

Air Conditioning Credits in the Light-Duty GHG Rule (and Beyond)

13 Jul 2010

Update for SAE Automotive Refrigerant and System Efficiency Symposium

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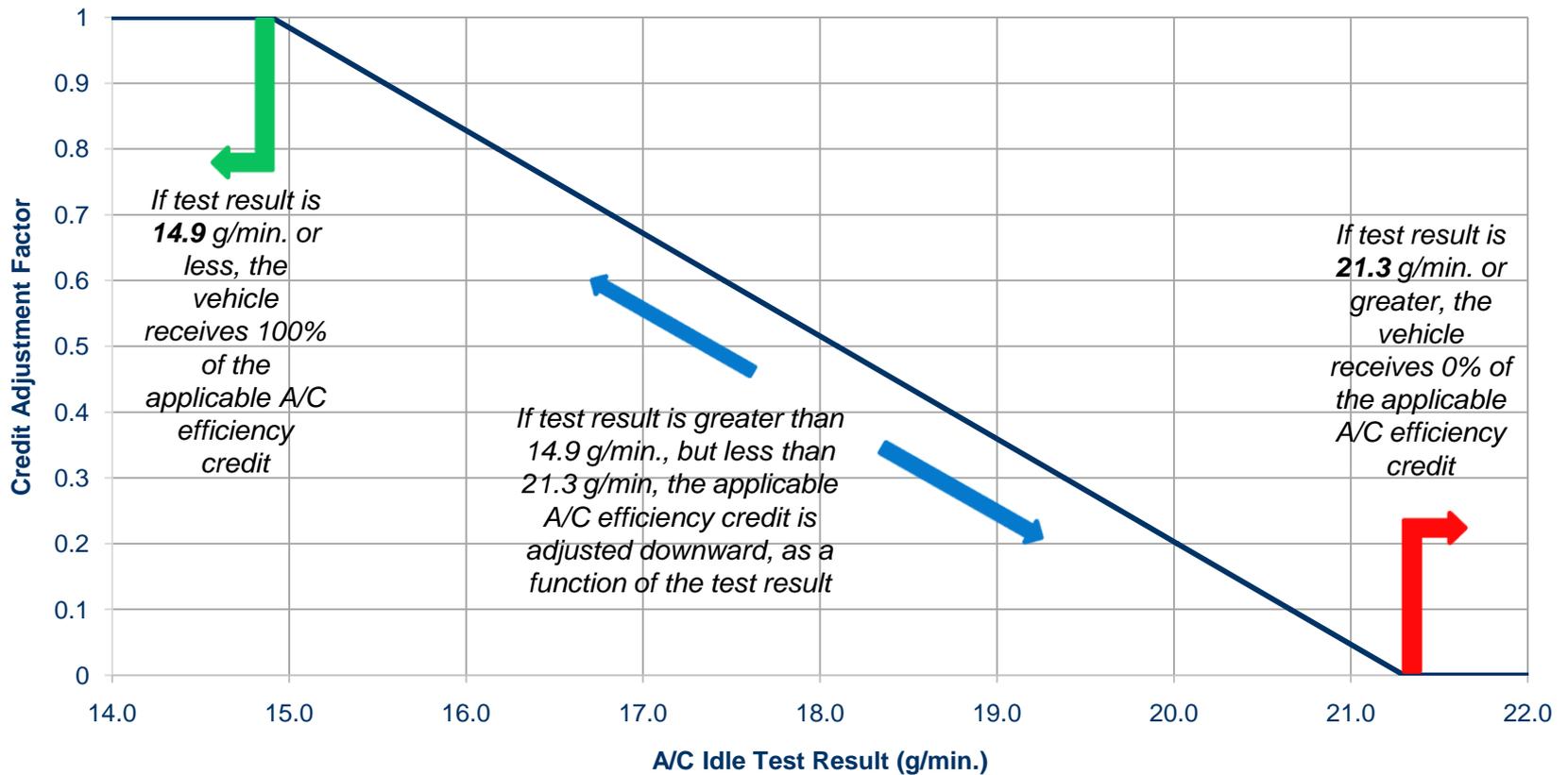


Key Elements Concerning A/C Credits

- “Leakage” credits are calculated using the method described in SAE J2727 (August 2008 version)
- “Efficiency” credits are calculated using menu-based approach, where design/control attributes of the vehicle’s A/C system are used to determine the amount of the credit:
 - For model years 2012 and 2013, only the menu is used
 - For model years 2014 through 2016, the menu is supplemented by an A/C Idle Test
 - The A/C Idle Test is used to measure the incremental CO₂ emissions due to A/C Use, and adjust the credit amount downward if test result less than 14.9 g/min.
- “Off-Cycle” credits are those which are not capture in an existing test cycle or menu item
 - Mfr. must justify rationale for granting an off-cycle credit for “new and innovative” technologies
 - Standard test metric does not exist for off-cycle credits



A/C Credit Adjustment (2014-2016 only)





What We Finalized in the A/C Credit Menu

Table III.C.1-2 Efficiency-Improving A/C Technologies and Credits

Technology Description	Estimated Reduction in A/C CO ₂ Emissions	A/C Efficiency Credit (g/mi CO ₂)
Reduced reheat, with externally-controlled, variable-displacement compressor	30%	1.7
Reduced reheat, with externally-controlled, fixed-displacement or pneumatic variable-displacement compressor	20%	1.1
Default to recirculated air with closed-loop control of the air supply (sensor feedback to control interior air quality) whenever the ambient temperature is 75 °F or higher (although deviations from this temperature are allowed if accompanied by an engineering analysis)	30%	1.7
Default to recirculated air with open-loop control air supply (no sensor feedback) whenever the ambient temperature 75 °F or higher (lower temperatures are allowed)	20%	1.1
Blower motor controls which limit wasted electrical energy (e.g., pulse width modulated power controller)	15%	0.9
Internal heat exchanger	20%	1.1
Improved condensers and/or evaporators (with system analysis on the component(s) indicating a COP improvement greater than 10%, when compared to previous industry standard designs)	20%	1.1
Oil Separator (with engineering analysis demonstrating effectiveness relative to the baseline design)	10%	0.6



Early A/C Credits

- Available in MYs 2009 – 2011
- Credits determined using same methodology as used for MY2012 A/C credits
- To earn early A/C credits for vehicles in California and CAA 177 states, the manufacturer must use one of the EPA early CO₂ credit Pathways that covers those vehicles
- For vehicles outside of California and CAA 177 states, manufacturers may earn early A/C credits regardless of whether or not the vehicles are included in an early CO₂ credit Pathway



Status of New MVAC Alternative Refrigerants

- **HFO-1234yf**
 - SNAP
 - Proposed acceptable with use conditions for new motor vehicles
 - Comment period closed
 - Final rule under development
 - Anticipated final rule publication: Fall 2010
 - SNUR
 - Comment period closed
 - Final rule under development
 - Anticipated final rule publication: Winter 2010
- **CO₂**
 - Proposed acceptable with use conditions for new motor vehicles
 - Comment period closed
 - Final rule under development
 - Anticipated final rule publication: Winter 2010
- **For more information:**
 - HFO-1234yf (SNAP): Margaret Sheppard, (202)-343-9163
 - HFO-1234yf (SNUR): Kenneth Moss, (202)-564-9232
 - CO₂ (SNAP): Yaidi Cancel, (202)-343-9512SNAP website: <http://www.epa.gov/ozone/snap/>



Next Steps

- What we said in the Final Rule concerning next steps:
 - *“While EPA considers a test cycle that covers a broader range of vehicle speed and climatic conditions to be ideal, developing such a representative A/C test would involve the work of many stakeholders, and would require a significant amount of time, exceeding the scope of this rule. EPA expects to continue working with industry, the California Air Resources Board, and other stakeholders to move toward increasingly robust performance tests and methods for determining the efficiency of mobile A/C systems and the related impact on vehicle CO2 emissions, including a potential adapted SC03 test.”*
- Have begun discussions with stakeholders to establish a framework for quantifying the power consumed by vehicle A/C systems:
 - Development of test methods/procedures
 - Use of models to determine expected power consumption
 - Verification of model results with vehicle-level testing