ENVIRONMENTAL PROTECTION AGENCY

[FRL–-9928-70-OAR]

Alternative Method for Calculating Off-cycle Credits under the Light-duty Vehicle Greenhouse Gas Emissions Program: Applications from Fiat Chrysler Automobiles, Ford Motor Company, and General Motors Corporation

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: The Environmental Protection Agency (EPA) is requesting comment on applications from Fiat Chrysler Automobiles LLC ("FCA"), Ford Motor Company (Ford) and General Motors Corporation (GM) for off-cycle carbon dioxide (CO_2) credits under EPA's light-duty vehicle greenhouse gas emissions standards. "Off-cycle" emission reductions can be achieved by employing technologies that result in real-world benefits, but where that benefit is not adequately or entirely captured on the test procedures used by manufacturers to demonstrate compliance with emission standards. EPA's light-duty vehicle greenhouse gas program acknowledges these benefits by giving automobile manufacturers several options for generating "off-cycle" carbon dioxide (CO_2) credits. Under the regulations, a manufacturer may apply for CO_2 credits for technologies that result in off-cycle benefits. In these cases, a manufacturer must provide EPA with a proposed methodology for determining the real-world off-cycle benefit. FCA and Ford have submitted applications that describe methodologies for determining off-cycle credits from high efficiency exterior lighting, solar reflective glass/glazing, solar reflective paint,

and active seat ventilation. Ford's application also proposes methodologies for determining the off-cycle benefits from active aerodynamic improvements (grill shutters), active transmission warm-up, active engine warm-up technologies, and engine idle stop-start. GM's application proposes a methodology to determine the real-world benefits of an air conditioning compressor with variable crankcase suction valve technology. Pursuant to applicable regulations, EPA is making descriptions of the manufacturers' off-cycle credit calculation methodologies available for public comment.

DATES: Comments must be received on or before [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–HQ– OAR–2015–0282, by one of the following methods:

• *http://www.regulations.gov:* Follow the On- Line Instructions for Submitting Comments.

• *Email:* a-and-r-docket@epa.gov.

• Fax: (202) 566–1741.

• *Mail:* Air and Radiation Docket, Docket ID No. EPA–HQ– OAR–2015–0282, U.S. Environmental Protection Agency, Mailcode: 22821T, 1200 Pennsylvania Avenue NW., Washington, DC 20460.

• *Hand Delivery:* EPA Docket Center, Public Reading Room, EPA West Building, Room 3334, 1301 Constitution Avenue NW., Washington, DC 20460. Attention Air and Radiation Docket ID No. EPA–HQ– OAR–2015–0282. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Online Instructions for Submitting Comments: Direct your comments to Docket ID No. Attention Air and Radiation Docket ID No. EPA–HQ– OAR–2015–0282. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at www.regulations.gov, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through www.regulations.gov or email. The www.regulations.gov Web site is an "anonymous access" system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an email comment directly to EPA without going through www.regulations.gov, your email address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD–ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket visit the EPA Docket Center homepage at http:// www.epa.gov/epahome/dockets.htm.

Docket: All documents in the docket are listed in the www.regulations.gov index. Although listed in the index, some information is not publicly available, e.g., CBI or other information for which disclosure is restricted by statute. Certain other material,

such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in www.regulations.gov or in hard copy at the Air and Radiation Docket, EPA/DC, EPA WJC West, Room 3334, 1301 Constitution Ave. NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Air and Radiation Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: Roberts French, Environmental Protection Specialist, Office of Transportation and Air Quality, Compliance Division, U.S. Environmental Protection Agency, 2000 Traverwood Drive, Ann Arbor, MI 48105. Telephone: (734) 214–4380. Fax: (734) 214–4869. Email address: french.roberts@epa.gov.

SUPPLEMENTARY INFORMATION:

I. Background

EPA's light-duty vehicle greenhouse gas (GHG) program provides three pathways by which a manufacturer may accrue off-cycle carbon dioxide (CO_2) credits for those technologies that achieve CO_2 reductions in the real world but where those reductions are not adequately or entirely captured on the test used to determine compliance with the CO_2 standards, and which are not otherwise reflected in the standards' stringency. The first pathway is a predetermined list of credit values for specific off-cycle technologies that may be used beginning in model year 2014.[1] This pathway allows manufacturers to use conservative credit values established by EPA for a wide range of technologies, with minimal data submittal or testing requirements. In cases where additional laboratory

[1] See 40 CFR 86.1869-12(b).

testing can demonstrate emission benefits, a second pathway allows manufacturers to use a broader array of emission tests (known as "5-cycle" testing because the methodology uses five different testing procedures) to demonstrate and justify off-cycle CO_2 credits.[2] The additional emission tests allow emission benefits to be demonstrated over some elements of real-world driving not captured by the GHG compliance tests, including high speeds, hard accelerations, and cold temperatures. These first two methodologies were completely defined through notice and comment rulemaking and therefore no additional process is necessary for manufacturers to use these methods. The third and last pathway allows manufacturers to seek EPA approval to use an alternative methodology for determining the off-cycle CO_2 credits.[3] This option is only available if the benefit of the technology cannot be adequately demonstrated using the 5-cycle methodology. Manufacturers may also use this option for model years prior to 2014 to demonstrate off-cycle CO_2 reductions for technologies that are on the predetermined list, or to demonstrate reductions that exceed those available via use of the predetermined list.

Under the regulations, a manufacturer seeking to demonstrate off-cycle credits with an alternative methodology (i.e., under the third pathway described above) must describe a methodology that meets the following criteria:

- Use modeling, on-road testing, on-road data collection, or other approved analytical or engineering methods;
- Be robust, verifiable, and capable of demonstrating the real-world emissions benefit with strong statistical significance;

[2] See 40 CFR 86.1869-12(c).
[3] See 40 CFR 86.1869-12(d).

- Result in a demonstration of baseline and controlled emissions over a wide range of driving conditions and number of vehicles such that issues of data uncertainty are minimized;
- Result in data on a model type basis unless the manufacturer demonstrates that another basis is appropriate and adequate.

Further, the regulations specify the following requirements regarding an application for off-cycle CO_2 credits:

- A manufacturer requesting off-cycle credits must develop a methodology for demonstrating and determining the benefit of the off-cycle technology, and carry out any necessary testing and analysis required to support that methodology.
- A manufacturer requesting off-cycle credits must conduct testing and/or prepare engineering analyses that demonstrate the in-use durability of the technology for the full useful life of the vehicle.
- The application must contain a detailed description of the off-cycle technology and how it functions to reduce CO_2 emissions under conditions not represented on the compliance tests.
- The application must contain a list of the vehicle model(s) which will be equipped with the technology.
- The application must contain a detailed description of the test vehicles selected and an engineering analysis that supports the selection of those vehicles for testing.

- The application must contain all testing and/or simulation data required under the regulations, plus any other data the manufacturer has considered in the analysis.

Finally, the alternative methodology must be approved by EPA prior to the manufacturer using it to generate credits. As part of the review process defined by regulation, the alternative methodology submitted to EPA for consideration must be made available for public comment.[4] EPA will consider public comments as part of its final decision to approve or deny the request for off-cycle credits.

II. Off-Cycle Credit Applications

A. Fiat Chrysler Automobiles

Using the alternative methodology approach discussed above, Fiat Chrysler Automobiles (FCA) is applying for credits for model years prior to 2014, and thus prior to when the list of default credits becomes available. FCA has applied for off-cycle credits using the alternative demonstration methodology pathway for the following technologies: high efficiency exterior lighting, solar reflective glass/glazing, solar reflective paint, and active seat ventilation. The application covers 2009-2013 model year vehicles. All of these technologies are described in the predetermined list of credits available in the 2014 and later model years. The methodologies described by FCA are generally consistent with those used by EPA to establish the predetermined list of credits in the regulations, and would result in the same credit values as described in the regulations. The magnitude of these credits is determined by specification or calculations in the regulations based on vehicle-specific measurements (e.g., the area of glass or the lighting locations using the

[4] See 40 CFR 86.1869-12(d)(2).

specified technologies), but would be no higher than the following established regulatory caps:

Technology	**Off-Cycle Credit – Cars**	**Off-Cycle Credit – Trucks**
High efficiency lighting	1.0 grams/mile	1.0 grams/mile
Solar reflective glass/glazing	2.9 grams/mile	3.9 grams/mile
Solar reflective paint	0.4 grams/mile	0.5 grams/mile
Active seat ventilation	1.0 grams/mile	1.3 grams/mile

B. Ford Motor Company

Using the alternative methodology approach discussed above, Ford Motor Company (Ford) is applying for credits for model years prior to 2014, and thus prior to when the list of default credits becomes available. Ford has applied for off-cycle credits using the alternative demonstration methodology pathway for the following technologies: high efficiency exterior lighting, solar reflective glass/glazing, solar reflective paint, active seat ventilation, active aerodynamics, active transmission warm-up, active engine warm-up, and engine idle start-stop. All of these technologies are described in the predetermined list of credits available in the 2014 and later model years. The application covers 2012 and 2013 model year vehicles. The methodologies described by Ford are generally equivalent to those used by EPA to establish the predetermined list of credits in the regulations, and would result in the same credit values as described in the regulations. The magnitude of these credits is determined by specification or calculations in the regulations based on vehicle-specific measurements (e.g., the area of glass or the lighting

locations using the specified technologies), but would be no higher than the following established regulatory caps:

Technology	**Off-Cycle Credit – Cars (grams/mile)**	**Off-Cycle Credit – Trucks (grams/mile)**
High efficiency lighting	1.0	1.0
Solar reflective glass/glazing	2.9	3.9
Solar reflective paint	0.4	0.5
Active seat ventilation	1.0	1.3
Active aerodynamics	Based on measured reduction in the coefficient of drag	
Active transmission warm-up	1.5	3.2
Active engine warm-up	1.5	3.2
Engine idle start-stop	2.5	4.4

C. General Motors Corporation

Using the alternative methodology approach discussed above, GM is applying for credits for model years 2013 through 2015. These credits are for a component of the air conditioning system that results in air conditioning efficiency credits beyond those provided in the regulations. GM has applied for off-cycle credits for the Denso SAS air conditioner compressor with variable crankcase suction valve technology. GM is requesting an off-cycle GHG credit of 1.1 grams CO_2 per mile for this technology. EPA currently provides Mobile Air Conditioner (MAC) GHG credits for reduced reheat using

an externally-controlled variable displacement compressor (EVDC), which provides significant efficiency improvements compared to the baseline fixed displacement compressors that were the norm at the time EPA created the GHG program. Under the 2012-2016 light-duty GHG program, the credit for using an EVDC is 1.7 grams of CO_2 per mile. GM has a new EVDC design from Denso that further improves the efficiency of the MAC compressor through the addition of a variable crankcase suction valve (variable CS valve). The Denso SAS compressor improves the internal valve system within the compressor to reduce the internal refrigerant flow necessary throughout the range of displacements that the compressor may use during its operating cycle. The variable CS valve can provide a larger mass flow under maximum capacity and compressor start-up conditions, when high flow is ideal, then reduce to smaller openings with reduced mass flow in mid or low capacity conditions. The refrigerant exiting the crankcase is optimized across the range of operating conditions, creating benefits for the energy consumption of the MAC system.

The "5-cycle" methodology would not adequately measure the real world GHG reduction benefits of either the EVDC or the variable CS valve. Only one of the five tests is conducted with the air conditioner on and that test cycle represents worse case conditions (e.g., high temperature, solar load, and humidity) and would not represent the real world benefits of the technology. Therefore, GM has chosen to determine the appropriate off-cycle credits through use of an alternative methodology.

GM worked with Denso to perform bench testing of EDVC with and without the variable CS valve and quantified the difference. Based on this analysis, GM determined an off-cycle credit of 1.1 grams of CO_2 per mile were appropriate.GM substantiated these results by also performing vehicle tests using the AC17 test procedure.

III. EPA Decision Process

EPA has reviewed the applications for completeness and is now making the applications available for public review and comment as required by the regulations. The off-cycle credit applications submitted by FCA, Ford, and GM (with confidential business information redacted) have been placed in the public docket (see ADDRESSES section above) and on EPA's web site at http://www.epa.gov/otaq/regs/ld-hwy/greenhouse/ld-ghg.htm. EPA is providing a 30-day comment period on the applications for off-cycle credits described in this notice, as specified by the regulations. The manufacturers may submit a written rebuttal of comments for EPA's consideration, or may revise an application in response to comments. After reviewing any public comments and any rebuttal of comments submitted by manufacturers, EPA will make a final decision regarding the credit requests. EPA will make its decision available to the public by placing a decision document (or multiple decision documents) in the docket and on EPA's web site at http://www.epa.gov/otaq/regs/ld-hwy/greenhouse/ld-ghg.htm. While the broad methodologies used by these manufacturers could potentially be used for other vehicles and by other manufacturers, the vehicle specific data needed to demonstrate the off-cycle emissions reductions would likely be different. In such cases, a new application would be required, including an opportunity for public comment.

Dated: May 27, 2015.

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6560-50-P

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