar panels used solely for charging the battery of an electric vehicle, plug-in hybrid electric vehicle, or hybrid electric vehicle shall be calculated using the following equation, and rounded to the nearest 0.1 grams/mile:

$$Credit \left(\frac{g}{mi}\right) = 0.04385 \times P_{panel}$$

Where:

P_{panel} is the is the rated power of the solar panel, in Watts, determined under the standard test conditions of 1000 Watts per meter squared direct solar irradiance at a panel temperature of 25 degrees Celsius (±2 degrees) with an air mass spectrum of 1.5 (AM1.5).

(B) Credits for solar panels used solely for active vehicle ventilation systems are those specified in paragraph (b)(1)(viii)(E).

(C) Credits for solar panels used both for active cabin ventilation and for charging the battery of an electric vehicle, plug-in hybrid electric vehicle, or hybrid electric vehicle shall be calculated using the following equation, and rounded to the nearest 0.1 grams/mile:

$$Credit \left(\frac{g}{mi}\right) = C_{vent} + 0.04385 \times (P_{panel} - P_{vent})$$

Where:

C_{vent} is the credit attributable to active cabin ventilation from paragraph (b)(1)(viii)(E) of this section;

P_{panel} is the is the rated power of the solar panel, in Watts, determined under the standard test conditions of 1000 Watts per meter squared direct solar irradiance at a panel temperature of 25 degrees Celsius (±2 degrees) with an air mass spectrum of 1.5 (AM1.5); and

P_{vent} is the amount of power, in Watts, required to run the active cabin ventilation system.

(iv) *Active aerodynamic improvements.* (A) The credit for active aerodynamic improvements for passenger automobiles shall be calculated using the following equation, and rounded to the nearest 0.1 grams/mile:

$$Credit \left(\frac{g}{mi}\right) = 19.36 \times CD_{reduced}$$

Where:

$CD_{reduced}$ is the percent reduction in the coefficient of drag (C_d), shown as a value from 0 to 1. The coefficient of drag shall be determined using good engineering judgment consistent with standard industry test methods and practices.

(B) The credit for active aerodynamic improvements for light trucks shall be calculated using the following equation, and rounded to the nearest 0.1 grams/mile:

$$Credit \left(\frac{g}{mi}\right) = 33.16 \times CD_{reduced}$$

Where:

$CD_{reduced}$ is the percent reduction in the coefficient of drag (C_d), shown as a value from 0 to 1. The coefficient of drag shall be determined using good engineering judgment consistent with standard industry test methods and practices.

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

Purchase Login