EPA Decision Document: Off-Cycle Credits for Fiat Chrysler Automobiles NV (FCA), Active Climate Control Seat Technology

United States Environmental Protection Agency

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Compliance Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

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EPA Decision Document: Off-Cycle Credits for Fiat Chrysler Automobiles NV (FCA) - Active Climate Control Seat Technology

I. Introduction

EPA's light-duty vehicle greenhouse gas (GHG) rules include opportunities for manufacturers to generate CO_2 credits for technologies that provide CO_2 reductions not captured by the 2-cycle emissions test. There are three pathways by which manufacturers can generate off-cycle credits: (1) a pre-determined "menu" of technologies and credits that is available for 2014 and later model years, (2) a testing-based option, and (3) an alternative methodology that includes opportunity for public comment. These are described in more detail in Section II.

Pursuant to those rules, Fiat Chrysler Automobiles NV (FCA), now a subsidiary of Stellantis, submitted an application requesting off-cycle credits for the use of an Active Climate Control Seat Technology in vehicles equipped with this technology starting in model year 2016 and later. This application was made available for a 30-day public comment period[1] beginning on April 5, 2021.

This technology and methodology for demonstrating the effectiveness of this technology have been previously approved through the public process by the EPA for other manufacturers. FCA's request is for approval of similar methodology and for the same amount of credits per vehicle granted in the General Motors request to EPA for off-cycle Credit dated September 29, 2017 and subsequently granted in EPA decision document EPA-420-R-18-014. Details of FCA's analysis and the approved request by General Motors can be found in the corresponding manufacturer's applications.

Section II of this document provides background on EPA's off-cycle credits program. Section III provides EPA's decision. This decision document applies only to the application referenced herein.

II. EPA's Off-cycle Credits Program

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 off-cycle technologies that achieve CO_2 reductions in the real world but where those reductions are not adequately captured on the test procedure used to determine compliance with the CO_2 standards. The first is a predetermined list of credit values for specific off-cycle technologies that may be used beginning in model year 2014.[2] This pathway allows manufacturers to use conservative credit values established by EPA for a wide range of

[1] 86 FR 17594

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

technologies, with minimal data submittal or testing requirements. In cases where additional laboratory testing can demonstrate emission benefits of an off-cycle technology, 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.[3] 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. Credits determined according to this methodology do not undergo additional public review. The third and last pathway allows manufacturers to seek EPA approval to use an alternative methodology for determining the off-cycle CO_2 credits.[4] This option is only available if the benefit of the off-cycle 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;
- 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.

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

- 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.[5] EPA will consider public comments as part of its final decision to approve or deny the request for off-cycle credits.

Although these credits are requested under regulatory provisions that don't explicitly require limitations, or caps, on credit values, EPA is stipulating here that credits for technologies for which there is a regulatory cap must be held to the applicable regulatory cap, if such credits are approved by EPA. For example, for reasons described in the implementing rulemaking documents and analyses, EPA established caps on thermal technology credits of 3.0 grams/mile for cars and 4.3 grams/mile for trucks. The rationale for these caps is applicable regardless of the off-cycle pathway being used to achieve such credits. EPA also established caps on technologies that improve the efficiency of air conditioning systems (5 grams/mile for cars and 7.2 grams per mile for trucks). Thus, credits approved in this Decision Document are being approved only to the extent that the regulatory caps on credits for certain technologies or categories of technologies are not exceeded.

III. EPA Decisions on Off-cycle Credit Applications

Active Climate Control Seat Technology

FCA applied for off-cycle credits for use of a Gentherm active climate control seating ("ACCS") technology. The company's analysis in their application yields a GHG credit equal to 2.3 grams CO_2 per mile for passenger cars and 2.9 grams CO_2 per mile for trucks on vehicles equipped with this technology in the front seating locations.

Active seat ventilation credits were defined in the 2017-2025 light duty greenhouse gas and CAFE rulemaking and were added to the predefined list of credits that could be claimed at 1.0 grams CO_2 per mile and 1.3 grams CO_2 per mile for trucks. The credits and their values were determined in a 2005 study performed by researchers from the National Renewable Energy Laboratory ("NREL") in which they evaluated a seat ventilation system that used two small fans to pull air through the seat. When occupant comfort is achieved the air conditioning system no longer needs to work as hard to cool down the cabin. This translates to lowered air conditioning consumption and lower GHG emissions due to lowered air conditioning consumption while improving occupant comfort.

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

The NREL study was published as an SAE technical paper in 2007 available at https://www.sae.org/publications/technicalpapers/content/2007-01-1194/. More recent advances in ventilated seat technology offer higher levels of performance in current vehicles over the simpler ventilated seat system that was the subject of the 2005 NREL study. The active climate-controlled seat technology developed by Gentherm and used in FCA premium products was subsequently evaluated by Gentherm in cooperation with NREL using comparable methodologies to those employed by NREL in 2005. The more advanced Gentherm ACCS system provides a greater level of comfort resulting in lower air conditioning consumption and air conditioning related emissions through use of its active cooling technology. Details are provided in the application by FCA.

EPA has evaluated the application and comments received during the public comment period. Though the Agency received comments raising concerns with the Agency's general approach to accounting of emissions due to HVAC operation, these comments did not address the *method* which FCA used, which was a previously approved method (see GM Decision Document) and which underwent public review without adverse comments prior to original approval of the method.

Therefore, since FCA is requesting use of a previously approved method and requesting the same credit values per vehicle as previously approved for similar implementations, EPA is approving the credits requested by FCA for the 2016 model year and later for all vehicles using this technology as described in FCA's application. Caps or limits on credits that are specified in the regulations also apply to the credits being approved in this document. Since the Gentherm climate controlled seat technology meets the Active Seat Ventilation definition found at §86.1869-12(b)(4)(viii) the thermal control technology caps of 3.0 g/mi for passenger automobiles and 4.3 g/mi for light trucks applies. All information necessary to determine the total Megagrams of credits must be included in the reporting to EPA, and the total Megagrams for each fleet and model year should be included in a summary of credit averaging, banking, and trading.