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# SUBCHAPTER Q—ENERGY POLICY

## PART 600—FUEL ECONOMY AND GREENHOUSE GAS EXHAUST EMISSIONS OF MOTOR VEHICLES

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## Subpart A—General Provisions

### § 600.001 General applicability.

(a) The provisions of this part apply to 2008 and later model year automobiles that are not medium duty passenger vehicles, and to 2011 and later model year automobiles including medium-duty passenger vehicles.

(b) The provisions of subparts A, D, and F of this part are optional through the 2011 model year in the following cases:

(1) Manufacturers that produce only electric vehicles are exempt from the requirements of this subpart, except with regard to the requirements in those sections pertaining specifically to electric vehicles.

(2) Manufacturers with worldwide production (excluding electric vehicle production) of less than 10,000 gasoline-fueled and/or diesel powered passenger automobiles and light trucks may optionally comply with the electric vehicle requirements in this subpart.

(c) Unless stated otherwise, references to fuel economy or fuel economy data in this part shall also be interpreted to mean the related exhaust emissions of $CO_2$, HC, and CO, and where applicable for alternative fuel vehicles, $CH_3OH$, $C_2H_5OH$, $C_2H_4O$, HCHO, NMHC and $CH_4$. References to average fuel economy shall be interpreted to also mean average carbon-related exhaust emissions and average $CO_2$ emissions. References to fuel economy data vehicles shall also be meant to refer to vehicles tested for carbon-related exhaust emissions for the purpose of demonstrating compliance with fleet average $CO_2$ standards in § 86.1818 of this chapter.

(d) The model year of initial applicability for sections in this part is indicated by the section number. The two digits following the hyphen designate the first model year for which a section is applicable. An individual section continues to apply for later model years until it is replaced by a different section that applies starting in a later model year. Sections that have no two-digit suffix apply for all 2008 and later model year vehicles, except as noted in those sections. If a section has a two-digit suffix but the regulation references that section without including the two-digit suffix, this refers to the section applicable for the appropriate model year. This also applies for references to part 86 of this chapter. As an example, § 600.113–08 applies to the 2008 and subsequent model years until § 600.113–12 is applicable beginning with the 2012 model year. Section 600.111–08 would then apply only for 2008 through 2011 model year vehicles.

[76 FR 39524, July 6, 2011]

**§ 600.002 Definitions.**

The following definitions apply throughout this part:

*3-bag FTP* means the Federal Test Procedure specified in part 86 of this chapter, with three sampling portions consisting of the cold-start transient (''Bag 1''), stabilized (''Bag 2''), and hot-start transient phases (''Bag 3'').

*4-bag FTP* means the 3-bag FTP, with the addition of a sampling portion for the hot-start stabilized phase (''Bag 4'').

*5-cycle* means the FTP, HFET, US06, SC03 and cold temperature FTP tests as described in subparts B and C of this part.

*Administrator* means the Administrator of the Environmental Protection Agency or his authorized representative.

*Alcohol* means a mixture containing 85 percent or more by volume methanol, ethanol, or other alcohols, in any combination.

*Alcohol-fueled automobile* means an automobile designed to operate exclusively on alcohol.

*Alcohol dual fuel automobile* means an automobile:

(1) Which is designed to operate on alcohol and on gasoline or diesel fuel; and

(2) Which provides equal or greater energy efficiency as calculated in accordance with § 600.510–08(g)(1) or § 600.510–12(g)(1) while operating on alcohol as it does while operating on gasoline or diesel fuel; and

(3) Which, in the case of passenger automobiles, meets or exceeds the minimum driving range established by the Department of Transportation in 49 CFR part 538.

*Alternative fuel* means any of the following:

(1) Methanol.

(2) Denatured ethanol.

(3) Other alcohols.

(4) A mixture containing at least 85 percent (or an alternative percentage as specified by the Secretary of Transportation under 49 U.S.C. 32901(b)) of methanol, denatured ethanol, and other alcohols by volume with gasoline or other fuels.

(5) Natural gas.

(6) Liquefied petroleum gas.

(7) Hydrogen.

(8) Coal derived liquid fuels.

(9) Fuels (except alcohol) derived from biological materials.

(10) Electricity (including electricity from solar energy).

(11) Any other fuel the Secretary of Transportation prescribes by regulation under 49 U.S.C. 32901(a)(1)(K).

*Automobile* has the meaning given by the Department of Transportation at 49 CFR 523.3. This includes ''passenger automobiles'' and ''non-passenger automobiles'' (or ''light trucks'').

*Auxiliary emission control device* (AECD) means an element of design as defined in § 86.1803 of this chapter.

*Average fuel economy* means the unique fuel economy value as computed under § 600.510 for a specific class of automobiles produced by a manufacturer that is subject to average fuel economy standards.

*Axle ratio* means the number of times the input shaft to the differential (or equivalent) turns for each turn of the drive wheels.

*Base level* means a unique combination of basic engine, inertia weight class and transmission class.

*Base tire* means the tire specified as standard equipment by the manufacturer.

*Base vehicle* means the lowest priced version of each body style that makes up a car line.

*Basic engine* means a unique combination of manufacturer, engine displacement, number of cylinders, fuel system (e.g., type of fuel injection), catalyst usage, and other engine and emission control system characteristics specified by the Administrator. For electric vehicles, basic engine means a unique combination of manufacturer and electric traction motor, motor controller, battery configuration, electrical charging system, energy storage device, and other components as specified by the Administrator.

*Battery configuration* means the electrochemical type, voltage, capacity (in Watt-hours at the c/3 rate), and physical characteristics of the battery used as the tractive energy device.

*Body style* means a level of commonality in vehicle construction as defined by number of doors and roof treatment (e.g., sedan, convertible, fastback, hatchback) and number of

seats (*i.e.*, front, second, or third seat) requiring seat belts pursuant to National Highway Traffic Safety Administration safety regulations in 49 CFR part 571. Station wagons and light trucks are identified as car lines.

*Calibration* means the set of specifications, including tolerances, unique to a particular design, version of application of a component, or component assembly capable of functionally describing its operation over its working range.

*Carbon-related exhaust emissions (CREE)* means the summation of the carbon-containing constituents of the exhaust emissions, with each constituent adjusted by a coefficient representing the carbon weight fraction of each constituent relative to the $CO_2$ carbon weight fraction, as specified in § 600.113. For example, carbon-related exhaust emissions (weighted 55 percent city and 45 percent highway) are used to demonstrate compliance with fleet average $CO_2$ emission standards outlined in § 86.1818 of this chapter.

*Car line* means a name denoting a group of vehicles within a make or car division which has a degree of commonality in construction (e.g., body, chassis). Car line does not consider any level of decor or opulence and is not generally distinguished by characteristics as roof line, number of doors, seats, or windows, except for station wagons or light-duty trucks. Station wagons and light-duty trucks are considered to be different car lines than passenger cars.

*Certification vehicle* means a vehicle which is selected under § 86.1828 of this chapter and used to determine compliance under § 86.1848 of this chapter for issuance of an original certificate of conformity.

*City fuel economy* means the city fuel economy determined by operating a vehicle (or vehicles) over the driving schedule in the Federal emission test procedure, or determined according to the vehicle-specific 5-cycle or derived 5-cycle procedures.

*Cold temperature FTP* means the test performed under the provisions of subpart C of part 86 of this chapter.

*Combined fuel economy* means:

(1) The fuel economy value determined for a vehicle (or vehicles) by harmonically averaging the city and highway fuel economy values, weighted 0.55 and 0.45, respectively.

(2) For electric vehicles, the term means the equivalent petroleum-based fuel economy value as determined by the calculation procedure promulgated by the Secretary of Energy.

*Dealer* means a person who resides or is located in the United States, any territory of the United States, or the District of Columbia and who is engaged in the sale or distribution of new automobiles to the ultimate purchaser.

*Derived 5-cycle fuel economy* means the 5-cycle fuel economy derived from the FTP-based city and HFET-based highway fuel economy by means of the equation provided in § 600.210.

*Derived 5-cycle $CO_2$* means the 5-cycle $CO_2$ derived from the FTP-based city and HFET-based highway fuel economy by means of the equation provided in § 600.210.

*Diesel gallon equivalent* means an amount of electricity or fuel with the energy equivalence of one gallon of diesel fuel. For purposes of this part, one gallon of diesel fuel is equivalent to 36.7 kilowatt-hours of electricity.

*Drive system* is determined by the number and location of drive axles (e.g., front wheel drive, rear wheel drive, four wheel drive) and any other feature of the drive system if the Administrator determines that such other features may result in a fuel economy difference.

*Dual fueled automobile* means an automobile:

(1) Which is designed to operate on an alternative fuel and on gasoline or diesel fuel; and

(2) Which provides equal or greater energy efficiency as calculated in accordance with § 600.510–08(g)(1) or § 600.510–12(g)(1) while operating on the alternative fuel as it does while operating on gasoline or diesel fuel; and

(3) Which, in the case of passenger automobiles, meets or exceeds the minimum driving range established by the Department of Transportation in 49 CFR part 538.

*Electrical charging system* means a device to convert 60 Hz alternating electric current, as commonly available in residential electric service in the

United States, to a proper form for recharging the energy storage device.

*Electric traction motor* means an electrically powered motor which provides tractive energy to the wheels of a vehicle.

*Electric vehicle* has the meaning given in § 86.1803 of this chapter.

*Energy storage device* means a rechargeable means of storing tractive energy on board a vehicle such as storage batteries or a flywheel.

*Engine code* means a unique combination, within an engine-system combination (as defined in § 86.1803 of this chapter), of displacement, fuel injection (or carburetion or other fuel delivery system), calibration, distributor calibration, choke calibration, auxiliary emission control devices, and other engine and emission control system components specified by the Administrator. For electric vehicles, engine code means a unique combination of manufacturer, electric traction motor, motor configuration, motor controller, and energy storage device.

*Federal emission test procedure* (FTP) refers to the dynamometer driving schedule, dynamometer procedure, and sampling and analytical procedures described in part 86 of this chapter for the respective model year, which are used to derive city fuel economy data.

*Footprint* has the meaning given in § 86.1803 of this chapter.

*FTP-based city fuel economy* means the fuel economy determined in § 600.113 of this part, on the basis of FTP testing.

*Fuel* means:

(1) Gasoline and diesel fuel for gasoline- or diesel-powered automobiles; or

(2) Electrical energy for electrically powered automobiles; or

(3) Alcohol for alcohol-powered automobiles; or

(4) Natural gas for natural gas-powered automobiles; or

(5) Liquid Petroleum Gas (LPG), commonly referred to as ''propane,'' for LPG-powered automobiles; or

(6) Hydrogen for hydrogen fuel cell automobiles and for automobiles equipped with hydrogen internal combustion engines.

*Fuel cell* has the meaning given in § 86.1803 of this chapter.

*Fuel cell vehicle* has the meaning given in § 86.1803 of this chapter.

*Fuel economy* means:

(1) The average number of miles traveled by an automobile or group of automobiles per volume of fuel consumed as calculated in this part; or

(2) For the purpose of calculating average fuel economy pursuant to the provisions of part 600, subpart F, fuel economy for electrically powered automobiles means the equivalent petroleum-based fuel economy as determined by the Secretary of Energy in accordance with the provisions of 10 CFR 474.

*Fuel economy data vehicle* means a vehicle used for the purpose of determining fuel economy which is not a certification vehicle.

*Gasoline gallon equivalent* means an amount of electricity or fuel with the energy equivalence of one gallon of gasoline. For purposes of this part, one gallon of gasoline is equivalent to 33.705 kilowatt-hours of electricity or 121.5 standard cubic feet of natural gas.

*Good engineering judgment* has the meaning given in § 1068.30 of this chapter. See § 1068.5 of this chapter for the administrative process we use to evaluate good engineering judgment.

*Gross vehicle weight rating* means the manufacturer's gross weight rating for the individual vehicle.

*Hatchback* means a passenger automobile where the conventional luggage compartment, *i.e.*, trunk, is replaced by a cargo area which is open to the passenger compartment and accessed vertically by a rear door which encompasses the rear window.

*Highway fuel economy* means the highway fuel economy determined either by operating a vehicle (or vehicles) over the driving schedule in the Federal highway fuel economy test procedure, or determined according to either the vehicle-specific 5-cycle equation or the derived 5-cycle equation for highway fuel economy.

*Highway fuel economy test procedure* (HFET) refers to the dynamometer driving schedule, dynamometer procedure, and sampling and analytical procedures described in subpart B of this part and which are used to derive highway fuel economy data.

*HFET-based fuel economy* means the highway fuel economy determined in § 600.113 of this part, on the basis of HFET testing.

*Hybrid electric vehicle (HEV)* has the meaning given in § 86.1803 of this chapter.

*Independent Commercial Importer* has the meaning given in § 85.1502 of this chapter.

*Inertia weight class* means the class, which is a group of test weights, into which a vehicle is grouped based on its loaded vehicle weight in accordance with the provisions of part 86 of this chapter.

*Label* means a sticker that contains fuel economy information and is affixed to new automobiles in accordance with subpart D of this part.

*Light truck* means an automobile that is not a passenger automobile, as defined by the Secretary of Transportation at 49 CFR 523.5. This term is interchangeable with ''non-passenger automobile.'' The term ''light truck'' includes medium-duty passenger vehicles which are manufactured during 2011 and later model years.

*Medium-duty passenger vehicle* means a vehicle which would satisfy the criteria for light trucks as defined by the Secretary of Transportation at 49 CFR 523.5 but for its gross vehicle weight rating or its curb weight, which is rated at more than 8,500 lbs GVWR or has a vehicle curb weight of more than 6,000 pounds or has a basic vehicle frontal area in excess of 45 square feet, and which is designed primarily to transport passengers, but does not include a vehicle that:

(1) Is an ''incomplete truck'' as defined in this subpart; or

(2) Has a seating capacity of more than 12 persons; or

(3) Is designed for more than 9 persons in seating rearward of the driver's seat; or

(4) Is equipped with an open cargo area (for example, a pick-up truck box or bed) of 72.0 inches in interior length or more. A covered box not readily accessible from the passenger compartment will be considered an open cargo area for purposes of this definition.

*Minivan* means a light truck which is designed primarily to carry no more than eight passengers, having an integral enclosure fully enclosing the driver, passenger, and load-carrying compartments, and rear seats readily removed, folded, stowed, or pivoted to facilitate cargo carrying. A minivan typically includes one or more sliding doors and a rear liftgate. Minivans typically have less total interior volume or overall height than full sized vans and are commonly advertised and marketed as ''minivans.''

*Model type* means a unique combination of car line, basic engine, and transmission class.

*Model year* means the manufacturer's annual production period (as determined by the Administrator) which includes January 1 of such calendar year. If a manufacturer has no annual production period, the term ''model year'' means the calendar year.

*Motor controller* means an electronic or electro-mechanical device to convert energy stored in an energy storage device into a form suitable to power the traction motor.

*Natural gas-fueled automobile* means an automobile designed to operate exclusively on natural gas.

*Natural gas dual fuel automobile* means an automobile:

(1) Which is designed to operate on natural gas and on gasoline or diesel fuel;

(2) Which provides equal or greater energy efficiency as calculated in § 600.510–08(g)(1) while operating on natural gas as it does while operating on gasoline or diesel fuel; and

(3) Which, in the case of passenger automobiles, meets or exceeds the minimum driving range established by the Department of Transportation in 49 CFR part 538.

*Non-passenger automobile* has the meaning given by the Department of Transportation at 49 CFR 523.5. This term is synonymous with ''light truck.''

*Passenger automobile* has the meaning given by the Department of Transportation at 49 CFR 523.4.

*Pickup truck* means a nonpassenger automobile which has a passenger compartment and an open cargo bed.

*Plug-in hybrid electric vehicle (PHEV)* has the meaning given in § 86.1803 of this chapter.

*Production volume* means, for a domestic manufacturer, the number of vehicle units domestically produced in a particular model year but not exported, and for a foreign manufacturer, means the number of vehicle units of a particular model imported into the United States.

*QR Code* means Quick Response Code, which is a registered trademark of Denso Wave, Incorporated.

*Round* has the meaning given in § 1065.1001 of this chapter, unless specified otherwise.

*SC03* means the test procedure specified in § 86.160 of this chapter.

*Secretary of Energy* means the Secretary of Energy or his authorized representative.

*Secretary of Transportation* means the Secretary of Transportation or his authorized representative.

*Sport utility vehicle* (SUV) means a light truck with an extended roof line to increase cargo or passenger capacity, cargo compartment open to the passenger compartment, and one or more rear seats readily removed or folded to facilitate cargo carrying.

*Station wagon* means a passenger automobile with an extended roof line to increase cargo or passenger capacity, cargo compartment open to the passenger compartment, a tailgate, and one or more rear seats readily removed or folded to facilitate cargo carrying.

*Subconfiguration* means a unique combination within a vehicle configuration of equivalent test weight, road-load horsepower, and any other operational characteristics or parameters which the Administrator determines may significantly affect fuel economy within a vehicle configuration.

*Test weight* means the weight within an inertia weight class which is used in the dynamometer testing of a vehicle, and which is based on its loaded vehicle weight in accordance with the provisions of part 86 of this chapter.

*Track width* has the meaning given in § 86.1803 of this chapter.

*Transmission class* means a group of transmissions having the following common features: Basic transmission type (manual, automatic, or semi-automatic); number of forward gears used in fuel economy testing (e.g., manual four-speed, three-speed automatic, two-speed semi-automatic); drive system (e.g., front wheel drive, rear wheel drive; four wheel drive), type of overdrive, if applicable (e.g., final gear ratio less than 1.00, separate overdrive unit); torque converter type, if applicable (e.g., non-lockup, lockup, variable ratio); and other transmission characteristics that may be determined to be significant by the Administrator.

*Transmission configuration* means the Administrator may further subdivide within a transmission class if the Administrator determines that sufficient fuel economy differences exist. Features such as gear ratios, torque converter multiplication ratio, stall speed, shift calibration, or shift speed may be used to further distinguish characteristics within a transmission class.

*Ultimate consumer* means the first person who purchases an automobile for purposes other than resale or who leases an automobile.

*US06* means the test procedure as described in § 86.159 of this chapter.

*US06-City* means the combined periods of the US06 test that occur before and after the US06-Highway period.

*US06-Highway* means the period of the US06 test that begins at the end of the deceleration which is scheduled to occur at 130 seconds of the driving schedule and terminates at the end of the deceleration which is scheduled to occur at 495 seconds of the driving schedule.

*Usable fuel storage capacity* means the amount of fuel that is available to a vehicle starting from a complete refueling event until the vehicle stops (or until driveability deteriorates to the point that further driving is unlikely or impractical). For liquid fuels, the usable fuel storage capacity represents the difference between the total fuel volume after a complete refueling event and the fuel volume that remains in the fuel tank after the vehicle runs out of fuel. For other fuels, use good engineering judgment to determine the full and empty conditions consistent with typical consumer behavior. For example, for natural gas vehicles, the full condition would be the point at which a typical operator would stop refueling based on the increasing system pressures, which are determined by

temperature effects related to the refueling process; this does not necessarily represent the maximum amount of fuel the tank can hold under equilibrium conditions. The empty condition would be the point at which fuel pressure drops enough that the engine is unable to maintain stable air-fuel ratios for acceptable continued operation.

*Van* means any light truck having an integral enclosure fully enclosing the driver compartment and load carrying compartment. The distance from the leading edge of the windshield to the foremost body section of vans is typically shorter than that of pickup trucks and SUVs.

*Vehicle configuration* means a unique combination of basic engine, engine code, inertia weight class, transmission configuration, and axle ratio within a base level.

*Vehicle-specific 5-cycle $CO_2$* means the $CO_2$ calculated according to the procedures in § 600.114.

*Vehicle-specific 5-cycle fuel economy* means the fuel economy calculated according to the procedures in § 600.114.

*Wheelbase* has the meaning given in § 86.1803 of this chapter.

[76 FR 39524, July 6, 2011]

### § 600.003 Abbreviations.

The abbreviations and acronyms used in this part have the same meaning as those in part 86 of this chapter, with the addition of the following:

(a) ''MPG'' or ''mpg'' means miles per gallon. This may be used to generally describe fuel economy as a quantity, or it may be used as the units associated with a particular value.

(b) MPGe means miles per gallon equivalent. This is generally used to quantify a fuel economy value for vehicles that use a fuel other than gasoline. The value represents miles the vehicle can drive with the energy equivalent of one gallon of gasoline.

(c) SCF means standard cubic feet.

(d) SUV means sport utility vehicle.

(e) CREE means carbon-related exhaust emissions.

[76 FR 39527, July 6, 2011]

### § 600.005 Maintenance of records and rights of entry.

The provisions of this section are applicable to all fuel economy data vehicles. Certification vehicles are required to meet the provisions of § 86.1844 of this chapter.

(a) The manufacturer of any new motor vehicle subject to any of the standards or procedures prescribed in this part shall establish, maintain, and retain the following adequately organized and indexed records:

(1) *General records.* (i) Identification and description of all vehicles for which data are submitted to meet the requirements of this part.

(ii) A description of all procedures used to test each vehicle.

(iii) A copy of the information required to be submitted under § 600.006 fulfills the requirements of paragraph (a)(1)(i) of this section.

(2) *Individual records.* A brief history of each vehicle for which data are submitted to meet the requirements of this part, in the form of a separate booklet or other document for each separate vehicle, in which must be recorded:

(i) The steps taken to ensure that the vehicle with respect to its engine, drive train, fuel system, emission control system components, exhaust after treatment device, vehicle weight, or any other device or component, as applicable, will be representative of production vehicles. In the case of electric vehicles, the manufacturer should describe the steps taken to ensure that the vehicle with respect to its electric traction motor, motor controller, battery configuration, or any other device or component, as applicable, will be representative of production vehicles.

(ii) A complete record of all emission tests performed under part 86 of this chapter, all fuel economy tests performed under this part 600 (except tests actually performed by EPA personnel), and all electric vehicle tests performed according to procedures promulgated by DOE, including all individual worksheets and other documentation relating to each such test or exact copies thereof; the date, time, purpose, and location of each test; the number of miles accumulated on the vehicle when the tests began and ended; and the

names of supervisory personnel responsible for the conduct of the tests.

(iii) A description of mileage accumulated since selection of buildup of such vehicles including the date and time of each mileage accumulation listing both the mileage accumulated and the name of each driver, or each operator of the automatic mileage accumulation device, if applicable. Additionally, a description of mileage accumulated prior to selection or buildup of such vehicle must be maintained in such detail as is available.

(iv) If used, the record of any devices employed to record the speed or mileage, or both, of the test vehicle in relationship to time.

(v) A record and description of all maintenance and other servicing performed, within 2,000 miles prior to fuel economy testing under this part, giving the date and time of the maintenance or service, the reason for it, the person authorizing it, and the names of supervisory personnel responsible for the conduct of the maintenance or service. A copy of the maintenance information to be submitted under § 600.006 fulfills the requirements of this paragraph (a)(2)(v).

(vi) A brief description of any significant events affecting the vehicle during any of the period covered by the history not described in an entry under one of the previous headings including such extraordinary events as vehicle accidents or driver speeding citations or warnings.

(3) *Keeping records.* The manufacturer shall retain all records required under this part for five years after the end of the model year to which they relate. Records may be retained as hard copy or some alternative storage medium, provided that in every case all the information contained in hard copy shall be retained.

(b)(1) Any manufacturer who has supplied fuel economy data to meet the requirements of this part shall admit any EPA Enforcement Officer during operating hours upon presentation of credentials at any of the following:

(i) Any facility where any fuel economy tests from which data are submitted or any procedures or activities connected with these tests are performed.

(ii) Any facility where any new motor vehicle which is being, was, or is to be tested is present.

(iii) Any facility where any construction process used in the modification or buildup of a vehicle into a fuel economy data vehicle is taking place or has taken place.

(iv) Any facility where any record or other document relating to any of the above is located.

(2) Upon admission to any facility referred to in paragraph (b)(1) of this section, the manufacturer shall allow any EPA Enforcement Officer:

(i) To inspect and monitor any part or aspect of procedures, activities, and testing facilities, including, but not limited to, monitoring vehicle preconditioning; emission and fuel economy tests and mileage accumulation; maintenance; vehicle soak and storage procedures; and to verify correlation of calibration of test equipment;

(ii) To inspect and make copies of any required records, designs, or other documents; and

(iii) To inspect and photograph any part or aspect of any fuel economy vehicle and any components to be used in the construction thereof.

(3) Any EPA Enforcement Officer will be furnished, by those in charge of facility being inspected, with such reasonable assistance as may be required to help discharge any function listed in this paragraph (b). Each manufacturer is required to have those in charge of the facility furnish such reasonable assistance without charge to EPA whether or not the manufacturer controls the facility.

(4) The duty to admit any EPA Enforcement Officer shall be applicable whether or not the manufacturer owns or controls the facility in question and is applicable to both domestic and foreign manufacturers and facilities. An EPA Enforcement Officer will not attempt to make any inspections which the officer has been informed are in contravention of any law. However, if local law makes it impossible for the EPA Enforcement Officer to verify or to ensure the accuracy of data generated at a facility such that no informed judgment can properly be made as to the accuracy or reliability of data

generated by or obtained for the facility, then a vehicle or data from that vehicle shall not be accepted for use in subpart C or F of this part (unless the Administrator is otherwise convinced of the accuracy and reliability of such data).

(5) For purposes of this paragraph (b):

(i) ''Presentation of credentials'' means display of the document designating a person as an EPA Enforcement Officer.

(ii) Where vehicle, component, or engine storage areas or facilities are concerned, ''operating hours'' shall mean all times during which personnel other than custodial personnel are at work in the vicinity of the area or facility and have access to it.

(iii) For facilities or areas other than those covered by paragraph (b)(5)(ii) of this section, the term, ''operating hours'' will mean all times during which an assembly line is in operation or all times during which testing, maintenance, mileage accumulation, production or compilation of records, or any other procedure or activity related to fuel economy testing, or to vehicle manufacturer or assembly, is being carried out in a facility.

(iv) ''Reasonable assistance'' means providing timely and unobstructed access to and opportunity for the copying of any record, book, paper, or document required to be maintained under this section and providing timely and unobstructed access to any motor vehicle, testing facility, or testing equipment.

(v) Any entry without 24 hours prior written or oral notification to the affected manufacturer shall be authorized in writing by the Assistant Administrator for Enforcement.

[45 FR 49259, July 24, 1980, as amended at 64 FR 23973, May 4, 1999. Redesignated and amended at 76 FR 39524, 39527, July 6, 2011]

### § 600.006 Data and information requirements for fuel economy data vehicles.

(a) For certification vehicles with less than 10,000 miles, the requirements of this section are considered to have been met except as noted in paragraph (c) of this section.

(b)(1) The manufacturer shall submit the following information for each fuel economy data vehicle:

(i) A description of the vehicle, exhaust emission test results, applicable deterioration factors, adjusted exhaust emission levels, and test fuel property values as specified in § 600.113–08.

(ii) A statement of the origin of the vehicle including total mileage accumulation, and modification (if any) form the vehicle configuration in which the mileage was accumulated. (For modifications requiring advance approval by the Administrator, the name of the Administrator's representative approving the modification and date of approval are required.) If the vehicle was previously used for testing for compliance with part 86 of this chapter or previously accepted by the Administrator as a fuel economy data vehicle in a different configuration, the requirements of this paragraph may be satisfied by reference to the vehicle number and previous configuration.

(iii) A statement that the fuel economy data vehicle for which data are submitted:

(A) Has been tested in accordance with applicable test procedures;

(B) Is, to the best of the manufacturer's knowledge, representative of the vehicle configuration listed; and

(C) Is in compliance with applicable exhaust emission standards.

(2) The manufacturer shall retain the following information for each fuel economy data vehicle, and make it available to the Administrator upon request:

(i) A description of all maintenance to engine, emission control system, or fuel system, or fuel system components performed within 2,000 miles prior to fuel economy testing.

(ii) In the case of electric vehicles, plug-in hybrid electric vehicles, and hybrid electric vehicles, a description of all maintenance to electric motor, motor controller, battery configuration, or other components performed within 2,000 miles prior to fuel economy testing.

(iii) A copy of calibrations for engine, fuel system, and emission control devices, showing the calibration of the actual components on the test vehicle as well as the design tolerances.

(iv) In the case of electric vehicles, plug-in hybrid electric vehicles, and hybrid electric vehicles, a copy of calibrations for the electric motor, motor controller, battery configuration, or other components on the test vehicle as well as the design tolerances.

(v) If calibrations for components specified in paragraph (b)(2) (iii) or (iv) of this section were submitted previously as part of the description of another vehicle or configuration, the original submittal may be referenced.

(c) The manufacturer shall submit the following fuel economy data:

(1) For vehicles tested to meet the requirements of part 86 of this chapter (other than those chosen in accordance with the provisions related to durability demonstration in § 86.1829 of this chapter or in-use verification testing in § 86.1845 of this chapter), the FTP, highway, US06, SC03 and cold temperature FTP fuel economy results, as applicable, from all tests on that vehicle, and the test results adjusted in accordance with paragraph (g) of this section.

(2) For each fuel economy data vehicle, all individual test results (excluding results of invalid and zero mile tests) and these test results adjusted in accordance with paragraph (g) of this section.

(3) For diesel vehicles tested to meet the requirements of part 86 of this chapter, data from a cold temperature FTP, performed in accordance with § 600.111–08(e), using the fuel specified in § 600.107–08(c).

(4) For all vehicles tested in paragraph (c)(1) through (3) of this section, the individual fuel economy results measured on a per-phase basis, that is, the individual phase results for all sample phases of the FTP, cold temperature FTP and US06 tests.

(5) Starting with the 2012 model year, the data submitted according to paragraphs (c)(1) through (4) of this section shall include total HC, CO, $CO_2$, and, where applicable for alternative fuel vehicles, $CH_3OH$, $C_2H_5OH$, $C_2H_4O$, HCHO, NMHC and $CH_4$. Manufacturers incorporating $N_2O$ and $CH_4$ emissions in their fleet average carbon-related exhaust emissions as allowed under § 86.1818 of this chapter shall also submit $N_2O$ and $CH_4$ emission data where applicable. The fuel economy, carbon-related exhaust emissions, and $CO_2$ emission test results shall be adjusted in accordance with paragraph (g) of this section.

(d) The manufacturer shall submit an indication of the intended purpose of the data (e.g., data required by the general labeling program or voluntarily submitted for specific labeling).

(e) In lieu of submitting actual data from a test vehicle, a manufacturer may provide fuel economy, $CO_2$ emissions, and carbon-related exhaust emission values derived from a previously tested vehicle, where the fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions are expected to be equivalent (or less fuel-efficient and with higher $CO_2$ emissions and carbon-related exhaust emissions). Additionally, in lieu of submitting actual data from a test vehicle, a manufacturer may provide fuel economy, $CO_2$ emissions, and carbon-related exhaust emission values derived from an analytical expression, e.g., regression analysis. In order for fuel economy, $CO_2$ emissions, and carbon-related exhaust emission values derived from analytical methods to be accepted, the expression (form and coefficients) must have been approved by the Administrator.

(f) If, in conducting tests required or authorized by this part, the manufacturer utilizes procedures, equipment, or facilities not described in the Application for Certification required in § 86.1844–01 of this chapter, the manufacturer shall submit to the Administrator a description of such procedures, equipment, and facilities.

(g)(1) The manufacturer shall adjust all test data used for fuel economy label calculations in subpart D and average fuel economy calculations in subpart F for the classes of automobiles within the categories identified in paragraphs of § 600.510(a)(1) through (4). The test data shall be adjusted in accordance with paragraph (g)(3) or (4) of this section as applicable.

(2) [Reserved]

(3)(i) The manufacturer shall adjust all fuel economy test data generated by vehicles with engine-drive system combinations with more than 6,200 miles by using the following equation:

$$FE_{4,000mi} = FE_T[0.979 + 5.25 \times 10^{-6}(mi)]^{-1}$$

Where:

$FE_{4,000mi}$ = Fuel economy data adjusted to 4,000-mile test point rounded to the nearest 0.1 mpg.

$FE_T$ = Tested fuel economy value rounded to the nearest 0.1 mpg.

mi = System miles accumulated at the start of the test rounded to the nearest whole mile.

(ii)(A) The manufacturer shall adjust all carbon-related exhaust emission (CREE) and all $CO_2$ test data generated by vehicles with engine-drive system combinations with more than 6,200 miles by using the following equation:

$$ADJ_{4,000mi} = TEST[0.979 + 5.25 \cdot 10^{-6} \cdot (mi)]$$

Where:

$ADJ_{4,000mi}$ = CREE or $CO_2$ emission data adjusted to 4,000-mile test point.

TEST = Tested emissions value of CREE or $CO_2$ in grams per mile.

mi = System miles accumulated at the start of the test rounded to the nearest whole mile.

(B) Emissions test values and results used and determined in the calculations in this paragraph (g)(3)(ii) shall be rounded in accordance with § 86.1837 of this chapter as applicable. $CO_2$ and CREE values shall be rounded to the nearest gram per mile.

(C) Note that the CREE test results are determined using the unadjusted $CO_2$ value; *i.e.*, $CO_2$ is not adjusted twice when determining the 4,000 mile CREE value.

(4) For vehicles with 6,200 miles or less accumulated, the manufacturer is not required to adjust the data.

(5) The Administrator may specify a different adjustment calculation for electric vehicles, plug-in hybrid electric vehicles, and fuel cell vehicles to allow for properly characterizing the fuel economy and emissions of these vehicles.

[71 FR 77929, Dec. 27, 2006, as amended at 75 FR 25702, May 7, 2010. Redesignated and amended at 76 FR 39524, 39528, July 6, 2011]

### § 600.007 Vehicle acceptability.

(a) All certification vehicles and other vehicles tested to meet the requirements of part 86 of this chapter (other than those chosen under the durability-demonstration provisions in § 86.1829 of this chapter), are considered to have met the requirements of this section.

(b) Any vehicle not meeting the provisions of paragraph (a) of this section must be judged acceptable by the Administrator under this section in order for the test results to be reviewed for use in subpart C or F of this part. The Administrator will judge the acceptability of a fuel economy data vehicle on the basis of the information supplied by the manufacturer under § 600.006(b). The criteria to be met are:

(1) A fuel economy data vehicle may have accumulated not more than 10,000 miles. A vehicle will be considered to have met this requirement if the engine and drivetrain have accumulated 10,000 or fewer miles. The Administrator may specify a different maximum value for electric vehicles, plug-in hybrid electric vehicles, and fuel cell vehicles that allows for the necessary operation for properly evaluating and characterizing those vehicles under this part. The components installed for a fuel economy test are not required to be the ones with which the mileage was accumulated, e.g., axles, transmission types, and tire sizes may be changed. The Administrator will determine if vehicle/engine component changes are acceptable.

(2) A vehicle may be tested in different vehicle configurations by change of vehicle components, as specified in paragraph (b)(1) of this section, or by testing in different inertia weight classes. Also, a single vehicle may be tested under different test conditions, *i.e.*, test weight and/or road load horsepower, to generate fuel economy data representing various situations within a vehicle configuration. For purposes of this part, data generated by a single vehicle tested in various test conditions will be treated as if the data were generated by the testing of multiple vehicles.

(3) The mileage on a fuel economy data vehicle must be, to the extent possible, accumulated according to § 86.1831 of this chapter.

(4) Each fuel economy data vehicle must meet the same exhaust emission standards as certification vehicles of the respective engine-system combination during the test in which the city

fuel economy test results are generated. This may be demonstrated using one of the following methods:

(i) The deterioration factors established for the respective engine-system combination per § 86.1841 of this chapter as applicable will be used; or

(ii) The fuel economy data vehicle will be equipped with aged emission control components according to the provisions of § 86.1823 of this chapter.

(5) The calibration information submitted under § 600.006(b) must be representative of the vehicle configuration for which the fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions data were submitted.

(6) Any vehicle tested for fuel economy, $CO_2$ emissions, or carbon-related exhaust emissions purposes must be representative of a vehicle which the manufacturer intends to produce under the provisions of a certificate of conformity.

(7) For vehicles imported under § 85.1509 or § 85.1511(b)(2), (b)(4), (c)(1), (c)(2) or (d) of this chapter (when applicable), only the following requirements must be met:

(i) For vehicles imported under § 85.1509 of this chapter, a highway fuel economy value must be generated contemporaneously with the emission tests used for purposes of demonstrating compliance with § 85.1509 of this chapter. No modifications or adjustments should be made to the vehicles between the highway fuel economy, FTP, US06, SC03 and Cold temperature FTP tests.

(ii) For vehicles imported under § 85.1509 or § 85.1511(b)(2), (b)(4), (c)(1), or (c)(2) of this chapter (when applicable) with over 10,000 miles, the equation in § 600.006(g)(3) shall be used as though only 10,000 miles had been accumulated.

(iii) Any required fuel economy testing must take place after any safety modifications are completed for each vehicle as required by regulations of the Department of Transportation.

(iv) Every vehicle imported under § 85.1509 or § 85.1511(b)(2), (b)(4), (c)(1), or (c)(2) of this chapter (when applicable) must be considered a separate type for the purposes of calculating a fuel economy label for a manufacturer's average fuel economy.

(c) If, based on review of the information submitted under § 600.006(b), the Administrator determines that a fuel economy data vehicle meets the requirements of this section, the fuel economy data vehicle will be judged to be acceptable and fuel economy and carbon-related exhaust emissions data from that fuel economy data vehicle will be reviewed pursuant to § 600.008.

(d) If, based on the review of the information submitted under § 600.006(b), the Administrator determines that a fuel economy data vehicle does not meet the requirements of this section, the Administrator will reject that fuel economy data vehicle and inform the manufacturer of the rejection in writing.

(e) If, based on a review of the emission data for a fuel economy data vehicle, submitted under § 600.006(b), or emission data generated by a vehicle tested under § 600.008(e), the Administrator finds an indication of non-compliance with section 202 of the Clean Air Act, 42 U.S.C. 1857 et seq. of the regulation thereunder, he may take such investigative actions as are appropriate to determine to what extent emission non-compliance actually exists.

(1) The Administrator may, under the provisions of § 86.1830 of this chapter, request the manufacturer to submit production vehicles of the configuration(s) specified by the Administrator for testing to determine to what extent emission noncompliance of a production vehicle configuration or of a group of production vehicle configurations may actually exist.

(2) If the Administrator determines, as a result of his investigation, that substantial emission non-compliance is exhibited by a production vehicle configuration or group of production vehicle configurations, he may proceed with respect to the vehicle configuration(s) as provided under section 206 or 207, as applicable, of the Clean Air Act, 42 U.S.C. 1857 *et seq.*

(f) All vehicles used to generate fuel economy and carbon-related exhaust emissions data, and for which emission standards apply, must be covered by a certificate of conformity under part 86 of this chapter before:

(1) The data may be used in the calculation of any approved general or specific label value, or

(2) The data will be used in any calculations under subpart F, except that vehicles imported under §§ 85.1509 and 85.1511 of this chapter need not be covered by a certificate of conformity.

[71 FR 77930, Dec. 27, 2006, as amended at 75 FR 25703, May 7, 2010. Redesignated and amended at 76 FR 39524, 39529, July 6, 2011]

### § 600.008 Review of fuel economy, $CO_2$ emissions, and carbon-related exhaust emission data, testing by the Administrator.

(a) *Testing by the Administrator*. (1)(i) The Administrator may require that any one or more of the test vehicles be submitted to the Agency, at such place or places as the Agency may designate, for the purposes of conducting fuel economy tests. The Administrator may specify that such testing be conducted at the manufacturer's facility, in which case instrumentation and equipment specified by the Administrator shall be made available by the manufacturer for test operations. The tests to be performed may comprise the FTP, highway fuel economy test, US06, SC03, or Cold temperature FTP or any combination of those tests. Any testing conducted at a manufacturer's facility pursuant to this paragraph shall be scheduled by the manufacturer as promptly as possible.

(ii) Starting with the 2012 model year for carbon-related exhaust emissions and with the 2013 model year for $CO_2$ emissions, the evaluations, testing, and test data described in this section pertaining to fuel economy shall also be performed for $CO_2$ emissions and carbon-related exhaust emissions, except that $CO_2$ emissions and carbon-related exhaust emissions shall be arithmetically averaged instead of harmonically averaged, and in cases where the manufacturer selects the lowest of several fuel economy results to represent the vehicle, the manufacturer shall select the $CO_2$ emissions and carbon-related exhaust emissions value from the test results associated with the lowest selected fuel economy results.

(2) Retesting and official data determination. For any vehicles selected for confirmatory testing under the provisions of paragraph (a)(1) of this section, the Administrator will follow this procedure:

(i) The manufacturer's fuel economy data (or harmonically averaged data if more than one test was conducted) will be compared with the results of the Administrator's test.

(ii) If, in the Administrator's judgment, the comparison in paragraph (a)(2)(i) of this section indicates a disparity in the data, the Administrator will repeat the test or tests as applicable.

(A) The manufacturer's average test results and the results of the Administrator's first test will be compared with the results of the Administrator's second test as in paragraph (a)(2)(i) of this section.

(B) If, in the Administrator's judgment, both comparisons in paragraph (a)(2)(i)(A) of this section, indicate a disparity in the data, the Administrator will repeat the applicable test or tests until:

(*1*) In the Administrator's judgment no disparity in the data is indicated by comparison of two tests by the Administrator or by comparison of the manufacturer's average test results and a test by the Administrator; or

(*2*) Four tests of a single test type are conducted by the Administrator in which a disparity in the data is indicated when compared as in paragraph (a)(2)(ii) of this section.

(iii) If there is, in the Administrator's judgment, no disparity indicated by comparison of manufacturer's average test results with a test by the Administrator, the test values generated by the Administrator will be used to represent the vehicle.

(iv) If there is, in the Administrator's judgment, no disparity indicated by comparison of two tests by the Administrator, the harmonic averages of the fuel economy results from those tests will be used to represent the vehicle.

(v) If the situation in paragraph (a)(2)(ii)(B)(*2*) of this section occurs, the Administrator will notify the manufacturer, in writing, that the Administrator rejects that fuel economy data vehicle.

(b) *Manufacturer-conducted confirmatory testing*. (1) If the Administrator

determines not to conduct a confirmatory test under the provisions of paragraph (a) of this section, manufacturers will conduct a confirmatory test at their facility after submitting the original test data to the Administrator whenever any of the following conditions exist:

(i) The vehicle configuration has previously failed an emission standard;

(ii) The test exhibits high emission levels determined by exceeding a percentage of the standards specified by the Administrator for that model year;

(iii) The fuel economy value of the FTP or HFET test is higher than expected based on procedures approved by the Administrator;

(iv) The fuel economy for the FTP or HFET test is close to a Gas Guzzler Tax threshold value based on tolerances established by the Administrator; or

(v) The fuel economy value for the FTP or highway is a potential fuel economy leader for a class of vehicles based on cut points provided by the Administrator.

(2) If the Administrator selects the vehicle for confirmatory testing based on the manufacturer's original test results, the testing shall be conducted as ordered by the Administrator. In this case, the manufacturer-conducted confirmatory testing specified under paragraph (b)(1) of this section would not be required.

(3) The manufacturer shall conduct a retest of the FTP or highway test if the difference between the fuel economy of the confirmatory test and the original manufacturer's test equals or exceeds three percent (or such lower percentage to be applied consistently to all manufacturer-conducted confirmatory testing as requested by the manufacturer and approved by the Administrator).

(i) The manufacturer may, in lieu of conducting a retest, accept the lower of the original and confirmatory test fuel economy results for use in subpart C or F of this part.

(ii) The manufacturer shall conduct a second retest of the FTP or highway test if the fuel economy difference between the second confirmatory test and the original manufacturer test equals or exceeds three percent (or such lower percentage as requested by the manufacturer and approved by the Administrator) and the fuel economy difference between the second confirmatory test and the first confirmatory test equals or exceeds three percent (or such lower percentage as requested by the manufacturer and approved by the Administrator). The manufacturer may, in lieu of conducting a second retest, accept the lowest of the original test, the first confirmatory test, and the second confirmatory test fuel economy results for use in subpart C or F of this part.

(4) The Administrator may request the manufacturer to conduct a retest of the US06, SC03 or Cold Temperature FTP on the basis of fuel economy that is higher than expected as specified in criteria provided by the Administrator. Such retests shall not be required before the 2011 model year.

(c) *Review of fuel economy data.* (1) Fuel economy data must be judged reasonable and representative by the Administrator in order for the test results to be used for the purposes of subpart C or F of this part. In making this determination, the Administrator will, when possible, compare the results of a test vehicle to those of other similar test vehicles.

(2) If testing was conducted by the Administrator under the provisions of paragraph (a) of this section, the data from this testing, together with all other fuel economy data submitted for that vehicle under § 600.006(c) or (e) will be evaluated by the Administrator for reasonableness and representativeness per paragraph (c)(1) of this section.

(i) The fuel economy data which are determined to best meet the criteria of paragraph (c)(1) of this section will be accepted for use in subpart C or F of this part.

(ii) City, HFET, US06, SC03 and Cold temperature FTP test data will be considered separately.

(iii) If more than one test was conducted, the Administrator may select an individual test result or the harmonic average of selected test results to satisfy the requirements of paragraph (c)(2)(i) of this section.

(3) If confirmatory testing was conducted by the manufacturer under the

provisions of paragraph (b) of this section, the data from this testing will be evaluated by the Administrator for reasonableness and representativeness per paragraph (c)(1) of this section.

(i) The fuel economy data which are determined to best meet the criteria of paragraph (c)(1) of this section will be accepted for use in subpart C or F of this part.

(ii) City, HFET, US06, SC03 and Cold temperature FTP test data will be considered separately.

(iii) If more than one test was conducted, the Administrator may select an individual test result or the harmonic average of selected test results to satisfy the requirements of paragraph (c)(2)(i) of this section.

(4) If no confirmatory testing was conducted by either the Administrator or the manufacturer under the provisions of paragraph (a) and (b) of this section, respectively, then the data submitted under the provisions of § 600.006(c) or (e) shall be accepted for use in subpart C or F of this part.

(i) City, HFET, US06, SC03 and Cold temperature FTP test data will be considered separately.

(ii) If more than one test was conducted, the harmonic average of the test results shall be accepted for use in subpart C or F of this part.

(d) If, based on a review of the fuel economy data generated by testing under paragraph (a) of this section, the Administrator determines that an unacceptable level of correlation exists between fuel economy data generated by a manufacturer and fuel economy data generated by the Administrator, he/she may reject all fuel economy data submitted by the manufacturer until the cause of the discrepancy is determined and the validity of the data is established by the manufacturer.

(e)(1) If, based on the results of an inspection conducted under § 600.005(b) or any other information, the Administrator has reason to believe that the manufacturer has not followed proper testing procedures or that the testing equipment is faulty or improperly calibrated, or if records do not exist that will enable him to make a finding of proper testing, the Administrator may notify the manufacturer in writing of his finding and require the manufacturer to:

(i) Submit the test vehicle(s) upon which the data are based or additional test vehicle(s) at a place he may designate for the purpose of fuel economy testing.

(ii) Conduct such additional fuel economy testing as may be required to demonstrate that prior fuel economy test data are reasonable and representative.

(2) Previous acceptance by the Administrator of any fuel economy test data submitted by the manufacturer shall not limit the Administrator's right to require additional testing under paragraph (e)(1) of this section.

(3) If, based on tests required under paragraph (e)(1) of this section, the Administrator determines that any fuel economy data submitted by the manufacturer and used to calculate the manufacturer's fuel economy average was unrepresentative, the Administrator may recalculate the manufacturer's fuel economy average based on fuel economy data that he/she deems representative.

(4) A manufacturer may request a hearing as provided in § 600.009 if the Administrator decides to recalculate the manufacturer's average pursuant to determinations made relative to this section.

[71 FR 77931, Dec. 27, 2006, as amended at 75 FR 25703, May 7, 2010. Redesignated and amended at 76 FR 39524, 39529, July 6, 2011]

### § 600.009 Hearing on acceptance of test data.

(a) The manufacturer may request a hearing on the Administrator's decision if the Administrator rejects any of the following:

(1) The use of a manufacturer's fuel economy data vehicle, in accordance with § 600.008(e) or (g), or

(2) The use of fuel economy data, in accordance with § 600.008(c), or (f), or

(3) The determination of a vehicle configuration, in accordance with § 600.206(a), or

(4) The identification of a car line, in accordance with § 600.002, or

(5) The fuel economy label values determined by the manufacturer under § 600.312–08(a), then:

(b) The request for a hearing must be filed in writing within 30 days after being notified of the Administrator's decision. The request must be signed by an authorized representative of the manufacturer and include a statement specifying the manufacturer's objections to the Administrator's determinations, with data in support of such objection.

(c) If, after the review of the request and supporting data, the Administrator finds that the request raises one or more substantial factual issues, the Administrator shall provide the manufacturer with a hearing in accordance with the provisions of 40 CFR part 1068, subpart G.

(d) A manufacturer's use of any fuel economy data which the manufacturer challenges pursuant to this section shall not constitute final acceptance by the manufacturer nor prejudice the manufacturer in the exercise of any appeal pursuant to this section challenging such fuel economy data.

[76 FR 39530, July 6, 2011]

### § 600.010 Vehicle test requirements and minimum data requirements.

(a) Unless otherwise exempted from specific emission compliance requirements, for each certification vehicle defined in this part, and for each vehicle tested according to the emission test procedures in part 86 of this chapter for addition of a model after certification or approval of a running change (§ 86.1842 of this chapter, as applicable):

(1) The manufacturer shall generate FTP fuel economy data by testing according to the applicable procedures.

(2) The manufacturer shall generate highway fuel economy data by:

(i) Testing according to applicable procedures, or

(ii) Using an analytical technique, as described in § 600.006(e).

(3) The manufacturer shall generate US06 fuel economy data by testing according to the applicable procedures. Alternate fueled vehicles or dual fueled vehicles operating on alternate fuel may optionally generate this data using the alternate fuel.

(4) The manufacturer shall generate SC03 fuel economy data by testing according to the applicable procedures. Alternate fueled vehicles or dual fueled vehicles operating on alternate fuel may optionally generate this data using the alternate fuel.

(5) The manufacturer shall generate cold temperature FTP fuel economy data by testing according to the applicable procedures. Alternate fueled vehicles or dual fueled vehicles operating on alternate fuel may optionally generate this data using the alternate fuel.

(6) The data generated in paragraphs (a)(1) through (5) of this section, shall be submitted to the Administrator in combination with other data for the vehicle required to be submitted in part 86 of this chapter.

(b) For each fuel economy data vehicle:

(1) The manufacturer shall generate FTP and HFET fuel economy data by:

(i) Testing according to applicable procedures, or

(ii) Use of an analytical technique as described in § 600.006(e), in addition to testing (e.g., city fuel economy data by testing, highway fuel economy data by analytical technique).

(2) The data generated shall be submitted to the Administrator according to the procedures in § 600.006.

(c) *Minimum data requirements for labeling.* (1) In order to establish fuel economy label values under § 600.301, the manufacturer shall use only test data accepted in accordance with § 600.008 meeting the minimum coverage of:

(i) Data required for emission certification under §§ 86.1828 and 86.1842 of this chapter.

(ii)(A) FTP and HFET data from the highest projected model year sales subconfiguration within the highest projected model year sales configuration for each base level, and

(B) If required under § 600.115, for 2011 and later model year vehicles, US06, SC03 and cold temperature FTP data from the highest projected model year sales subconfiguration within the highest projected model year sales configuration for each base level. Manufacturers may optionally generate this data for any 2008 through 2010 model years, and, 2011 and later model year vehicles, if not otherwise required.

(iii) For additional model types established under § 600.208–08(a)(2), § 600.208–12(a)(2) § 600.209–08(a)(2), or

§ 600.209–12(a)(2) FTP and HFET data, and if required under § 600.115, US06, SC03 and Cold temperature FTP data from each subconfiguration included within the model type.

(2) For the purpose of recalculating fuel economy label values as required under § 600.314–08(b), the manufacturer shall submit data required under § 600.507.

(d) *Minimum data requirements for the manufacturer's average fuel economy and average carbon-related exhaust emissions.* For the purpose of calculating the manufacturer's average fuel economy and average carbon-related exhaust emissions under § 600.510, the manufacturer shall submit FTP (city) and HFET (highway) test data representing at least 90 percent of the manufacturer's actual model year production, by configuration, for each category identified for calculation under § 600.510–08(a) or § 600.510–12(a)(1).

[71 FR 77932, Dec. 27, 2006, as amended at 74 FR 61549, Nov. 25, 2009; 75 FR 25703, May 7, 2010. Redesignated and amended at 76 FR 39524, 39530, July 6, 2011]

### § 600.011 Incorporation by reference.

(a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the Environmental Protection Agency must publish a notice of the change in the FEDERAL REGISTER and the material must be available to the public. All approved material is available for inspection at U.S. EPA, Air and Radiation Docket and Information Center, 1301 Constitution Ave., NW., Room B102, EPA West Building, Washington, DC 20460, (202) 202–1744, and is available from the sources listed below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html* and is available from the sources listed below:

(b) American Society for Testing and Materials, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA, 19428–2959, (610) 832–9585, *http://www.astm.org/*.

(1) ASTM D975–11 Standard Specification for Diesel Fuel Oils, approved March 1, 2011, IBR approved for § 600.107–08(b).

(2) ASTM D 1298–99 (Reapproved 2005) Standard Practice for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method, approved November 1, 2005, IBR approved for §§ 600.113–08(f) and (g), 600.113–12(f) and (g), 600.510–08(g), and 600.510–12(g).

(3) ASTM D 1945–03 (Reapproved 2010) Standard Test Method for Analysis of Natural Gas By Gas Chromatography, approved January 1, 2010, IBR approved for §§ 600.113–08(f) and 600.113–12(f).

(4) ASTM D 3338/D 3338M –09 Standard Test Method for Estimation of Net Heat of Combustion of Aviation Fuels, approved April 15, 2009, IBR approved for §§ 600.113–08(f) and 600.113–12(f).

(5) ASTM D 3343–05 (Reapproved 2010) Standard Test Method for Estimation of Hydrogen Content of Aviation Fuels, approved October 1, 2010, IBR approved for §§ 600.113–08(f) and 600.113–12(f).

(c) Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096–0001, (877) 606–7323 (U.S. and Canada) or (724) 776–4970 (outside the U.S. and Canada), *http://www.sae.org*.

(1) Motor Vehicle Dimensions—Recommended Practice SAE 1100a (Report of Human Factors Engineering Committee, Society of Automotive Engineers, approved September 1973 as revised September 1975), IBR approved for § 600.315–08(c).

(2) SAE J1634, Electric Vehicle Energy Consumption and Range Test Procedure, Cancelled October 2002, IBR approved for §§ 600.116–12(a) and 600.311–12(j) and (k).

(3) SAE J1711, Recommended Practice for Measuring the Exhaust Emissions and Fuel Economy of Hybrid-Electric Vehicles, Including Plug-In Hybrid Vehicles, June 2010, IBR approved for §§ 600.114–12(c) and (f), 600.116–12(b), and 600.311–12(d), (j), and (k).

(d) International Organization for Standardization, Case Postale 56, CH–1211 Geneva 20, Switzerland, (41) 22749

0111, *http://www.iso.org*, or *central@iso.org*.

(1) ISO/IEC 18004:2006(E), Information technology—Automatic identification and data capture techniques—QR Code 2005 bar code symbology specification, Second Edition, September 1, 2006, IBR approved for § 600.302–12(b).

(2) [Reserved]

[76 FR 39530, July 6, 2011, as amended at 76 FR 57379, Sept. 15, 2011]

## Subpart B—Fuel Economy and Carbon-Related Exhaust Emission Test Procedures

SOURCE: 42 FR 45657, Sept. 12, 1977, unless otherwise noted.

### § 600.106–08 Equipment requirements.

The requirements for test equipment to be used for all fuel economy testing are given in subparts B and C of part 86 of this chapter.

[76 FR 39531, July 6, 2011]

### § 600.107–08 Fuel specifications.

(a) The test fuel specifications for gasoline, diesel, methanol, and methanol-petroleum fuel mixtures are given in § 86.113 of this chapter, except for cold temperature FTP fuel requirements for diesel and alternative fuel vehicles, which are given in paragraph (b) of this section.

(b)(1) Diesel test fuel used for cold temperature FTP testing must comprise a winter-grade diesel fuel as specified in ASTM D975 (incorporated by reference in § 600.011). Alternatively, EPA may approve the use of a different diesel fuel, provided that the level of kerosene added shall not exceed 20 percent.

(2) The manufacturer may request EPA approval of the use of an alternative fuel for cold temperature FTP testing.

(c) Test fuels representing fuel types for which there are no specifications provided in § 86.113 of this chapter may be used if approved in advance by the Administrator.

[76 FR 39531, July 6, 2011]

### § 600.108–08 Analytical gases.

The analytical gases for all fuel economy testing must meet the criteria given in § 86.114 of this chapter.

[42 FR 45657, Sept. 12, 1977. Redesignated at 76 FR 39531, July 6, 2011]

### § 600.109–08 EPA driving cycles.

(a) The FTP driving cycle is prescribed in § 86.115 of this chapter.

(b) The highway fuel economy driving cycle is specified in this paragraph.

(1) The Highway Fuel Economy Driving Schedule is set forth in appendix I of this part. The driving schedule is defined by a smooth trace drawn through the specified speed versus time relationships.

(2) The speed tolerance at any given time on the dynamometer driving schedule specified in appendix I of this part, or as printed on a driver's aid chart approved by the Administrator, when conducted to meet the requirements of paragraph (b) of § 600.111 is defined by upper and lower limits. The upper limit is 2 mph higher than the highest point on trace within 1 second of the given time. The lower limit is 2 mph lower than the lowest point on the trace within 1 second of the given time. Speed variations greater than the tolerances (such as may occur during gear changes) are acceptable provided they occur for less than 2 seconds on any occasion. Speeds lower than those prescribed are acceptable provided the vehicle is operated at maximum available power during such occurrences.

(3) A graphic representation of the range of acceptable speed tolerances is found in § 86.115 of this chapter.

(c) The US06 driving cycle is set forth in appendix I of part 86 of this chapter.

(d) The SC03 driving cycle is set forth in appendix I of part 86 of this chapter.

[71 FR 77933, Dec. 27, 2006, as amended at 76 FR 39531, July 6, 2011]

### § 600.110–08 Equipment calibration.

The equipment used for fuel economy testing must be calibrated according to the provisions of §§ 86.116 and 86.216 of this chapter.

[71 FR 77933, Dec. 27, 2006]

**§ 600.111–08 Test procedures.**

This section provides test procedures for the FTP, highway, US06, SC03, and the cold temperature FTP tests. Testing shall be performed according to test procedures and other requirements contained in this part 600 and in part 86 of this chapter, including the provisions of part 86, subparts B, C, and S.

(a) *FTP testing procedures.* The test procedures to be followed for conducting the FTP test are those prescribed in §§ 86.127 through 86.138 of this chapter, as applicable, except as provided for in paragraph (b)(5) of this section. (The evaporative loss portion of the test procedure may be omitted unless specifically required by the Administrator.)

(b) *Highway fuel economy testing procedures.* (1) The Highway Fuel Economy Dynamometer Procedure (HFET) consists of a preconditioning highway driving sequence and a measured highway driving sequence.

(2) The HFET is designated to simulate non-metropolitan driving with an average speed of 48.6 mph and a maximum speed of 60 mph. The cycle is 10.2 miles long with 0.2 stop per mile and consists of warmed-up vehicle operation on a chassis dynamometer through a specified driving cycle. A proportional part of the diluted exhaust emission is collected continuously for subsequent analysis of hydrocarbons, carbon monoxide, carbon dioxide using a constant volume (variable dilution) sampler. Diesel dilute exhaust is continuously analyzed for hydrocarbons using a heated sample line and analyzer. Methanol and formaldehyde samples are collected and individually analyzed for methanol-fueled vehicles (measurement of methanol and formaldehyde may be omitted for 1993 through 1994 model year methanol-fueled vehicles provided a HFID calibrated on methanol is used for measuring HC plus methanol). Methanol, ethanol, formaldehyde, and acetaldehyde samples are collected and individually analyzed for ethanol fueled vehicles.

(3) Except in cases of component malfunction or failure, all emission control systems installed on or incorporated in a new motor vehicle must be functioning during all procedures in this subpart. The Administrator may authorize maintenance to correct component malfunction or failure.

(4) The provisions of § 86.128 of this chapter apply for vehicle transmission operation during highway fuel economy testing under this subpart.

(5) Section 86.129 of this chapter applies for determination of road load power and test weight for highway fuel economy testing. The test weight for the testing of a certification vehicle will be that test weight specified by the Administrator under the provisions of part 86 of this chapter. The test weight for a fuel economy data vehicle will be that test weight specified by the Administrator from the test weights covered by that vehicle configuration. The Administrator will base his selection of a test weight on the relative projected sales volumes of the various test weights within the vehicle configuration.

(6) The HFET is designed to be performed immediately following the Federal Emission Test Procedure, §§ 86.127 through 86.138 of this chapter. When conditions allow, the tests should be scheduled in this sequence. In the event the tests cannot be scheduled within three hours of the Federal Emission Test Procedure (including one hour hot soak evaporative loss test, if applicable) the vehicle should be preconditioned as in paragraph (b)(6)(i) or (ii) of this section, as applicable.

(i) If the vehicle has experienced more than three hours of soak (68 °F–86 °F) since the completion of the Federal Emission Test Procedure, or has experienced periods of storage outdoors, or in environments where soak temperature is not controlled to 68 °F–86 °F, the vehicle must be preconditioned by operation on a dynamometer through one cycle of the EPA Urban Dynamometer Driving Schedule, § 86.115 of this chapter.

(ii) EPA may approve a manufacturer's request for additional preconditioning in unusual circumstances.

(7) Use the following procedure to determine highway fuel economy:

(i) The dynamometer procedure consists of two cycles of the Highway Fuel Economy Driving Schedule (§ 600.109–08(b)) separated by 15 seconds of idle.

The first cycle of the Highway Fuel Economy Driving Schedule is driven to precondition the test vehicle and the second is driven for the fuel economy measurement.

(ii) The provisions of § 86.135 of this chapter, except for the overview and the allowance for practice runs, apply for highway fuel economy testing.

(iii) Only one exhaust sample and one background sample are collected and analyzed for hydrocarbons (except diesel hydrocarbons which are analyzed continuously), carbon monoxide, and carbon dioxide. Methanol and formaldehyde samples (exhaust and dilution air) are collected and analyzed for methanol-fueled vehicles (measurement of methanol and formaldehyde may be omitted for 1993 through 1994 model year methanol-fueled vehicles provided a HFID calibrated on methanol is used for measuring HC plus methanol). Methanol, ethanol, formaldehyde, and acetaldehyde samples are collected and analyzed for ethanol fueled vehicles.

(iv) The fuel economy measurement cycle of the test includes two seconds of idle indexed at the beginning of the second cycle and two seconds of idle indexed at the end of the second cycle.

(8) If the engine is not running at the initiation of the highway fuel economy test (preconditioning cycle), the start-up procedure must be according to the manufacturer's recommended procedures. False starts and stalls during the preconditioning cycle must be treated as in § 86.136 of this chapter. If the vehicle stalls during the measurement cycle of the highway fuel economy test, the test is voided, corrective action may be taken according to § 86.1834 of this chapter, and the vehicle may be rescheduled for testing. The person taking the corrective action shall report the action so that the test records for the vehicle contain a record of the action.

(9) The following steps must be taken for each test:

(i) Place the drive wheels of the vehicle on the dynamometer. The vehicle may be driven onto the dynamometer.

(ii) Open the vehicle engine compartment cover and position the cooling fan(s) required. Manufacturers may request the use of additional cooling fans or variable speed fan(s) for additional engine compartment or under-vehicle cooling and for controlling high tire or brake temperatures during dynamometer operation. With prior EPA approval, manufacturers may perform the test with the engine compartment closed, e.g., to provide adequate air flow to an intercooler (through a factory installed hood scoop). Additionally, the Administrator may conduct fuel economy testing using the additional cooling set-up approved for a specific vehicle.

(iii) Preparation of the CVS must be performed before the measurement highway driving cycle.

(iv) The provisions of § 86.137–94(b)(3) through (6) of this chapter apply for highway fuel economy test, except that only one exhaust sample collection bag and one dilution air sample collection bag need to be connected to the sample collection systems.

(v) Operate the vehicle over one Highway Fuel Economy Driving Schedule cycle according to the dynamometer driving schedule specified in § 600.109–08(b).

(vi) When the vehicle reaches zero speed at the end of the preconditioning cycle, the driver has 17 seconds to prepare for the emission measurement cycle of the test.

(vii) Operate the vehicle over one Highway Fuel Economy Driving Schedule cycle according to the dynamometer driving schedule specified in § 600.109–08(b) while sampling the exhaust gas.

(viii) Sampling must begin two seconds before beginning the first acceleration of the fuel economy measurement cycle and must end two seconds after the end of the deceleration to zero. At the end of the deceleration to zero speed, the roll or shaft revolutions must be recorded.

(10) For alcohol-based dual fuel automobiles, the procedures of § 600.111–08(a) and (b) shall be performed for each of the fuels on which the vehicle is designed to operate.

(c) *US06 Testing procedures*. The test procedures to be followed for conducting the US06 test are those prescribed in § 86.159 of this chapter, as applicable.

(d) *SC03 testing procedures.* The test procedures to be followed for conducting the SC03 test are prescribed in §§ 86.160 and 86.161 of this chapter, as applicable.

(e) *Cold temperature FTP procedures.* The test procedures to be followed for conducting the cold temperature FTP test are generally prescribed in subpart C of part 86 of this chapter, as applicable. For the purpose of fuel economy labeling, diesel vehicles are subject to cold temperature FTP testing, but are not required to measure particulate matter, as described in § 86.210 of this chapter.

(f) *Special test procedures.* The Administrator may prescribe test procedures, other than those set forth in this subpart B, for any vehicle which is not susceptible to satisfactory testing and/or testing results by the procedures set forth in this part. For example, special test procedures may be used for advanced technology vehicles, including, but not limited to fuel cell vehicles, hybrid electric vehicles using hydraulic energy storage, and vehicles equipped with hydrogen internal combustion engines. Additionally, the Administrator may conduct fuel economy and carbon-related exhaust emission testing using the special test procedures approved for a specific vehicle.

[76 FR 39531, July 6, 2011]

### § 600.112–08 Exhaust sample analysis.

The exhaust sample analysis must be performed according to § 86.140, or § 86.240 of this chapter, as applicable.

[71 FR 77935, Dec. 27, 2006]

### § 600.113–08 Fuel economy calculations for FTP, HFET, US06, SC03 and cold temperature FTP tests.

The Administrator will use the calculation procedure set forth in this paragraph for all official EPA testing of vehicles fueled with gasoline, diesel, alcohol-based or natural gas fuel. The calculations of the weighted fuel economy values require input of the weighted grams/mile values for total hydrocarbons (HC), carbon monoxide (CO), and carbon dioxide ($CO_2$); and, additionally for methanol-fueled automobiles, methanol ($CH_3OH$) and formaldehyde (HCHO); and additionally for natural gas-fueled vehicles non-methane hydrocarbons (NMHC) and methane ($CH_4$) for the FTP, HFET, US06, SC03 and cold temperature FTP tests. Additionally, the specific gravity, carbon weight fraction and net heating value of the test fuel must be determined. The FTP, HFET, US06, SC03 and cold temperature FTP fuel economy values shall be calculated as specified in this section. An example appears in appendix II of this part.

(a) Calculate the FTP fuel economy.

(1) Calculate the weighted grams/mile values for the FTP test for HC, CO and $CO_2$; and, additionally for methanol-fueled automobiles, $CH_3OH$ and HCHO; and additionally for natural gas-fueled automobiles NMHC and $CH_4$ as specified in § 86.144 of this chapter. Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(2) Calculate separately the grams/mile values for the cold transient phase, stabilized phase and hot transient phase of the FTP test. For vehicles with more than one source of propulsion energy, one of which is a rechargeable energy storage system, or vehicles with special features that the Administrator determines may have a rechargeable energy source, whose charge can vary during the test, calculate separately the grams/mile values for the cold transient phase, stabilized phase, hot transient phase and hot stabilized phase of the FTP test.

(b) Calculate the HFET fuel economy.

(1) Calculate the mass values for the highway fuel economy test for HC, CO and $CO_2$, and where applicable $CH_3OH$, HCHO, NMHC and $CH_4$ as specified in § 86.144(b) of this chapter. Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(2) Calculate the grams/mile values for the highway fuel economy test for HC, CO and $CO_2$, and where applicable $CH_3OH$, HCHO, NMHC and $CH_4$ by dividing the mass values obtained in paragraph (b)(1) of this section, by the actual distance traveled, measured in miles, as specified in § 86.135(h) of this chapter.

(c) Calculate the cold temperature FTP fuel economy.

(1) Calculate the weighted grams/mile values for the cold temperature FTP test for HC, CO and $CO_2$; and, additionally for methanol-fueled automobiles, $CH_3OH$ and HCHO; and additionally for natural gas-fueled automobiles NMHC and $CH_4$ as specified in § 86.244 of this chapter. For 2008 through 2010 diesel-fueled vehicles, HC measurement is optional.

(2) Calculate separately the grams/mile values for the cold transient phase, stabilized phase and hot transient phase of the cold temperature FTP test in § 86.244 of this chapter.

(3) Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(d) Calculate the US06 fuel economy.

(1) Calculate the total grams/mile values for the US06 test for HC, CO and $CO_2$; and where applicable $CH_3OH$, HCHO, NMHC and $CH_4$, as specified in § 86.164 of this chapter.

(2) Calculate separately the grams/mile values for HC, CO and $CO_2$; and where applicable $CH_3OH$, HCHO, NMHC and $CH_4$, for both the US06 City phase and the US06 Highway phase of the US06 test as specified in § 86.164 of this chapter. In lieu of directly measuring the emissions of the separate city and highway phases of the US06 test according to the provisions of § 86.159 of this chapter, the manufacturer may, with the advance approval of the Administrator and using good engineering judgment, optionally analytically determine the grams/mile values for the city and highway phases of the US06 test. To analytically determine US06 City and US06 Highway phase emission results, the manufacturer shall multiply the US06 total grams/mile values determined in paragraph (d)(1) of this section by the estimated proportion of fuel use for the city and highway phases relative to the total US06 fuel use. The manufacturer may estimate the proportion of fuel use for the US06 City and US06 Highway phases by using modal HC, CO, and $CO_2$ emissions data, or by using appropriate OBD data (e.g., fuel flow rate in grams of fuel per second), or another method approved by the Administrator.

(3) Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(e) Calculate the grams/mile values for the SC03 test for HC, CO and $CO_2$; and additionally for methanol-fueled automobiles, $CH_3OH$ and HCHO; and additionally for natural gas-fueled automobiles NMHC and $CH_4$ as specified in § 86.144 of this chapter. Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(f)(1) Gasoline test fuel properties shall be determined by analysis of a fuel sample taken from the fuel supply. A sample shall be taken after each addition of fresh fuel to the fuel supply. Additionally, the fuel shall be resampled once a month to account for any fuel property changes during storage. Less frequent resampling may be permitted if EPA concludes, on the basis of manufacturer-supplied data, that the properties of test fuel in the manufacturer's storage facility will remain stable for a period longer than one month. The fuel samples shall be analyzed to determine the following fuel properties:

(i) Specific gravity per ASTM D 1298 (incorporated by reference in § 600.011).

(ii) Carbon weight fraction per ASTM D 3343 (incorporated by reference in § 600.011).

(iii) Net heating value (Btu/lb) per ASTM D 3338/D 3338M (incorporated by reference in § 600.011).

(2) Methanol test fuel shall be analyzed to determine the following fuel properties:

(i) Specific gravity using ASTM D 1298 (incorporated by reference in § 600.011). You may determine specific gravity for the blend, or you may determine specific gravity for the gasoline and methanol fuel components separately before combining the results using the following equation:

$$SG = SG_g \times \text{volume fraction gasoline} + SG_m \times \text{volume fraction methanol.}$$

(ii)(A) Carbon weight fraction using the following equation:

$$CWF = CWF_g \times MF_g + 0.375 \times MF_m$$

Where:

$CWF_g$ = Carbon weight fraction of gasoline portion of blend per ASTM D 3343 (incorporated by reference in § 600.011).

$MF_g$ = Mass fraction gasoline = $(G \times SG_g)/(G \times SG_g + M \times SG_m)$

$MF_m$ = Mass fraction methanol = $(M \times SG_m)/(G \times SG_g + M \times SG_m)$

Where:

G = Volume fraction gasoline.

M = Volume fraction methanol.

$SG_g$ = Specific gravity of gasoline as measured by ASTM D 1298 (incorporated by reference in § 600.011).

$SG_m$ = Specific gravity of methanol as measured by ASTM D 1298 (incorporated by reference in § 600.011).

(B) Upon the approval of the Administrator, other procedures to measure the carbon weight fraction of the fuel blend may be used if the manufacturer can show that the procedures are superior to or equally as accurate as those specified in this paragraph (f)(2)(ii).

(3) Natural gas test fuel shall be analyzed to determine the following fuel properties:

(i) Fuel composition per ASTM D 1945 (incorporated by reference in § 600.011).

(ii) Specific gravity (based on fuel composition per ASTM D 1945 (incorporated by reference in § 600.011).

(iii) Carbon weight fraction based on the carbon contained only in the HC constituents of the fuel = weight of carbon in HC constituents divided by the total weight of fuel.

(iv) Carbon weight fraction of fuel = total weight of carbon in the fuel (*i.e.*, includes carbon contained in HC and in $CO_2$) divided by total weight of fuel.

(g) Calculate separate FTP, highway, US06, SC03 and Cold temperature FTP fuel economy from the grams/mile values for total HC, CO, $CO_2$ and, where applicable, $CH_3OH$, HCHO, NMHC and $CH_4$ and, the test fuel's specific gravity, carbon weight fraction, net heating value, and additionally for natural gas, the test fuel's composition. The emission values (obtained per paragraph (a) through (e) of this section, as applicable) used in each calculation of this section shall be rounded in accordance with § 86.094–26(a)(6)(iii) or § 86.1837–01 of this chapter as applicable. The $CO_2$ values (obtained per this section, as applicable) used in each calculation of this section shall be rounded to the nearest gram/mile. The specific gravity and the carbon weight fraction (obtained per paragraph (f) of this section) shall be recorded using three places to the right of the decimal point. The net heating value (obtained per paragraph (f) of this section) shall be recorded to the nearest whole Btu/lb.

(h)(1) For gasoline-fueled automobiles tested on test fuel specified in § 86.113–04(a), the fuel economy in miles per gallon is to be calculated using the following equation:

$$mpg = (5174 \times 10^4 \times CWF \times SG)/[((CWF \times HC) + (0.429 \times CO) + (0.273 \times CO_2)) \times ((0.6 \times SG \times NHV) + 5471)]$$

Where:

HC = Grams/mile HC as obtained in paragraph (g) of this section.

CO = Grams/mile CO as obtained in paragraph (g) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g) of this section.

CWF = Carbon weight fraction of test fuel as obtained in paragraph (g) of this section.

NHV = Net heating value by mass of test fuel as obtained in paragraph (g) of this section.

SG = Specific gravity of test fuel as obtained in paragraph (g) of this section.

(2) Round the calculated result to the nearest 0.1 miles per gallon.

(i)(1) For diesel-fueled automobiles, calculate the fuel economy in miles per gallon of diesel fuel by dividing 2778 by the sum of three terms:

(i) (A) 0.866 multiplied by HC (in grams/miles as obtained in paragraph (g) of this section) or

(B) zero, in the case of cold FTP diesel tests for which HC was not collected, as permitted in § 600.113–08(c);

(ii) 0.429 multiplied by CO (in grams/mile as obtained in paragraph (g) of this section); and

(iii) 0.273 multiplied by $CO_2$ (in grams/mile as obtained in paragraph (g) of this section).

(2) Round the quotient to the nearest 0.1 mile per gallon.

(j) For methanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and methanol, the fuel economy in miles per gallon is to be calculated using the following equation:

$$mpg = (CWF \times SG \times 3781.8)/((CWF_{exHC} \times HC) + (0.429 \times CO) + (0.273 \times CO_2) + (0.375 \times CH_3OH) + (0.400 \times HCHO))$$

Where:

CWF = Carbon weight fraction of the fuel as determined in paragraph (f)(2)(ii) of this section.

SG = Specific gravity of the fuel as determined in paragraph (f)(2)(i) of this section.

$CWF_{exHC}$ = Carbon weight fraction of exhaust hydrocarbons = $CWF_g$ as determined in

(f)(2)(ii) of this section (for M100 fuel, $CWF_{exHC}$ = 0.866).

HC = Grams/mile HC as obtained in paragraph (g) of this section.

CO = Grams/mile CO as obtained in paragraph (g) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g) of this section.

$CH_3OH$ = Grams/mile $CH_3OH$ (methanol) as obtained in paragraph (d) of this section.

HCHO = Grams/mile HCHO (formaldehyde) as obtained in paragraph (g) of this section.

(k) For automobiles fueled with natural gas, the fuel economy in miles per gallon of natural gas is to be calculated using the following equation:

$$mpg_e = \frac{CWF_{HC/NG} \times D_{NG} \times 121.5}{(0.749 \times CH_4) + CWF_{NMHC} + (0.429 \times CO) + \left(0.273 \times \left(CO_2 - CO_{2NG}\right)\right)}$$

Where:

$mpg_e$ = miles per equivalent gallon of natural gas.

$CWF_{HC/NG}$ = carbon weight fraction based on the hydrocarbon constituents in the natural gas fuel as obtained in paragraph (g) of this section.

$D_{NG}$ = density of the natural gas fuel [grams/ft$^3$ at 68 °F (20 °C) and 760 mm Hg (101.3 kPa)] pressure as obtained in paragraph (g) of this section.

$CH_4$, NMHC, CO, and $CO_2$ = weighted mass exhaust emissions [grams/mile] for methane, non-methane HC, carbon monoxide, and carbon dioxide as calculated in § 600.113.

$CWF_{NMHC}$ = carbon weight fraction of the non-methane HC constituents in the fuel as determined from the speciated fuel composition per paragraph (f)(3) of this section.

$CO_{2NG}$ = grams of carbon dioxide in the natural gas fuel consumed per mile of travel.

$$CO_{2NG} = FC_{NG} \times D_{NG} \times WF_{CO2}$$

Where:

$$FC_{NG} = \frac{(0.749 \times CH_4) + (CWF_{NMHC} \times NMHC) + (0.429 \times CO) + (0.273 \times CO_2)}{CWF_{NG} \times D_{NG}}$$

= cubic feet of natural gas fuel consumed per mile.

$CWF_{NG}$ = the carbon weight fraction of the natural gas fuel as calculated in paragraph (f) of this section.

$WF_{CO2}$ = weight fraction carbon dioxide of the natural gas fuel calculated using the mole fractions and molecular weights of the natural gas fuel constituents per ASTM D 1945–91 ''Standard Test Method for Analysis of Natural Gas by Gas Chromatography'' (incorporated by reference at § 600.011–93).

(l) Equations for fuels other than those specified in paragraphs (h) through (k) of this section may be used with advance EPA approval.

[71 FR 77935, Dec. 27, 2006, as amended at 74 FR 61550, Nov. 25, 2009; 76 FR 39533, July 6, 2011]

### § 600.113–12 Fuel economy, $CO_2$ emissions, and carbon-related exhaust emission calculations for FTP, HFET, US06, SC03 and cold temperature FTP tests.

The Administrator will use the calculation procedure set forth in this paragraph for all official EPA testing of vehicles fueled with gasoline, diesel, alcohol-based or natural gas fuel. The

calculations of the weighted fuel economy and carbon-related exhaust emission values require input of the weighted grams/mile values for total hydrocarbons (HC), carbon monoxide (CO), and carbon dioxide ($CO_2$); and, additionally for methanol-fueled automobiles, methanol ($CH_3OH$) and formaldehyde (HCHO); and, additionally for ethanol-fueled automobiles, methanol ($CH_3OH$), ethanol ($C_2H_5OH$), acetaldehyde ($C_2H_4O$), and formaldehyde (HCHO); and additionally for natural gas-fueled vehicles, non-methane hydrocarbons (NMHC) and methane ($CH_4$). For manufacturers selecting the fleet averaging option for $N_2O$ and $CH_4$ as allowed under § 86.1818 of this chapter the calculations of the carbon-related exhaust emissions require the input of grams/mile values for nitrous oxide ($N_2O$) and methane ($CH_4$). Emissions shall be determined for the FTP, HFET, US06, SC03 and cold temperature FTP tests. Additionally, the specific gravity, carbon weight fraction and net heating value of the test fuel must be determined. The FTP, HFET, US06, SC03 and cold temperature FTP fuel economy and carbon-related exhaust emission values shall be calculated as specified in this section. An example fuel economy calculation appears in Appendix II of this part.

(a) Calculate the FTP fuel economy as follows:

(1) Calculate the weighted grams/mile values for the FTP test for $CO_2$, HC, and CO, and where applicable, $CH_3OH$, $C_2H_5OH$, $C_2H_4O$, HCHO, NMHC, $N_2O$ and $CH_4$ as specified in § 86.144–94(b) of this chapter. Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(2) Calculate separately the grams/mile values for the cold transient phase, stabilized phase and hot transient phase of the FTP test. For vehicles with more than one source of propulsion energy, one of which is a rechargeable energy storage system, or vehicles with special features that the Administrator determines may have a rechargeable energy source, whose charge can vary during the test, calculate separately the grams/mile values for the cold transient phase, stabilized phase, hot transient phase and hot stabilized phase of the FTP test.

(b) Calculate the HFET fuel economy as follows:

(1) Calculate the mass values for the highway fuel economy test for HC, CO and $CO_2$, and where applicable, $CH_3OH$, $C_2H_5OH$, $C_2H_4O$, HCHO, NMHC, $N_2O$ and $CH_4$ as specified in § 86.144–94(b) of this chapter. Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(2) Calculate the grams/mile values for the highway fuel economy test for HC, CO and $CO_2$, and where applicable $CH_3OH$, $C_2H_5OH$, $C_2H_4O$, HCHO, NMHC, $N_2O$ and $CH_4$ by dividing the mass values obtained in paragraph (b)(1) of this section, by the actual driving distance, measured in miles, as specified in § 86.135 of this chapter.

(c) Calculate the cold temperature FTP fuel economy as follows:

(1) Calculate the weighted grams/mile values for the cold temperature FTP test for HC, CO and $CO_2$, and where applicable, $CH_3OH$, $C_2H_5OH$, $C_2H_4O$, HCHO, NMHC, $N_2O$ and $CH_4$ as specified in § 86.144–94(b) of this chapter. For 2008 through 2010 diesel-fueled vehicles, HC measurement is optional.

(2) Calculate separately the grams/mile values for the cold transient phase, stabilized phase and hot transient phase of the cold temperature FTP test in § 86.244 of this chapter.

(3) Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(d) Calculate the US06 fuel economy as follows:

(1) Calculate the total grams/mile values for the US06 test for HC, CO and $CO_2$, and where applicable, $CH_3OH$, $C_2H_5OH$, $C_2H_4O$, HCHO, NMHC, $N_2O$ and $CH_4$ as specified in § 86.144–94(b) of this chapter.

(2) Calculate separately the grams/mile values for HC, CO and $CO_2$, and where applicable, $CH_3OH$, $C_2H_5OH$, $C_2H_4O$, HCHO, NMHC, $N_2O$ and $CH_4$, for both the US06 City phase and the US06 Highway phase of the US06 test as specified in § 86.164 of this chapter. In lieu of directly measuring the emissions of the separate city and highway phases of the US06 test according to the provisions of § 86.159 of this chapter, the manufacturer may, with the advance approval of the Administrator and using good engineering judgment,

optionally analytically determine the grams/mile values for the city and highway phases of the US06 test. To analytically determine US06 City and US06 Highway phase emission results, the manufacturer shall multiply the US06 total grams/mile values determined in paragraph (d)(1) of this section by the estimated proportion of fuel use for the city and highway phases relative to the total US06 fuel use. The manufacturer may estimate the proportion of fuel use for the US06 City and US06 Highway phases by using modal $CO_2$, HC, and CO emissions data, or by using appropriate OBD data (e.g., fuel flow rate in grams of fuel per second), or another method approved by the Administrator.

(3) Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(e) Calculate the SC03 fuel economy as follows:

(1) Calculate the grams/mile values for the SC03 test for HC, CO and $CO_2$, and where applicable, $CH_3OH$, $C_2H_5OH$, $C_2H_4O$, HCHO, NMHC, $N_2O$ and $CH_4$ as specified in §86.144–94(b) of this chapter.

(2) Measure and record the test fuel's properties as specified in paragraph (f) of this section.

(f) Analyze and determine fuel properties as follows:

(1) Gasoline test fuel properties shall be determined by analysis of a fuel sample taken from the fuel supply. A sample shall be taken after each addition of fresh fuel to the fuel supply. Additionally, the fuel shall be resampled once a month to account for any fuel property changes during storage. Less frequent resampling may be permitted if EPA concludes, on the basis of manufacturer-supplied data, that the properties of test fuel in the manufacturer's storage facility will remain stable for a period longer than one month. The fuel samples shall be analyzed to determine the following fuel properties:

(i) Specific gravity measured using ASTM D 1298 (incorporated by reference in §600.011).

(ii) Carbon weight fraction measured using ASTM D 3343 (incorporated by reference in §600.011).

(iii) Net heating value (Btu/lb) determined using ASTM D 3338/D 3338M (incorporated by reference in §600.011).

(2) Methanol test fuel shall be analyzed to determine the following fuel properties:

(i) Specific gravity using ASTM D 1298 (incorporated by reference in §600.011). You may determine specific gravity for the blend, or you may determine specific gravity for the gasoline and methanol fuel components separately before combining the results using the following equation:

$$SG = SGg \times \text{volume fraction gasoline} + SGm \times \text{volume fraction methanol}.$$

(ii)(A) Carbon weight fraction using the following equation:

$$CWF = CWFg \times MFg + 0.375 \times MFm$$

Where:

CWFg = Carbon weight fraction of gasoline portion of blend measured using ASTM D 3343 (incorporated by reference in §600.011).

MFg = Mass fraction gasoline = $(G \times SGg)/(G \times SGg + M \times SGm)$

MFm = Mass fraction methanol = $(M \times SGm)/(G \times SGg + M \times SGm)$

Where:

G = Volume fraction gasoline.

M = Volume fraction methanol.

SGg = Specific gravity of gasoline as measured using ASTM D 1298 (incorporated by reference in §600.011).

SGm = Specific gravity of methanol as measured using ASTM D 1298 (incorporated by reference in §600.011).

(B) Upon the approval of the Administrator, other procedures to measure the carbon weight fraction of the fuel blend may be used if the manufacturer can show that the procedures are superior to or equally as accurate as those specified in this paragraph (f)(2)(ii).

(3) Natural gas test fuel shall be analyzed to determine the following fuel properties:

(i) Fuel composition measured using ASTM D 1945 (incorporated by reference in §600.011).

(ii) Specific gravity measured as based on fuel composition per ASTM D 1945 (incorporated by reference in §600.011).

(iii) Carbon weight fraction, based on the carbon contained only in the hydrocarbon constituents of the fuel. This equals the weight of carbon in the

hydrocarbon constituents divided by the total weight of fuel.

(iv) Carbon weight fraction of the fuel, which equals the total weight of carbon in the fuel (*i.e.*, includes carbon contained in hydrocarbons and in $CO_2$) divided by the total weight of fuel.

(4) Ethanol test fuel shall be analyzed to determine the following fuel properties:

(i) Specific gravity using ASTM D 1298 (incorporated by reference in § 600.011). You may determine specific gravity for the blend, or you may determine specific gravity for the gasoline and methanol fuel components separately before combining the results using the following equation:

$$SG = SGg \times \text{volume fraction gasoline} + SGe \times \text{volume fraction ethanol}.$$

(ii)(A) Carbon weight fraction using the following equation:

$$CWF = CWFg \times MFg + 0.521 \times MFe$$

Where:

CWFg = Carbon weight fraction of gasoline portion of blend measured using ASTM D 3343 (incorporated by reference in § 600.011).

MFg = Mass fraction gasoline = $(G \times SGg)/(G \times SGg + E \times SGe)$

MFe = Mass fraction ethanol = $(E \times SGe)/(G \times SGg + E \times SGe)$

Where:

G = Volume fraction gasoline.

E = Volume fraction ethanol.

SGg = Specific gravity of gasoline as measured using ASTM D 1298 (incorporated by reference in § 600.011).

SGe = Specific gravity of ethanol as measured using ASTM D 1298 (incorporated by reference in § 600.011).

(B) Upon the approval of the Administrator, other procedures to measure the carbon weight fraction of the fuel blend may be used if the manufacturer can show that the procedures are superior to or equally as accurate as those specified in this paragraph (f)(4)(ii).

(g) Calculate separate FTP, highway, US06, SC03 and Cold temperature FTP fuel economy and carbon-related exhaust emissions from the grams/mile values for total HC, CO, $CO_2$ and, where applicable, $CH_3OH$, $C_2H_5OH$, $C_2H_4O$, HCHO, NMHC, $N_2O$, and $CH_4$, and the test fuel's specific gravity, carbon weight fraction, net heating value, and additionally for natural gas, the test fuel's composition.

(1)*Emission values for fuel economy calculations.* The emission values (obtained per paragraph (a) through (e) of this section, as applicable) used in the calculations of fuel economy in this section shall be rounded in accordance with § 86.1837 of this chapter. The $CO_2$ values (obtained per this section, as applicable) used in each calculation of fuel economy in this section shall be rounded to the nearest gram/mile.

(2) *Emission values for carbon-related exhaust emission calculations.* (i) If the emission values (obtained per paragraph (a) through (e) of this section, as applicable) were obtained from testing with aged exhaust emission control components as allowed under § 86.1823 of this chapter, then these test values shall be used in the calculations of carbon-related exhaust emissions in this section.

(ii) If the emission values (obtained per paragraph (a) through (e) of this section, as applicable) were not obtained from testing with aged exhaust emission control components as allowed under § 86.1823 of this chapter, then these test values shall be adjusted by the appropriate deterioration factor determined according to § 86.1823 of this chapter before being used in the calculations of carbon-related exhaust emissions in this section. For vehicles within a test group, the appropriate NMOG deterioration factor may be used in lieu of the deterioration factors for $CH_3OH$, $C_2H_5OH$, and/or $C_2H_4O$ emissions.

(iii) The emission values determined in paragraph (g)(2)(i) or (ii) of this section shall be rounded in accordance with § 86.1837 of this chapter. The $CO_2$ values (obtained per this section, as applicable) used in each calculation of carbon-related exhaust emissions in this section shall be rounded to the nearest gram/mile.

(iv) For manufacturers complying with the fleet averaging option for $N_2O$ and $CH_4$ as allowed under § 86.1818 of this chapter, $N_2O$ and $CH_4$ emission values for use in the calculation of carbon-related exhaust emissions in this section shall be the values determined according to paragraph (g)(2)(iv)(A), (B), or (C) of this section.

(A) The FTP and HFET test values as determined for the emission data vehicle according to the provisions of § 86.1835 of this chapter. These values shall apply to all vehicles tested under this section that are included in the test group represented by the emission data vehicle and shall be adjusted by the appropriate deterioration factor determined according to § 86.1823 of this chapter before being used in the calculations of carbon-related exhaust emissions in this section, except that in-use test data shall not be adjusted by a deterioration factor.

(B) The FTP and HFET test values as determined according to testing conducted under the provisions of this subpart. These values shall be adjusted by the appropriate deterioration factor determined according to § 86.1823 of this chapter before being used in the calculations of carbon-related exhaust emissions in this section, except that in-use test data shall not be adjusted by a deterioration factor.

(C) For the 2012 through 2014 model years only, manufacturers may use an assigned value of 0.010 g/mi for $N_2O$ FTP and HFET test values. This value is not required to be adjusted by a deterioration factor.

(3) The specific gravity and the carbon weight fraction (obtained per paragraph (f) of this section) shall be recorded using three places to the right of the decimal point. The net heating value (obtained per paragraph (f) of this section) shall be recorded to the nearest whole Btu/lb.

(4) For the purpose of determining the applicable in-use $CO_2$ exhaust emission standard under § 86.1818 of this chapter, the combined city/highway carbon-related exhaust emission value for a vehicle subconfiguration is calculated by arithmetically averaging the FTP-based city and HFET-based highway carbon-related exhaust emission values, as determined in paragraphs (h) through (n) of this section for the subconfiguration, weighted 0.55 and 0.45 respectively, and rounded to the nearest tenth of a gram per mile.

(h)(1) For gasoline-fueled automobiles tested on a test fuel specified in § 86.113 of this chapter, the fuel economy in miles per gallon is to be calculated using the following equation and rounded to the nearest 0.1 miles per gallon:

$$mpg = (5174 \times 10^4 \times CWF \times SG)/[((CWF \times HC) + (0.429 \times CO) + (0.273 \times CO_2)) \times ((0.6 \times SG \times NHV) + 5471)]$$

Where:

HC = Grams/mile HC as obtained in paragraph (g)(1) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(1) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g)(1) of this section.

CWF = Carbon weight fraction of test fuel as obtained in paragraph (f)(1) of this section and rounded according to paragraph (g)(3) of this section.

NHV = Net heating value by mass of test fuel as obtained in paragraph (f)(1) of this section and rounded according to paragraph (g)(3) of this section.

SG = Specific gravity of test fuel as obtained in paragraph (f)(1) of this section and rounded according to paragraph (g)(3) of this section.

(2)(i) For 2012 and later model year gasoline-fueled automobiles tested on a test fuel specified in § 86.113 of this chapter, the carbon-related exhaust emissions in grams per mile is to be calculated using the following equation and rounded to the nearest 1 gram per mile:

$$CREE = (CWF/0.273 \times HC) + (1.571 \times CO) + CO_2$$

Where:

CREE means the carbon-related exhaust emissions as defined in § 600.002.

HC = Grams/mile HC as obtained in paragraph (g)(2) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g)(2) of this section.

CWF = Carbon weight fraction of test fuel as obtained in paragraph (f)(1) of this section and rounded according to paragraph (g)(3) of this section.

(ii) For manufacturers complying with the fleet averaging option for $N_2O$ and $CH_4$ as allowed under § 86.1818 of this chapter, the carbon-related exhaust emissions in grams per mile for 2012 and later model year gasoline-fueled automobiles tested on a test fuel specified in § 86.113 of this chapter is to be calculated using the following equation and rounded to the nearest 1 gram per mile:

$$CREE = [(CWF/0.273) \times NMHC] + (1.571 \times CO) + CO_2 + (298 \times N_2O) + (25 \times CH_4)$$

Where:

CREE means the carbon-related exhaust emissions as defined in § 600.002.

NMHC = Grams/mile NMHC as obtained in paragraph (g)(2) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g)(2) of this section.

$N_2O$ = Grams/mile $N_2O$ as obtained in paragraph (g)(2) of this section.

$CH_4$ = Grams/mile $CH_4$ as obtained in paragraph (g)(2) of this section.

CWF = Carbon weight fraction of test fuel as obtained in paragraph (f)(1) of this section and rounded according to paragraph (g)(3) of this section.

(i)(1) For diesel-fueled automobiles, calculate the fuel economy in miles per gallon of diesel fuel by dividing 2778 by the sum of three terms and rounding the quotient to the nearest 0.1 mile per gallon:

(i)(A) 0.866 multiplied by HC (in grams/miles as obtained in paragraph (g)(1) of this section), or

(B) Zero, in the case of cold FTP diesel tests for which HC was not collected, as permitted in § 600.113–08(c);

(ii) 0.429 multiplied by CO (in grams/mile as obtained in paragraph (g)(1) of this section); and

(iii) 0.273 multiplied by $CO_2$ (in grams/mile as obtained in paragraph (g)(1) of this section).

(2)(i) For 2012 and later model year diesel-fueled automobiles, the carbon-related exhaust emissions in grams per mile is to be calculated using the following equation and rounded to the nearest 1 gram per mile:

$$CREE = (3.172 \times HC) + (1.571 \times CO) + CO_2$$

Where:

CREE means the carbon-related exhaust emissions as defined in § 600.002.

HC = Grams/mile HC as obtained in paragraph (g)(2) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g)(2) of this section.

(ii) For manufacturers complying with the fleet averaging option for $N_2O$ and $CH_4$ as allowed under § 86.1818 of this chapter, the carbon-related exhaust emissions in grams per mile for 2012 and later model year diesel-fueled automobiles is to be calculated using the following equation and rounded to the nearest 1 gram per mile:

$$CREE = (3.172 \times NMHC) + (1.571 \times CO) + CO_2 + (298 \times N_2O) + (25 \times CH_4)$$

Where:

CREE means the carbon-related exhaust emissions as defined in § 600.002.

NMHC = Grams/mile NMHC as obtained in paragraph (g)(2) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g)(2) of this section.

$N_2O$ = Grams/mile $N_2O$ as obtained in paragraph (g)(2) of this section.

$CH_4$ = Grams/mile $CH_4$ as obtained in paragraph (g)(2) of this section.

(j)(1) For methanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and methanol, the fuel economy in miles per gallon is to be calculated using the following equation:

$$mpg = (CWF \times SG \times 3781.8)/((CWF_{exHC} \times HC) + (0.429 \times CO) + (0.273 \times CO_2) + (0.375 \times CH_3OH) + (0.400 \times HCHO))$$

Where:

CWF = Carbon weight fraction of the fuel as determined in paragraph (f)(2)(ii) of this section and rounded according to paragraph (g)(3) of this section.

SG = Specific gravity of the fuel as determined in paragraph (f)(2)(i) of this section and rounded according to paragraph (g)(3) of this section.

$CWF_{exHC}$ = Carbon weight fraction of exhaust hydrocarbons = CWF as determined in paragraph (f)(2)(ii) of this section and rounded according to paragraph (g)(3) of this section (for M100 fuel, $CWF_{exHC}$= 0.866).

HC = Grams/mile HC as obtained in paragraph (g)(1) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(1) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g)(1) of this section.

$CH_3OH$ = Grams/mile $CH_3OH$ (methanol) as obtained in paragraph (g)(1) of this section.

HCHO = Grams/mile HCHO (formaldehyde) as obtained in paragraph (g)(1) of this section.

(2)(i) For 2012 and later model year methanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and methanol, the carbon-related exhaust emissions in grams per mile is to be calculated using the following equation and rounded to the nearest 1 gram per mile:

$CREE = (CWF_{exHC}/0.273 \times HC) + (1.571 \times CO) + (1.374 \times CH_3OH) + (1.466 \times HCHO) + CO_2$

Where:

CREE means the carbon-related exhaust emission value as defined in § 600.002.

$CWF_{exHC}$ = Carbon weight fraction of exhaust hydrocarbons = CWF as determined in paragraph (f)(2)(ii) of this section and rounded according to paragraph (g)(3) of this section (for M100 fuel, $CWF_{exHC}$= 0.866).

HC = Grams/mile HC as obtained in paragraph (g)(2) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g)(2) of this section.

$CH_3OH$ = Grams/mile $CH_3OH$ (methanol) as obtained in paragraph (g)(2) of this section.

HCHO = Grams/mile HCHO (formaldehyde) as obtained in paragraph (g)(2) of this section.

(ii) For manufacturers complying with the fleet averaging option for $N_2O$ and $CH_4$ as allowed under § 86.1818 of this chapter, the carbon-related exhaust emissions in grams per mile for 2012 and later model year methanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and methanol is to be calculated using the following equation and rounded to the nearest 1 gram per mile:

$CREE = [(CWF_{exHC}/0.273) \times NMHC] + (1.571 \times CO) + (1.374 \times CH_3OH) + (1.466 \times HCHO) + CO_2 + (298 \times N_2O) + (25 \times CH_4)$

Where:

CREE means the carbon-related exhaust emission value as defined in § 600.002.

$CWF_{exHC}$ = Carbon weight fraction of exhaust hydrocarbons = CWF as determined in paragraph (f)(2)(ii) of this section and rounded according to paragraph (g)(3) of this section (for M100 fuel, $CWF_{exHC}$ = 0.866).

NMHC = Grams/mile HC as obtained in paragraph (g)(2) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g)(2) of this section.

$CH_3OH$ = Grams/mile $CH_3OH$ (methanol) as obtained in paragraph (g)(2) of this section.

HCHO = Grams/mile HCHO (formaldehyde) as obtained in paragraph (g)(2) of this section.

$N_2O$ = Grams/mile $N_2O$ as obtained in paragraph (g)(2) of this section.

$CH_4$ = Grams/mile $CH_4$ as obtained in paragraph (g)(2) of this section.

(k)(1) For automobiles fueled with natural gas, the fuel economy in miles per gallon of natural gas is to be calculated using the following equation:

$$mpg_e = \frac{CWF_{HC/NG} \times D_{NG} \times 121.5}{(0.749 \times CH_4) + (CWF_{NMHC} \times NMHC) + (0.429 \times CO) + (0.273 \times (CO_2 - CO_{2NG}))}$$

Where:

$mpg_e$ = miles per gasoline gallon equivalent of natural gas.

$CWF_{HC/NG}$ = carbon weight fraction based on the hydrocarbon constituents in the natural gas fuel as obtained in paragraph (f)(3) of this section and rounded according to paragraph (g)(3) of this section.

$D_{NG}$ = density of the natural gas fuel [grams/$ft^3$ at 68 °F (20 °C) and 760 mm Hg (101.3 kPa)] pressure as obtained in paragraph (g)(3) of this section.

$CH_4$, NMHC, CO, and $CO_2$ = weighted mass exhaust emissions [grams/mile] for methane, non-methane HC, carbon monoxide, and carbon dioxide as obtained in paragraph (g)(2) of this section.

$CWF_{NMHC}$ = carbon weight fraction of the non-methane HC constituents in the fuel as determined from the speciated fuel composition per paragraph (f)(3) of this section and rounded according to paragraph (g)(3) of this section.

$CO_{2NG}$ = grams of carbon dioxide in the natural gas fuel consumed per mile of travel.

$CO_{2NG} = FC_{NG} \times D_{NG} \times WF_{CO2}$

Where:

$$FC_{NG} = \frac{(0.749 \times CH_4) + (CWF_{NMHC} \times NMHC) + (0.429 \times CO) + (0.273 \times CO_2)}{CWF_{NG} \times D_{NG}}$$

= cubic feet of natural gas fuel consumed per mile

Where:

$CWF_{NG}$ = the carbon weight fraction of the natural gas fuel as calculated in paragraph (f)(3) of this section.

$WF_{CO2}$ = weight fraction carbon dioxide of the natural gas fuel calculated using the mole fractions and molecular weights of the natural gas fuel constituents per ASTM D 1945 (incorporated by reference in §600.011).

(2)(i) For automobiles fueled with natural gas, the carbon-related exhaust emissions in grams per mile is to be calculated for 2012 and later model year vehicles using the following equation and rounded to the nearest 1 gram per mile:

$$CREE = 2.743 \times CH_4 + CWF_{NMHC}/0.273 \times NMHC + 1.571 \times CO + CO_2$$

Where:

CREE means the carbon-related exhaust emission value as defined in §600.002.

$CH_4$ = Grams/mile $CH_4$ as obtained in paragraph (g)(2) of this section.

NMHC = Grams/mile NMHC as obtained in paragraph (g)(2) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g)(2) of this section.

$CWF_{NMHC}$ = carbon weight fraction of the non-methane HC constituents in the fuel as determined from the speciated fuel composition per paragraph (f)(3) of this section and rounded according to paragraph (f)(3) of this section.

(ii) For manufacturers complying with the fleet averaging option for $N_2O$ and $CH_4$ as allowed under §86.1818 of this chapter, the carbon-related exhaust emissions in grams per mile for 2012 and later model year automobiles fueled with natural gas is to be calculated using the following equation and rounded to the nearest 1 gram per mile:

$$CREE = (25 \times CH_4) + [(CWF_{NMHC}/0.273) \times NMHC] + (1.571 \times CO) + CO_2 + (298 \times N_2O)$$

Where:

CREE means the carbon-related exhaust emission value as defined in §600.002.

$CH_4$ = Grams/mile $CH_4$ as obtained in paragraph (g)(2) of this section.

NMHC = Grams/mile NMHC as obtained in paragraph (g)(2) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g)(2) of this section.

$CWF_{NMHC}$ = carbon weight fraction of the non-methane HC constituents in the fuel as determined from the speciated fuel composition per paragraph (f)(3) of this section and rounded according to paragraph (f)(3) of this section.

$N_2O$ = Grams/mile $N_2O$ as obtained in paragraph (g)(2) of this section.

(l)(1) For ethanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and ethanol, the fuel economy in miles per gallon is to be calculated using the following equation:

$$mpg = (CWF \times SG \times 3781.8)/((CWF_{exHC} \times HC) + (0.429 \times CO) + (0.273 \times CO_2) + (0.375 \times CH_3OH) + (0.400 \times HCHO) + (0.521 \times C_2H_5OH) + (0.545 \times C_2H_4O))$$

Where:

CWF = Carbon weight fraction of the fuel as determined in paragraph (f)(4) of this section and rounded according to paragraph (f)(3) of this section.

SG = Specific gravity of the fuel as determined in paragraph (f)(4) of this section and rounded according to paragraph (f)(3) of this section.

$CWF_{exHC}$= Carbon weight fraction of exhaust hydrocarbons = CWF as determined in paragraph (f)(4) of this section and rounded according to paragraph (f)(3) of this section.

HC = Grams/mile HC as obtained in paragraph (g)(1) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(1) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g)(1) of this section.

$CH_3OH$ = Grams/mile $CH_3OH$ (methanol) as obtained in paragraph (g)(1) of this section.

HCHO = Grams/mile HCHO (formaldehyde) as obtained in paragraph (g)(1) of this section.

$C_2H_5OH$ = Grams/mile $C_2H_5OH$ (ethanol) as obtained in paragraph (g)(1) of this section.

$C_2H_4O$ = Grams/mile $C_2H_4O$ (acetaldehyde) as obtained in paragraph (g)(1) of this section.

(2)(i) For 2012 and later model year ethanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and ethanol, the carbon-related exhaust emissions in grams per mile is to be calculated using the following equation and rounded to the nearest 1 gram per mile:

$$CREE = (CWF_{exHC}/0.273 \times HC) + (1.571 \times CO) + (1.374 \times CH_3OH) + (1.466 \times HCHO) + (1.911 \times C_2H_5OH) + (1.998 \times C_2H_4O) + CO_2$$

Where:

CREE means the carbon-related exhaust emission value as defined in § 600.002.

$CWF_{exHC}$ = Carbon weight fraction of exhaust hydrocarbons = CWF as determined in paragraph (f)(4) of this section and rounded according to paragraph (f)(3) of this section.

HC = Grams/mile HC as obtained in paragraph (g)(2) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g)(2) of this section.

$CH_3OH$ = Grams/mile $CH_3OH$ (methanol) as obtained in paragraph (g)(2) of this section.

HCHO = Grams/mile HCHO (formaldehyde) as obtained in paragraph (g)(2) of this section.

$C_2H_5OH$ = Grams/mile $C_2H_5OH$ (ethanol) as obtained in paragraph (g)(2) of this section.

$C_2H_4O$ = Grams/mile $C_2H_4O$ (acetaldehyde) as obtained in paragraph (g)(2) of this section.

(ii) For manufacturers complying with the fleet averaging option for $N_2O$ and $CH_4$ as allowed under § 86.1818 of this chapter, the carbon-related exhaust emissions in grams per mile for 2012 and later model year ethanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and ethanol is to be calculated using the following equation and rounded to the nearest 1 gram per mile:

$$CREE = [(CWF_{exHC}/0.273) \times NMHC] + (1.571 \times CO) + (1.374 \times CH_3OH) + (1.466 \times HCHO) + (1.911 \times C_2H_5OH) + (1.998 \times C_2H_4O) + CO_2 + (298 \times N_2O) + (25 \times CH_4)$$

Where:

CREE means the carbon-related exhaust emission value as defined in § 600.002.

$CWF_{exHC}$ = Carbon weight fraction of exhaust hydrocarbons = CWF as determined in paragraph (f)(4) of this section and rounded according to paragraph (f)(3) of this section.

NMHC = Grams/mile HC as obtained in paragraph (g)(2) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.

$CO_2$ = Grams/mile $CO_2$ as obtained in paragraph (g)(2) of this section.

$CH_3OH$ = Grams/mile $CH_3OH$ (methanol) as obtained in paragraph (g)(2) of this section.

HCHO = Grams/mile HCHO (formaldehyde) as obtained in paragraph (g)(2) of this section.

$C_2H_5OH$ = Grams/mile $C_2H_5OH$ (ethanol) as obtained in paragraph (g)(2) of this section.

$C_2H_4O$ = Grams/mile $C_2H_4O$ (acetaldehyde) as obtained in paragraph (g)(2) of this section.

$N_2O$= Grams/mile $N_2O$ as obtained in paragraph (g)(2) of this section.

$CH_4$= Grams/mile $CH_4$ as obtained in paragraph (g)(2) of this section.

(m) Manufacturers shall determine $CO_2$ emissions and carbon-related exhaust emissions for electric vehicles, fuel cell vehicles, and plug-in hybrid electric vehicles according to the provisions of this paragraph (m). Subject to the limitations on the number of vehicles produced and delivered for sale as described in § 86.1866 of this chapter, the manufacturer may be allowed to use a value of 0 grams/mile to represent the emissions of fuel cell vehicles and the proportion of electric operation of a electric vehicles and plug-in hybrid electric vehicles that is derived from electricity that is generated from sources that are not onboard the vehicle, as described in paragraphs (m)(1) through (3) of this section. For purposes of labeling under this part, the $CO_2$ emissions for electric vehicles shall be 0 grams per mile. Similarly, the $CO_2$ emissions for plug-in hybrid electric vehicles shall be 0 grams per mile for the proportion of electric operation that is derived from electricity that is generated from sources that are not onboard the vehicle.

(1) For 2012 and later model year electric vehicles, but not including fuel cell vehicles, the carbon-related exhaust emissions in grams per mile is to be calculated using the following equation and rounded to the nearest one gram per mile:

$CREE = CREE_{UP} - CREE_{GAS}$

Where:

CREE means the carbon-related exhaust emission value as defined in § 600.002, which may be set equal to zero for eligible 2012 through 2016 model year electric vehicles for a certain number of vehicles produced and delivered for sale as described in § 86.1866–12(a) of , and this chapter.

$$CREE_{UP} = \frac{EC}{GRIDLOSS} \times AVGUSUP \text{, and}$$

$$CREE_{GAS} = 0.2485 \times TargetCO_2,$$

Where:

EC = The vehicle energy consumption in watt-hours per mile, determined according to procedures established by the Administrator under § 600.111–08(f).

GRIDLOSS = 0.93 (to account for grid transmission losses).

AVGUSUP = 0.642 (the nationwide average electricity greenhouse gas emission rate at the powerplant, in grams per watt-hour).

$TargetCO_2$ = The $CO_2$ Target Value determined according to § 86.1818 of this chapter for passenger automobiles and light trucks, respectively.

(2) For 2012 and later model year plug-in hybrid electric vehicles, the carbon-related exhaust emissions in grams per mile is to be calculated using the following equation and rounded to the nearest one gram per mile:

$CREE = (ECF \times CREE_{CD}) + [(1–ECF) \times CREE_{CS}]$,

Where:

CREE means the carbon-related exhaust emission value as defined in § 600.002;

$CREE_{CS}$ = The carbon-related exhaust emissions determined for charge-sustaining operation according to procedures established by the Administrator under § 600.116; and

$CREE_{CD} = CREE_{CDEC} + CREE_{CDGAS}$

Where:

$CREE_{CDEC}$ = The carbon-related exhaust emissions determined for electricity consumption during charge-depleting operation determined according to paragraph (m)(1) of this section; and

$CREE_{CDGAS}$ = The carbon-related exhaust emissions determined for charge-depleting operation determined according to the provisions of this section for the applicable fuel according to procedures established by the Administrator under § 600.116; and

ECF = Electricity consumption factor as determined by the Administrator.

(3) For 2012 and later model year fuel cell vehicles, the carbon-related exhaust emissions in grams per mile shall be calculated using the method specified in paragraph (m)(1) of this section, except that $CREE_{UP}$ shall be determined according to procedures established by the Administrator under § 600.111–08(f). As described in § 86.1866 of this chapter the value of CREE may be set equal to zero for a certain number of 2012 through 2016 model year fuel cell vehicles.

(n) Equations for fuels other than those specified in paragraphs (h) through (l) of this section may be used with advance EPA approval. Alternate calculation methods for fuel economy and carbon-related exhaust emissions may be used in lieu of the methods described in this section if shown to yield equivalent or superior results and if approved in advance by the Administrator.

[76 FR 39533, July 6, 2011]

### § 600.114–08 Vehicle-specific 5-cycle fuel economy and carbon-related exhaust emission calculations.

Paragraphs (a) through (c) 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 emissions values for the purpose of determining optional technology-based $CO_2$ emissions credits under the provisions of paragraph (d) of § 86.1866–12 of this chapter.

(a) *City fuel economy*. For each vehicle tested under § 600.010–08(c)(i) and (ii),

determine the 5-cycle city fuel economy using the following equation:

$$(1)\ \text{City FE} = 0.905 \times \frac{1}{(\text{Start FC} + \text{Running FC})}$$

Where:

$$\text{(i) Start FC (gallons per mile)} = 0.33 \times \left( \frac{(0.76 \times \text{Start Fuel}_{75} + 0.24 \times \text{Start Fuel}_{20})}{4.1} \right)$$

Where:

$$\text{Start Fuel}_x = 3.6 \times \left( \frac{1}{\text{Bag 1 FE}_x} - \frac{1}{\text{Bag 3 FE}_x} \right)$$

Where:

Bag Y $FE_X$ = the fuel economy in miles per gallon of fuel during the specified bag of the FTP test conducted at an ambient temperature of 75 °F or 20 °F,

and,

$$\text{(ii) Running FC} = 0.82 \times \left[ \frac{0.48}{\text{Bag } 2_{75}\ \text{FE}} + \frac{0.41}{\text{Bag } 3_{75}\ \text{FE}} + \frac{0.11}{\text{US06 City FE}} \right] + 0.18 \times \left[ \frac{0.5}{\text{Bag } 2_{20}\ \text{FE}} + \frac{0.5}{\text{Bag } 3_{20}\ \text{FE}} \right] + 0.133 \times 1.083 \times \left[ \frac{1}{\text{SC03 FE}} - \left( \frac{0.61}{\text{Bag } 3_{75}\ \text{FE}} + \frac{0.39}{\text{Bag } 2_{75}\ \text{FE}} \right) \right]$$

Where:

US06 City FE = fuel economy in miles per gallon over the ''city'' portion of the US06 test,

HFET FE = fuel economy in miles per gallon over the HFET test,

SC03 FE = fuel economy in miles per gallon over the SC03 test.

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

$$\text{Highway FE} = 0.905 \times \frac{1}{\text{Start FC} + \text{Running FC}}$$

Where:

$$\text{(i) Start FC} = 0.33 \times \left( \frac{\left(0.76 \times \text{Start Fuel}_{75}\right) + \left(0.24 \times \text{Start Fuel}_{20}\right)}{60} \right)$$

Where:

$$\text{Start Fuel}_x = 3.6 \times \left( \frac{1}{\text{Bag 1 FE}_x} - \frac{1}{\text{Bag 3 FE}_x} \right)$$

and,

$$\text{(ii) Running FC} = 1.007 \times \left[ \frac{0.79}{\text{US06 Highway FE}} + \frac{0.21}{\text{HFET FE}} \right] + 0.133 \times 0.377 \times \left[ \frac{1}{\text{SC03 FE}} - \left( \frac{0.61}{\text{Bag 3}_{75}\text{FE}} + \frac{0.39}{\text{Bag 2}_{75}\text{FE}} \right) \right]$$

Where:

US06 Highway FE = fuel economy in mile per gallon over the highway portion of the US06 test,

HFET FE = fuel economy in mile per gallon over the HFET test,

SC03 FE = fuel economy in mile per gallon over the SC03 test.

(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:

$$\text{Highway FE} = 0.905 \times \frac{1}{\text{Start FC} + \text{Running FC}}$$

Where:

$$\text{(A) } StartFC = 0.33 \times \frac{\left(0.005515 + 1.13637 \times StartFuel_{75}\right)}{60.0}$$

Where:

$$StartFuel_{75} = 3.6 \times \left( \frac{1}{Bag\ 1\ FE_{75}} - \frac{1}{Bag\ 3\ FE_{75}} \right)$$

Bag y $FE_{75}$ = the fuel economy in miles per gallon of fuel during the specified bag of the FTP test conducted at an ambient temperature of 75 °F.

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

Where:

US06 Highway FE = fuel economy in miles per gallon over the highway portion of the US06 test.

HFET FE = fuel economy in miles per gallon over the HFET test.

US06 FE = fuel economy in miles per gallon over the entire US06 test.

(c) *Fuel economy calculations for hybrid electric vehicles.* Under the requirements of § 86.1811–04(n), hybrid electric vehicles are subject to California test methods which require FTP emission sampling for the 75 °F FTP test over four phases (bags) of the UDDS (cold-start, transient, warm-start, transient). Optionally, these four phases may be combined into two phases (phases 1 + 2 and phases 3 + 4). Calculations for these sampling methods follow.

(1) *Four-bag FTP equations.* If the 4-bag sampling method is used, manufacturers may use the equations in paragraphs (a) and (b) of this section to determine city and highway fuel economy estimates. If this method is chosen, it must be used to determine both city and highway fuel economy. Optionally, the following calculations may be used, provided that they are used to determine both city and highway fuel economy:

(i) *City fuel economy.*

$$\text{City FE} = 0.905 \times \frac{1}{(\text{Start FC} + \text{Running FC})}$$

Where:

$$\text{(A) Start FC (gallons per mile)} = 0.33 \times \left( \frac{(0.76 \times \text{Start Fuel}_{75} + 0.24 \times \text{Start Fuel}_{20})}{4.1} \right)$$

Where:

$$(1)\ \text{Start Fuel}_{75} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_{75}} - \frac{1}{\text{Bag 3 FE}_{75}} \right] + 3.9 \times \left[ \frac{1}{\text{Bag 2 FE}_{75}} - \frac{1}{\text{Bag 4 FE}_{75}} \right]$$

and

$$(2)\ \text{Start Fuel}_{20} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_{20}} - \frac{1}{\text{Bag 3 FE}_{20}} \right]$$

$$\text{(B) Running FC (gallons per mile)} = 0.82 \times \left[ \frac{0.48}{Bag\ 4_{75}\ FE} + \frac{0.41}{Bag\ 3_{75}\ FE} + \frac{0.11}{US06\ City\ FE} \right]$$

$$+ 0.18 \times \left[ \frac{0.5}{Bag\ 2_{20}\ FE} + \frac{0.5}{Bag\ 3_{20}\ FE} \right] + 0.133 \times 1.083 \times \left[ \frac{1}{SC03\ FE} - \left( \frac{0.61}{Bag\ 3_{75}\ FE} + \frac{0.39}{Bag\ 4_{75}\ FE} \right) \right]$$

Where:

$BagY_X$ FE = the fuel economy in miles per gallon of fuel during the specified bag Y of the FTP test conducted at an ambient temperature X of 75 °F or 20 °F.

US06 City FE = fuel economy in miles per gallon over the city portion of the US06 test.

SC03 FE = fuel economy in miles per gallon over the SC03 test.

(ii) *Highway fuel economy.*

$$\text{Highway FE} = 0.905 \times \frac{1}{\text{Start FC} + \text{Running FC}}$$

Where:

$$\text{(A) Start FC} = 0.33 \times \frac{(0.76 \times \text{Start Fuel}_{75} + 0.24 \times \text{Start Fuel}_{20})}{60}$$

Where:

$$\text{Start Fuel}_{75} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_{75}} - \frac{1}{\text{Bag 3 FE}_{75}} \right] + 3.9 \times \left[ \frac{1}{\text{Bag 2 FE}_{75}} - \frac{1}{\text{Bag 4 FE}_{75}} \right]$$

$$\text{Start Fuel}_{20} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_{20}} - \frac{1}{\text{Bag 3 FE}_{20}} \right]$$

$$\text{(B) Running FC} = 1.007 \times \left[ \frac{0.79}{\text{US06 Highway FE}} + \frac{0.21}{\text{HFET FE}} \right] + 0.133 \times 0.377 \times \left[ \frac{1}{\text{SC03 FE}} - \left( \frac{0.61}{\text{Bag 3}_{75}\ \text{FE}} + \frac{0.39}{\text{Bag 4}_{75}\ \text{FE}} \right) \right]$$

Where:

US06 Highway FE = fuel economy in miles per gallon over the Highway portion of the US06 test,

HFET FE = fuel economy in miles per gallon over the HFET test,

SC03 FE = fuel economy in miles per gallon over the SC03 test.

(2) *Two-bag FTP equations.* If the 2-bag sampling method is used for the 75

°F FTP test, it must be used to determine both city and highway fuel economy. The following calculations must be used to determine both city and highway fuel economy:

(i) *City fuel economy.*

$$\text{City FE} = 0.905 \times \frac{1}{\text{Start FC} + \text{Running FC}}$$

Where:

$$\text{(A) Start FC} = 0.33 \times \frac{\left(0.76 \times \text{Start Fuel}_{75} + 0.24 \times \text{Start Fuel}_{20}\right)}{4.1}$$

Where:

$$\text{Start Fuel}_{75} = 7.5 \times \left[\frac{1}{\text{Bag 1/2 FE}_{75}} - \frac{1}{\text{Bag 3/4 FE}_{75}}\right]$$

$$\text{Start Fuel}_{20} = 3.6 \times \left[\frac{1}{\text{Bag 1 FE}_{20}} - \frac{1}{\text{Bag 3 FE}_{20}}\right]$$

Where:

Bag y $FE_{20}$ = the fuel economy in miles per gallon of fuel during Bag 1 or Bag 3 of the 20 °F FTP test.

Bag x/y $FE_X$ = fuel economy in miles per gallon of fuel during combined phases 1 and 2 or phases 3 and 4 of the FTP test conducted at an ambient temperature of 75 °F.

$$\text{(B) Running FC} = 0.82 \times \left[\frac{0.90}{\text{Bag 3/4}_{75}\text{ FE}} + \frac{0.10}{\text{US06 City FE}}\right] + 0.18 \times \left[\frac{0.5}{\text{Bag 2}_{20}\text{ FE}} + \frac{0.5}{\text{Bag 3}_{20}\text{ FE}}\right] + 0.133 \times 1.083 \times \left[\frac{1}{\text{SC03 FE}} - \left(\frac{1.0}{\text{Bag 3/4}_{75}\text{ FE}}\right)\right]$$

Where:

US06 City FE = fuel economy in miles per gallon over the city portion of the US06 test,

SC03 FE = fuel economy in miles per gallon over the SC03 test.

Bag x/y $FE_X$ = fuel economy in miles per gallon of fuel during combined phases 1 and 2 or phases 3 and 4 of the FTP test conducted at an ambient temperature of 75 °F.

(ii) *Highway fuel economy.*

$$\text{Highway FE} = 0.905 \times \frac{1}{\text{Start FC} + \text{Running FC}}$$

Where:

$$\text{(A) Start FC} = 0.33 \times \frac{(0.76 \times \text{Start Fuel}_{75} + 0.24 \times \text{Start Fuel}_{20})}{60}$$

Where:

$$\text{Start Fuel}_{75} = 7.5 \times \left[ \frac{1}{\text{Bag 1/2 FE}_{75}} - \frac{1}{\text{Bag 3/4 FE}_{75}} \right]$$

and

$$\text{Start Fuel}_{20} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_{20}} - \frac{1}{\text{Bag 3 FE}_{20}} \right]$$

and

$$\text{(B) Running FC} = 1.007 \times \left[ \frac{0.79}{\text{US06 Highway FE}} + \frac{0.21}{\text{HFET FE}} \right] + 0.133 \times 0.377 \times \left[ \frac{1}{\text{SC03 FE}} - \left( \frac{1.0}{\text{Bag 3/4}_{75}\text{ FE}} \right) \right]$$

Where:

US06 Highway FE = fuel economy in miles per gallon over the city portion of the US06 test,

SC03 FE = fuel economy in miles per gallon over the SC03 test.

Bag y $FE_{20}$ = the fuel economy in miles per gallon of fuel during Bag 1 or Bag 3 of the 20 °F FTP test.

Bag x/y $FE_X$ = fuel economy in miles per gallon of fuel during phases 1 and 2 or phases 3 and 4 of the FTP test conducted at an ambient temperature of 75 °F.

(3) For hybrid electric vehicles using the modified 5-cycle highway calculation in paragraph (b)(2) of this section, the equation in paragraph (b)(2)(ii)(A) of this section, applies except that the equation for Start $Fuel_{75}$ will be replaced with one of the following:

(i) The equation for Start $Fuel_{75}$ for hybrids tested according to the 4-bag FTP is:

$$\text{Start Fuel}_{75} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE 75}_{75}} - \frac{1}{\text{Bag 3 FE}_{75}} \right] + 3.9 \times \left[ \frac{1}{\text{Bag 2 FE}_{75}} - \frac{1}{\text{Bag 4 FE}_{75}} \right]$$

(ii) The equation for Start $Fuel_{75}$ for hybrids tested according to the 2-bag FTP is:

$$\text{Start Fuel}_{75} = 7.5 \left[ \frac{1}{\text{Bag } 1/2 \text{ FE}_{75}} - \frac{1}{\text{Bag } 3/4 \text{ FE}_{75}} \right]$$

(d) *City carbon-related exhaust emission value.* For each vehicle tested, determine the 5-cycle city carbon-related exhaust emissions using the following equation:

(1) CityCREE = 0.905 × (StartCREE + RunningCREE)

Where:

(i) StartCREE =

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

Where:

$\text{StartCREE}_X$ = 3.6 × ($\text{Bag1CREE}_X$ − $\text{Bag3CREE}_X$)

Where:

Bag Y $\text{CREE}_X$ = the carbon-related exhaust emissions in grams per mile during the specified bag of the FTP test conducted at an ambient temperature of 75 °F or 20 °F.

(ii) Running CREE =

0.82 × [(0.48 × $\text{Bag2}_{75}$CREE) + (0.41 × $\text{BAG3}_{75}$CREE) + (0.11× US06 CityCREE)] +

0.18 × [(0.5 × $\text{Bag2}_{20}$CREE) + (0.5 × $\text{Bag3}_{20}$CREE)] +

0.144 × [SC03 CREE − ((0.61 × $\text{Bag3}_{75}$CREE) + (0.39 × $\text{Bag2}_{75}$CREE))]

Where:

$\text{BagY}_X$CREE = carbon-related exhaust emissions in grams per mile over Bag Y at temperature X.

US06 City CREE = carbon-related exhaust emissions in grams per mile over the ''city'' portion of the US06 test.

SC03 CREE = carbon-related exhaust emissions in grams per mile over the SC03 test.

(e) *Highway carbon-related exhaust emissions.* For each vehicle tested, determine the 5-cycle highway carbon-related exhaust emissions using the following equation:

HighwayCREE = 0.905 × (StartCREE + RunningCREE)

Where:

(1) StartCREE =

$$0.33 \times \left( \frac{(0.76 \times \text{StartCREE}_{75} + 0.24 \times \text{StartCREE}_{20})}{60} \right)$$

Where:

$\text{StartCREE}_X$ = 3.6 × ($\text{BagCREE}_X$ − $\text{Bag3CREE}_X$)

(2) Running CREE =

1.007 × [(0.79 × *US06 Highway CREE)* + (0.21 × *HFET CREE*)] + 0.045 × [*SC03 CREE* − ((0.61 × *$\text{Bag3}_{75}$CREE*) + (0.39 × *$\text{Bag2}_{75}$CREE*))]

Where:

$\text{BagY}_X$CREE = carbon-related exhaust emissions in grams per mile over Bag Y at temperature X,

US06 Highway CREE = carbon-related exhaust emissions in grams per mile over the highway portion of the US06 test,

HFET CREE = carbon-related exhaust emissions in grams per mile over the HFET test,

SC03 CREE = carbon-related exhaust emissions in grams per mile over the SC03 test.

(f) *Carbon-related exhaust emissions calculations for hybrid electric vehicles.* Hybrid electric vehicles shall be tested according to California test methods

which require FTP emission sampling for the 75 °F FTP test over four phases (bags) of the UDDS (cold-start, transient, warm-start, transient). Optionally, these four phases may be combined into two phases (phases 1 + 2 and phases 3 + 4). Calculations for these sampling methods follow.

(1) *Four-bag FTP equations.* If the 4-bag sampling method is used, manufacturers may use the equations in paragraphs (a) and (b) of this section to determine city and highway carbon-related exhaust emissions values. If this method is chosen, it must be used to determine both city and highway carbon-related exhaust emissions. Optionally, the following calculations may be used, provided that they are used to determine both city and highway carbon-related exhaust emissions values:

(i) *City carbon-related exhaust emissions.*

CityCREE = 0.905 × (StartCREE + RunningCREE)

Where:

(A) StartCREE =

$$0.33\times\left(\frac{(0.76\times \mathrm{StartCREE}_{75}+0.24\times \mathrm{StartCREE}_{20})}{4.1}\right)$$

Where:

(*1*) $StartCREE_{75}$ =

3.6 × (Bag1$CREE_{75}$ − $Bag3CREE_{75}$) + 3.9 × ($Bag2CREE_{75}$ − $Bag4CREE_{75}$)

and

(*2*) $\mathrm{StartCREE}_{20}$ =

3.6 × ($Bag1CREE_{20}$ − $Bag3CREE_{20}$)

(B) RunningCREE =

0.82 × [(0.48 × $Bag4_{75}CREE$) + (0.41 × $Bag3_{75}CREE$) + (0.11 × *US*06 *City CREE*)] + 0.18 × [(0.5 × $Bag2_{20}CREE$) + (0.5 × $Bag3_{20}CREE$)] + 0.144 × [*SC*03 *CREE* − ((0.61 × $Bag3_{75}CREE$) + (0.39 × $Bag4_{75}CREE$))]

Where:

US06 Highway CREE = carbon-related exhaust emissions in grams per mile over the city portion of the US06 test.

US06 Highway CREE = carbon-related exhaust emissions in miles per gallon over the Highway portion of the US06 test.

HFET CREE = carbon-related exhaust emissions in grams per mile over the HFET test.

SC03 CREE = carbon-related exhaust emissions in grams per mile over the SC03 test.

(ii) *Highway carbon-related exhaust emissions.*

HighwayCREE = 0.905 × (StartCREE + RunningCREE)

Where:

(A) StartCREE =

$$0.33\times\left(\frac{(0.76\times \mathrm{StartCREE}_{75}+0.24\times \mathrm{StartCREE}_{20})}{60}\right)$$

Where:

$\mathrm{StartCREE}_{75}$ = 3.6 × ($\mathrm{Bag1CREE}_{75}$ − $\mathrm{Bag3CREE}^{75}$) + 3.9 × ($\mathrm{Bag2CREE}_{75}$ − $\mathrm{Bag4CREE}_{75}$)

and

$\mathrm{StartCREE}_{20}$ = 3.6 × ($\mathrm{Bag1CREE}_{20}$ − $\mathrm{Bag3CREE}_{20}$)

(B) RunningCREE =

1.007 × [(0.79 × *US*06 *Highway CREE*) + (0.21 × *HFET CREE*)] + 0.045 × [*SC*03 *CREE* − ((0.61 × $Bag3_{75}CREE$) + (0.39 × $Bag4_{75}CREE$))]

Where:

US06 Highway CREE = carbon-related exhaust emissions in grams per mile over the Highway portion of the US06 test,

HFET CREE = carbon-related exhaust emissions in grams per mile over the HFET test,

SC03 CREE = carbon-related exhaust emissions in grams per mile over the SC03 test.

(2) *Two-bag FTP equations.* If the 2-bag sampling method is used for the 75

°F FTP test, it must be used to determine both city and highway carbon-related exhaust emissions. The following calculations must be used to determine both city and highway carbon-related exhaust emissions:

(i) *City carbon-related exhaust emissions.*

CityCREE = 0.905 × (StartCREE + RunningCREE)

Where:

(A) StartCREE =

$$0.33\times\left(\frac{(0.76\times StartCREE_{75}+0.24\times StartCREE_{20})}{4.1}\right)$$

Where:

Start $CREE_{75}$ = 3.6 × (Bag ½ $CREE_{75}$ − Bag ¾ $CREE_{75}$)

and

Start $CREE_{20}$ = 3.6 × (Bag1$CREE_{20}$ − Bag3$CREE_{20}$)

Where:

Bag Y $FE_{20}$ = the carbon-related exhaust emissions in grams per mile of fuel during Bag 1 or Bag 3 of the 20 °F FTP test, and

Bag X/Y $FE_{75}$ = carbon-related exhaust emissions in grams per mile of fuel during combined phases 1 and 2 or phases 3 and 4 of the FTP test conducted at an ambient temperature of 75 °F.

(B) RunningCREE =

0.82 × [(0.90 × Bag$^{3}/_{4}{}_{75}$CREE) + (0.10 × US06 City CREE)] + 0.18 × [(0.5 × Bag$2_{20}$CREE) + (0.5 × Bag$3_{20}$CREE)] + 0.144 × [SC03 CREE − (Bag$^{3}/_{4}{}_{75}$CREE)]

Where:

US06 City CREE = carbon-related exhaust emissions in grams per mile over the city portion of the US06 test, and

SC03 CREE = carbon-related exhaust emissions in grams per mile over the SC03 test, and

Bag X/Y $FE_{75}$ = carbon-related exhaust emissions in grams per mile of fuel during combined phases 1 and 2 or phases 3 and 4 of the FTP test conducted at an ambient temperature of 75 °F.

(ii) *Highway carbon-related exhaust emissions.*

HighwayCREE = 0.905 × (StartCREE + RunningCREE)

Where:

(A) StartCREE =

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

Where:

Start $CREE_{75}$ = 7.5 × (Bag½$CREE_{75}$ − Bag¾$CREE_{75}$)

and

Start $CREE_{20}$ = 3.6 × (Bag1$CREE_{20}$ − Bag3$CREE_{20}$)

(B) RunningCREE =

1.007 × [(0.79 × US06 Highway CREE) + (0.21 × HFET CREE)] + 0.045 × [SC03 CREE − Bag$^{3}/_{4}{}_{75}$CREE]

Where:

US06 Highway CREE = carbon-related exhaust emissions in grams per mile over the city portion of the US06 test, and

SC03 CREE = carbon-related exhaust emissions in gram per mile over the SC03 test, and

Bag Y $FE_{20}$ = the carbon-related exhaust emissions in grams per mile of fuel during Bag 1 or Bag 3 of the 20 °F FTP test, and

Bag X/Y $FE_{75}$ = carbon-related exhaust emissions in grams per mile of fuel during phases 1 and 2 or phases 3 and 4 of the FTP test conducted at an ambient temperature of 75 °F.

[71 FR 77938, Dec. 27, 2006; 72 FR 20403, Apr. 24, 2007, as amended at 74 FR 61550, Nov. 25, 2009; 75 FR 25709, May 7, 2010]

**§ 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:

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

$$\text{StartFuel}_x = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_x} - \frac{1}{\text{Bag 3 FE}_x} \right]$$

$$\text{RunningFC} = 0.82 \times \left[ \frac{0.48}{\text{Bag 2 FE}_{75}} + \frac{0.41}{\text{Bag 3 FE}_{75}} + \frac{0.11}{\text{US06 City FE}} \right] + 0.18 \times \left[ \frac{0.5}{\text{Bag 2 FE}_{20}} + \frac{0.5}{\text{Bag 3 FE}_{20}} \right]$$
$$+ 0.133 \times 1.083 \times \left[ \frac{1}{\text{SC0 3FE}} - \left( \frac{0.61}{\text{Bag 3 FE}_{75}} + \frac{0.39}{\text{Bag 2 FE}_{75}} \right) \right]$$

(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:

$$\text{HighwayFE} = \frac{0.905}{(\text{Start FC} + \text{Running FC})}$$

Where:

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

$$\text{StartFuel}_{x} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_{x}} - \frac{1}{\text{Bag 3 FE}_{x}} \right]$$

$$\text{RunningFC} = 1.007 \times \left[ \frac{0.79}{\text{US06 HighwayFE}} + \frac{0.21}{\text{HFET FE}} \right] + 0.133 \times 0.377 \times \left[ \frac{1}{\text{SC03 FE}} - \left( \frac{0.61}{\text{Bag 3 FE}_{75}} + \frac{0.39}{\text{Bag 2 FE}_{75}} \right) \right]$$

(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:

$$\text{HighwayFE} = \frac{0.905}{(\text{Start FC} + \text{Running FC})}$$

Where:

$$\text{StartFC} = 0.33 \times \frac{\left(0.005515 + 1.13637 \times \text{StartFuel}_{75}\right)}{60}$$

$$\text{StartFuel}_{75} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_{75}} - \frac{1}{\text{Bag 3 FE}_{75}} \right]$$

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

(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:

(1) *Four-bag FTP equations.* If the 4-bag sampling method is used, manufacturers may use the equations in paragraphs (a) and (b) of this section to determine city and highway fuel economy estimates. If this method is chosen, it must be used to determine both city and highway fuel economy. Optionally, the following calculations may be used, provided that they are used to determine both city and highway fuel economy:

(i) *City fuel economy.*

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

Where:

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

$$\text{StartFuel}_{75} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_{75}} - \frac{1}{\text{Bag 3 FE}_{75}} \right] + 3.9 \times \left[ \frac{1}{\text{Bag 2 FE}_{75}} - \frac{1}{\text{Bag 4 FE}_{75}} \right]$$

$$\text{StartFuel}_{20} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_{20}} - \frac{1}{\text{Bag 3 FE}_{20}} \right]$$

$$\text{RunningFC} = 0.82 \times \left[ \frac{0.48}{\text{Bag 4 FE}_{75}} + \frac{0.41}{\text{Bag 3 FE}_{75}} + \frac{0.11}{\text{US06 City FE}} \right]$$
$$+ 0.18 \times \left[ \frac{0.5}{\text{Bag 2 FE}_{20}} + \frac{0.5}{\text{Bag 3 FE}_{20}} \right] + 0.133 \times 1.083 \times \left[ \frac{1}{\text{SC03 FE}} - \left( \frac{0.61}{\text{Bag 3 FE}_{75}} + \frac{0.39}{\text{Bag 4 FE}_{75}} \right) \right]$$

(ii) *Highway fuel economy.*

$$\text{HighwayFE} = \frac{0.905}{(\text{Start FC} + \text{Running FC})}$$

Where:

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

$$\text{StartFuel}_{75} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_{75}} - \frac{1}{\text{Bag 3 FE}_{75}} \right] + 3.9 \times \left[ \frac{1}{\text{Bag 2 FE}_{75}} - \frac{1}{\text{Bag 4 FE}_{75}} \right]$$

$$\text{StartFuel}_{20} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_{20}} - \frac{1}{\text{Bag 3 FE}_{20}} \right]$$

$$\text{RunningFC} = 1.007 \times \left[ \frac{0.79}{\text{US06 Highway FE}} + \frac{0.21}{\text{HFET FE}} \right] + 0.133 \times 0.377 \times \left[ \frac{1}{\text{SC03 FE}} - \left( \frac{0.61}{\text{Bag 3 FE}_{75}} + \frac{0.39}{\text{Bag 4 FE}_{75}} \right) \right]$$

(2) *Two-bag FTP equations.* If the 2-bag sampling method is used for the 75 °F FTP test, it must be used to determine both city and highway fuel economy. The following calculations must be used to determine both city and highway fuel economy:

(i) *City fuel economy.*

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

Where:

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

$$\text{StartFuel}_{75} = 7.5 \times \left[ \frac{1}{\text{Bag}\,1/2\,\text{FE}_{75}} - \frac{1}{\text{Bag}\,3/4\,\text{FE}_{75}} \right]$$

$$\text{StartFuel}_{20} = 3.6 \times \left[ \frac{1}{\text{Bag}\,1\,\text{FE}_{20}} - \frac{1}{\text{Bag}\,3\,\text{FE}_{20}} \right]$$

$$\text{RunningFC} = 0.82 \times \left[ \frac{0.90}{\text{Bag}\,3/4\,\text{FE}_{75}} + \frac{0.10}{\text{US06 City FE}} \right]$$
$$+ 0.18 \times \left[ \frac{0.5}{\text{Bag}\,2\,\text{FE}_{20}} + \frac{0.5}{\text{Bag}\,3\,\text{FE}_{20}} \right] + 0.133 \times 1.083 \times \left[ \frac{1}{\text{SC03 FE}} - \left( \frac{1.0}{\text{Bag}\,3/4\,\text{FE}_{75}} \right) \right]$$

(ii) *Highway fuel economy.*

$$\text{HighwayFE} = \frac{0.905}{(\text{Start FC} + \text{Running FC})}$$

Where:

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

$$\text{StartFuel}_{75} = 7.5 \times \left[ \frac{1}{\text{Bag 1/2 FE}_{75}} - \frac{1}{\text{Bag 3/4 FE}_{75}} \right]$$

$$\text{StartFuel}_{20} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_{20}} - \frac{1}{\text{Bag 3 FE}_{20}} \right]$$

$$\text{RunningFC} = 1.007 \times \left[ \frac{0.79}{\text{US06HighwayFE}} + \frac{0.21}{\text{HFETFE}} \right] + 0.133 \times 0.377 \times \left[ \frac{1}{\text{SC03FE}} - \left( \frac{1.0}{\text{Bag3/4FE}_{75}} \right) \right]$$

(3) For hybrid electric vehicles using the modified 5-cycle highway calculation in paragraph (b)(2) of this section, the equation in paragraph (b)(2)(ii)(A) of this section applies except that the equation for Start $\text{Fuel}_{75}$ will be replaced with one of the following:

(i) The equation for Start $\text{Fuel}_{75}$ for hybrids tested according to the 4-bag FTP is:

$$\text{StartFuel}_{75} = 3.6 \times \left[ \frac{1}{\text{Bag 1 FE}_{75}} - \frac{1}{\text{Bag 3 FE}_{75}} \right] + 3.9 \times \left[ \frac{1}{\text{Bag 2 FE}_{75}} - \frac{1}{\text{Bag 4 FE}_{75}} \right]$$

(ii) The equation for Start $\text{Fuel}_{75}$ for hybrids tested according to the 2-bag FTP is:

$$\text{StartFuel}_{75} = 7.5 \times \left[ \frac{1}{\text{Bag 1/2 FE}_{75}} - \frac{1}{\text{Bag 3/4 FE}_{75}} \right]$$

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

Bag X/Y $\text{FE}_{75}$ = fuel economy in miles per gallon of fuel during combined phases X and Y of the FTP test conducted at an ambient temperature of 75 °F.

Bag Y $\text{FE}_X$ = 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 City FE = fuel economy in miles per gallon over the city portion of the US06 test.

US06 Highway FE = fuel economy in miles per gallon over the highway portion of the US06 test.

(d) *City $CO_2$ emissions and carbon-related exhaust emissions.* For each vehicle tested, determine the 5-cycle city $CO_2$ emissions and carbon-related exhaust emissions using the following equation:

$$(1)\ \text{City CREE} = \frac{(\text{Start CREE} + \text{Running CREE})}{0.905}$$

Where:

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

$$\text{Start CREE}_X = 3.6 \times (\text{Bag 1 CREE}_X - \text{Bag 3 CREE}_X)$$

$$\text{Running CREE} = 0.82 \times \left[ (0.48 \times \text{Bag2CREE}_{75}) + (0.41 \times \text{Bag3CREE}_{75}) + (0.11 \times \text{US06 City CREE}) \right] +$$
$$0.18 \times \left[ (0.5 \times \text{Bag2CREE}_{20}) + (0.5 \times \text{Bag3CREE}_{20}) \right] +$$
$$0.133 \times 1.083 \times \left[ \text{SC03 CREE} - \left( (0.61 \times \text{Bag3CREE}_{75}) + (0.39 \times \text{Bag2CREE}_{75}) \right) \right]$$

(2) To determine the City $CO_2$ emissions, use the appropriate $CO_2$ grams/mile values instead of CREE values in the equations in this paragraph (d).

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

Bag Y $\text{CREE}_X$ = the carbon-related exhaust emissions in grams per mile during bag Y of the FTP test conducted at an ambient temperature X of 75 °F or 20 °F.

US06 City CREE = carbon-related exhaust emissions in grams per mile over the city portion of the US06 test.

SC03 CREE = carbon-related exhaust emissions in grams per mile over the SC03 test.

(e) *Highway $CO_2$ emissions and carbon-related exhaust emissions.* (1) For each vehicle tested, determine the 5-cycle highway carbon-related exhaust emissions using the following equation:

$$\text{Highway CREE} = \frac{(\text{Start CREE} + \text{Running CREE})}{0.905}$$

Where:

$$\text{Start CREE} = 0.33 \times \left( \frac{(0.76 \times \text{Start CREE}_{75}) + \begin{pmatrix} 0.24 \times \text{Start} \\ \text{CREE}_{20} \end{pmatrix}}{60} \right)$$

$$\text{Start CREE}_{X} = 3.6 \times (\text{Bag 1 CREE}_{X} - \text{Bag 3 CREE}_{X})$$

Running CREE =

$$1.007 \times [(0.79 \times \text{US06 Highway CREE}) + (0.21 \times \text{HFET CREE})] +$$
$$0.133 \times 0.377 \times [\text{SC03 CREE} - ((0.61 \times \text{Bag3CREE}_{75}) + (0.39 \times \text{Bag2CREE}_{75}))]$$

(2) If the condition specified in § 600.115–08(b)(2)(iii)(B) is met, in lieu of using the calculation in paragraph (e)(1) of this section, the manufacturer may optionally determine the highway carbon-related exhaust emissions 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 carbon-related exhaust emissions according to the following formula:

$$\text{Highway CREE} = \frac{(\text{Start CREE} + \text{Running CREE})}{0.905}$$

Where:

$$\text{StartCREE} = 0.33 \times \frac{((0.005515 \times \text{A}) + 1.13637 \times \text{StartCREE}_{75})}{60}$$

Start $\text{CREE}_{75}$ = 3.6 × (Bag $1\text{CREE}_{75}$ − Bag $3\text{CREE}_{75}$)

Running CREE = 1.007 × [(0.79 × US06 Highway CREE) + (0.21 × HFET CREE)] + [0.377 × 0.133 × ((0.00540 × A) + (0.1357 × US06 CREE))]

(3) To determine the Highway $CO_2$ emissions, use the appropriate $CO_2$

grams/mile values instead of CREE values in the equations in this paragraph (e).

(4) Terms used in the equations in this paragraph (e) are defined as follows:

A = 8,887 for gasoline-fueled vehicles, 10,180 for diesel-fueled vehicles, or an appropriate value specified by the Administrator for other fuels.

Bag Y $CREE_X$ = the carbon-related exhaust emissions in grams per mile during bag Y of the FTP test conducted at an ambient temperature X of 75 °F or 20 °F.

US06 Highway CREE = carbon-related exhaust emissions in grams per mile over the highway portion of the US06 test.

US06 CREE = carbon-related exhaust emissions in grams per mile over the US06 test.

HFET CREE = carbon-related exhaust emissions in grams per mile over the HFET test.

SC03 CREE = carbon-related exhaust emissions in grams per mile over the SC03 test.

(f) *$CO_2$ and carbon-related exhaust emissions 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:

(1) *Four-bag FTP equations.* If the 4-bag sampling method is used, manufacturers may use the equations in paragraphs (a) and (b) of this section to determine city and highway $CO_2$ and carbon-related exhaust emissions values. If this method is chosen, it must be used to determine both city and highway $CO_2$ emissions and carbon-related exhaust emissions. Optionally, the following calculations may be used, provided that they are used to determine both city and highway $CO_2$ and carbon-related exhaust emissions values:

(i) *City $CO_2$ emissions and carbon-related exhaust emissions.*

$$\text{City CREE} = \frac{(\text{Start CREE} + \text{Running CREE})}{0.905}$$

Where:

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

$$\text{Start CREE}_{75} = 3.6 \times (\text{Bag 1 CREE}_{75} - \text{Bag 3 CREE}_{75}) + 3.9 \times (\text{Bag 2 CREE}_{75} - \text{Bag 4 CREE}_{75})$$

$$\text{Start CREE}_{20} = 3.6 \times (\text{Bag 1 CREE}_{20} - \text{Bag 3 CREE}_{20})$$

$$\text{Running CREE} = 0.82 \times \left[ (0.48 \times \text{Bag4CREE}_{75}) + (0.41 \times \text{Bag3CREE}_{75}) + (0.11 \times \text{US06 City CREE}) \right] + 0.18 \times \left[ (0.5 \times \text{Bag2CREE}_{20}) + (0.5 \times \text{Bag3CREE}_{20}) \right] + 0.133 \times 1.083 \times \left[ \text{SC03 CREE} - ((0.61 \times \text{Bag3CREE}_{75}) + (0.39 \times \text{Bag4CREE}_{75})) \right]$$

(ii) *Highway $CO_2$ emissions and carbon-related exhaust emissions.*

$$\text{Highway CREE} = \frac{(\text{Start CREE} + \text{Running CREE})}{0.905}$$

Where:

$$\text{Start CREE} = 0.33 \times \left( \frac{(0.76 \times \text{Start CREE}_{75} + 0.24 \times \text{Start CREE}_{20})}{60} \right)$$

$$\text{Start CREE}_{75} = 3.6 \times (\text{Bag 1 CREE}_{75} - \text{Bag 3 CREE}_{75}) + 3.9 \times (\text{Bag 2 CREE}_{75} - \text{Bag 4 CREE}_{75})$$

$$\text{Start CREE}_{20} = 3.6 \times (\text{Bag1CREE}_{20} - \text{Bag3CREE}_{20})$$

$$\text{Running CREE} = 1.007 \times \left[ (0.79 \times \text{US06 Highway CREE}) + (0.21 \times \text{HFET CREE}) \right] + 0.133 \times 0.377 \times \left[ \text{SC03 CREE} - \left( (0.61 \times \text{Bag3CREE}_{75}) + (0.39 \times \text{Bag4CREE}_{75}) \right) \right]$$

(2) *Two-bag FTP equations.* If the 2-bag sampling method is used for the 75 °F FTP test, it must be used to determine both city and highway $CO_2$ emissions and carbon-related exhaust emissions. The following calculations must be used to determine both city and highway $CO_2$ emissions and carbon-related exhaust emissions:

(i) *City $CO_2$ emissions and carbon-related exhaust emissions.*

$$\text{City CREE} = \frac{(\text{Start CREE} + \text{Running CREE})}{0.905}$$

Where:

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

$$\text{Start CREE}_{75} = 7.5 \times (\text{Bag1/2 CREE}_{75} - \text{Bag3/4 CREE}_{75})$$

$$\text{StartCREE}_{20} = 3.6 \times (\text{Bag1CREE}_{20} - \text{Bag3CREE}_{20})$$

$$\text{RunningCREE} = 0.82 \times [(0.90 \times \text{Bag3/4CREE}_{75}) + (0.10 \times \text{US06CityCREE})] +$$
$$0.18 \times [(0.5 \times \text{Bag2CREE}_{20}) + (0.5 \times \text{Bag3CREE}_{20})] +$$
$$0.133 \times 1.083 \times [\text{SC03CREE} - (\text{Bag3/4CREE}_{75})]$$

(ii) *Highway $CO_2$ emissions and carbon-related exhaust emissions.*

$$\text{Highway CREE} = \frac{(\text{Start CREE} + \text{Running CREE})}{0.905}$$

Where:

$$\text{Start CREE} = 0.33 \times \left( \frac{(0.76 \times \text{Start CREE}_{75} + 0.24 \times \text{Start CREE}_{20})}{60} \right)$$

$$\text{Start CREE}_{75} = 7.5 \times (\text{Bag1/2 CREE}_{75} - \text{Bag3/4 CREE}_{75})$$

$$\text{Start CREE}_{20} = 3.6 \times (\text{Bag1CREE}_{20} - \text{Bag3CREE}_{20})$$

$$\text{Running CREE} = 1.007 \times [(0.79 \times \text{US06 Highway CREE}) + (0.21 \times \text{HFET CREE})] +$$
$$0.133 \times 0.377 \times [\text{SC03 CREE} - \text{Bag3/4}_{75}\text{CREE}]$$

(3) For hybrid electric vehicles using the modified 5-cycle highway calculation in paragraph (e)(2) of this section, the equation in paragraph (e)(2)(ii)(A) of this section applies except that the equation for Start $CREE_{75}$ will be replaced with one of the following:

(i) The equation for Start $CREE_{75}$ for hybrids tested according to the 4-bag FTP is:

Start $CREE_{75}$= 3.6 × (Bag 1 $CREE_{75}$ − Bag 3 $CREE_{75}$ + 3.9 × (Bag 2 $CREE_{75}$ − Bag 4 $CREE_{75}$)

(ii) The equation for Start $CREE_{75}$ for hybrids tested according to the 2-bag FTP is:

Start $CREE_{75}$= 7.5 × (Bag ½ $CREE_{75}$ − Bag ¾ $CREE_{75}$)

(4) To determine the City and Highway $CO_2$ emissions, use the appropriate $CO_2$ grams/mile values instead of CREE values in the equations in paragraphs (f)(1) through (3) of this section.

(5) Terms used in the equations in this paragraph (e) are defined as follows:

Bag Y $CREE_X$ = the carbon-related exhaust emissions in grams per mile during bag Y of the FTP test conducted at an ambient temperature X of 75 °F or 20 °F.US06 City CREE = carbon-related exhaust emissions in grams per mile over the City portion of the US06 test.

SC03 CREE = carbon-related exhaust emissions in grams per mile over the SC03 test.

US06 Highway CREE = carbon-related exhaust emissions in grams per mile over the Highway portion of the US06 test.

HFET CREE = carbon-related exhaust emissions in grams per mile over the HFET test.

Bag X/Y $CREE_{75}$ = carbon-related exhaust emissions in grams per mile of fuel during combined phases X and Y of the FTP test conducted at an ambient temperature of 75 °F.

[76 FR 39538, July 6, 2011, as amended at 76 FR 57379, Sept. 15, 2011]

## § 600.115–11 Criteria for determining the fuel economy label calculation method.

This section provides the criteria to determine if the derived 5-cycle method for determining fuel economy label values, as specified in § 600.210–08(a)(2) or (b)(2) or § 600.210–12(a)(2) or (b)(2), as applicable, may be used to determine label values. Separate criteria apply to city and highway fuel economy for each test group. The provisions of this section are optional. If this option is not chosen, or if the criteria provided in this section are not met, fuel economy label values must be determined according to the vehicle-specific 5-cycle method specified in § 600.210–08(a)(1) or (b)(1) or § 600.210–12(a)(1) or (b)(1), as applicable. However, dedicated alternative-fuel vehicles, dual fuel vehicles when operating on the alternative fuel, plug-in hybrid electric vehicles while operating in charge-depleting mode, MDPVs, and vehicles imported by Independent Commercial Importers may use the derived 5-cycle method for determining fuel economy label values whether or not the criteria provided in this section are met. Manufacturers may alternatively account for this effect by multiplying 2-cycle fuel economy values by 0.7 and dividing 2-cycle $CO_2$ emission values by 0.7.

(a) *City fuel economy criterion.* (1) For each test group certified for emission compliance under § 86.1848 of this chapter, the FTP, HFET, US06, SC03 and Cold FTP tests determined to be official under § 86.1835 of this chapter are used to calculate the vehicle-specific 5-cycle city fuel economy which is then compared to the derived 5-cycle city fuel economy, as follows:

(i) The vehicle-specific 5-cycle city fuel economy from the official FTP, HFET, US06, SC03 and Cold FTP tests for the test group is determined according to the provisions of § 600.114–08(a) or (c) or § 600.114–12(a) or (c) and rounded to the nearest one tenth of a mile per gallon.

(ii) Using the same FTP data as used in paragraph (a)(1)(i) of this section, the corresponding derived 5-cycle city fuel economy is calculated according to the following equation:

$$\text{Derived 5-cycle city fuel economy} = \frac{1}{\left(\{City\ Intercept\} + \frac{\{City\ Slope\}}{FTP\ FE}\right)}$$

Where:

City Intercept = Intercept determined by the Administrator. *See* §600.210–08(a)(2)(iii) or §600.210–12(a)(2)(iii).

City Slope = Slope determined by the Administrator. *See* §600.210–08(a)(2)(iii) or §600.210–12(a)(2)(ii).

FTP FE = the FTP-based city fuel economy from the official test used for certification compliance, determined under §600.113–08(a), rounded to the nearest tenth.

(2) The derived 5-cycle fuel economy value determined in paragraph (a)(1)(ii) of this section is multiplied by 0.96 and rounded to the nearest one tenth of a mile per gallon.

(3) If the vehicle-specific 5-cycle city fuel economy determined in paragraph (a)(1)(i) of this section is greater than or equal to the value determined in paragraph (a)(2) of this section, then the manufacturer may base the city fuel economy estimates for the model types covered by the test group on the derived 5-cycle method specified in §600.210–08(a)(2) or (b)(2) or §600.210–12(a)(2) or (b)(2), as applicable.

(b) *Highway fuel economy criterion.* The determination for highway fuel economy depends upon the outcome of the determination for city fuel economy in paragraph (a)(3) of this section for each test group.

(1) If the city determination for a test group made in paragraph (a)(3) of this section does not allow the use of the derived 5-cycle method, then the highway fuel economy values for all model types represented by the test group are likewise not allowed to be determined using the derived 5-cycle method, and must be determined according to the vehicle-specific 5-cycle method specified in §600.210–08(a)(1) or (b)(1) or §600.210–12(a)(1) or (b)(1), as applicable.

(2) If the city determination made in paragraph (a)(3) of this section allows the use of the derived 5-cycle method, a separate determination is made for the highway fuel economy labeling method as follows:

(i) For each test group certified for emission compliance under §86.1848 of this chapter, the FTP, HFET, US06, SC03 and Cold FTP tests determined to be official under §86.1835 of this chapter are used to calculate the vehicle-specific 5-cycle highway fuel economy, which is then compared to the derived 5-cycle highway fuel economy, as follows:

(A) The vehicle-specific 5-cycle highway fuel economy from the official FTP, HFET, US06, SC03 and Cold FTP tests for the test group is determined according to the provisions of §600.114–08(b)(1) or §600.114–12(b)(1) and rounded to the nearest one tenth of a mile per gallon.

(B) Using the same HFET data as used in paragraph (b)(2)(i)(A) of this section, the corresponding derived 5-cycle highway fuel economy is calculated using the following equation:

$$\text{Derived 5-cycle highway fuel economy} = \frac{1}{\left(\{\text{Highway Intercept}\} + \frac{\{\text{Highway Slope}\}}{\text{HFET FE}}\right)}$$

Where:

Highway Intercept = Intercept determined by the Administrator. See §600.210–08(a)(2)(iii) or §600.210–12(a)(2)(iii).

Highway Slope = Slope determined by the Administrator. See §600.210–08(a)(2)(iii) or §600.210–12(a)(2)(iii).

HFET FE = the HFET-based highway fuel economy determined under § 600.113–08(b), rounded to the nearest tenth.

(ii) The derived 5-cycle highway fuel economy calculated in paragraph (b)(2)(i)(B) of this section is multiplied by 0.95 and rounded to the nearest one tenth of a mile per gallon.

(iii) (A) If the vehicle-specific 5-cycle highway fuel economy of the vehicle tested in paragraph (b)(2)(i)(A) of this section is greater than or equal to the value determined in paragraph (b)(2)(ii) of this section, then the manufacturer may base the highway fuel economy estimates for the model types covered by the test group on the derived 5-cycle method specified in § 600.210–08(a)(2) or (b)(2) or § 600.210–12(a)(2) or (b)(2), as applicable.

(B) If the vehicle-specific 5-cycle highway fuel economy determined in paragraph (b)(2)(i)(A) of this section is less than the value determined in paragraph (b)(2)(ii) of this section, the manufacturer may determine the highway fuel economy for the model types covered by the test group on the modified 5-cycle equation specified in § 600.114–08(b)(2) or § 600.114–12(b)(2).

(c) The manufacturer will apply the criteria in paragraph (a) and (b) of this section to every test group for each model year.

(d) The tests used to make the evaluations in paragraphs (a) and (b) of this section will be the procedures for official test determinations under § 86.1835. Adjustments and/or substitutions to the official test data may be made with advance approval of the Administrator.

[76 FR 39547, July 6, 2011, as amended at 76 FR 57380, Sept. 15, 2011]

### § 600.116–12 Special procedures related to electric vehicles and plug-in hybrid electric vehicles.

(a) Determine fuel economy label values for electric vehicles as specified in §§ 600.210 and 600.311 using the procedures of SAE J1634 (incorporated by reference in § 600.011), with the following clarifications and modifications:

(1) Use one of the following approaches to define end-of-test criteria for vehicles whose maximum speed is less than the maximum speed specified in the driving schedule, where the vehicle's maximum speed is determined, to the nearest 0.1 mph, from observing the highest speed over the first duty cycle (FTP, HFET, etc.):

(i) If the vehicle can follow the driving schedule within the speed tolerances specified in § 86.115 of this chapter up to its maximum speed, the end-of-test criterion is based on the point at which the vehicle can no longer meet the specified speed tolerances up to and including its maximum speed.

(ii) If the vehicle cannot follow the driving schedule within the speed tolerances specified in § 86.115 of this chapter up to its maximum speed, the end-of-test criterion is based on the following procedure:

(A) Measure and record the vehicle's speed (to the nearest 0.1 mph) while making a best effort to follow the specified driving schedule.

(B) This recorded sequence of driving speeds becomes the driving schedule for the test vehicle. Apply the end-of-test criterion based on the point at which the vehicle can no longer meet the specified speed tolerances over this new driving schedule. The driving to establish the new driving schedule may be done separately, or as part of the measurement procedure.

(2) Soak time between repeat duty cycles (four-bag FTP, HFET, etc.) may be up to 30 minutes. No recharging may occur during the soak time.

(3) Recharging the vehicle's battery must start within three hours after the end of testing.

(4) Do not apply the C coefficient adjustment specified in Section 4.4.2.

(5) We may approve alternate measurement procedures with respect to electric vehicles if they are necessary or appropriate for meeting the objectives of this part.

(6) All label values related to fuel economy, energy consumption, and range must be based on 5-cycle testing or on values adjusted to be equivalent to 5-cycle results.

(b) Determine performance values for plug-in hybrid electric vehicles as specified in §§ 600.210 and 600.311 using the procedures of SAE J1711 (incorporated by reference in § 600.011), with the following clarifications and modifications:

(1) To determine fuel economy and CREE values to demonstrate compliance with CAFE and GHG standards, calculate composite values representing combined operation during charge-deplete and charge-sustain operation using the following utility factors except as specified in this paragraph (b):

TABLE 1 OF § 600.116–12—FLEET UTILITY FACTORS FOR URBAN "CITY" DRIVING

| Schedule range for UDDS phases, miles | Cumulative UF | Sequential UF |
|---|---|---|
| 3.59 | 0.125 | 0.125 |
| 7.45 | 0.243 | 0.117 |
| 11.04 | 0.338 | 0.095 |
| 14.90 | 0.426 | 0.088 |
| 18.49 | 0.497 | 0.071 |
| 22.35 | 0.563 | 0.066 |
| 25.94 | 0.616 | 0.053 |
| 29.80 | 0.666 | 0.049 |
| 33.39 | 0.705 | 0.040 |
| 37.25 | 0.742 | 0.037 |
| 40.84 | 0.772 | 0.030 |
| 44.70 | 0.800 | 0.028 |
| 48.29 | 0.822 | 0.022 |
| 52.15 | 0.843 | 0.021 |
| 55.74 | 0.859 | 0.017 |
| 59.60 | 0.875 | 0.016 |
| 63.19 | 0.888 | 0.013 |

TABLE 1 OF § 600.116–12—FLEET UTILITY FACTORS FOR URBAN "CITY" DRIVING—Continued

| Schedule range for UDDS phases, miles | Cumulative UF | Sequential UF |
|---|---|---|
| 67.05 | 0.900 | 0.012 |
| 70.64 | 0.909 | 0.010 |

TABLE 2 OF § 600.116–12—FLEET UTILITY FACTORS FOR HIGHWAY DRIVING

| Schedule range for HFET, miles | Cumulative UF | Sequential UF |
|---|---|---|
| 10.3 | 0.123 | 0.123 |
| 20.6 | 0.240 | 0.117 |
| 30.9 | 0.345 | 0.105 |
| 41.2 | 0.437 | 0.092 |
| 51.5 | 0.516 | 0.079 |
| 61.8 | 0.583 | 0.067 |
| 72.1 | 0.639 | 0.056 |

(2) To determine fuel economy and $CO_2$ emission values for labeling purposes, calculate composite values representing combined operation during charge-deplete and charge-sustain operation using the following utility factors except as specified in this paragraph (b):

TABLE 3 OF § 600.116–12—MULTI-DAY INDIVIDUAL UTILITY FACTORS FOR URBAN "CITY" DRIVING

| Schedule range for UDDS phases, miles | Equivalent 5-cycle distance, miles | Cumulative UF | Sequential UF |
|---|---|---|---|
| 3.59 | 2.51 | 0.08 | 0.08 |
| 7.45 | 5.22 | 0.15 | 0.08 |
| 11.04 | 7.73 | 0.22 | 0.06 |
| 14.90 | 10.43 | 0.28 | 0.06 |
| 18.49 | 12.94 | 0.33 | 0.05 |
| 22.35 | 15.65 | 0.38 | 0.05 |
| 25.94 | 18.16 | 0.43 | 0.04 |
| 29.80 | 20.86 | 0.47 | 0.04 |
| 33.39 | 23.37 | 0.50 | 0.04 |
| 37.25 | 26.08 | 0.54 | 0.04 |
| 40.84 | 28.59 | 0.57 | 0.03 |
| 44.70 | 31.29 | 0.60 | 0.03 |
| 48.29 | 33.80 | 0.62 | 0.02 |
| 52.15 | 36.51 | 0.65 | 0.02 |
| 55.74 | 39.02 | 0.67 | 0.02 |
| 59.60 | 41.72 | 0.69 | 0.02 |
| 63.19 | 44.23 | 0.71 | 0.02 |
| 67.05 | 46.94 | 0.72 | 0.02 |
| 70.64 | 49.45 | 0.74 | 0.01 |
| 74.50 | 52.15 | 0.75 | 0.01 |
| 78.09 | 54.66 | 0.78 | 0.03 |
| 81.95 | 57.37 | 0.79 | 0.01 |
| 85.54 | 59.88 | 0.80 | 0.01 |
| 89.40 | 62.58 | 0.81 | 0.01 |
| 92.99 | 65.09 | 0.82 | 0.01 |

TABLE 4 OF § 600.116–12—MULTI-DAY INDIVIDUAL UTILITY FACTORS FOR HIGHWAY DRIVING

| Schedule range for HFET phases, miles | Equivalent 5-cycle distance, miles | Cumulative UF | Sequential UF |
|---|---|---|---|
| 10.30 | 7.21 | 0.21 | 0.21 |

TABLE 4 OF § 600.116–12—MULTI-DAY INDIVIDUAL UTILITY FACTORS FOR HIGHWAY DRIVING—Continued

| Schedule range for HFET phases, miles | Equivalent 5-cycle distance, miles | Cumulative UF | Sequential UF |
|---|---|---|---|
| 20.60 | 14.42 | 0.36 | 0.16 |
| 30.90 | 21.63 | 0.48 | 0.12 |
| 41.20 | 28.84 | 0.57 | 0.09 |
| 51.50 | 36.05 | 0.64 | 0.07 |
| 61.80 | 43.26 | 0.70 | 0.06 |
| 72.10 | 50.47 | 0.75 | 0.04 |
| 82.40 | 57.68 | 0.78 | 0.04 |
| 92.70 | 64.89 | 0.81 | 0.03 |
| 103.00 | 72.10 | 0.83 | 0.02 |
| 113.30 | 79.31 | 0.85 | 0.02 |

(3) You may calculate performance values under paragraphs (b)(1) and (2) of this section by combining phases during FTP testing. For example, you may treat the first 7.45 miles as a single phase by adding the individual utility factors for that portion of driving and assigning emission levels to the combined phase. Do this consistently throughout a test run.

(4) Instead of the utility factors specified in paragraphs (b)(1) and (2) of this section, calculate utility factors using the following equation for vehicles whose maximum speed is less than the maximum speed specified in the driving schedule, where the vehicle's maximum speed is determined, to the nearest 0.1 mph, from observing the highest speed over the first duty cycle (FTP, HFET, etc.):

$$UF_i = 1 - \left[ \exp\left( -\sum_{j=1}^{k} \left( \left( \frac{d_i}{ND} \right)^j \times C_j \right) \right) \right] - \sum_{i=1}^{n} UF_{i-1}$$

Where:

$UF_i$ = the utility factor for phase $i$. Let $UF_0 = 0$.

$j$ = a counter to identify the appropriate term in the summation (with terms numbered consecutively).

$k$ = the number of terms in the equation (see Table 3 of this section).

$d_i$ = the distance driven in phase $i$.

$ND$ = the normalized distance. Use 399 for both FTP and HFET operation.

$C_j$ = the coefficient for term $j$ from the following table:

TABLE 5 OF § 600.116–12—CITY/HIGHWAY SPECIFIC UTILITY FACTOR COEFFICIENTS

| Coefficient | Fleet values for CAFE and GHG values | | Multi-day individual value for labeling |
|---|---|---|---|
| | City | Highway | City or highway |
| 1 | 14.86 | 4.8 | 13.1 |
| 2 | 2.965 | 13 | −18.7 |
| 3 | −84.05 | −65 | 5.22 |

TABLE 5 OF § 600.116–12—CITY/HIGHWAY SPECIFIC UTILITY FACTOR COEFFICIENTS—Continued

| Coefficient | Fleet values for CAFE and GHG values | | Multi-day individual value for labeling |
|---|---|---|---|
| | City | Highway | City or highway |
| 4 | 153.7 | 120 | 8.15 |
| 5 | −43.59 | −100.00 | 3.53 |
| 6 | −96.94 | 31.00 | −1.34 |
| 7 | 14.47 | ..... | −4.01 |
| 8 | 91.70 | ..... | −3.90 |
| 9 | −46.36 | ..... | −1.15 |
| 10 | ..... | ..... | 3.88 |

$n$ = the number of test phases (or bag measurements) before the vehicle reaches the end-of-test criterion.

(5) The end-of-test criterion is based on a 1 percent Net Energy Change as

specified in Section 3.8. The Administrator may approve alternate Net Energy Change tolerances as specified in Section 3.9.1 or Appendix C if the 1 percent threshold is insufficient or inappropriate for marking the end of charge-deplete operation.

(6) Use the vehicle's Actual Charge-Depleting Range, $R_{cda}$, as specified in Section 6.1.3 for evaluating the end-of-test criterion.

(7) Measure and record AC watt-hours throughout the recharging procedure. Position the measurement appropriately to account for any losses in the charging system.

(8) We may approve alternate measurement procedures with respect to plug-in hybrid electric vehicles if they are necessary or appropriate for meeting the objectives of this part.

[76 FR 39548, July 6, 2011, as amended at 76 FR 57380, Sept. 15, 2011]

## Subpart C—Procedures for Calculating Fuel Economy and Carbon-Related Exhaust Emission Values

### § 600.206–08 Calculation and use of FTP-based and HFET-based fuel economy values for vehicle configurations.

(a) Fuel economy values determined for each vehicle under § 600.113(a) and (b) and as approved in § 600.008–08 (c), are used to determine FTP-based city, HFET-based highway, and combined FTP/Highway-based fuel economy values for each vehicle configuration for which data are available.

(1) If only one set of FTP-based city and HFET-based highway fuel economy values is accepted for a vehicle configuration, these values, rounded to the nearest tenth of a mile per gallon, comprise the city and highway fuel economy values for that configuration.

(2) If more than one set of FTP-based city and HFET-based highway fuel economy values are accepted for a vehicle configuration:

(i) All data shall be grouped according to the subconfiguration for which the data were generated using sales projections supplied in accordance with § 600.208(a)(3).

(ii) Within each group of data, all values are harmonically averaged and rounded to the nearest 0.0001 of a mile per gallon in order to determine FTP-based city and HFET-based highway fuel economy values for each subconfiguration at which the vehicle configuration was tested.

(iii) All FTP-based city fuel economy values and all HFET-based highway fuel economy values calculated in paragraph (a)(2)(ii) of this section are (separately for city and highway) averaged in proportion to the sales fraction (rounded to the nearest 0.0001) within the vehicle configuration (as provided to the Administrator by the manufacturer) of vehicles of each tested subconfiguration. The resultant values, rounded to the nearest 0.0001 mile per gallon, are the FTP-based city and HFET-based highway fuel economy values for the vehicle configuration.

(3) For the purpose of determining average fuel economy under § 600.510–08, the combined fuel economy value for a vehicle configuration is calculated by harmonically averaging the FTP-based city and HFET-based highway fuel economy values, as determined in § 600.206(a)(1) or (2) of this section, weighted 0.55 and 0.45 respectively, and rounded to the nearest 0.0001 mile per gallon. A sample of this calculation appears in appendix II of this part.

(4) For alcohol dual fuel automobiles and natural gas dual fuel automobiles the procedures of paragraphs (a)(1) or (2) of this section, as applicable, shall be used to calculate two separate sets of FTP-based city, HFET-based highway, and combined fuel economy values for each configuration.

(i) Calculate the city, highway, and combined fuel economy values from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the city, highway, and combined fuel economy values from the tests performed using alcohol or natural gas test fuel.

(b) If only one equivalent petroleum-based fuel economy value exists for an electric configuration, that value, rounded to the nearest tenth of a mile per gallon, will comprise the petroleum-based fuel economy for that configuration.

(c) If more than one equivalent petroleum-based fuel economy value exists for an electric vehicle configuration,

all values for that vehicle configuration are harmonically averaged and rounded to the nearest 0.0001 mile per gallon for that configuration.

[71 FR 77944, Dec. 27, 2006]

### § 600.206–12 Calculation and use of FTP-based and HFET-based fuel economy, $CO_2$ emissions, and carbon-related exhaust emission values for vehicle configurations.

(a) Fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions values determined for each vehicle under § 600.113–08(a) and (b) and as approved in § 600.008 (c), are used to determine FTP-based city, HFET-based highway, and combined FTP/Highway-based fuel economy, $CO_2$ emissions, and carbon-related exhaust emission values for each vehicle configuration for which data are available. Note that fuel economy for some alternative fuel vehicles may mean miles per gasoline gallon equivalent and/or miles per unit of fuel consumed. For example, electric vehicles will determine miles per kilowatt-hour in addition to miles per gasoline gallon equivalent, and fuel cell vehicles will determine miles per kilogram of hydrogen.

(1) If only one set of FTP-based city and HFET-based highway fuel economy values is accepted for a vehicle configuration, these values, rounded to the nearest tenth of a mile per gallon, comprise the city and highway fuel economy values for that configuration. If only one set of FTP-based city and HFET-based highway $CO_2$ emissions and carbon-related exhaust emission values is accepted for a vehicle configuration, these values, rounded to the nearest gram per mile, comprise the city and highway $CO_2$ emissions and carbon-related exhaust emission values for that configuration.

(2) If more than one set of FTP-based city and HFET-based highway fuel economy and/or carbon-related exhaust emission values are accepted for a vehicle configuration:

(i) All data shall be grouped according to the subconfiguration for which the data were generated using sales projections supplied in accordance with § 600.208–12(a)(3).

(ii) Within each group of data, all fuel economy values are harmonically averaged and rounded to the nearest 0.0001 of a mile per gallon and all $CO_2$ emissions and carbon-related exhaust emission values are arithmetically averaged and rounded to the nearest tenth of a gram per mile in order to determine FTP-based city and HFET-based highway fuel economy, $CO_2$ emissions, and carbon-related exhaust emission values for each subconfiguration at which the vehicle configuration was tested.

(iii) All FTP-based city fuel economy, $CO_2$ emissions, and carbon-related exhaust emission values and all HFET-based highway fuel economy and carbon-related exhaust emission values calculated in paragraph (a)(2)(ii) of this section are (separately for city and highway) averaged in proportion to the sales fraction (rounded to the nearest 0.0001) within the vehicle configuration (as provided to the Administrator by the manufacturer) of vehicles of each tested subconfiguration. Fuel economy values shall be harmonically averaged, and $CO_2$ emissions and carbon-related exhaust emission values shall be arithmetically averaged. The resultant fuel economy values, rounded to the nearest 0.0001 mile per gallon, are the FTP-based city and HFET-based highway fuel economy values for the vehicle configuration. The resultant $CO_2$ emissions and carbon-related exhaust emission values, rounded to the nearest tenth of a gram per mile, are the FTP-based city and HFET-based highway $CO_2$ emissions and carbon-related exhaust emission values for the vehicle configuration.

(3)(i) For the purpose of determining average fuel economy under § 600.510, the combined fuel economy value for a vehicle configuration is calculated by harmonically averaging the FTP-based city and HFET-based highway fuel economy values, as determined in paragraph (a)(1) or (2) of this section, weighted 0.55 and 0.45 respectively, and rounded to the nearest 0.0001 mile per gallon. A sample of this calculation appears in Appendix II of this part.

(ii) For the purpose of determining average carbon-related exhaust emissions under § 600.510, the combined carbon-related exhaust emission value for a vehicle configuration is calculated by arithmetically averaging the FTP-

based city and HFET-based highway carbon-related exhaust emission values, as determined in paragraph (a)(1) or (2) of this section, weighted 0.55 and 0.45 respectively, and rounded to the nearest tenth of gram per mile.

(4) For alcohol dual fuel automobiles and natural gas dual fuel automobiles the procedures of paragraphs (a)(1) or (2) of this section, as applicable, shall be used to calculate two separate sets of FTP-based city, HFET-based highway, and combined values for fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions for each configuration.

(i) Calculate the city, highway, and combined fuel economy, $CO_2$ emissions, and carbon-related exhaust emission values from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the city, highway, and combined fuel economy, $CO_2$ emissions, and carbon-related exhaust emission values from the tests performed using alcohol or natural gas test fuel.

(b) If only one equivalent petroleum-based fuel economy value exists for an electric vehicle configuration, that value, rounded to the nearest tenth of a mile per gallon, will comprise the petroleum-based fuel economy for that configuration.

(c) If more than one equivalent petroleum-based fuel economy value exists for an electric vehicle configuration, all values for that vehicle configuration are harmonically averaged and rounded to the nearest 0.0001 mile per gallon for that configuration.

[76 FR 39551, July 6, 2011]

### § 600.207–08 Calculation and use of vehicle-specific 5-cycle-based fuel economy values for vehicle configurations.

(a) Fuel economy values determined for each vehicle under § 600.114–08 and as approved in § 600.008–08 (c), are used to determine vehicle-specific 5-cycle city and highway fuel economy values for each vehicle configuration for which data are available.

(1) If only one set of 5-cycle city and highway fuel economy values is accepted for a vehicle configuration, these values, rounded to the nearest tenth of a mile per gallon, comprise the city and highway fuel economy values for that configuration.

(2) If more than one set of 5-cycle city and highway fuel economy values are accepted for a vehicle configuration:

(i) All data shall be grouped according to the subconfiguration for which the data were generated using sales projections supplied in accordance with § 600.209(a)(3).

(ii) Within each subconfiguration of data, all values are harmonically averaged and rounded to the nearest 0.0001 of a mile per gallon in order to determine 5-cycle city and highway fuel economy values for each subconfiguration at which the vehicle configuration was tested.

(iii) All 5-cycle city fuel economy values and all 5-cycle highway fuel economy values calculated in paragraph (a)(2)(ii) of this section are (separately for city and highway) averaged in proportion to the sales fraction (rounded to the nearest 0.0001) within the vehicle configuration (as provided to the Administrator by the manufacturer) of vehicles of each tested subconfiguration. The resultant values, rounded to the nearest 0.0001 mile per gallon, are the 5-cycle city and 5-cycle highway fuel economy values for the vehicle configuration.

(3) [Reserved]

(4) For alcohol dual fuel automobiles and natural gas dual fuel automobiles the procedures of paragraphs (a)(1) and (2) of this section shall be used to calculate two separate sets of 5-cycle city, highway fuel economy values for each configuration.

(i) Calculate the 5-cycle city and highway fuel economy values from the tests performed using gasoline or diesel test fuel.

(ii)(A) Calculate the 5-cycle city and highway fuel economy values from the tests performed using alcohol or natural gas test fuel, if 5-cycle testing has been performed. Otherwise, the procedure in § 600.210(a)(3) or (b)(3) applies.

(b) If only one equivalent petroleum-based fuel economy value exists for an electric configuration, that value, rounded to the nearest tenth of a mile per gallon, will comprise the petroleum-based 5-cycle fuel economy for that configuration.

(c) If more than one equivalent petroleum-based 5-cycle fuel economy value exists for an electric vehicle configuration, all values for that vehicle configuration are harmonically averaged and rounded to the nearest 0.0001 mile per gallon for that configuration.

[71 FR 77944, Dec. 27, 2006]

**§ 600.207–12 Calculation and use of vehicle-specific 5-cycle-based fuel economy and $CO_2$ emission values for vehicle configurations.**

(a) Fuel economy and $CO_2$ emission values determined for each vehicle under § 600.114 and as approved in § 600.008(c), are used to determine vehicle-specific 5-cycle city and highway fuel economy and $CO_2$ emission values for each vehicle configuration for which data are available.

(1) If only one set of 5-cycle city and highway fuel economy and $CO_2$ emission values is accepted for a vehicle configuration, these values, where fuel economy is rounded to the nearest 0.0001 of a mile per gallon and the $CO_2$ emission value in grams per mile is rounded to the nearest tenth of a gram per mile, comprise the city and highway fuel economy and $CO_2$ emission values for that configuration.

(2) If more than one set of 5-cycle city and highway fuel economy and $CO_2$ emission values are accepted for a vehicle configuration:

(i) All data shall be grouped according to the subconfiguration for which the data were generated using sales projections supplied in accordance with § 600.209–12(a)(3).

(ii) Within each subconfiguration of data, all fuel economy values are harmonically averaged and rounded to the nearest 0.0001 of a mile per gallon in order to determine 5-cycle city and highway fuel economy values for each subconfiguration at which the vehicle configuration was tested, and all $CO_2$ emissions values are arithmetically averaged and rounded to the nearest tenth of gram per mile to determine 5-cycle city and highway $CO_2$ emission values for each subconfiguration at which the vehicle configuration was tested.

(iii) All 5-cycle city fuel economy values and all 5-cycle highway fuel economy values calculated in paragraph (a)(2)(ii) of this section are (separately for city and highway) averaged in proportion to the sales fraction (rounded to the nearest 0.0001) within the vehicle configuration (as provided to the Administrator by the manufacturer) of vehicles of each tested subconfiguration. The resultant values, rounded to the nearest 0.0001 mile per gallon, are the 5-cycle city and 5-cycle highway fuel economy values for the vehicle configuration.

(iv) All 5-cycle city $CO_2$ emission values and all 5-cycle highway $CO_2$ emission values calculated in paragraph (a)(2)(ii) of this section are (separately for city and highway) averaged in proportion to the sales fraction (rounded to the nearest 0.0001) within the vehicle configuration (as provided to the Administrator by the manufacturer) of vehicles of each tested subconfiguration. The resultant values, rounded to the nearest 0.1 grams per mile, are the 5-cycle city and 5-cycle highway $CO_2$ emission values for the vehicle configuration.

(3) [Reserved]

(4) For alcohol dual fuel automobiles and natural gas dual fuel automobiles the procedures of paragraphs (a)(1) and (2) of this section shall be used to calculate two separate sets of 5-cycle city and highway fuel economy and $CO_2$ emission values for each configuration.

(i) Calculate the 5-cycle city and highway fuel economy and $CO_2$ emission values from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the 5-cycle city and highway fuel economy and $CO_2$ emission values from the tests performed using alcohol or natural gas test fuel, if 5-cycle testing has been performed. Otherwise, the procedure in § 600.210–12(a)(3) or (b)(3) applies.

(b) If only one equivalent petroleum-based fuel economy value exists for an electric configuration, that value, rounded to the nearest tenth of a mile per gallon, will comprise the petroleum-based 5-cycle fuel economy for that configuration.

(c) If more than one equivalent petroleum-based 5-cycle fuel economy value exists for an electric vehicle configuration, all values for that vehicle configuration are harmonically averaged

and rounded to the nearest 0.0001 mile per gallon for that configuration.

[76 FR 39551, July 6, 2011]

### § 600.208–08 Calculation of FTP-based and HFET-based fuel economy values for a model type.

(a) Fuel economy values for a base level are calculated from vehicle configuration fuel economy values as determined in § 600.206–08(a), (b), or (c) as applicable, for low-altitude tests.

(1) If the Administrator determines that automobiles intended for sale in the State of California are likely to exhibit significant differences in fuel economy from those intended for sale in other states, he will calculate fuel economy values for each base level for vehicles intended for sale in California and for each base level for vehicles intended for sale in the rest of the states.

(2) In order to highlight the fuel efficiency of certain designs otherwise included within a model type, a manufacturer may wish to subdivide a model type into one or more additional model types. This is accomplished by separating subconfigurations from an existing base level and placing them into a new base level. The new base level is identical to the existing base level except that it shall be considered, for the purposes of this paragraph, as containing a new basic engine. The manufacturer will be permitted to designate such new basic engines and base level(s) if:

(i) Each additional model type resulting from division of another model type has a unique car line name and that name appears on the label and on the vehicle bearing that label;

(ii) The subconfigurations included in the new base levels are not included in any other base level which differs only by basic engine (*i.e.*, they are not included in the calculation of the original base level fuel economy values); and

(iii) All subconfigurations within the new base level are represented by test data in accordance with § 600.010–08(c)(1)(ii).

(3) The manufacturer shall supply total model year sales projections for each car line/vehicle subconfiguration combination.

(i) Sales projections must be supplied separately for each car line-vehicle subconfiguration intended for sale in California and each car line/vehicle subconfiguration intended for sale in the rest of the states if required by the Administrator under paragraph (a)(1) of this section.

(ii) Manufacturers shall update sales projections at the time any model type value is calculated for a label value.

(iii) The provisions of paragraph (a)(3) of this section may be satisfied by providing an amended application for certification, as described in § 86.1844–01.

(4) Vehicle configuration fuel economy values, as determined in § 600.206–08 (a), (b) or (c), as applicable, are grouped according to base level.

(i) If only one vehicle configuration within a base level has been tested, the fuel economy value from that vehicle configuration constitutes the fuel economy for that base level.

(ii) If more than one vehicle configuration within a base level has been tested, the vehicle configuration fuel economy values are harmonically averaged in proportion to the respective sales fraction (rounded to the nearest 0.0001) of each vehicle configuration and the resultant fuel economy value rounded to the nearest 0.0001 mile per gallon.

(5) The procedure specified in paragraph (a)(1) through (4) of this section will be repeated for each base level, thus establishing city, highway, and combined fuel economy values for each base level.

(6) For the purposes of calculating a base level fuel economy value, if the only vehicle configuration(s) within the base level are vehicle configuration(s) which are intended for sale at high altitude, the Administrator may use fuel economy data from tests conducted on these vehicle configuration(s) at high altitude to calculate the fuel economy for the base level.

(7) For alcohol dual fuel automobiles and natural gas dual fuel automobiles, the procedures of paragraphs (a)(1) through (6) of this section shall be used to calculate two separate sets of city, highway, and combined fuel economy values for each base level.

(i) Calculate the city, highway, and combined fuel economy values from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the city, highway, and combined fuel economy values from the tests performed using alcohol or natural gas test fuel.

(b) For each model type, as determined by the Administrator, a city, highway, and combined fuel economy value will be calculated by using the projected sales and fuel economy values for each base level within the model type. Separate model type calculations will be done based on the vehicle configuration fuel economy values as determined in § 600.206–08 (a), (b) or (c), as applicable.

(1) If the Administrator determines that automobiles intended for sale in the State of California are likely to exhibit significant differences in fuel economy from those intended for sale in other states, he will calculate fuel economy values for each model type for vehicles intended for sale in California and for each model type for vehicles intended for sale in the rest of the states.

(2) The sales fraction for each base level is calculated by dividing the projected sales of the base level within the model type by the projected sales of the model type and rounding the quotient to the nearest 0.0001.

(3) The FTP-based city fuel economy values of the model type (calculated to the nearest 0.0001 mpg) are determined by dividing one by a sum of terms, each of which corresponds to a base level and which is a fraction determined by dividing:

(i) The sales fraction of a base level; by

(ii) The FTP-based city fuel economy value for the respective base level.

(4) The procedure specified in paragraph (b)(3) of this section is repeated in an analogous manner to determine the highway and combined fuel economy values for the model type.

(5) For alcohol dual fuel automobiles and natural gas dual fuel automobiles, the procedures of paragraphs (b)(1) through (4) of this section shall be used to calculate two separate sets of city, highway, and combined fuel economy values for each model type.

(i) Calculate the city, highway, and combined fuel economy values from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the city, highway, and combined fuel economy values from the tests performed using alcohol or natural gas test fuel.

[71 FR 77945, Dec. 27, 2006]

### § 600.208–12 Calculation of FTP-based and HFET-based fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions for a model type.

(a) Fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions for a base level are calculated from vehicle configuration fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions as determined in § 600.206–12(a), (b), or (c) as applicable, for low-altitude tests.

(1) If the Administrator determines that automobiles intended for sale in the State of California and in section 177 states are likely to exhibit significant differences in fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions from those intended for sale in other states, she will calculate fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions for each base level for vehicles intended for sale in California and in section 177 states and for each base level for vehicles intended for sale in the rest of the states.

(2) In order to highlight the fuel efficiency, $CO_2$ emissions, and carbon-related exhaust emissions of certain designs otherwise included within a model type, a manufacturer may wish to subdivide a model type into one or more additional model types. This is accomplished by separating subconfigurations from an existing base level and placing them into a new base level. The new base level is identical to the existing base level except that it shall be considered, for the purposes of this paragraph, as containing a new basic engine. The manufacturer will be permitted to designate such new basic engines and base level(s) if:

(i) Each additional model type resulting from division of another model type has a unique car line name and that name appears on the label and on the vehicle bearing that label;

(ii) The subconfigurations included in the new base levels are not included in any other base level which differs only by basic engine (*i.e.*, they are not included in the calculation of the original base level fuel economy values); and

(iii) All subconfigurations within the new base level are represented by test data in accordance with § 600.010(c)(1)(ii).

(3) The manufacturer shall supply total model year sales projections for each car line/vehicle subconfiguration combination.

(i) Sales projections must be supplied separately for each car line-vehicle subconfiguration intended for sale in California and each car line/vehicle subconfiguration intended for sale in the rest of the states if required by the Administrator under paragraph (a)(1) of this section.

(ii) Manufacturers shall update sales projections at the time any model type value is calculated for a label value.

(iii) The provisions of paragraph (a)(3) of this section may be satisfied by providing an amended application for certification, as described in § 86.1844 of this chapter.

(4) Vehicle configuration fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions, as determined in § 600.206–12(a), (b) or (c), as applicable, are grouped according to base level.

(i) If only one vehicle configuration within a base level has been tested, the fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions from that vehicle configuration will constitute the fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions for that base level.

(ii) If more than one vehicle configuration within a base level has been tested, the vehicle configuration fuel economy values are harmonically averaged in proportion to the respective sales fraction (rounded to the nearest 0.0001) of each vehicle configuration and the resultant fuel economy value rounded to the nearest 0.0001 mile per gallon; and the vehicle configuration $CO_2$ emissions and carbon-related exhaust emissions are arithmetically averaged in proportion to the respective sales fraction (rounded to the nearest 0.0001) of each vehicle configuration and the resultant carbon-related exhaust emission value rounded to the nearest tenth of a gram per mile.

(5) The procedure specified in paragraph (a)(1) through (4) of this section will be repeated for each base level, thus establishing city, highway, and combined fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions for each base level.

(6) [Reserved]

(7) For alcohol dual fuel automobiles and natural gas dual fuel automobiles, the procedures of paragraphs (a)(1) through (6) of this section shall be used to calculate two separate sets of city, highway, and combined fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions for each base level.

(i) Calculate the city, highway, and combined fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the city, highway, and combined fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions from the tests performed using alcohol or natural gas test fuel.

(b) For each model type, as determined by the Administrator, a city, highway, and combined fuel economy value, $CO_2$ emission value, and a carbon-related exhaust emission value will be calculated by using the projected sales and values for fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions for each base level within the model type. Separate model type calculations will be done based on the vehicle configuration fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions as determined in § 600.206–12(a), (b) or (c), as applicable.

(1) If the Administrator determines that automobiles intended for sale in the State of California and in section 177 states are likely to exhibit significant differences in fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions from those intended for sale in other states, he or she will calculate values for fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions for each model type for vehicles intended for sale in California and in section 177 states and for each model type for vehicles intended for sale in the rest of the states.

(2) The sales fraction for each base level is calculated by dividing the projected sales of the base level within the model type by the projected sales of the model type and rounding the quotient to the nearest 0.0001.

(3)(i) The FTP-based city fuel economy values of the model type (calculated to the nearest 0.0001 mpg) are determined by dividing one by a sum of terms, each of which corresponds to a base level and which is a fraction determined by dividing:

(A) The sales fraction of a base level; by

(B) The FTP-based city fuel economy value for the respective base level.

(ii) The FTP-based city carbon-related exhaust emission value of the model type (calculated to the nearest gram per mile) are determined by a sum of terms, each of which corresponds to a base level and which is a product determined by multiplying:

(A) The sales fraction of a base level; by

(B) The FTP-based city carbon-related exhaust emission value for the respective base level.

(iii) The FTP-based city $CO_2$ emissions of the model type (calculated to the nearest gram per mile) are determined by a sum of terms, each of which corresponds to a base level and which is a product determined by multiplying:

(A) The sales fraction of a base level; by

(B) The FTP-based city $CO_2$ emissions for the respective base level.

(4) The procedure specified in paragraph (b)(3) of this section is repeated in an analogous manner to determine the highway and combined fuel economy, $CO_2$ emissions, and carbon-related exhaust emissions for the model type.

(5) For alcohol dual fuel automobiles and natural gas dual fuel automobiles, the procedures of paragraphs (b)(1) through (4) of this section shall be used to calculate two separate sets of city, highway, and combined fuel economy values and two separate sets of city, highway, and combined $CO_2$ and carbon-related exhaust emission values for each model type.

(i) Calculate the city, highway, and combined fuel economy, $CO_2$ emissions, and carbon-related exhaust emission values from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the city, highway, and combined fuel economy, $CO_2$ emissions, and carbon-related exhaust emission values from the tests performed using alcohol or natural gas test fuel.

[76 FR 39552, July 6, 2011]

### § 600.209–08 Calculation of vehicle-specific 5-cycle fuel economy values for a model type.

(a) *Base level.* 5-cycle fuel economy values for a base level are calculated from vehicle configuration 5-cycle fuel economy values as determined in § 600.207–08 for low-altitude tests.

(1) If the Administrator determines that automobiles intended for sale in the State of California are likely to exhibit significant differences in fuel economy from those intended for sale in other states, he will calculate fuel economy values for each base level for vehicles intended for sale in California and for each base level for vehicles intended for sale in the rest of the states.

(2) In order to highlight the fuel efficiency of certain designs otherwise included within a model type, a manufacturer may wish to subdivide a model type into one or more additional model types. This is accomplished by separating subconfigurations from an existing base level and placing them into a new base level. The new base level is identical to the existing base level except that it shall be considered, for the purposes of this paragraph, as containing a new basic engine. The manufacturer will be permitted to designate such new basic engines and base level(s) if:

(i) Each additional model type resulting from division of another model type has a unique car line name and that name appears on the label and on the vehicle bearing that label;

(ii) The subconfigurations included in the new base levels are not included in any other base level which differs only by basic engine (*i.e.*, they are not included in the calculation of the original base level fuel economy values); and

(iii) All subconfigurations within the new base level are represented by test data in accordance with § 600.010–08 (c)(ii).

(3) The manufacturer shall supply total model year sales projections for each car line/vehicle subconfiguration combination.

(i) Sales projections must be supplied separately for each car line-vehicle subconfiguration intended for sale in California and each car line/vehicle subconfiguration intended for sale in the rest of the states if required by the Administrator under paragraph (a)(1) of this section.

(ii) Manufacturers shall update sales projections at the time any model type value is calculated for a label value.

(iii) The provisions of this paragraph (a)(3) may be satisfied by providing an amended application for certification, as described in § 86.1844–01 of this chapter.

(4) 5-cycle vehicle configuration fuel economy values, as determined in § 600.207–08(a), (b), or (c), as applicable, are grouped according to base level.

(i) If only one vehicle configuration within a base level has been tested, the fuel economy value from that vehicle configuration constitutes the fuel economy for that base level.

(ii) If more than one vehicle configuration within a base level has been tested, the vehicle configuration fuel economy values are harmonically averaged in proportion to the respective sales fraction (rounded to the nearest 0.0001) of each vehicle configuration and the resultant fuel economy value rounded to the nearest 0.0001 mile per gallon.

(5) The procedure specified in § 600.209–08 (a) will be repeated for each base level, thus establishing city and highway fuel economy values for each base level.

(6) For the purposes of calculating a base level fuel economy value, if the only vehicle configuration(s) within the base level are vehicle configuration(s) which are intended for sale at high altitude, the Administrator may use fuel economy data from tests conducted on these vehicle configuration(s) at high altitude to calculate the fuel economy for the base level.

(7) For alcohol dual fuel automobiles and natural gas dual fuel automobiles, the procedures of paragraphs (a)(1) through (6) of this section shall be used to calculate two separate sets of city, highway, and combined fuel economy values for each base level.

(i) Calculate the city and highway fuel economy values from the tests performed using gasoline or diesel test fuel.

(ii) If 5-cycle testing was performed on the alcohol or natural gas test fuel, calculate the city and highway fuel economy values from the tests performed using alcohol or natural gas test fuel.

(b) *Model type.* For each model type, as determined by the Administrator, a city and highway fuel economy value will be calculated by using the projected sales and fuel economy values for each base level within the model type. Separate model type calculations will be done based on the vehicle configuration fuel economy values as determined in § 600.207–08, as applicable.

(1) If the Administrator determines that automobiles intended for sale in the State of California are likely to exhibit significant differences in fuel economy from those intended for sale in other states, he will calculate fuel economy values for each model type for vehicles intended for sale in California and for each model type for vehicles intended for sale in the rest of the states.

(2) The sales fraction for each base level is calculated by dividing the projected sales of the base level within the model type by the projected sales of the model type and rounding the quotient to the nearest 0.0001.

(3) The 5-cycle city fuel economy values of the model type (calculated to the nearest 0.0001 mpg) are determined by dividing one by a sum of terms, each of which corresponds to a base level and which is a fraction determined by dividing:

(i) The sales fraction of a base level; by

(ii) The 5-cycle city fuel economy value for the respective base level.

(4) The procedure specified in paragraph (b)(3) of this section is repeated in an analogous manner to determine the highway and combined fuel economy values for the model type.

(5) For alcohol dual fuel automobiles and natural gas dual fuel automobiles the procedures of paragraphs (b)(1) through (4) of this section shall be used

to calculate two separate sets of city and highway fuel economy values for each model type.

(i) Calculate the city and highway fuel economy values from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the city, highway, and combined fuel economy values from the tests performed using alcohol or natural gas test fuel, if 5-cycle testing was performed on the alcohol or natural gas test fuel. Otherwise, the procedure in § 600.210(a)(3) or (b)(3) applies.

[71 FR 77946, Dec. 27, 2006]

### § 600.209–12 Calculation of vehicle-specific 5-cycle fuel economy and $CO_2$ emission values for a model type.

(a) *Base level.* 5-cycle fuel economy and $CO_2$ emission values for a base level are calculated from vehicle configuration 5-cycle fuel economy and $CO_2$ emission values as determined in § 600.207 for low-altitude tests.

(1) If the Administrator determines that automobiles intended for sale in the State of California are likely to exhibit significant differences in fuel economy and $CO_2$ emissions from those intended for sale in other states, he will calculate fuel economy and $CO_2$ emission values for each base level for vehicles intended for sale in California and for each base level for vehicles intended for sale in the rest of the states.

(2) In order to highlight the fuel efficiency and $CO_2$ emissions of certain designs otherwise included within a model type, a manufacturer may wish to subdivide a model type into one or more additional model types. This is accomplished by separating subconfigurations from an existing base level and placing them into a new base level. The new base level is identical to the existing base level except that it shall be considered, for the purposes of this paragraph, as containing a new basic engine. The manufacturer will be permitted to designate such new basic engines and base level(s) if:

(i) Each additional model type resulting from division of another model type has a unique car line name and that name appears on the label and on the vehicle bearing that label;

(ii) The subconfigurations included in the new base levels are not included in any other base level which differs only by basic engine (*i.e.*, they are not included in the calculation of the original base level fuel economy values); and

(iii) All subconfigurations within the new base level are represented by test data in accordance with § 600.010(c)(i)(ii).

(3) The manufacturer shall supply total model year sales projections for each car line/vehicle subconfiguration combination.

(i) Sales projections must be supplied separately for each car line-vehicle subconfiguration intended for sale in California and each car line/vehicle subconfiguration intended for sale in the rest of the states if required by the Administrator under paragraph (a)(1) of this section.

(ii) Manufacturers shall update sales projections at the time any model type value is calculated for a label value.

(iii) The provisions of this paragraph (a)(3) may be satisfied by providing an amended application for certification, as described in § 86.1844 of this chapter.

(4) 5-cycle vehicle configuration fuel economy and $CO_2$ emission values, as determined in § 600.207–12(a), (b), or (c), as applicable, are grouped according to base level.

(i) If only one vehicle configuration within a base level has been tested, the fuel economy and $CO_2$ emission values from that vehicle configuration constitute the fuel economy and $CO_2$ emission values for that base level.

(ii) If more than one vehicle configuration within a base level has been tested, the vehicle configuration fuel economy values are harmonically averaged in proportion to the respective sales fraction (rounded to the nearest 0.0001) of each vehicle configuration and the resultant fuel economy value rounded to the nearest 0.0001 mile per gallon.

(iii) If more than one vehicle configuration within a base level has been tested, the vehicle configuration $CO_2$ emission values are arithmetically averaged in proportion to the respective sales fraction (rounded to the nearest 0.0001) of each vehicle configuration and the resultant $CO_2$ emission value rounded to the nearest 0.1 gram per mile.

(5) The procedure specified in § 600.209–12(a) will be repeated for each base level, thus establishing city and highway fuel economy and $CO_2$ emission values for each base level.

(6) [Reserved]

(7) For alcohol dual fuel automobiles and natural gas dual fuel automobiles, the procedures of paragraphs (a)(1) through (6) of this section shall be used to calculate two separate sets of city, highway, and combined fuel economy and $CO_2$ emission values for each base level.

(i) Calculate the city and highway fuel economy and $CO_2$ emission values from the tests performed using gasoline or diesel test fuel.

(ii) If 5-cycle testing was performed on the alcohol or natural gas test fuel, calculate the city and highway fuel economy and $CO_2$ emission values from the tests performed using alcohol or natural gas test fuel.

(b) *Model type.* For each model type, as determined by the Administrator, city and highway fuel economy and $CO_2$ emissions values will be calculated by using the projected sales and fuel economy and $CO_2$ emission values for each base level within the model type. Separate model type calculations will be done based on the vehicle configuration fuel economy and $CO_2$ emission values as determined in § 600.207, as applicable.

(1) If the Administrator determines that automobiles intended for sale in the State of California are likely to exhibit significant differences in fuel economy and $CO_2$ emissions from those intended for sale in other states, he will calculate fuel economy and $CO_2$ emission values for each model type for vehicles intended for sale in California and for each model type for vehicles intended for sale in the rest of the states.

(2) The sales fraction for each base level is calculated by dividing the projected sales of the base level within the model type by the projected sales of the model type and rounding the quotient to the nearest 0.0001.

(3)(i) The 5-cycle city fuel economy values of the model type (calculated to the nearest 0.0001 mpg) are determined by dividing one by a sum of terms, each of which corresponds to a base level and which is a fraction determined by dividing:

(A) The sales fraction of a base level; by

(B) The 5-cycle city fuel economy value for the respective base level.

(ii) The 5-cycle city $CO_2$ emissions of the model type (calculated to the nearest tenth of a gram per mile) are determined by a sum of terms, each of which corresponds to a base level and which is a product determined by multiplying:

(A) The sales fraction of a base level; by

(B) The 5-cycle city $CO_2$ emissions for the respective base level.

(4) The procedure specified in paragraph (b)(3) of this section is repeated in an analogous manner to determine the highway and combined fuel economy and $CO_2$ emission values for the model type.

(5) For alcohol dual fuel automobiles and natural gas dual fuel automobiles the procedures of paragraphs (b)(1) through (4) of this section shall be used to calculate two separate sets of city and highway fuel economy and $CO_2$ emission values for each model type.

(i) Calculate the city and highway fuel economy and $CO_2$ emission values from the tests performed using gasoline or diesel test fuel.

(ii) Calculate the city, highway, and combined fuel economy and $CO_2$ emission values from the tests performed using alcohol or natural gas test fuel, if 5-cycle testing was performed on the alcohol or natural gas test fuel. Otherwise, the procedure in § 600.210–12(a)(3) or (b)(3) applies.

[76 FR 39553, July 6, 2011]

### § 600.210–08 Calculation of fuel economy values for labeling.

(a) *General labels.* Except as permitted in paragraph (e) of this section, fuel economy for general labels can be determined by two methods. The first is based on vehicle-specific model-type 5-cycle data as determined in § 600.209–08(b). This method is optional beginning in the 2008 model year for all vehicles, including medium-duty passenger vehicles, and required beginning in the 2011 model year (except for dedicated alternative-fuel vehicles, dual fuel vehicles when operating on alternative

fuel, and medium duty passenger vehicles) unless otherwise indicated according to the provisions in § 600.115–08. The second method is the derived 5-cycle method, and is based on fuel economy that is derived from vehicle-specific 5-cycle model type data as determined in paragraph (a)(2) of this section. This method is required for 2008 through 2010 model years (except for medium-duty passenger vehicles, in which case it is optional), and is permitted beginning in 2011 model year under the provisions of § 600.115–08. If the manufacturer determines that the resulting label values from either of these methods are not representative of the fuel economy for that model type, they may voluntarily lower these values. All 2011 and later model year medium-duty passenger vehicles, dedicated alternative-fueled vehicles, and dual fuel vehicles when operating on alternative fuel must be labeled for fuel economy, using the derived 5-cycle method or, at the manufacturer's option, the vehicle-specific 5-cycle method. Fuel economy label values for dual fuel vehicles operating on alcohol-based or natural gas fuel are calculated separately.

(1) *Vehicle-specific 5-cycle labels.* The city and highway model type fuel economy determined in § 600.209–08(b), rounded to the nearest mpg, comprise the fuel economy values for general fuel economy labels, or, alternatively;

(2) *Derived 5-cycle labels.* Derived 5-cycle city and highway label values are determined according to the following method:

(i) For each model type, determine the derived five-cycle city fuel economy using the following equation and coefficients determined by the Administrator:

$$\text{Derived 5-cycle City Fuel Economy} = \frac{1}{\left(\{\text{City Intercept}\} + \frac{\{\text{City Slope}\}}{\text{MT FTP FE}}\right)}$$

Where:

City Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

City Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

MT FTP FE = the model type FTP-based city fuel economy determined under § 600.208–08(b), rounded to the nearest 0.0001 mpg.

(ii) For each model type, determine the derived five-cycle highway fuel economy using the equation below and coefficients determined by the Administrator:

$$\text{Derived 5-cycle Highway Fuel Economy} = \frac{1}{\left(\{\text{Highway Intercept}\} + \frac{\{\text{Highway Slope}\}}{\text{MT HFET FE}}\right)}$$

Where:

Highway Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

Highway Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

MT HFET FE = the model type highway fuel economy determined under § 600.208–08(b), rounded to the nearest 0.0001 mpg.

(iii) For 2008 and later model year vehicles, unless and until superseded by written guidance from the Administrator, the following intercepts and slopes shall be used in the equations in paragraphs (a)(2)(i) and (a)(2)(ii) of this section:

City Intercept = 0.003259.
City Slope = 1.1805.
Highway Intercept = 0.001376.
Highway Slope = 1.3466.

The Administrator will periodically update the slopes and intercepts via guidance and will determine the model year that the new coefficients must take effect. The Administrator will issue guidance no later than six months prior to the earliest starting date of the effective model year (e.g., for 2011 models, the earliest start of the model year is January 2, 2010, so guidance would be issued by July 1, 2009.) Until otherwise instructed by written guidance from the Administrator, manufacturers must use the coefficients that are in currently in effect.

(3) *General alternate fuel label values for dual-fueled vehicles.* (i) City and Highway label values for dual fuel alcohol-based and natural gas vehicles when using the alternate fuel are separately determined by the following calculation:

$$Derived\ FE_{alt} = FE_{alt} \times \frac{5cycle_{gas}}{FE_{gas}}$$

Where:

$FE_{alt}$ = The unrounded FTP-based model-type city or HFET-based model-type highway fuel economy from the alternate fuel, as determined in § 600.208(b)(5)(ii).

5-cycle $FE_{gas}$ = The unrounded vehicle-specific or derived 5-cycle model-type city or highway fuel economy, as determined in paragraph (a)(1) or (a)(2) of this section.

$FE_{gas}$ = The unrounded FTP-based city or HFET-based model type highway fuel economy from gasoline (or diesel), as determined in § 600.208(b)(5)(i).

The result, rounded to the nearest whole number, is the alternate fuel label value for dual fuel vehicles.

(ii) Optionally, if complete 5-cycle testing has been performed using the alternate fuel, the manufacturer may choose to use the alternate fuel label city or highway value result in § 600.209–08(b)(5)(ii), rounded to the nearest whole number.

(b) *Specific Labels.* The following two methods are used to determine specific labels. The first is based on vehicle-specific configuration 5-cycle data as determined in § 600.207–08. This method is optional beginning in the 2008 model year for all vehicles, including medium-duty passenger vehicles, and required beginning in the 2011 model year (except for medium-duty passenger vehicles) unless otherwise indicated according to the provisions in § 600.115–08. The second method is based on derived 5-cycle configuration data as determined in paragraph (a)(2) of this section. This method is required for 2008 through 2010 model years (except for medium-duty passenger vehicles, in which case it is optional), and is allowed beginning in 2011 model year if permitted under the provisions in § 600.115–08. If the manufacturer determines that the resulting label values from either of these methods are not representative of the fuel economy for that model type, they may voluntarily lower these values. All 2011 and later model year medium-duty passenger vehicles must be labeled for fuel economy, using the derived 5-cycle method or, at the manufacturer's option, the vehicle-specific 5-cycle method. Fuel economy label values for dual fuel vehicles operating on alcohol-based or natural gas fuel are calculated separately.

(1) *Vehicle-specific 5-cycle labels.* The city and highway configuration fuel economy determined in § 600.207–08, rounded to the nearest mpg, comprise the fuel economy values for specific fuel economy labels, or, alternatively;

(2) *Derived 5-cycle labels.* Specific city and highway label values from derived 5-cycle are determined according to the following method:

(i) Determine the derived five-cycle city fuel economy of the configuration using the equation below and coefficients determined by the Administrator:

$$\text{Derived 5-cycle City Fuel Economy} = \frac{1}{\left(\{\text{City Intercept}\} + \frac{\{\text{City Slope}\}}{\text{Config FTP FE}}\right)}$$

Where:

City Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

City Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

Config FTP FE = the configuration FTP-based city fuel economy determined under § 600.206–08, rounded to the nearest tenth.

(ii) Determine the derived five-cycle highway fuel economy of the configuration using the equation below and coefficients determined by the Administrator:

$$\text{Derived 5-cycle Highway Fuel Economy} = \frac{1}{\left(\{\text{Highway Intercept}\} + \frac{\{\text{Highway Slope}\}}{\text{Config HFET FE}}\right)}$$

Where:

Highway Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

Highway Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

Config HFET FE = the configuration highway fuel economy determined under § 600.206–08, rounded to the nearest tenth.

(iii) The slopes and intercepts of paragraph (a)(2)(iii) of this section apply.

(3) Specific alternate fuel label values for dual-fueled vehicles. (i) Specific city and highway label values for dual fuel alcohol-based and natural gas vehicles when using the alternate fuel are separately determined by the following calculation:

$$\text{Derived FE}_{\text{alt}} = \text{FE}_{\text{alt}} \times \frac{5\ \text{cycle}_{\text{gas}}}{\text{FE}_{\text{gas}}}$$

Where:

$FE_{alt}$ = The unrounded FTP-based configuration city or HFET-based configuration highway fuel economy from the alternate fuel, as determined in § 600.206.

5cycle $FE_{gas}$ = The unrounded vehicle-specific or derived 5-cycle configuration city or highway fuel economy as determined in paragraph (b)(1) or (b)(2) of this section.

$FE_{gas}$ = The unrounded FTP-based city or HFET-based configuration highway fuel economy from gasoline, as determined in § 600.206–08.

The result, rounded to the nearest whole number, is the alternate fuel label value for dual fuel vehicles.

(ii) Optionally, if complete 5-cycle testing has been performed using the alternate fuel, the manufacturer may choose to use the alternate fuel label city or highway value result in § 600.207–08(a)(4)(ii), rounded to the nearest whole number.

(c) For the purposes of calculating the combined fuel economy for a model type, to be used in displaying on the label and for determining annual fuel costs under § 600.307–08, the manufacturer shall:

(1)(i) For gasoline-fueled, diesel-fueled, alcohol-fueled, and natural gas-fueled automobiles, and for dual fuel automobiles operated on gasoline or diesel fuel, harmonically average the unrounded city and highway values, determined in paragraphs (a)(1) or (2) of this section and (b)(1) or (2) of this section, weighted 0.55 and 0.45 respectively, and round to the nearest whole mpg. (An example of this calculation procedure appears in appendix II of this part); or

(ii) For alcohol dual fuel and natural gas dual fuel automobiles operated on the alternate fuel, harmonically average the unrounded city and highway values from the tests performed using the alternative fuel as determined in paragraphs (a)(3) and (b)(3) of this section, weighted 0.55 and 0.45 respectively, and round to the nearest whole mpg.

(d)(1) Label values for 2008–2010 model year automobiles (except medium-duty passenger vehicles) the city and highway values for a model type must be determined by the same method. If the manufacturer optionally chooses to determine fuel economy for a model type using the vehicle-specific 5-cycle method, that method must be used to determine both the city and highway fuel economy.

(2) For 2011 and later model year automobiles, if the criteria in § 600.115–08(a) are met for a model type, both the city and highway fuel economy must be determined using the vehicle-specific 5-cycle method. If the criteria in § 600.115–08(b) are met for a model type, the city fuel economy may be determined using either method, but the highway fuel economy must be determined using the vehicle-specific 5-cycle method (or modified 5-cycle method as allowed under § 600.114–08(b)(2)).

(3) If the criteria in § 600.115–08 are not met for a model type, the city and highway label values must be determined by using the same method, either the derived 5-cycle or vehicle-specific 5-cycle.

(e) *Fuel economy values and other information for advanced technology vehicles.* (1) The Administrator may prescribe an alternative method of determining the city and highway model type fuel economy values for general, unique or specific fuel economy labels other than those set forth in this subpart C for advanced technology vehicles including, but not limited to battery electric vehicles, fuel cell vehicles, plug-in hybrid electric vehicles and vehicles equipped with hydrogen internal combustion engines.

(2) For advanced technology vehicles, the Administrator may prescribe special methods for calculating and/or determining information other than fuel economy that is required to be displayed on fuel economy labels as specified in section 600.307–08(k) of this part. For example, the Administrator may prescribe methods to determine the city and highway electrical energy consumption values and the all electric driving range for battery electric vehicles and plug-in hybrid electric vehicles.

(f) *Sample calculations.* An example of the calculation required in this subpart is in Appendix III of this part.

[71 FR 77946, Dec. 27, 2006, as amended at 74 FR 61551, Nov. 25, 2009; 76 FR 39554, July 6, 2011]

### § 600.210–12 Calculation of fuel economy and $CO_2$ emission values for labeling.

(a) *General labels.* Except as specified in paragraphs (d) and (e) of this section, fuel economy and $CO_2$ emissions for general labels may be determined by one of two methods. The first is based on vehicle-specific model-type 5-cycle data as determined in § 600.209–12(b). This method is available for all vehicles and is required for vehicles that do not qualify for the second method as described in § 600.115 (other than electric vehicles). The second method, the derived 5-cycle method, determines fuel economy and $CO_2$ emissions values from the FTP and HFET tests using equations that are derived from vehicle-specific 5-cycle model type data, as determined in paragraph (a)(2) of this section. Manufacturers may voluntarily lower fuel economy values and raise $CO_2$ values if they determine that the label values from any method are not representative of the fuel economy or $CO_2$ emissions for that model type.

(1) *Vehicle-specific 5-cycle labels.* The city and highway model type fuel economy determined in § 600.209–12(b), rounded to the nearest mpg, and the city and highway model type $CO_2$ emissions determined in § 600.209–12(b), rounded to the nearest gram per mile, comprise the fuel economy and $CO_2$ emission values for general fuel economy labels, or, alternatively;

(2) *Derived 5-cycle labels.* Derived 5-cycle city and highway label values are determined according to the following method:

(i)(A) For each model type, determine the derived five-cycle city fuel economy using the following equation and coefficients determined by the Administrator:

$$\text{Derived 5-cycle City Fuel Economy} = \frac{1}{\left(\{\text{City Intercept}\} + \frac{\{\text{City Slope}\}}{\text{MT FTP FE}}\right)}$$

Where:

City Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

City Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

MT FTP FE = the model type FTP-based city fuel economy determined under § 600.208–12(b), rounded to the nearest 0.0001 mpg.

(B) For each model type, determine the derived five-cycle city $CO_2$ emissions using the following equation and coefficients determined by the Administrator:

Derived 5−cycle City $CO_2$ = ({City Intercept} × A) + ({City Slope} × MT FTP $CO_2$)

Where:

A = 8,887 for gasoline-fueled vehicles, 10,180 for diesel-fueled vehicles, or an appropriate value specified by the Administrator for other fuels.

City Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

City Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

MT FTP $CO_2$ = the model type FTP-based city $CO_2$ emissions determined under § 600.208–12(b), rounded to the nearest 0.1 grams per mile.

(ii)(A) For each model type, determine the derived five-cycle highway fuel economy using the equation below and coefficients determined by the Administrator:

$$\text{Derived 5-cycle Highway Fuel Economy} = \frac{1}{\left(\{\text{Highway Intercept}\} + \frac{\{\text{Highway Slope}\}}{\text{MT HFET FE}}\right)}$$

Where:

Highway Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

Highway Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

MT HFET FE = the model type highway fuel economy determined under § 600.208–12(b), rounded to the nearest 0.0001 mpg.

(B) For each model type, determine the derived five-cycle highway $CO_2$ emissions using the equation below and coefficients determined by the Administrator:

Derived 5-cycle Highway $CO_2$ = ({Highway Intercept} × A) + ({Highway Slope} × MT HFET $CO_2$)

Where:

A = 8,887 for gasoline-fueled vehicles, 10,180 for diesel-fueled vehicles, or an appropriate value specified by the Administrator for other fuels.

Highway Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

Highway Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

MT HFET $CO_2$ = the model type highway $CO_2$ emissions determined under § 600.208–12(b), rounded to the nearest 0.1 grams per mile.

(iii) Unless and until superseded by written guidance from the Administrator, the following intercepts and slopes shall be used in the equations in paragraphs (a)(2)(i) and (ii) of this section:

City Intercept = 0.003259.
City Slope = 1.1805.
Highway Intercept = 0.001376.
Highway Slope = 1.3466.

(iv) The Administrator will periodically update the slopes and intercepts through guidance and will determine the model year that the new coefficients must take effect. The Administrator will issue guidance no later than six months prior to the earliest starting date of the effective model year (e.g., for 2011 models, the earliest start of the model year is January 2, 2010, so guidance would be issued by July 1, 2009.) Until otherwise instructed by written guidance from the Administrator, manufacturers must use the coefficients that are currently in effect.

(3) *General alternate fuel economy and $CO_2$ emissions label values for dual fuel vehicles.*

(i)(A) City and Highway fuel economy label values for dual fuel alcohol-based and natural gas vehicles when using the alternate fuel are separately determined by the following calculation:

$$Derived\ FE_{alt} = FE_{alt} \times \frac{5cycle_{gas}}{FE_{gas}}$$

Where:

$FE_{alt}$ = The unrounded FTP-based model-type city or HFET-based model-type highway fuel economy from the alternate fuel, as determined in § 600.208–12(b)(5)(ii).

5cycle $FE_{gas}$ = The unrounded vehicle-specific or derived 5-cycle model-type city or highway fuel economy, as determined in paragraph (a)(1) or (2) of this section.

$FE_{gas}$ = The unrounded FTP-based city or HFET-based model type highway fuel economy from gasoline (or diesel), as determined in § 600.208–12(b)(5)(i).

The result, rounded to the nearest whole number, is the alternate fuel label value for dual fuel vehicles.

(B) City and Highway $CO_2$ label values for dual fuel alcohol-based and natural gas vehicles when using the alternate fuel are separately determined by the following calculation:

$$Derived\ CO2_{alt} = CO2_{alt} \times \frac{5cycle\ CO2_{gas}}{CO2_{gas}}$$

Where:

$CO2_{alt}$ = The unrounded FTP-based model-type city or HFET-based model-type $CO_2$ emissions value from the alternate fuel, as determined in § 600.208–12(b)(5)(ii).

5cycle $CO2_{gas}$ = The unrounded vehicle-specific or derived 5-cycle model-type city or highway $CO_2$ emissions value, as determined in paragraph (a)(1) or (2) of this section.

$CO2_{gas}$ = The unrounded FTP-based city or HFET-based model type highway $CO_2$ emissions value from gasoline (or diesel), as determined in § 600.208–12(b)(5)(i).

The result, rounded to the nearest whole number, is the alternate fuel $CO_2$ emissions label value for dual fuel vehicles.

(ii) Optionally, if complete 5-cycle testing has been performed using the alternate fuel, the manufacturer may choose to use the alternate fuel label city or highway fuel economy and $CO_2$ emission values determined in § 600.209–12(b)(5)(ii), rounded to the nearest whole number.

(4) *General alternate fuel economy and $CO_2$ emissions label values for electric vehicles.* Determine FTP-based city and HFET-based highway fuel economy label values for electric vehicles as described in § 600.116. Convert W-hour/mile results to miles per kW-hr and miles per gasoline gallon equivalent. $CO_2$ label information is based on tailpipe emissions only, so $CO_2$ emissions from electric vehicles are assumed to be zero.

(5) *General alternate fuel economy and $CO_2$ emissions label values for fuel cell vehicles.* Determine FTP-based city and HFET-based highway fuel economy label values for electric vehicles using procedures specified by the Administrator. Convert kilograms of hydrogen/mile results to miles per kilogram of hydrogen and miles per gasoline gallon

equivalent. $CO_2$ label information is based on tailpipe emissions only, so $CO_2$ emissions from fuel cell vehicles are assumed to be zero.

(b) *Specific labels.* Except as specified in paragraphs (d) and (e) of this section, fuel economy and $CO_2$ emissions for specific labels may be determined by one of two methods. The first is based on vehicle-specific configuration 5-cycle data as determined in § 600.207. This method is available for all vehicles and is required for vehicles that do not qualify for the second method as described in § 600.115 (other than electric vehicles). The second method, the derived 5-cycle method, determines fuel economy and $CO_2$ emissions values from the FTP and HFET tests using equations that are derived from vehicle-specific 5-cycle configuration data, as determined in paragraph (b)(2) of this section. Manufacturers may voluntarily lower fuel economy values and raise $CO_2$ values if they determine that the label values from either method are not representative of the fuel economy or $CO_2$ emissions for that model type.

(1) *Vehicle-specific 5-cycle labels.* The city and highway configuration fuel economy determined in § 600.207, rounded to the nearest mpg, and the city and highway configuration $CO_2$ emissions determined in § 600.207, rounded to the nearest gram per mile, comprise the fuel economy and $CO_2$ emission values for specific fuel economy labels, or, alternatively;

(2) *Derived 5-cycle labels.* Specific city and highway label values from derived 5-cycle are determined according to the following method:

(i)(A) Determine the derived five-cycle city fuel economy of the configuration using the equation below and coefficients determined by the Administrator:

$$\text{Derived 5-cycle City Fuel Economy} = \frac{1}{\left(\{\text{City Intercept}\} + \frac{\{\text{City Slope}\}}{\text{Config FTP FE}}\right)}$$

Where:

City Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

City Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

Config FTP FE = the configuration FTP-based city fuel economy determined under § 600.206, rounded to the nearest 0.0001 mpg.

(B) Determine the derived five-cycle city $CO_2$ emissions of the configuration using the equation below and coefficients determined by the Administrator:

Derived 5-cycle City $CO_2$ = {City Intercept} + {City Slope} × Config FTP $CO_2$

Where:

City Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

City Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

Config FTP $CO_2$ = the configuration FTP-based city $CO_2$ emissions determined under § 600.206, rounded to the nearest 0.1 grams per mile.

(ii)(A) Determine the derived five-cycle highway fuel economy of the configuration using the equation below and coefficients determined by the Administrator:

$$\text{Derived 5-cycle Highway Fuel Economy} = \frac{1}{\left(\{\text{Highway Intercept}\} + \frac{\{\text{Highway Slope}\}}{\text{Config HFET FE}}\right)}$$

Where:

Highway Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

Highway Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

Config HFET FE = the configuration highway fuel economy determined under § 600.206, rounded to the nearest tenth.

(B) Determine the derived five-cycle highway $CO_2$ emissions of the configuration using the equation below and coefficients determined by the Administrator:

Derived 5-cycle city Highway $CO_2$ = {Highway Intercept} + {Highway Slope} × Config HFET $CO_2$

Where:

Highway Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

Highway Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

Config HFET $CO_2$ = the configuration highway fuel economy determined under § 600.206, rounded to the nearest tenth.

(iii) The slopes and intercepts of paragraph (a)(2)(iii) of this section apply.

(3) *Specific alternate fuel economy and $CO_2$ emissions label values for dual fuel vehicles.* (i)(A) Specific city and highway fuel economy label values for dual fuel alcohol-based and natural gas vehicles when using the alternate fuel are separately determined by the following calculation:

$$\text{Derived FE}_{alt} = \text{FE}_{alt} \times \frac{\text{5 cycle}_{gas}}{\text{FE}_{gas}}$$

Where:

$FE_{alt}$ = The unrounded FTP-based configuration city or HFET-based configuration highway fuel economy from the alternate fuel, as determined in § 600.206.

5cycle $FE_{gas}$ = The unrounded vehicle-specific or derived 5-cycle configuration city or highway fuel economy as determined in paragraph (b)(1) or (2) of this section.

$FE_{gas}$ = The unrounded FTP-based city or HFET-based configuration highway fuel economy from gasoline, as determined in § 600.206.

The result, rounded to the nearest whole number, is the alternate fuel label value for dual fuel vehicles.

(B) Specific city and highway $CO_2$ emission label values for dual fuel alcohol-based and natural gas vehicles when using the alternate fuel are separately determined by the following calculation:

$$Derived\ CO2_{alt} = CO2_{alt} \times \frac{5cycle\ CO2_{gas}}{CO2_{gas}}$$

$$\text{Derived FE}_{alt} = \text{FE}_{alt} \times \frac{\text{5 cycle}_{gas}}{\text{FE}_{gas}}$$

Where:

$CO2_{alt}$ = The unrounded FTP-based configuration city or HFET-based configuration highway $CO_2$ emissions value from the alternate fuel, as determined in § 600.206.

5cycle $CO2_{gas}$ = The unrounded vehicle-specific or derived 5-cycle configuration city or highway $CO_2$ emissions value as determined in paragraph (b)(1) or (b)(2) of this section.

$CO2_{gas}$ = The unrounded FTP-based city or HFET-based configuration highway $CO_2$ emissions value from gasoline, as determined in § 600.206.

The result, rounded to the nearest whole number, is the alternate fuel $CO_2$ emissions label value for dual fuel vehicles.

(ii) Optionally, if complete 5-cycle testing has been performed using the alternate fuel, the manufacturer may choose to use the alternate fuel label city or highway fuel economy and $CO_2$ emission values determined in § 600.207–

12(a)(4)(ii), rounded to the nearest whole number.

(4) *Specific alternate fuel economy and $CO_2$ emissions label values for electric vehicles.* Determine FTP-based city and HFET-based highway fuel economy label values for electric vehicles as described in § 600.116. Determine these values by running the appropriate repeat test cycles. Convert W-hour/mile results to miles per kW-hr and miles per gasoline gallon equivalent. $CO_2$ label information is based on tailpipe emissions only, so $CO_2$ emissions from electric vehicles are assumed to be zero.

(5) *Specific alternate fuel economy and $CO_2$ emissions label values for fuel cell vehicles.* Determine FTP-based city and HFET-based highway fuel economy label values for fuel cell vehicles using procedures specified by the Administrator. Convert kilograms of hydrogen/mile results to miles per kilogram of hydrogen and miles per gasoline gallon equivalent. $CO_2$ label information is based on tailpipe emissions only, so $CO_2$ emissions from fuel cell vehicles are assumed to be zero.

(c) *Calculating combined fuel economy.* (1) For the purposes of calculating the combined fuel economy for a model type, to be used in displaying on the label and for determining annual fuel costs under subpart D of this part, the manufacturer shall use one of the following procedures:

(i) For gasoline-fueled, diesel-fueled, alcohol-fueled, and natural gas-fueled automobiles, and for dual fuel automobiles that can operate on gasoline or diesel fuel, harmonically average the unrounded city and highway fuel economy values, determined in paragraphs (a)(1) or (2) of this section and (b)(1) or (2) of this section, weighted 0.55 and 0.45 respectively. Round the result to the nearest whole mpg. (An example of this calculation procedure appears in Appendix II of this part).

(ii) For alcohol dual fuel and natural gas dual fuel automobiles operated on the alternate fuel, harmonically average the unrounded city and highway values from the tests performed using the alternative fuel as determined in paragraphs (a)(3) and (b)(3) of this section, weighted 0.55 and 0.45 respectively. Round the result to the nearest whole mpg.

(iii) For electric vehicles, calculate the combined fuel economy, in miles per kW-hr and miles per gasoline gallon equivalent, by harmonically averaging the unrounded city and highway values, weighted 0.55 and 0.45 respectively. Round miles per kW-hr to the nearest 0.001 and round miles per gasoline gallon equivalent to the nearest whole number.

(iv) For plug-in hybrid electric vehicles, calculate a combined fuel economy value, in miles per gasoline gallon equivalent as follows:

(A) Determine city and highway fuel economy values for vehicle operation after the battery has been fully discharged (''gas only operation'' or ''charge-sustaining mode'') as described in paragraphs (a) and (b) of this section.

(B) Determine city and highway fuel economy values for vehicle operation starting with a full battery charge (''all-electric operation'' or ''gas plus electric operation'', as appropriate, or ''charge-depleting mode'') as described in § 600.116. For battery energy, convert W-hour/mile results to miles per gasoline gallon equivalent or miles per diesel gallon equivalent, as applicable. Note that you must also express battery-based fuel economy values in miles per kW-hr for calculating annual fuel cost as described in § 600.311.

(C) Calculate a composite city fuel economy value and a composite highway fuel economy value by combining the separate results for battery and engine operation using the procedures described in § 600.116). Apply the derived 5-cycle adjustment to these composite values. Use these values to calculate the vehicle's combined fuel economy as described in paragraph (c)(1)(i) of this section.

(v) For fuel cell vehicles, calculate the combined fuel economy, in miles per kilogram and miles per gasoline gallon equivalent, by harmonically averaging the unrounded city and highway values, weighted 0.55 and 0.45 respectively. Round miles per kilogram to the nearest whole number and round miles per gasoline gallon equivalent to the nearest whole number.

(2) For the purposes of calculating the combined $CO_2$ emissions value for a model type, to be used in displaying on the label under subpart D of this part, the manufacturer shall:

(i) For gasoline-fueled, diesel-fueled, alcohol-fueled, and natural gas-fueled automobiles, and for dual fuel automobiles that can operate on gasoline or diesel fuel, arithmetically average the unrounded city and highway values, determined in paragraphs (a)(1) or (2) of this section and (b)(1) or (2) of this section, weighted 0.55 and 0.45 respectively, and round to the nearest whole gram per mile; or

(ii) For alcohol dual fuel and natural gas dual fuel automobiles operated on the alternate fuel, arithmetically average the unrounded city and highway $CO_2$ emission values from the tests performed using the alternative fuel as determined in paragraphs (a)(3) and (b)(3) of this section, weighted 0.55 and 0.45 respectively, and round to the nearest whole gram per mile.

(iii) $CO_2$ label information is based on tailpipe emissions only, so $CO_2$ emissions from electric vehicles and fuel cell vehicles are assumed to be zero.

(iv) For plug-in hybrid electric vehicles, calculate combined $CO_2$ emissions as follows:

(A) Determine city and highway $CO_2$ emission rates for vehicle operation after the battery has been fully discharged (''gas only operation'' or ''charge-sustaining mode'') as described in paragraphs (a) and (b) of this section.

(B) Determine city and highway $CO_2$ emission rates for vehicle operation starting with a full battery charge (''all-electric operation'' or ''gas plus electric operation'', as appropriate, or ''charge-depleting mode'') as described in § 600.116. Note that $CO_2$ label information is based on tailpipe emissions only, so $CO_2$ emissions from electricity are assumed to be zero.

(C) Calculate a composite city $CO_2$ emission rate and a composite highway $CO_2$ emission rate by combining the separate results for battery and engine operation using the procedures described in § 600.116. Use these values to calculate the vehicle's combined fuel economy as described in paragraph (c)(1)(i) of this section.

(d) *Calculating combined fuel economy and $CO_2$ emissions.* (1) If the criteria in § 600.115–11(a) are met for a model type, both the city and highway fuel economy and $CO_2$ emissions values must be determined using the vehicle-specific 5-cycle method. If the criteria in § 600.115–11(b) are met for a model type, the city fuel economy and $CO_2$ emissions values may be determined using either method, but the highway fuel economy and $CO_2$ emissions values must be determined using the vehicle-specific 5-cycle method (or modified 5-cycle method as allowed under § 600.114–12(b)(2)).

(2) If the criteria in § 600.115 are not met for a model type, the city and highway fuel economy and $CO_2$ emission label values must be determined by using the same method, either the derived 5-cycle or vehicle-specific 5-cycle.

(3) Manufacturers may use any of the following methods for determining 5-cycle values for fuel economy and $CO_2$ emissions for electric vehicles:

(i) Generate 5-cycle data as described in paragraph (a)(1) of this section.

(ii) Multiply 2-cycle fuel economy values by 0.7 and divide 2-cycle $CO_2$ emission values by 0.7.

(iii) Manufacturers may ask the Administrator to approve adjustment factors for deriving 5-cycle fuel economy results from 2-cycle test data based on operating data from their in-use vehicles. Such data should be collected from multiple vehicles with different drivers over a range of representative driving routes and conditions. The Administrator may approve such an adjustment factor for any of the manufacturer's vehicle models that are properly represented by the collected data.

(e) *Fuel economy values and other information for advanced technology vehicles.* (1) The Administrator may prescribe an alternative method of determining the city and highway model type fuel economy and $CO_2$ emission values for general, unique or specific fuel economy labels other than those set forth in this subpart C for advanced technology vehicles including, but not limited to fuel cell vehicles, hybrid electric vehicles using hydraulic energy storage, and vehicles equipped

with hydrogen internal combustion engines.

(2) For advanced technology vehicles, the Administrator may prescribe special methods for determining information other than fuel economy that is required to be displayed on fuel economy labels as specified in § 600.302–12(e).

(f) *Sample calculations.* An example of the calculation required in this subpart is in Appendix III of this part.

[76 FR 39554, July 6, 2011, as amended at 76 FR 57380, Sept. 15, 2011]

## Subpart D—Fuel Economy Labeling

SOURCE: 41 FR 49761, Nov. 10, 1976, unless otherwise noted.

### § 600.301 Labeling requirements.

(a) Prior to being offered for sale, each manufacturer shall affix or cause to be affixed and each dealer shall maintain or cause to be maintained on each automobile:

(1) A general fuel economy label (initial, or updated as required in § 600.314) as described in § 600.302 or:

(2) A specific label, for those automobiles manufactured or imported before the date that occurs 15 days after general labels have been determined by the manufacturer, as described in § 600.210–08(b) or § 600.210–12(b).

(i) If the manufacturer elects to use a specific label within a model type (as defined in § 600.002, he shall also affix specific labels on all automobiles within this model type, except on those automobiles manufactured or imported before the date that labels are required to bear range values as required by paragraph (b) of this section, or determined by the Administrator, or as permitted under § 600.310.

(ii) If a manufacturer elects to change from general to specific labels or vice versa within a model type, the manufacturer shall, within five calendar days, initiate or discontinue as applicable, the use of specific labels on all vehicles within a model type at all facilities where labels are affixed.

(3) For any vehicle for which a specific label is requested which has a combined FTP/HFET-based fuel economy value, as determined in § 600.513, at or below the minimum tax-free value, the following statement must appear on the specific label:

''[Manufacturer's name] may have to pay IRS a Gas Guzzler Tax on this vehicle because of the low fuel economy.''

(4)(i) At the time a general fuel economy value is determined for a model type, a manufacturer shall, except as provided in paragraph (a)(4)(ii) of this section, relabel, or cause to be relabeled, vehicles which:

(A) Have not been delivered to the ultimate purchaser, and

(B) Have a combined FTP/HFET-based model type fuel economy value (as determined in § 600.208–08(b) or § 600.208–12(b) of 0.1 mpg or more below the lowest fuel economy value at which a Gas Guzzler Tax of $0 is to be assessed.

(ii) The manufacturer has the option of re-labeling vehicles during the first five working days after the general label value is known.

(iii) For those vehicle model types which have been issued a specific label and are subsequently found to have tax liability, the manufacturer is responsible for the tax liability regardless of whether the vehicle has been sold or not or whether the vehicle has been relabeled or not.

(b) The manufacturer shall include the current range of fuel economy of comparable automobiles (as described in §§ 600.311 and 600.314) in the label of each vehicle manufactured or imported more than 15 calendar days after the current range is made available by the Administrator.

(1) Automobiles manufactured or imported before a date 16 or more calendar days after the initial label range is made available under § 600.311 shall include the range from the previous model year.

(2) Automobiles manufactured or imported more than 15 calendar days after the label range is made available under § 600.311 shall be labeled with the current range of fuel economy of comparable automobiles as approved for that label.

(c) The fuel economy label must be readily visible from the exterior of the automobile and remain affixed until the time the automobile is delivered to the ultimate consumer.

(1) It is preferable that the fuel economy label information be incorporated into the Automobile Information Disclosure Act label, provided that the prominence and legibility of the fuel economy label is maintained. For this purpose, all fuel economy label information must be placed on a separate section in the Automobile Information Disclosure Act label and may not be intermixed with that label information, except for vehicle descriptions as noted in § 600.303–08(d)(1).

(2) The fuel economy label must be located on a side window. If the window is not large enough to contain both the Automobile Information Disclosure Act label and the fuel economy label, the manufacturer shall have the fuel economy label affixed on another window and as close as possible to the Automobile Information Disclosure Act label.

(3) The manufacturer shall have the fuel economy label affixed in such a manner that appearance and legibility are maintained until after the vehicle is delivered to the ultimate consumer.

(d) The labeling requirements specified in this subpart for 2008 model year vehicles continue to apply through the 2011 model year. In the 2012 model year, manufacturers may label their vehicles as specified in this subpart for either 2008 or 2012 model years. The labeling requirements specified in this subpart for 2012 model year vehicles are mandatory for 2013 and later model years.

[76 FR 39558, July 6, 2011]

### § 600.302–08 Fuel economy label format requirements.

Examples of fuel economy labels for gasoline and diesel vehicles, dual fuel vehicles and alternate fuel vehicles are provided in appendix IV of this part. Detailed printing specifications are given in appendix V of this part, and unless otherwise permitted, apply to the provisions in this section. The Administrator may approve modifications to the style guidelines in cases where there may be space limitations and/or legibility concerns.

(a) Fuel economy labels must be:

(1) Rectangular in shape with a minimum height of 4.5 inches (114 mm) and a minimum length of 7.0 inches (178 mm) as specified in appendix V of this part.

(2) Printed in a color which contrasts with the background paper color.

(3) Have a contrasting border, with dimensions specified in appendix V of this part.

(b) *Label information*. The information on the label shall contain:

(1) The titles ''CITY MPG'' and ''HIGHWAY MPG'', centered over the applicable fuel economy estimates.

(2) The numeric, whole-number city and highway estimates, as determined in § 600.210–08, as specified in appendix V of this part. The font size of the numbers may be larger than specified, provided: that the city and highway numbers are equal in size; that the titles ''CITY MPG'' and ''HIGHWAY MPG'' are increased in the same proportion; and that doing so does not obscure the other information on the label.

(i) For dedicated gasoline-fueled, diesel-fueled, alcohol-fueled, and natural gas-fueled automobiles, the city and highway fuel economy estimates calculated in accordance with § 600.210–08.

(ii) For alcohol dual fuel automobiles and natural gas dual fuel automobiles, the city and highway fuel economy estimates for operation on gasoline or diesel fuel as calculated in § 600.210–08(a) and (b).

(3) The fuel pump logo.

(4) The following phrase: ''Your actual mileage will vary depending on how you drive and maintain your vehicle.'', located and formatted as shown in appendix V of this part.

(5) The statement: ''Expected range for most drivers: ____ to ____ mpg'', placed underneath both the city and highway estimates, centered to the estimate numbers. The range values for this statement are to be calculated in accordance with the following:

(i) The lower range values shall be determined by multiplying the city and highway estimates by 0.83, then rounding to the next lower integer value.

(ii) The upper range values shall be determined by multiplying the city and highway estimates by 1.17 and rounding to the next higher integer value.

(6) The top border shall contain the centered title ''EPA Fuel Economy Estimates'' in a contrasting color.

(7) *Alternate fuel titles.* (i) For dedicated alcohol-fueled automobiles, the title ''[insert appropriate fuel (e.g., ''ETHANOL (E85))'']*''. The title shall be positioned and sized according to the style guidelines in appendix V of this part.

(ii) For dedicated natural gas-fueled automobiles, the title ''NATURAL GAS*''. The title shall be positioned in the grey area above the window of the fuel pump logo, in a size and format specified in appendix V of this part.

(iii) For alcohol-based dual fuel automobiles and natural gas dual fuel automobiles, the title ''Dual Fuel Vehicle*'', and directly below that, the title ''[insert appropriate conventional fuel (example Gasoline)]-[insert appropriate alternate fuel (example ''Ethanol (E85)'']''. Both of these titles are centered in the grey area above the window of the fuel pump logo, with a size and format specified in appendix V of this part.

(8) *Alternate fuel information.* (i) For dedicated alcohol-fueled automobiles, the title ''[insert appropriate fuel (example ''E85'')]'' centered above the title ''CITY MPG'' and above the title ''HIGHWAY MPG'' with a size and format specified in appendix V of this part.

(ii) For dedicated natural gas-fueled automobile, the title ''GASOLINE EQUIVALENT'' centered above the title ''CITY MPG'' and above the title ''HIGHWAY MPG'' with a size and format specified in appendix V of this part.

(iii) For alcohol dual fuel automobiles and natural gas dual fuel automobiles, the title ''GASOLINE'' [or ''DIESEL'', as applicable] centered above the title ''CITY MPG'' and above the title ''HIGHWAY MPG'' with a size and format specified in appendix V of this part.

(9) The bottom border of the label shall contain the following centered statement, formatted according to the style guidelines in appendix V: ''See the FREE Fuel Economy Guide at dealers or *www.fueleconomy.gov*''.

(10) If the label is separate from the Automobile Information Disclosure Act label, the vehicle description, as described in paragraph (d) of this section, located on the label such that it does not interfere with the other required information. In cases where the vehicle description information may not easily fit on the label, the manufacturer may request Administrator approval of modifications to the label format to accommodate this information.

(11) *Comparison fuel economy.* A graphic depiction of comparison fuel economy information, in the style and format given in appendix V of this part, containing the following elements:

(i) A bar that represents the total range of combined fuel economy for the applicable class of comparison fuel economy.

(ii) A downward pointing tail-less arrow, located at the top of the bar positioned on the bar where that vehicle's combined fuel economy falls relative to the range of comparable vehicles.

(iii) The combined fuel economy value for the vehicle as determined in § 600.210–08(c), located directly above the arrow.

(iv) The statement ''This Vehicle'' directly above the combined fuel economy number.

(vi)(A) For gasoline and diesel fuel vehicles, the statement ''Combined Fuel Economy'', located above the ''This Vehicle'' statement, and centered above the bar.

(B) For dual fuel vehicles, the statement ''Combined Gasoline [or ''Diesel'', as appropriate] Fuel Economy'', located above the ''This Vehicle'' statement, and centered above the bar, in two lines, if needed.

(C) For dedicated natural gas vehicles, the statement ''Combined Gasoline Equivalent Fuel Economy'', located above the ''This Vehicle'' statement, and centered above the bar, in two lines, if needed.

(v) The upper and lower MPG ranges for that class of vehicles, with the lower range shown directly to the left of the bar and the upper range directly to the right of the bar. The range values are those determined in accordance with § 600.311.

(vi) The statement ''All [name of the comparable vehicle class]s'', centered below the bar. The names of the comparable classes given in § 600.315–08 apply. For the purpose of presenting the name of the class on the label, the

following class names may be shortened as indicated: minicompact cars may be ''Minicompacts'', subcompact cars may be ''Subcompacts'', compact cars may be ''Compacts'', small station wagons may be ''Small Wagons'', midsize station wagons may be ''Midsize Wagons'', large station wagons may be ''Large Wagons'', small pickup trucks may be ''Small Pickups'', standard pickup trucks may be ''Standard Pickups'', and sport utility vehicles may be ''SUVs''.

(12)(i) The statement: ''Estimated Annual Fuel Cost:'' followed by the appropriate value calculated in accordance with paragraph (f) or (g) of this section and the statement ''based on [EPA-provided number of miles per paragraph (f) of this section] miles at [the EPA-provided dollar cost per gallon of the required fuel for that vehicle] per gallon of gasoline.'' The estimated annual fuel cost value for alcohol dual fuel automobiles and natural gas dual fuel vehicles to appear on the fuel economy label shall be that calculated based on operating the vehicle on gasoline or diesel fuel as determined in paragraphs (f) and (g) of this section.

(ii) At the manufacturer's option, the label may also contain the estimated annual fuel cost value based on operating the vehicle on the alternative fuel.

(13) The Gas Guzzler statement, when applicable (see paragraph (e) of this section), must be located on the bottom half of the label, either in the space reserved for alternate fuel information, or, if the vehicle is an alternate fuel vehicle, directly beneath this space.

(14) *Alternate fuel statement.* (i) For dedicated alternate fuel automobiles, the statement: ''* This vehicle operates on NATURAL GAS FUEL [or other alternate fuel as appropriate] only. Fuel economy is expressed in gasoline equivalent values.'' This statement is located on the right-hand bottom portion of the label. See appendix V of this part for details of location, size and format.

(ii) For dual fuel automobiles, the statement: ''*Fuel economy when operating on E85 [or other alternate fuel as appropriate] will yield different values than gasoline [or diesel as appropriate]. See Fuel Economy Guide for more information.'' Optionally, this statement may be replaced with the city, highway and combined fuel economy values using the alternate fuel, in a size and format specified in appendix V of this part.

(c) The city mpg number shall be displayed on the upper half of the left side of the label and the highway mpg number displayed on the upper half of the right side of the label. If the manufacturer chooses to enlarge the label from that specified in paragraph (a)(1) of this section, the logo and the fuel economy label values, including the titles ''CITY MPG'' and ''HIGHWAY MPG'', must be increased in the same proportion.

(d) Vehicle description information for general and specific labels.

(1) Where the fuel economy label is physically incorporated with the Motor Vehicle Information and Cost Savings Act label, the applicable vehicle description, as set forth in this paragraph, does not have to be repeated if the information is readily found on this label.

(2) For fuel economy labels which are physically separate from the Motor Vehicle Information and Cost Savings Act label, the vehicle description on general labels will be as follows:

(i) Model year;

(ii) Vehicle car line;

(iii) Engine displacement, in cubic inches, cubic centimeters, or liters whichever is consistent with the customary description of that engine;

(iv) Transmission class.

(v) Other descriptive information, as necessary, such as number of engine cylinders, to distinguish otherwise identical model types or, in the case of specific labels, vehicle configurations, as approved by the Administrator.

(e)(1) For fuel economy labels of passenger automobile model types requiring a tax statement under § 600.513–08, the phrase ''Gas Guzzler Tax'' followed by the dollar amount, in a size and format specified in appendix V of this part.

(2) The tax value required by this paragraph shall be based on the combined fuel economy value for the model type calculated in accordance with § 600.513–08 and rounded to the nearest 0.1 mpg.

(f) *Estimated annual fuel cost—general labels.* The annual fuel cost estimate for operating an automobile included in a model type shall be computed by using values for the fuel cost per gallon of the recommended fuel as specified by the manufacturer in the owner's manual and average annual mileage, predetermined by the Administrator, and the combined fuel economy determined in § 600.210(c).

(1) The annual fuel cost estimate for a model type is computed by multiplying:

(i) Fuel cost per gallon (natural gas must be expressed in units of cost per equivalent gallon, where 100 SCF = 0.823 equivalent gallons) expressed in dollars to the nearest 0.05 dollar; by

(ii) Average annual mileage, expressed in miles per year to the nearest 1,000 miles per year, by

(iii) The inverse of the combined fuel economy value determined in § 600.210–08(c) for a model type (as determined in § 600.210–08(a), rounded to the nearest 0.0001 gallons per mile (natural gas must be expressed in units of gallon equivalent per mile, where 100 SCF=0.823 equivalent gallons).

(2) The product computed in paragraph (f)(1) of this section and rounded to the nearest dollar per year will comprise the annual fuel cost estimate that appears on general labels for the model type.

(g) *Estimated annual fuel cost—specific labels.* (1) The annual fuel cost estimate for operating an automobile included in a vehicle configuration will be computed by using the values for the fuel cost per volume (gallon for liquid fuels, cubic feet for gaseous fuels) and average mileage and the fuel economy determined by multiplying:

(i) Fuel cost per gallon (natural gas must be expressed in units of cost per equivalent gallon, where 100 SCF=0.823 equivalent gallons) expressed in dollars to the nearest 0.05 dollar; by

(ii) Average annual mileage, expressed in miles per year to the nearest 1,000 miles per year, by

(iii) The inverse, rounded to the nearest 0.0001 gallons per mile (natural gas must be expressed in units of gallon equivalent per mile, where 100 SCF=0.823 equivalent gallons) of the combined fuel economy value determined in § 600.210–08(c) for a vehicle configuration (as determined in § 600.210–08(b).

(2) The product computed in paragraph (g)(1) of this section and rounded to the nearest dollar per year will comprise the annual fuel cost estimate that appears on specific labels for that vehicle configuration.

(h)–(j)

[71 FR 77949, Dec. 27, 2006, as amended at 74 FR 61552, Nov. 25, 2009. Redesignated and amended at 76 FR 39558, 39559, July 6, 2011]

### § 600.302–12 Fuel economy label—general provisions.

This section describes labeling requirements and specifications that apply to all vehicles. The requirements and specifications in this section and those in §§ 600.304 through 600.310 are illustrated in Appendix VI of this part.

(a) *Basic format.* Fuel economy labels must be rectangular in shape with a minimum width of 174 mm and a minimum height of 114 mm. The required label can be divided into three fields separated and outlined by a continuous border, as described in paragraphs (b) through (e) of this section.

(b) *Border.* Create a continuous black border to outline the label and separate the three information fields. Include the following information in the top and bottom portions of the border:

(1) In the left portion of the upper border, include ''EPA'' and ''DOT'' with a horizontal line in between (''EPA divided by DOT'').

(2) Immediately to the right of the Agency names, include the heading ''Fuel Economy and Environment''.

(3) Identify the vehicle's fuel type on the right-most portion of the upper border in a blue-colored field as follows:

(i) For vehicles designed to operate on a single fuel, identify the appropriate fuel. For example, identify the vehicle as ''Gasoline Vehicle'', ''Diesel Vehicle'', ''Compressed Natural Gas Vehicle'', ''Hydrogen Fuel Cell Vehicle'', etc. This includes hybrid electric vehicles that do not have plug-in capability. Include a logo corresponding to the fuel to the left of this designation as follows:

(A) For gasoline, include a fuel pump logo.

(B) For diesel fuel, include a fuel pump logo with a ''D'' inscribed in the base of the fuel pump.

(C) For natural gas, include the established CNG logo.

(D) For hydrogen fuel cells, include the expression ''$H_2$''.

(ii) Identify flexible-fuel vehicles and dual-fuel vehicles as ''Flexible-Fuel Vehicle Gasoline-Ethanol (E85)'', ''Flexible-Fuel Vehicle Diesel-Natural Gas'', etc. Include a fuel pump logo or a combination of logos to the left of this designation as appropriate. For example, for vehicles that operate on gasoline or ethanol, include a fuel pump logo and the designation ''E85''.

(iii) Identify plug-in hybrid electric vehicles as ''Plug-In Hybrid Vehicle Electricity-Gasoline'' or ''Plug-In Hybrid Vehicle Electricity-Diesel''. Include a fuel pump logo as specified in paragraph (b)(3)(i) of this section and an electric plug logo to the left of this designation.

(iv) Identify electric vehicles as ''Electric Vehicle''. Include an electric plug logo to the left of this designation.

(4) Include the following statement in the upper left portion of the lower border: ''Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets *a* MPG and costs $*b* to fuel over 5 years. Cost estimates are based on *c* miles per year at $*d* per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.'' For *a*, *b*, *c*, and *d*, insert the appropriate values established by EPA, including consideration of the type of fuel that is required for the vehicle. See §§ 600.303 through 600.310 for alternate statements that apply for vehicles that use a fuel other than gasoline or diesel fuel.

(5) In the lower left portion of the lower border, include the Web site reference, ''fueleconomy.gov'', and the following statement: ''Calculate personalized estimates and compare vehicles''.

(6) Include a field in the right-most portion of the lower border to allow for accessing interactive information with mobile electronic devices. To do this, include an image of a QR code that will direct mobile electronic devices to an EPA-specified Web site with fuel economy information. Generate the QR code as specified in ISO/IEC 18004 (incorporated by reference in § 600.011). To the left of the QR code, include the vertically oriented caption ''Smartphone QR Code™''.

(7) Along the lower edge of the lower border, to the left of the field with the QR Code, include the logos for EPA, the Department of Transportation, and the Department of Energy.

(c) *Fuel economy and cost values.* Include the following elements in the field at the top of the label:

(1) The elements specified in this paragraph (c)(1) for vehicles that run on gasoline or diesel fuel with no plug-in capability. See §§ 600.304 through 600.310 for specifications that apply for other vehicles.

(i) The heading ''Fuel Economy'' near the top left corner of the field.

(ii) The combined fuel economy value as determined in § 600.311 below the heading. Include the expression ''combined city/hwy'' below this number.

(iii) The fuel pump logo to the left of the combined fuel economy value. For diesel fuel, include a fuel pump logo with a ''D'' inscribed in the base of the fuel pump.

(iv) The units identifier and specific fuel economy values to the right of the combined fuel economy rating as follows:

(A) Include the term ''MPG'' in the upper portion of the designated space.

(B) Include the city fuel economy value determined in § 600.311 in the lower left portion of the designated space. Include the expression ''city'' below this number.

(C) Include the highway fuel economy value determined in § 600.311 in the lower right portion of the designated space. Include the expression ''highway'' below this number.

(v) The fuel consumption rate determined in § 600.311, below the combined fuel economy value, followed by the expression ''gallons per 100 miles''.

(2) In the upper middle portion of the field, include the following statement: ''_____ range from *x* to *y* MPG. The best vehicle rates *z* MPGe.'' Fill in the blank with the appropriate vehicle

class (such as Small SUVs). For *x*, *y*, and *z*, insert the appropriate values established by EPA.

(3) Include one of the following statements in the right side of the field:

(i) For vehicles with calculated fuel costs higher than the average vehicle as specified in § 600.311: ''You spend $*x* more in fuel costs over 5 years compared to the average new vehicle.'' Complete the statement by including the calculated increase in fuel costs as specified in § 600.311.

(ii) For all other vehicles: ''You save $*x* in fuel costs over 5 years compared to the average new vehicle.'' Complete the statement by including the calculated fuel savings as specified in § 600.311. Note that this includes fuel savings of $0.

(d) *Annual fuel cost.* Include the following statement in the field in the lower left portion of the label: ''Annual fuel cost $*x*''. Complete this statement using the value for annual fuel cost determined in § 600.311.

(e) *Performance ratings.* Include the following information in the field in the lower left portion of the label:

(1) The heading, ''Fuel Economy and Greenhouse Gas Rating (tailpipe only)'' in the top left corner of the field.

(2) A slider bar below the heading in the left portion of the field to characterize the vehicle's fuel economy and greenhouse gas ratings, as determined in § 600.311. Position a box with a downward-pointing wedge above the slider bar positioned to show where that vehicle's fuel economy rating falls relative to the total range; include the vehicle's fuel economy rating inside the box. If the greenhouse gas rating from § 600.311 is different than the fuel economy rating, position a second box with an upward-pointing wedge below the slider bar positioned to show where that vehicle's greenhouse gas rating falls relative to the total range; include the vehicle's greenhouse gas rating inside the box. Include the expression ''$CO_2$'' to the left of the box with the greenhouse gas rating and add the expression MPG to the left of the box with the fuel economy rating. Include the number 1 inside the border at the left end of the slider bar. Include the number 10 inside the border at the right end of the slider bar and add the term ''Best'' below the slider bar, directly under the number. EPA will periodically calculate and publish updated rating values as described in § 600.311. Add color to the slider bar such that it is blue at the left end of the range, white at the right end of the range, and shaded continuously across the range.

(3) The heading, ''Smog Rating (tailpipe only)'' in the top right corner of the field.

(4) Insert a slider bar in the right portion of the field to characterize the vehicle's level of emission control for ozone-related air pollutants relative to that of all vehicles. Position a box with a downward-pointing wedge above the slider bar positioned to show where that vehicle's emission rating falls relative to the total range. Include the vehicle's emission rating (as described in § 600.311) inside the box. Include the number 1 in the border at the left end of the slider bar; include the number 10 in the border at the right end of the slider bar and add the term ''Best'' below the slider bar, directly under the number. EPA will periodically calculate and publish updated range values as described in § 600.311. Add color to the slider bar such that it is blue at the left end of the range, white at the right end of the range, and shaded continuously across the range.

(5) The following statements below the slider bars: ''This vehicle emits *x* grams $CO_2$ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.gov.'' For *x*, insert the vehicle's composite $CO_2$ emission rate as described in § 600.311. See §§ 600.308 and 600.310 for specifications that apply for vehicles powered by electricity.

(f) *Vehicle description.* Where the fuel economy label is physically incorporated with the Motor Vehicle Information and Cost Savings Act label, no further vehicle description is needed. If the fuel economy label is separate from the Automobile Information Disclosure Act label, describe the vehicle in a location on the label that does not interfere with the other required information. In cases where the vehicle description may not easily fit on the label, the manufacturer may request

Administrator approval of modifications to the label format to accommodate this information. Include the following items in the vehicle description, if applicable:

(1) Model year.

(2) Vehicle car line.

(3) Engine displacement, in cubic inches, cubic centimeters, or liters whichever is consistent with the customary description of that engine.

(4) Transmission class.

(5) Other descriptive information, as necessary, such as number of engine cylinders, to distinguish otherwise identical model types or, in the case of specific labels, vehicle configurations, as approved by the Administrator.

(g) [Reserved]

(h) *Gas guzzler provisions.* For vehicles requiring a tax statement under § 600.513, add the phrase ''$*x* gas guzzler tax'', where $*x* is the value of the tax. The tax value required by this paragraph (h) is based on the combined fuel economy value for the model type calculated according to § 600.513 and rounded to the nearest 0.1 mpg.

(i) *Alternative label provisions for special cases.* The Administrator may approve modifications to the style guidelines if space is limited. The Administrator may also prescribe special label format and information requirements for vehicles that are not specifically described in this subpart, such as hydrogen-fueled internal combustion engines or hybrid electric vehicles that have engines operating on fuels other than gasoline or diesel fuel. The Administrator may also approve alternate wording of statements on the label if that is necessary or appropriate for a given fuel or combination of fuels. The revised labeling specifications will conform to the principles established in this subpart, with any appropriate modifications or additions to reflect the vehicle's unique characteristics. See 49 U.S.C. 32908(b)(1)(F).

(j) *Rounding.* Unless the regulation specifies otherwise, do not round intermediate values, but round final calculated values identified in this subpart to the nearest whole number.

(k) *Updating information.* EPA will periodically publish updated information that is needed to comply with the labeling requirements in this subpart. This includes the annual mileage rates and fuel-cost information, the ''best and worst'' values needed for calculating relative ratings for individual vehicles, and the various rating criteria as specified in § 600.311.

[76 FR 39559, July 6, 2011, as amended at 76 FR 57380, Sept. 15, 2011]

### § 600.303–12 Fuel economy label—special requirements for flexible-fuel vehicles.

Fuel economy labels for flexible-fuel vehicles must meet the specifications described in § 600.302, the modifications described in this section. This section describes how to label vehicles equipped with gasoline engines. If the vehicle has a diesel engine, all the references to ''gas'' or ''gasoline'' in this section are understood to refer to ''diesel'' or ''diesel fuel'', respectively.

(a) For qualifying vehicles, include the following additional sentence in the statement identified in § 600.302–12(b)(4): ''This is a dual fueled automobile.'' See the definition of ''dual fueled automobile'' in § 600.002.

(b) You may include fuel economy information as described in § 600.302–12(c)(1), or you may include the following elements instead:

(1) The heading ''Fuel Economy'' near the top left corner of the field.

(2) The combined fuel economy value as determined in § 600.311 below the heading. Include the expression ''combined city/hwy'' below this number.

(3) The fuel pump logo and other logos as specified in § 600.302–12(b)(3)(ii) to the left of the combined fuel economy value.

(4) The units identifier and specific fuel economy values to the right of the combined fuel economy value as follows:

(i) Include the term ''MPG'' in the upper portion of the designated space.

(ii) Include the city fuel economy value determined in § 600.311 in the lower left portion of the designated space. Include the expression ''city'' below this number.

(iii) Include the highway fuel economy value determined in § 600.311 in the lower right portion of the designated space. Include the expression ''highway'' below this number.

(5) The fuel consumption rate determined in § 600.311, to the right of the fuel economy information. Include the expression ''gallons per 100 miles'' below the numerical value.

(6) The sub-heading ''Driving Range'' below the combined fuel economy value, with range bars below this sub-heading as follows:

(i) Insert a horizontal range bar nominally 80 mm long to show how far the vehicle can drive from a full tank of gasoline. Include a vehicle logo at the right end of the range bar. Include the following left-justified expression inside the range bar: ''Gasoline: *x* miles''. Complete the expression by identifying the appropriate value for total driving range from § 600.311.

(ii) Insert a second horizontal range bar as described in paragraph (b)(7)(i) of this section that shows how far the vehicle can drive from a full tank with the second fuel. Establish the length of the line based on the proportion of driving ranges for the different fuels. Identify the appropriate fuel in the range bar.

(c) Add the following statement after the statements described in § 600.302–12(c)(2): ''Values are based on gasoline and do not reflect performance and ratings based on E85.'' Adjust this statement as appropriate for vehicles designed to operate on different fuels.

[76 FR 39561, July 6, 2011]

### § 600.304–12 Fuel economy label—special requirements for hydrogen fuel cell vehicles.

Fuel economy labels for hydrogen fuel cell vehicles must meet the specifications described in § 600.302, with the following modifications:

(a) Include the following statement instead of the statement specified in § 600.302–12(b)(4): ''Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets *a* MPG and costs $*b* to fuel over 5 years. Cost estimates are based on *c* miles per year at $*d* per kilogram of hydrogen. Vehicle emissions are a significant cause of global warming and smog.'' For *a*, *b*, *c*, and *d*, insert the appropriate values established by EPA.

(b) Include the following elements instead of the information identified in § 600.302–12(c)(1):

(1) The heading ''Fuel Economy'' near the top left corner of the field.

(2) The combined fuel economy value as determined in § 600.311 below the heading. Include the expression ''combined city/hwy'' below this number.

(3) The logo specified in § 600.302–12(b)(3)(ii) to the left of the combined fuel economy value.

(4) The units identifier and specific fuel economy values to the right of the combined fuel economy value as follows:

(i) Include the term ''MPGe'' in the upper portion of the designated space.

(ii) Include the city fuel economy value determined in § 600.311 in the lower left portion of the designated space. Include the expression ''city'' below this number.

(iii) Include the highway fuel economy value determined in § 600.311 in the lower right portion of the designated space. Include the expression ''highway'' below this number.

(5) The fuel consumption rate determined in § 600.311, to the right of the fuel economy information. Include the expression ''kg $H_2$ per 100 miles'' below the numerical value.

(6) The sub-heading ''Driving Range'' below the combined fuel economy value. Below this sub-heading, insert a horizontal range bar nominally 80 mm long to show how far the vehicle can drive when fully fueled. Include a vehicle logo at the right end of the range bar. Include the following left-justified expression inside the range bar: ''When fully fueled, vehicle can travel about * * *''. Below the right end of the range bar, include the expression ''*x* miles''; complete the expression by identifying the appropriate value for total driving range from § 600.311. Include numbers below the bar showing the scale, with numbers starting at 0 and increasing in equal increments. Use good engineering judgment to divide the range bar into four, five, or six increments.

[76 FR 39561, July 6, 2011]

**§ 600.306–12 Fuel economy label—special requirements for compressed natural gas vehicles.**

Fuel economy labels for dedicated natural gas vehicles must meet the specifications described in § 600.302, with the following modifications:

(a) Include the following statement instead of the statement specified in § 600.302–12(b)(4): ''Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets *a* MPG and costs $*b* to fuel over 5 years. Cost estimates are based on *c* miles per year at $*d* per gasoline gallon equivalent. Vehicle emissions are a significant cause of global warming and smog.'' For *a*, *b*, *c*, and *d*, insert the appropriate values established by EPA.

(b) Include the following elements instead of the information identified in § 600.302–12(c)(1):

(1) The heading ''Fuel Economy'' near the top left corner of the field.

(2) The combined fuel economy value as determined in § 600.311 below the heading. Include the expression ''combined city/hwy'' below this number.

(3) The logo specified in § 600.302–12(b)(3)(ii) to the left of the combined fuel economy value.

(4) The units identifier and specific fuel economy ratings to the right of the combined fuel economy value as follows:

(i) Include the term ''MPGe'' in the upper portion of the designated space.

(ii) Include the city fuel economy value determined in § 600.311 in the lower left portion of the designated space. Include the expression ''city'' below this number.

(iii) Include the highway fuel economy value determined in § 600.311 in the lower right portion of the designated space. Include the expression ''highway'' below this number.

(5) The fuel consumption rate determined in § 600.311, to the right of the fuel economy information. Include the expression ''equivalent gallons per 100 miles'' below the numerical value.

(6) The sub-heading ''Driving Range'' below the combined fuel economy value. Below this sub-heading, insert a horizontal range bar nominally 80 mm long to show how far the vehicle can drive when fully fueled. Include a vehicle logo at the right end of the range bar. Include the following left-justified expression inside the range bar: ''When fully fueled, vehicle can travel about * * *''''. Below the right end of the range bar, include the expression ''*x* miles''; complete the expression by identifying the appropriate value for total driving range from § 600.311. Include numbers below the bar showing the scale, with numbers starting at 0 and increasing in equal increments. Use good engineering judgment to divide the range bar into four, five, or six increments.

[76 FR 39562, July 6, 2011]

**§ 600.308–12 Fuel economy label format requirements—plug-in hybrid electric vehicles.**

Fuel economy labels for plug-in hybrid electric vehicles must meet the specifications described in § 600.302, with the exceptions and additional specifications described in this section. This section describes how to label vehicles equipped with gasoline engines. If the vehicle has a diesel engine, all the references to ''gas'' or ''gasoline'' in this section are understood to refer to ''diesel'' or ''diesel fuel'', respectively.

(a) Include the following statement instead of the statement specified in § 600.302–12(b)(4): ''Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets *a* MPG and costs $*b* to fuel over 5 years. Cost estimates are based on *c* miles per year at $*d* per gallon and $*e* per kW-hr. Vehicle emissions are a significant cause of global warming and smog.'' For *a*, *b*, *c*, *d*, and *e*, insert the appropriate values established by EPA. For qualifying vehicles, include the following additional sentence: ''This is a dual fueled automobile.'' See the definition of ''dual fueled automobile in § 600.002.

(b) Include the following elements instead of the information identified in § 600.302–12(c)(1):

(1) The heading ''Fuel Economy'' near the top left corner of the field. Include the statement specified in § 600.312–12(c)(2) to the right of the heading.

(2) An outlined box below the heading with the following information:

(i) The sub-heading ''Electricity'' if the vehicle's engine starts only after the battery is fully discharged, or ''Electricity + Gasoline'' if the vehicle uses combined power from the battery and the engine before the battery is fully discharged.

(ii) The expression ''Charge Time: $x$ hours (240V)'' below the sub-heading, where $x$ is the time to charge the battery as specified in § 600.311. Change the specified voltage if appropriate as specified in § 600.311.

(iii) The combined fuel economy value for the charge-depleting mode of operation as determined in § 600.311 below the charge time. Include the expression ''combined city/highway'' below this number.

(iv) An electric plug logo to the left of the combined fuel economy value. For vehicles that use combined power from the battery and the engine before the battery is fully discharged, also include the fuel pump logo.

(v) The units identifier and consumption ratings to the right of the combined fuel economy value as follows:

(A) Include the term ''MPGe'' in the upper portion of the designated space.

(B) If the vehicle's engine starts only after the battery is fully discharged, identify the vehicle's electricity consumption rate as specified in § 600.311. Below the number, include the expression: ''kW-hrs per 100 miles''.

(C) If the vehicle uses combined power from the battery and the engine before the battery is fully discharged, identify the vehicle's gasoline consumption rate as specified in § 600.311; to the right of this number, include the expression: ''gallons per 100 miles''. Below the gasoline consumption rate, identify the vehicle's electricity consumption rate as specified in § 600.311; to the right of this number, include the expression: ''kW-hrs per 100 miles''.

(3) A second outlined box to the right of the box described in paragraph (b)(2) of this section with the following information:

(i) The sub-heading ''Gasoline Only''.

(ii) The combined fuel economy value for operation after the battery is fully discharged as determined in § 600.311 below the sub-heading. Include the expression ''combined city/highway'' below this number.

(iii) A fuel pump logo to the left of the combined fuel economy value.

(iv) The units identifier and consumption rating to the right of the combined fuel economy value as follows:

(A) Include the term ''MPG'' in the upper portion of the designated space.

(B) Identify the vehicle's gasoline consumption rate as specified in § 600.311.

Below this number, include the expression: ''gallons per 100 miles''.

(4) Insert a horizontal range bar below the boxes specified in paragraphs (b)(2) and

(3) of this section that shows how far the vehicle can drive before the battery is fully discharged, and also how far the vehicle can drive before running out of fuel, as described in § 600.311. Scale the range bar such that the driving range at the point of fully discharging the battery is directly between the two boxes. Identify the driving range up to fully discharging the battery underneath that point on the range bar (e.g., ''50 miles''). Use solid black for the gasoline-only portion of the range bar. Include the left-justified expression ''Gasoline only'' in the gasoline-only portion of the range bar. Similarly, in the electric portion of the range bar, include the left-justified expression ''All electric range'' if the vehicle's engine starts only after the battery is fully discharged, or ''Electricity + Gasoline'' if the vehicle uses combined power from the battery and the engine before the battery is fully discharged. Include a vehicle logo at the right end of the range bar. Extend an arrow from the battery portion of the range bar up to the right side of the box described in paragraph (b)(2) of this section. Similarly, extend an arrow from the gasoline-only portion of the range bar up to the left side of the box described in paragraph (b)(3) of this section. Include numbers below the bar showing the scale, with at least three evenly spaced increments to cover operation before the battery is fully discharged. Include one more increment using that same scale into the gasoline-only portion of the range bar. Indicate a broken line toward the right end

of the range bar, followed by the vehicle's total driving distance before running out of fuel, as described in § 600.311. Adjust the scale and length of the range bar if the specifications in this paragraph (a)(5) do not work for your vehicle. Include a left-justified heading above the range bar with the expression: ''Driving Range''. For vehicles that use combined power from the battery and the engine before the battery is fully discharged, add the following statement below the range bar described in this paragraph (b)(4): ''All electric range = x miles''; complete the expression by identifying the appropriate value for driving range starting from a full battery before the engine starts as described in § 600.311.

(c) Include the following statement instead of the one identified in § 600.302–12(c)(5): ''This vehicle emits *x* grams $CO_2$ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel and electricity also create emissions; learn more at fueleconomy.gov.'' For *x*, insert the vehicle's composite $CO_2$ emission rate as described in § 600.311.

[76 FR 39562, July 6, 2011]

### § 600.310–12 Fuel economy label format requirements—electric vehicles.

Fuel economy labels for electric vehicles must meet the specifications described in § 600.302, with the following modifications:

(a) Include the following statement instead of the statement specified in § 600.302–12(b)(4): ''Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets *a* MPG and costs $*b* to fuel over 5 years. Cost estimates are based on *c* miles per year at $*d* per kW-hr. Vehicle emissions are a significant cause of global warming and smog.'' For *a*, *b*, *c*, and *d*, insert the appropriate values established by EPA.

(b) Include the following elements instead of the information identified in § 600.302–12(c)(1):

(1) The heading ''Fuel Economy'' near the top left corner of the field.

(2) The combined fuel economy value as determined in § 600.311 below the heading. Include the expression ''combined city/hwy'' below this number.

(3) An electric plug logo to the left of the combined fuel economy value.

(4) The units identifier and specific fuel economy values to the right of the combined fuel economy value as follows:

(i) Include the term ''MPGe'' in the upper portion of the designated space.

(ii) Include the city fuel economy value determined in § 600.311 in the lower left portion of the designated space. Include the expression ''city'' below this number.

(iii) Include the highway fuel economy value determined in § 600.311 in the lower right portion of the designated space. Include the expression ''highway'' below this number.

(5) The fuel consumption rate determined in § 600.311, to the right of the fuel economy information. Include the expression ''kW-hrs per 100 miles'' below the numerical value.

(6) The sub-heading ''Driving Range'' below the combined fuel economy value. Below this sub-heading, insert a horizontal range bar nominally 80 mm long to show how far the vehicle can drive when fully fueled. Include a vehicle logo at the right end of the range bar. Include the following left-justified expression inside the range bar: ''When fully charged, vehicle can travel about * * *''. Below the right end of the range bar, include the expression ''*x* miles''; complete the expression by identifying the appropriate value for total driving range from § 600.311. Include numbers below the bar showing the scale, with numbers starting at 0 and increasing in equal increments. Use good engineering judgment to divide the range bar into four, five, or six increments.

(7) Below the driving range information, the expression ''Charge Time: *x* hours (240V)'', where *x* is the time to charge the battery as specified in § 600.311. Change the specified voltage if appropriate as specified in § 600.311.

(c) Include the following statement instead of the one identified in § 600.302–12(c)(5): ''This vehicle emits *x* grams $CO_2$ per mile. The best emits 0 grams per mile (tailpipe only). Does not include emissions from generating electricity; learn more at

fueleconomy.gov.'' For $x$, insert the vehicle's composite $CO_2$ emission rate as described in § 600.311.

[76 FR 39563, July 6, 2011]

### § 600.311–08 Range of fuel economy for comparable automobiles.

(a) The Administrator will determine the range of combined fuel economy values for each class of comparable automobiles comprising the maximum and minimum combined fuel economy values for all general labels as determined in § 600.210–08(c).

(b)(1) The ranges for a model year will be made available on a date specified by the Administrator that closely coincides to the date of the general model introduction for the industry.

(2) If the Administrator has not made available the fuel economy ranges prior to the model introduction, the ranges from the previous model year must be used.

(3) For 2008 model year automobiles manufactured or imported prior to the date specified in § 600.306–08(b), the Administrator will provide initial fuel economy ranges based upon data from 2007 models that have been adjusted in accordance with the derived 5-cycle calculations in § 600.210–08.

(c) If the Administrator determines that automobiles intended for sale in California are likely to exhibit significant differences in fuel economy from those intended for sale in other states, he/she will compute separate ranges of fuel economy values for each class of automobiles for California and for the other states.

(d) For high altitude vehicles determined under § 600.310, both general and specific labels will contain the range of comparable fuel economy computed in this section.

(e) The manufacturer shall include the appropriate range of fuel economy determined by the Administrator in paragraph (b) of this section, on each label affixed to an automobile within the class, except as provided in § 600.306(b)(1).

[71 FR 77951, Dec. 27, 2006]

### § 600.311–12 Determination of values for fuel economy labels.

(a) *Fuel economy*. Determine city and highway fuel economy values as described in § 600.210–12(a) and (b). Determine combined fuel economy values as described in § 600.210–12(c). Note that the label for plug-in hybrid electric vehicles requires separate values for combined fuel economy for vehicle operation before and after the vehicle's battery is fully discharged; we generally refer to these modes as ''Blended Electric+Gas'' (or ''Electric Only'', as applicable) and ''Gas only''.

(b) $CO_2$ emission rate. Determine the engine-related $CO_2$ emission rate as described in § 600.210–12(d).

(c) *Fuel consumption rate*. Calculate the fuel consumption rate as follows:

(1) For vehicles with engines that are not plug-in hybrid electric vehicles, calculate the fuel consumption rate in gallons per 100 miles (or gasoline gallon equivalent per 100 miles for fuels other than gasoline or diesel fuel) with the following formula, rounded to the first decimal place:

$$\text{Fuel Consumption Rate} = 100/MPG$$

Where:

MPG = The unrounded value for combined fuel economy from § 600.210–12(c).

(2) For plug-in hybrid electric vehicles, calculate two separate fuel consumption rates as follows:

(i) Calculate the fuel consumption rate based on engine operation after the battery is fully discharged as described in paragraph (c)(1) of this section.

(ii) Calculate the fuel consumption rate during operation before the battery is fully discharged in kW-hours per 100 miles as described in SAE J1711 (incorporated by reference in § 600.011), as described in § 600.116.

(3) For electric vehicles, calculate the fuel consumption rate in kW-hours per 100 miles with the following formula, rounded to the nearest whole number:

$$\text{Fuel Consumption Rate} = 100/MPG$$

Where:

MPG = The combined fuel economy value from paragraph (a) of this section, in miles per kW-hour.

(4) For hydrogen fuel cell vehicles, calculate the fuel consumption rate in kilograms of hydrogen per 100 miles with the following formula, rounded to the nearest whole number:

Fuel Consumption Rate = 100/MPG

Where:

MPG = The combined fuel economy value from paragraph (a) of this section, in miles per kilogram of hydrogen.

(d) *Fuel economy and greenhouse gas ratings.* Determine a vehicle's fuel economy and greenhouse gas ratings as follows:

(1) For gasoline-fueled vehicles that are not plug-in hybrid electric vehicles (including flexible fuel vehicles that operate on gasoline), establish a single rating based only on the vehicle's combined fuel economy from paragraph (a) of this section. For all other vehicles, establish a fuel economy rating based on the vehicle's combined fuel economy and establish a separate greenhouse gas rating based on combined $CO_2$ emission rates from paragraph (b) of this section.

(2) We will establish the fuel economy rating based on fuel consumption values specified in paragraph (c) of this section. We will establish the value dividing the 5 and 6 ratings based on the fuel consumption corresponding to the projected achieved Corporate Average Fuel Economy level for the applicable model year. This is intended to prevent below-average vehicles from getting an above-average fuel economy rating for the label. We will establish the remaining cutpoints based on a statistical evaluation of available information from the certification database for all model types. Specifically, the mean value plus two standard deviations will define the point between the 1 and 2 ratings. The mean value minus two standard deviations will define the point between the 9 and 10 ratings. The 1 rating will apply for any vehicle with higher fuel consumption rates than the 2 rating; similarly, the 10 rating will apply for any vehicle with lower fuel consumption rates than the 9 rating. We will calculate range values for the remaining intermediate ratings by dividing the range into equal intervals. We will convert the resulting range intervals to equivalent miles-per-gallon values. We will define the greenhouse gas ratings by converting the values from the fuel economy rating intervals to equivalent $CO_2$ emission rates using the conventional conversion factor for gasoline (8887 g $CO_2$ per gallon of consumed fuel).

(e) *Annual fuel cost.* Calculate annual fuel costs as follows:

(1) Except as specified in paragraph (e)(3) of this section, calculate the total annual fuel cost with the following formula, rounded to nearest $50:

Annual Fuel Cost = Fuel Price/MPG × Average Annual Miles

Where:

Fuel Price = The estimated fuel price provided by EPA for the type of fuel required for the vehicle. The units are dollars per gallon for gasoline and diesel fuel, dollars per gasoline gallon equivalent for natural gas, dollars per kW-hr for plug-in electricity, and dollars per kilogram of hydrogen for hydrogen fuel cell vehicles.

MPG = The combined fuel economy value from paragraph (a) of this section. The units are miles per gallon for gasoline and diesel fuel, miles per gasoline gallon equivalent for natural gas, miles per kW-hr for plug-in electricity, and miles per kilogram of hydrogen for hydrogen fuel cell vehicles.

Average Annual Miles = The estimated annual mileage figure provided by EPA, in miles.

(2) For dual fuel vehicles and flexible fuel vehicles, disregard operation on the alternative fuel.

(3) For plug-in hybrid electric vehicles, calculate annual fuel cost as described in this paragraph (e)(3). This description applies for vehicles whose engine starts only after the battery is fully discharged. Use good engineering judgment to extrapolate this for calculating annual fuel cost for vehicles that use combined power from the battery and the engine before the battery is fully discharged. Calculate annual fuel cost as follows:

(i) Determine the charge-depleting ranges for city and highway operation as described in paragraph (j)(4)(i) of this section. Adjust each of these values for 5-cycle operation.

(ii) Calculate multi-day individual utility factors (UF) as described in § 600.116 corresponding to the driving

ranges from paragraph (e)(3)(i) of this section.

(iii) Calculate values for the vehicle's average fuel economy over the charge-depleting range (in miles per kW-hr) for city and highway operation as described in § 600.210. Adjust each of these values for 5-cycle operation. Convert these to $/mile values by dividing the appropriate fuel price from paragraph (e)(1) of this section by the average fuel economy determined in this paragraph (e)(3)(iii).

(iv) Calculate values for the vehicle's average fuel economy over the charge-sustaining range (in miles per gallon) for city and highway operation as described in § 600.210–12. Adjust each of these values for 5-cycle operation. Convert these to $/mile values by dividing the appropriate fuel price from paragraph (e)(1) of this section by the average fuel economy determined in this paragraph (e)(3)(iv).

(v) Calculate a composite $/mile value for city driving using the following equation:

$$\$/\text{mile} = \$/\text{mile}_{CD} \times UF + \$/\text{mile}_{CS} \times (1-UF)$$

(vi) Repeat the calculation in paragraph (e)(3)(v) of this section for highway driving.

(vii) Calculate the annual fuel cost based the combined values for city and highway driving using the following equation:

$$\text{Annual fuel cost} = (\$/\text{mile}_{city} \times 0.55 + \$/\text{mile}_{hwy} \times 0.45) \times \text{Average Annual Miles}$$

(f) *Fuel savings*. Calculate an estimated five-year cost increment relative to an average vehicle by multiplying the annual fuel cost from paragraph (e) of this section by 5 and subtracting this value from the average five-year fuel cost. We will calculate the average five-year fuel cost from the annual fuel cost equation in paragraph (e) of this section based on a gasoline-fueled vehicle with a mean fuel economy value, consistent with the value dividing the 5 and 6 ratings under paragraph (d) of this section. The average five-year fuel cost for model year 2012 is $12,600 for a 22-mpg vehicle that drives 15,000 miles per year with gasoline priced at $3.70 per gallon. We may periodically update this five year reference fuel cost for later model years to better characterize the fuel economy for an average vehicle. Round the calculated five-year cost increment to the nearest $50. Negative values represent a cost increase compared to the average vehicle.

(g) *Smog rating*. Establish a rating for exhaust emissions other than $CO_2$ based on the applicable emission standards as shown in Table 2 of this section. For Independent Commercial Importers that import vehicles not subject to Tier 2 emission standards, the vehicle's smog rating is 1. If EPA or California emission standards change in the future, we may revise the emission levels corresponding to each rating for future model years as appropriate to reflect the changed standards. If this occurs, we would publish the revised ratings as described in § 600.302–12(k), allowing sufficient lead time to make the changes; we would also expect to initiate a rulemaking to update the smog rating in the regulation.

TABLE 1 TO § 600.311–12—CRITERIA FOR ESTABLISHING SMOG RATING

| Rating | U.S. EPA Tier 2 emission standard | California Air Resources Board LEV II emission standard |
|---|---|---|
| 1 | — | ULEV &LEV II large trucks |
| 2 | Bin 8 | SULEV II large trucks |
| 3 | Bin 7 | — |
| 4 | Bin 6 | LEV II, option 1 |
| 5 | Bin 5 | LEV II |
| 6 | Bin 4 | ULEV II |
| 7 | Bin 3 | — |
| 8 | Bin 2 | SULEV II |
| 9 | — | PZEV |
| 10 | Bin 1 | ZEV |

(h) *Ranges of fuel economy and $CO_2$ emission values*. We will determine the range of combined fuel economy and $CO_2$ emission values for each vehicle class identified in § 600.315. We will generally update these range values before the start of each model year based on the lowest and highest values within each vehicle class. We will also use this same information to establish a range of fuel economy values for all vehicles. Continue to use the most recently published numbers until we update them, even if you start a new model year before we publish the range values for the new model year.

(i) [Reserved]

(j) *Driving range.* Determine the driving range for certain vehicles as follows:

(1) For vehicles operating on nonpressurized liquid fuels, determine the vehicle's driving range in miles by multiplying the combined fuel economy described in paragraph (a) of this section by the vehicle's usable fuel storage capacity, rounded to the nearest whole number.

(2) For electric vehicles, determine the vehicle's overall driving range as described in Section 8 of SAE J1634 (incorporated by reference in § 600.011), as described in § 600.116. Determine separate range values for FTP-based city and HFET-based highway driving, then calculate a combined value by arithmetically averaging the two values, weighted 0.55 and 0.45 respectively, and rounding to the nearest whole number.

(3) For natural gas vehicles, determine the vehicle's driving range in miles by multiplying the combined fuel economy described in paragraph (a) of this section by the vehicle's usable fuel storage capacity (expressed in gasoline gallon equivalents), rounded to the nearest whole number.

(4) For plug-in hybrid electric vehicles, determine the battery driving range and overall driving range as described in SAE J1711 (incorporated by reference in § 600.011), as described in § 600.116, as follows:

(i) Determine the vehicle's Actual Charge-Depleting Range, $R_{cda}$. Determine separate range values for FTP-based city and HFET-based highway driving, then calculate a combined value by arithmetically averaging the two values, weighted 0.55 and 0.45 respectively, and rounding to the nearest whole number. Precondition the vehicle as needed to minimize engine operation for consuming stored fuel vapors in evaporative canisters; for example, you may purge the evaporative canister or time a refueling event to avoid engine starting related to purging the canister. For vehicles that use combined power from the battery and the engine before the battery is fully discharged, also use this procedure to establish an all electric range by determining the distance the vehicle drives before the engine starts, rounded to the nearest mile. You may represent this as a range of values. We may approve adjustments to these procedures if they are necessary to properly characterize a vehicle's all electric range.

(ii) Use good engineering judgment to calculate the vehicle's operating distance before the fuel tank is empty when starting with a full fuel tank and a fully charged battery, consistent with the procedure and calculation specified in this paragraph (j), rounded to the nearest 10 miles.

(5) For hydrogen fuel cell vehicles, determine the vehicle's driving range in miles by multiplying the combined fuel economy described in paragraph (a) of this section by the vehicle's usable fuel storage capacity (expressed in kilograms of hydrogen), rounded to the nearest whole number.

(k) *Charge time.* For electric vehicles, determine the time it takes to fully charge the battery from a 240 volt power source to the point that the battery meets the manufacturer's end-of-charge criteria, consistent with the procedures specified in SAE J1634 (incorporated by reference in § 600.011) for electric vehicles and in SAE J1711 (incorporated by reference in § 600.011) for plug-in hybrid electric vehicles, as described in § 600.116. This value may be more or less than the 12-hour minimum charging time specified for testing. You must alternatively specify the charge time based on a standard 120 volt power source if the vehicle cannot be charged at the higher voltage.

(l) *California-specific values.* If the Administrator determines that automobiles intended for sale in California are likely to exhibit significant differences in fuel economy or other label values from those intended for sale in other states, the Administrator will compute separate values for each class of automobiles for California and for the other states.

[76 FR 39563, July 6, 2011, as amended at 76 FR 57380, Sept. 15, 2011]

### § 600.312–08 Labeling, reporting, and recordkeeping; Administrator reviews.

(a)(1) The manufacturer shall determine label values (general and specific) using the procedures specified in subparts C and D of this part and submit

the label values, and the data sufficient to calculate the label values, to the Administrator according to the timetable specified in § 600.313.

(2) Except under paragraph (a)(4) of this section, the manufacturer is not required to obtain Administrator approval of label values prior to the introduction of vehicles for sale.

(3) The label values that the manufacturer calculates and submits under paragraph (a)(1) of this section shall constitute the EPA fuel economy estimates unless the Administrator determines that they are not calculated according to the procedures specified in subparts C and D of this part.

(4) If required by the Administrator, the manufacturer shall obtain Administrator approval of label values prior to affixing labels to vehicles.

(5)(i) If at any time during the model year, any label values are determined not to be calculated according to the procedures specified in subparts C and D of this part, the Administrator shall notify the manufacturer in writing.

(ii) If the Administrator has sufficient information to enable calculation of the correct label values, this notification shall specify the correct label values which constitute the EPA Fuel Economy Estimates.

(iii) If additional information is required, the Administrator shall request such additional information and a recalculation of the label value by the manufacturer.

(6) If the Administrator determines revised label values under paragraph (a)(5) of this section are lower than the label values calculated by the manufacturer, the manufacturer shall affix the revised labels to all affected new vehicles which are unsold beginning no later than 15 calendar days after the date of notification by the Administrator.

(b)(1) The manufacturer is responsible for affixing vehicle labels that meet the format and content requirements of this subpart.

(2) The manufacturer shall retain for examination, at the Administrator's discretion, typical label formats representing all information required on the manufacturer's fuel economy labels. The information shall include the text of all required and voluntary information as well as the size and color of print and paper, spacing, and location of all printed information. Where the fuel economy label is incorporated with the Automobile Information Disclosure Act label, the above requirements pertain to those sections of the label concerning fuel economy labeling information.

(3) If the Administrator determines upon examination of record that the label format or content do not meet the requirements of this subpart, the Administrator may:

(i) Require the manufacturer to make specific changes in subsequent labels, and

(ii) Require such changes to be implemented on a reasonable timetable, but no sooner than 15 days from the date of notification to the manufacturer.

[49 FR 13852, Apr. 6, 1984. Redesignated at 76 FR 39558, July 6, 2011]

### § 600.313–08 Timetable for data and information submittal and review.

(a) A manufacturer shall submit to the Administrator fuel economy label values and sufficient information to determine fuel economy label values within the following time constraints (except for manufacturers designated under § 600.312(a)(4) who shall submit the information no later than thirty calendar days prior to the date the model type [vehicle] is initially offered for sale.

(1) For initial general label values, no later than five working days before the date that the model type is initially offered for sale;

(2) For specific label values, no later than five working days before any vehicles are offered for sale;

(3) For model types having label values updated because of running changes (as required under § 600.314(b)), the submission must be made at least five working days before the date of implementation of the running change.

(b) A manufacturer may not proceed with any label calculation until the data from each vehicle used in such calculation satisfies the requirements of § 600.008, except as allowed under the provisions of § 600.314–01(e) and approved by the Administrator.

(c) If the Administrator has waived any testing in paragraph (b) of this section and subsequently finds that the decision to waive testing was based on an incorrect data submission or that a fuel economy offset exists (based on subsequent testing of that manufacturer's product line), the Administrator may require confirmation of the data generated by any such waived vehicle.

[64 FR 23975, May 4, 1999. Redesignated at 76 FR 39558, July 6, 2011]

### § 600.314–08 Updating label values, annual fuel cost, Gas Guzzler Tax, and range of fuel economy for comparable automobiles.

(a) The label values established in § 600.312 shall remain in effect for the model year unless updated in accordance with paragraph (b) of this section.

(b)(1) The manufacturer shall recalculate the model type fuel economy values for any model type containing base levels affected by running changes specified in § 600.507.

(2) For separate model types created in § 600.209–08(a)(2) or § 600.209–12(a)(2), the manufacturer shall recalculate the model type values for any additions or deletions of subconfigurations to the model type. Minimum data requirements specified in § 600.010(c) shall be met prior to recalculation.

(3) Label value recalculations shall be performed as follows:

(i) The manufacturer shall use updated total model year projected sales for label value recalculations.

(ii) All model year data approved by the Administrator at the time of the recalculation for that model type shall be included in the recalculation.

(iii) Using the additional data under this paragraph (b), the manufacturer shall calculate new model type city and highway values in accordance with § 600.210 except that the values shall be rounded to the nearest 0.1 mpg.

(iv) The existing label values, calculated in accordance with § 600.210, shall be rounded to the nearest 0.1 mpg.

(4)(i) If the recalculated city or highway fuel economy value in paragraph (b)(3)(iii) of this section is less than the respective city or highway value in paragraph (b)(3)(iv) of this section by 1.0 mpg or more, the manufacturer shall affix labels with the recalculated model type values (rounded to the nearest whole mpg) to all new vehicles of that model type beginning on the day of implementation of the running change.

(ii) If the recalculated city or highway fuel economy value in paragraph (b)(3)(iii) of this section is higher than the respective city or highway value in paragraph (b)(3)(iv) of this section by 1.0 mpg or more, then the manufacturer has the option to use the recalculated values for labeling the entire model type beginning on the day of implementation of the running change.

(c) For fuel economy labels updated using recalculated fuel economy values determined in accordance with paragraph (b) of this section, the manufacturer shall concurrently update all other label information (e.g., the annual fuel cost, range of comparable vehicles and the applicability of the Gas Guzzler Tax as needed).

(d) The Administrator shall periodically update the range of fuel economies of comparable automobiles based upon all label data supplied to the Administrator.

(e) The manufacturer may request permission from the Administrator to calculate and use label values based on test data from vehicles which have not completed the Administrator-ordered confirmatory testing required under the provisions of § 600.008–08(b). If the Administrator approves such a calculation the following procedures shall be used to determine if relabeling is required after the confirmatory testing is completed.

(1) The Administrator-ordered confirmatory testing shall be completed as quickly as possible.

(2) Using the additional data under paragraph (e)(1) of this section, the manufacturer shall calculate new model type city and highway values in accordance with §§ 600.207 and 600.210 except that the values shall be rounded to the nearest 0.1 mpg.

(3) The existing label values, calculated in accordance with § 600.210, shall be rounded to the nearest 0.1 mpg.

(4) The manufacturer may need to revise fuel economy labels as follows:

(i) If the recalculated city or highway fuel economy value in paragraph (b)(3)(iii) of this section is less than the

respective city or highway value in paragraph (b)(3)(iv) of this section by 0.5 mpg or more, the manufacturer shall affix labels with the recalculated model type MPG values (rounded to the nearest whole number) to all new vehicles of that model type beginning 15 days after the completion of the confirmatory test.

(ii) If both the recalculated city or highway fuel economy value in paragraph (b)(3)(iii) of this section is less than the respective city or highway value in paragraph (b)(3)(iv) of this section by 0.1 mpg or more and the recalculated gas guzzler tax rate determined under the provisions of § 600.513–08 is larger, the manufacturer shall affix labels with the recalculated model type values and gas guzzler tax statement and rates to all new vehicles of that model type beginning 15 days after the completion of the confirmatory test.

(5) For fuel economy labels updated using recalculated fuel economy values determined in accordance with paragraph (e)(4) of this section, the manufacturer shall concurrently update all other label information (e.g., the annual fuel cost, range of comparable vehicles and the applicability of the Gas Guzzler Tax if required by Department of Treasury regulations).

[76 FR 39565, July 6, 2011]

### § 600.315–08 Classes of comparable automobiles.

(a) The Secretary will classify automobiles as passenger automobiles or light trucks (nonpassenger automobiles) in accordance with 49 CFR part 523.

(1) The Administrator will classify passenger automobiles by car line into one of the following classes based on interior volume index or seating capacity except for those passenger automobiles which the Administrator determines are most appropriately placed in a different classification or classed as special purpose vehicles as provided in paragraph (a)(3) of this section.

(i) *Two seaters.* A car line shall be classed as ''Two Seater'' if the majority of the vehicles in that car line have no more than two designated seating positions as such term is defined in the regulations of the National Highway Traffic Safety Administration, Department of Transportation (DOT), 49 CFR 571.3.

(ii) *Minicompact cars.* Interior volume index less than 85 cubic feet.

(iii) *Subcompact cars.* Interior volume index greater than or equal to 85 cubic feet but less than 100 cubic feet.

(iv) *Compact cars.* Interior volume index greater than or equal to 100 cubic feet but less than 110 cubic feet.

(v) *Midsize cars.* Interior volume index greater than or equal to 110 cubic feet but less than 120 cubic feet.

(vi) *Large cars.* Interior volume index greater than or equal to 120 cubic feet.

(vii) *Small station wagons.* Station wagons with interior volume index less than 130 cubic feet.

(viii) *Midsize station wagons.* Station wagons with interior volume index greater than or equal to 130 cubic feet but less than 160 cubic feet.

(ix) *Large station wagons.* Station wagons with interior volume index greater than or equal to 160 cubic feet.

(2) The Administrator will classify light trucks (nonpassenger automobiles) into the following classes: Small pickup trucks, standard pickup trucks, vans, minivans, and SUVs. Starting in the 2013 model year, SUVs will be divided between small sport utility vehicles and standard sport utility vehicles. Pickup trucks and SUVs are separated by car line on the basis of gross vehicle weight rating (GVWR). For a product line with more than one GVWR, establish the characteristic GVWR value for the product line by calculating the arithmetic average of all distinct GVWR values less than or equal to 8,500 pounds available for that product line. The Administrator may determine that specific light trucks should be most appropriately placed in a different class or in the special purpose vehicle class as provided in paragraphs (a)(3)(i) and (ii) of this section, based on the features and characteristics of the specific vehicle, consumer information provided by the manufacturer, and other information available to consumers.

(i) Small pickup trucks. Pickup trucks with a GVWR below 6,000 pounds.

(ii) Standard pickup trucks. Pickup trucks with a GVWR at or above 6,000 pounds and at or below 8,500 pounds.

(iii) Vans.

(iv) Minivans.

(v) Small sport utility vehicles. Sport utility vehicles with a GVWR below 6,000 pounds.

(vi) Standard sport utility vehicles. Sport utility vehicles with a GVWR at or above 6,000 pounds and at or below 10,000 pounds.

(3)(i) *Special purpose vehicles.* All automobiles with GVWR less than or equal to 8,500 pounds and all medium-duty passenger vehicles which possess special features and which the Administrator determines are more appropriately classified separately from typical automobiles or which do not meet the requirements of paragraphs (a)(1) and (2) of this section will be classified as special purpose vehicles. For example, the Administrator may determine that advanced technology vehicles (such as battery electric vehicles, fuel cell vehicles, plug-in hybrid electric vehicles and vehicles equipped with hydrogen internal combustion engines) should be appropriately classified as a type of ''special purpose vehicle.'' The Administrator may determine appropriate names for such types of special purpose vehicles, different from the name ''special purpose vehicle.''

(ii) All automobiles which possess features that could apply to two classes will be classified by the Administrator based on the Administrator's judgment on which class of vehicles consumers are more likely to make comparisons.

(4) Once a certain car line is classified by the Administrator, the classification will remain in effect for the model year.

(b) *Interior volume index—passenger automobiles.* (1) The interior volume index shall be calculated for each car line which is not a ''two seater'' car line, in cubic feet rounded to the nearest 0.1 cubic foot. For car lines with more than one body style, the interior volume index for the car line is the arithmetic average of the interior volume indexes of each body style in the car line.

(2) For all body styles except station wagons and hatchbacks with more than one seat (e.g., with a second or third seat) equipped with seatbelts as required by DOT safety regulations, interior volume index is the sum, rounded to the nearest 0.1 cubic feet, of the front seat volume, the rear seat volume(s), if applicable, and the luggage capacity.

(3) For all station wagons and hatchbacks with more than one seat (e.g., with a second or third seat) equipped with seatbelts as required by DOT safety regulations, interior volume index is the sum, rounded to the nearest 0.1 cubic feet, of the front seat volume, the rear seat volume, and the cargo volume index.

(c) All interior and cargo dimensions are measured in inches to the nearest 0.1 inch. All dimensions and volumes shall be determined from the base vehicles of each body style in each car line, and do not include optional equipment. The dimensions H61, W3, W5, L34, H63, W4, W6, L51, H201, L205, L210, L211, H198, W201, and volume V1 are to be determined in accordance with the procedures outlined in Motor Vehicle Dimensions SAE 1100a (incorporated by reference in § 600.011), except as follows:

(1) *SAE J1100a(2.3)—Cargo dimensions.* All dimensions are measured with the front seat positioned the same as for the interior dimensions and the second seat, for the station wagons and hatchbacks, in the upright position. All head restraints shall be in the stowed position and considered part of the seat.

(2) *SAE J1100a(8)—Luggage capacity.* Total of columns of individual pieces of standard luggage set plus H boxes stowed in the luggage compartment in accordance with the procedure described in 8.2. For passenger automobiles with no rear seat or with two rear seats with no rear seatbelts, the luggage compartment shall include the area to the rear of the front seat, with the rear seat (if applicable) folded, to the height of a horizontal plane tangent to the top of the front seatback.

(3) *SAE J1100a(7)—Cargo dimensions.* (i) L210-Cargo length at second seatback height-hatchback. The minimum horizontal dimension from the ''X'' plane tangent to the rearmost surface of the second seatback to the inside limiting interference of the hatchback door on the zero ''Y'' plane.

(ii) *L211—Cargo length at floor-second-hatchback*. The minimum horizontal dimensions at floor level from the rear of the second seatback to the normal limiting interference of the hatchback door on the vehicle zero ''Y'' plane.

(iii) *H198—Second seatback to load floor height*. The dimension measured vertically from the horizontal tangent to the top of the second seatback to the undepressed floor covering.

(d) The front seat volume is calculated in cubic feet by dividing 1,728 into the product of three terms listed below and rounding the quotient to the nearest 0.001 cubic feet:

(1) *H61—Effective head room-front*. (In inches, obtained according to paragraph (c) of this section),

(2)(i) (W3+W5+5)/2-Average of shoulder and hip room-front, if hip room is more than 5 inches less than shoulder room. (In inches, W3 and W5 are obtained according to paragraph (c) of this section), or

(ii) W3-Shoulder room-front, if hip room is not more than 5 inches less than shoulder room. (In inches, W3 is obtained according to paragraph (c) of this section), and

(3) *L34—Maximum effective leg room-accelerator*. (In inches, obtained according to paragraph (c) of this section.) Round the quotient to the nearest 0.001 cubic feet.

(e) The rear seat volume is calculated in cubic feet, for vehicles with a rear seat equipped with rear seat belts (as required by DOT), by dividing 1,728 into the product of three terms listed below and rounding the quotient to the nearest 0.001 cubic feet:

(1) *H63—Effective head room-second*. (Inches obtained according to paragraph (c) of this section),

(2)(i) (W4+W6+5)/2-Average of shoulder and hip room-second, if hip room is more than 5 inches less than shoulder room. (In inches, W4 and W6 are obtained according to paragraph (c) of this section), or

(ii) W4—Shoulder room-second, if hip room is not more than 5 inches less than shoulder room. (In inches, W4 is obtained according to paragraph (c) of this section), and

(3) *L51—Minimum effective leg room-second*. (In inches obtained according to paragraph (c) of this section.)

(f) The luggage capacity is V1, the usable luggage capacity obtained according to paragraph (c) of this section. For passenger automobiles with no rear seat or with a rear seat but no rear seat belts, the area to the rear of the front seat shall be included in the determination of V1, usable luggage capacity, as outlined in paragraph (c) of this section.

(g) *Cargo volume index*. (1) For station wagons the cargo volume index V10 is calculated, in cubic feet, by dividing 1,728 into the product of three terms and rounding the quotient to the nearest 0.001 cubic feet:

(i) Average cargo width, which is the arithmetic average of:

(A) W4—Shoulder room-second (in inches obtained according to paragraph (c) of this section); and

(B) W201—Cargo width-wheelhouse (in inches obtained according to paragraph (c) of this section).

(ii) *H201–Cargo height*. (In inches obtained according to paragraph (c) of this section.)

(iii) *L205–Cargo length at belt-second*. (In inches obtained according to paragraph (c) of this section.)

(2) For hatchbacks, the cargo volume index V11 is calculated, in cubic feet, by dividing 1,728 into the product of three terms and rounding the quotient to the nearest 0.001 cubic foot:

(i) Average cargo length, which is the arithmetic average of:

(A) L210–Cargo length at second seatback height-hatchback. (In inches obtained according to paragraph (c) of this section);

(B) L211–Cargo length at floor-second-hatchback. (In inches obtained according to paragraph (c) of this section);

(ii) W4–Shoulder room-second. (In inches obtained according to paragraph (c) of this section);

(iii) H198—Second seatback to load floor height. (In inches obtained according to paragraph (c) of this section.)

(h) The following data must be submitted to the Administrator no later than the time of a general label request. Data shall be included for each body style in the car line covered by that general label.

(1) For all passenger automobiles:

(i) Dimensions H61, W3, L34 determined in accordance with paragraph (c) of this section.

(ii) Front seat volume determined in accordance with paragraph (d) of this section.

(iii) Dimensions H63, W4, L51 (if applicable) determined in accordance with paragraph (c) of this section.

(iv) Rear seat volume (if applicable) determined in accordance with paragraph (e) of this section.

(v) The interior volume index determined in accordance with paragraph (b) of this section for:

(A) Each body style, and

(B) The car line.

(vi) The class of the car line as determined in paragraph (a) of this section.

(2) For all passenger automobiles except station wagons and hatchbacks with more than one seat (e.g., with a second or third seat) equipped with seat belts as required by DOT safety regulations:

(i) The quantity and letter designation of the pieces of the standard luggage set installed in the vehicle in the determination of usable luggage capacity V1, and

(ii) The usable luggage capacity V1, determined in accordance with paragraph (f) of this section.

(3) For station wagons with more than one seat (e.g., with a second or third seat) equipped with seat belts as required by DOT safety regulations:

(i) The dimensions H201, L205, and W201 determined in accordance with paragraph (c) of this section, and

(ii) The cargo volume index V10 determined in accordance with paragraph (g)(1) of this section.

(4) For hatchbacks with more than one seat (e.g., with a second or third seat) equipped with seat belts as required by DOT safety regulations:

(i) The dimensions L210, L211, and H198 determined in accordance with paragraph (c) of this section.

(ii) The cargo volume index V11 determined in accordance with paragraph (g)(2) of this section.

(5) For pickup trucks:

(i) All GVWR's of less than or equal to 8,500 pounds available in the car line.

(ii) The arithmetic average GVWR for the car line.

[71 FR 77952, Dec. 27, 2006; 72 FR 7921, Feb. 21, 2007, as amended at 74 FR 61552, Nov. 25, 2009; 76 FR 39566, July 6, 2011]

### § 600.316–08 Multistage manufacture.

Where more than one person is the manufacturer of a vehicle, the final stage manufacturer (as defined in 49 CFR 529.3) is treated as the vehicle manufacturer for purposes of compliance with this subpart.

[76 FR 39566, July 6, 2011]

## Subpart E—Dealer Availability of Fuel Economy Information

SOURCE: 41 FR 49764, Nov. 10, 1976, unless otherwise noted.

### § 600.405–08 Dealer requirements.

(a) Each dealer shall prominently display at each location where new automobiles are offered for sale a copy of the annual Fuel Economy Guide containing the information specified in § 600.407. The Fuel Economy Guide may be made available either in hard copy or electronically via an on-site computer available for prospective purchasers to view and print as desired. The dealer shall provide this information without charge. The dealer will be expected to make this information available as soon as it is received by the dealer, but in no case later than 15 working days after notification is given of its availability. The Department of Energy will annually notify dealers of the availability of the information with instructions on how to obtain it either electronically or in hard copy.

(b) The dealer shall display the Fuel Economy Guide, or a notice of where the customer can electronically access the Fuel Economy Guide, in the same manner and in each location used to display brochures describing the automobiles offered for sale by the dealer. The notice shall include a link to the official Web site where this information is contained (*http://www.fueleconomy.gov.*)

(c) The dealer shall display the booklet applicable to each model year automobile offered for sale at the location.

[71 FR 77954, Dec. 27, 2006]

### § 600.407–08 Booklets displayed by dealers.

(a) Booklets displayed by dealers in order to fulfill the obligations of § 600.405 may be either

(1) The printed copy of the annual Fuel Economy Guide published by the Department of Energy, or;

(2) Optionally, dealers may display the Fuel Economy Guide on a computer that is linked to the electronic version of the Fuel Economy Guide (available at *http://www.fueleconomy.gov*), or;

(3) A booklet approved by the Administrator of EPA containing the same information, format, and order as the Fuel Economy Guide published by the Department of Energy. Such a booklet may highlight the dealer's product line by contrasting color of ink or boldface type and may include other supplemental information regarding the dealer's product line subject to approval by the Administrator.

(b) A manufacturer's name and logo or a dealer's name and address or both may appear on the back cover of the hard copies of the Fuel Economy Guide.

[71 FR 77954, Dec. 27, 2006]

## Subpart F—Procedures for Determining Manufacturer's Average Fuel Economy and Manufacturer's Average Carbon-Related Exhaust Emissions

AUTHORITY: Sec. 301, Pub. L. 94–163, 89 Stat. 901 (15 U.S.C. 2001, 2003, 2005, 2006).

SOURCE: 42 FR 45662, Sept. 12, 1977, unless otherwise noted.

### § 600.502 Definitions.

The following definitions apply to this subpart in addition to those in § 600.002:

(a) The *Declared value* of imported components shall be:

(1) The value at which components are declared by the importer to the U.S. Customs Service at the date of entry into the customs territory of the United States; or

(2) With respect to imports into Canada, the declared value of such components as if they were declared as imports into the United States at the date of entry into Canada; or

(3) With respect to imports into Mexico, the declared value of such components as if they were declared as imports into the United States at the date of entry into Mexico.

(b) *Cost of production of a car line* shall mean the aggregate of the products of:

(1) The average U.S. dealer wholesale price for such car line as computed from each official dealer price list effective during the course of a model year, and

(2) The number of automobiles within the car line produced during the part of the model year that the price list was in effect.

(c) *Equivalent petroleum-based fuel economy value* means a number representing the average number of miles traveled by an electric vehicle per gallon of gasoline.

[76 FR 39567, July 6, 2011]

### § 600.507–08 Running change data requirements.

(a) Except as specified in paragraph (d) of this section, the manufacturer shall submit additional running change fuel economy data as specified in paragraph (b) of this section for any running change approved or implemented under §§ 86.079–32, 86.079–33, or 86.082–34 or 86.1842–01 as applicable, which:

(1) Creates a new base level or,

(2) Affects an existing base level by:

(i) Adding an axle ratio which is at least 10 percent larger (or, optionally, 10 percent smaller) than the largest axle ratio tested.

(ii) Increasing (or, optionally, decreasing) the road-load horsepower for a subconfiguration by 10 percent or more for the individual running change or, when considered cumulatively, since original certification (for each cumulative 10 percent increase using the originally certified road-load horsepower as a base).

(iii) Adding a new subconfiguration by increasing (or, optionally, decreasing) the equivalent test weight for any

previously tested subconfiguration in the base level.

(b)(1) The additional running change fuel economy data requirement in paragraph (a) of this section will be determined based on the sales of the vehicle configurations in the created or affected base level(s) as updated at the time of running change approval.

(2) Within each newly created base level as specified in paragraph (a)(1) of this section, the manufacturer shall submit data from the highest projected total model year sales subconfiguration within the highest projected total model year sales configuration in the base level.

(3) Within each base level affected by a running change as specified in paragraph (a)(2) of this section, fuel economy data shall be submitted for the vehicle configuration created or affected by the running change which has the highest total model year sales. The test vehicle shall be of the subconfiguration created by the running change which has the highest projected total model year sales within the applicable vehicle configuration.

(c) The manufacturer shall submit the fuel economy data required by this section to the Administrator in accordance with § 600.314(b).

(d) For those model types created under § 600.208–08(a)(2), the manufacturer shall submit data for each subconfiguration added by a running change.

[71 FR 77954, Dec. 27, 2006]

### § 600.507–12 Running change data requirements.

(a) Except as specified in paragraph (d) of this section, the manufacturer shall submit additional running change fuel economy and carbon-related exhaust emissions data as specified in paragraph (b) of this section for any running change approved or implemented under § 86.1842 of this chapter, which:

(1) Creates a new base level or,

(2) Affects an existing base level by:

(i) Adding an axle ratio which is at least 10 percent larger (or, optionally, 10 percent smaller) than the largest axle ratio tested.

(ii) Increasing (or, optionally, decreasing) the road-load horsepower for a subconfiguration by 10 percent or more for the individual running change or, when considered cumulatively, since original certification (for each cumulative 10 percent increase using the originally certified road-load horsepower as a base).

(iii) Adding a new subconfiguration by increasing (or, optionally, decreasing) the equivalent test weight for any previously tested subconfiguration in the base level.

(iv) Revising the calibration of an electric vehicle, fuel cell vehicle, hybrid electric vehicle, plug-in hybrid electric vehicle or other advanced technology vehicle in such a way that the city or highway fuel economy of the vehicle (or the energy consumption of the vehicle, as may be applicable) is expected to become less fuel efficient (or optionally, more fuel efficient) by 4.0 percent or more as compared to the original fuel economy label values for fuel economy and/or energy consumption, as applicable.

(b)(1) The additional running change fuel economy and carbon-related exhaust emissions data requirement in paragraph (a) of this section will be determined based on the sales of the vehicle configurations in the created or affected base level(s) as updated at the time of running change approval.

(2) Within each newly created base level as specified in paragraph (a)(1) of this section, the manufacturer shall submit data from the highest projected total model year sales subconfiguration within the highest projected total model year sales configuration in the base level.

(3) Within each base level affected by a running change as specified in paragraph (a)(2) of this section, fuel economy and carbon-related exhaust emissions data shall be submitted for the vehicle configuration created or affected by the running change which has the highest total model year projected sales. The test vehicle shall be of the subconfiguration created by the running change which has the highest projected total model year sales within the applicable vehicle configuration.

(c) The manufacturer shall submit the fuel economy data required by this section to the Administrator in accordance with § 600.314.

(d) For those model types created under § 600.208–12(a)(2), the manufacturer shall submit fuel economy and carbon-related exhaust emissions data for each subconfiguration added by a running change.

[75 FR 25713, May 7, 2010, as amended at 76 FR 39567, July 6, 2011]

### § 600.509–08 Voluntary submission of additional data.

(a) The manufacturer may, at his option, submit data in addition to the data required by the Administrator.

(b) Additional fuel economy data may be submitted by the manufacturer for any vehicle configuration which is to be tested as required in § 600.507 or for which fuel economy data were previously submitted under paragraph (c) of this section.

(c) Within a base level, additional fuel economy data may be submitted by manufacturing for any vehicle configuration which is not required to be tested by § 600.507.

[49 FR 13854, Apr. 6, 1984. Redesignated at 76 FR 39567, July 6, 2011]

### § 600.509–12 Voluntary submission of additional data.

(a) The manufacturer may optionally submit data in addition to the data required by the Administrator.

(b) Additional fuel economy and carbon-related exhaust emissions data may be submitted by the manufacturer for any vehicle configuration which is to be tested as required in § 600.507 or for which fuel economy and carbon-related exhaust emissions data were previously submitted under paragraph (c) of this section.

(c) Within a base level, additional fuel economy and carbon-related exhaust emissions data may be submitted by the manufacturer for any vehicle configuration which is not required to be tested by § 600.507.

[75 FR 25713, May 7, 2010]

### § 600.510–08 Calculation of average fuel economy.

(a) Average fuel economy will be calculated to the nearest 0.1 mpg for the classes of automobiles identified in this section, and the results of such calculations will be reported to the Secretary of Transportation for use in determining compliance with the applicable fuel economy standards.

(1) An average fuel economy calculation will be made for the category of passenger automobiles as determined by the Secretary of Transportation. For example, categories may include, but are not limited to domestically manufactured and/or non-domestically manufactured passenger automobiles as determined by the Secretary of Transportation.

(2) [Reserved]

(3) An average fuel economy calculation will be made for the category of trucks as determined by the Secretary of Transportation. For example, categories may include, but are not limited to domestically manufactured trucks, non-domestically manufactured trucks, light-duty trucks, medium-duty passenger vehicles, and/or heavy-duty trucks as determined by the Secretary of Transportation.

(4) [Reserved]

(b) For the purpose of calculating average fuel economy under paragraph (c), of this section:

(1) All fuel economy data submitted in accordance with § 600.006(e) or § 600.512(c) shall be used.

(2) The combined city/highway fuel economy will be calculated for each model type in accordance with § 600.208–08 of this section except that:

(i) Separate fuel economy values will be calculated for model types and base levels associated with car lines for each category of passenger automobiles and trucks as determined by the Secretary of Transportation pursuant to paragraphs (a)(1) and (a)(3) of this section.

(A)–(B) [Reserved]

(ii) Total model year production data, as required by this subpart, will be used instead of sales projections;

(iii) The fuel economy value of diesel-powered model types will be multiplied by the factor 1.0 to correct gallons of diesel fuel to equivalent gallons of gasoline;

(iv) The fuel economy value will be rounded to the nearest 0.1 mpg; and

(v) At the manufacturer's option, those vehicle configurations that are self-compensating to altitude changes

may be separated by sales into high-altitude sales categories and low-altitude sales categories. These separate sales categories may then be treated (only for the purpose of this section) as separate configurations in accordance with the procedure of § 600.208–08(a)(4)(ii).

(3) The fuel economy value for each vehicle configuration is the combined fuel economy calculated according to § 600.206–08(a)(3) except that:

(i) Separate fuel economy values will be calculated for vehicle configurations associated with car lines for each category of passenger automobiles and trucks as determined by the Secretary of Transportation pursuant to paragraphs (a)(1) and (a)(3) of this section.

(A)–(B) [Reserved]

(ii) Total model year production data, as required by this subpart will be used instead of sales projections; and

(iii) The fuel economy value of diesel-powered model types will be multiplied by the factor 1.0 to convert gallons of diesel fuel to equivalent gallons of gasoline.

(c) Except as permitted in paragraph (d) of this section, the average fuel economy will be calculated individually for each category identified in paragraph (a) of this section as follows:

(1) Divide the total production volume of that category of automobiles; by

(2) A sum of terms, each of which corresponds to a model type within that category of automobiles and is a fraction determined by dividing:

(i) The number of automobiles of that model type produced by the manufacturer in the model year; by

(ii) For gasoline-fueled and diesel-fueled model types, the fuel economy calculated for that model type in accordance with paragraph (b)(2) of this section; or

(iii) For alcohol-fueled model types, the fuel economy value calculated for that model type in accordance with paragraph (b)(2) of this section divided by 0.15 and rounded to the nearest 0.1 mpg; or

(iv) For natural gas-fueled model types, the fuel economy value calculated for that model type in accordance with paragraph (b)(2) of this section divided by 0.15 and rounded to the nearest 0.1 mpg; or

(v) For alcohol dual fuel model types, for model years 1993 through 2019, the harmonic average of the following two terms; the result rounded to the nearest 0.1 mpg:

(A) The combined model type fuel economy value for operation on gasoline or diesel fuel as determined in § 600.208(b)(5)(i); and

(B) The combined model type fuel economy value for operation on alcohol fuel as determined in § 600.208(b)(5)(ii) divided by 0.15 provided the requirements of § 600.510(g) are met; or

(vi) For natural gas dual fuel model types, for model years 1993 through 2019, the harmonic average of the following two terms; the result rounded to the nearest 0.1 mpg:

(A) The combined model type fuel economy value for operation on gasoline or diesel as determined in § 600.208(b)(5)(i); and

(B) The combined model type fuel economy value for operation on natural gas as determined in § 600.208(b)(5)(ii) divided by 0.15 provided the requirements of paragraph (g) of this section are met.

(d) The Administrator may approve alternative calculation methods if they are part of an approved credit plan under the provisions of 15 U.S.C. 2003.

(e) For passenger categories identified in paragraphs (a)(1) and (2) of this section, the average fuel economy calculated in accordance with paragraph (c) of this section shall be adjusted using the following equation:

$$AFE_{adj} = AFE[((0.55 \times a \times c) + (0.45 \times c) + (0.5556 \times a) + 0.4487) / ((0.55 \times a) + 0.45)] + IW$$

Where:

$AFE_{adj}$ = Adjusted average combined fuel economy, rounded to the nearest 0.1 mpg.

AFE = Average combined fuel economy as calculated in paragraph (c) of this section, rounded to the nearest 0.0001 mpg.

a = Sales-weight average (rounded to the nearest 0.0001 mpg) of all model type highway fuel economy values (rounded to the nearest 0.1 mpg) divided by the sales-weighted average (rounded to the nearest 0.0001 mpg) of all model type city fuel economy values (rounded to the nearest 0.1 mpg). The quotient shall be rounded to 4

decimal places. These average fuel economies shall be determined using the methodology of paragraph (c) of this section.

c = 0.0022 for the 1986 model year.

c = A constant value, fixed by model year. For 1987, the Administrator will specify the c value after the necessary laboratory humidity and test fuel data become available. For 1988 and later model years, the Administrator will specify the c value after the necessary laboratory humidity and test fuel data become available.

$IW = (9.2917 \times 10^{-3} \times SF_{3IWC} \times FE_{3IWC}) - (3.5123 \times 10^{-3} \times SF_{4ETW} \times FE_{4IWC})$.

NOTE: Any calculated value of IW less than zero shall be set equal to zero.

$SF_{3IWC}$ = The 3000 lb. inertia weight class sales divided by total sales. The quotient shall be rounded to 4 decimal places.

$SF_{4ETW}$ = The 4000 lb. equivalent test weight category sales divided by total sales. The quotient shall be rounded to 4 decimal places.

$FE_{4IWC}$ = The sales-weighted average combined fuel economy of all 3000 lb. inertia weight class base levels in the compliance category. Round the result to the nearest 0.0001 mpg.

$FE_{4IWC}$ = The sales-weighted average combined fuel economy of all 4000 lb. inertia weight class base levels in the compliance category. Round the result to the nearest 0.0001 mpg.

(f) The Administrator shall calculate and apply additional average fuel economy adjustments if, after notice and opportunity for comment, the Administrator determines that, as a result of test procedure changes not previously considered, such correction is necessary to yield fuel economy test results that are comparable to those obtained under the 1975 test procedures. In making such determinations, the Administrator must find that:

(1) A directional change in measured fuel economy of an average vehicle can be predicted from a revision to the test procedures;

(2) The magnitude of the change in measured fuel economy for any vehicle or fleet of vehicles caused by a revision to the test procedures is quantifiable from theoretical calculations or best available test data;

(3) The impact of a change on average fuel economy is not due to eliminating the ability of manufacturers to take advantage of flexibility within the existing test procedures to gain measured improvements in fuel economy which are not the result of actual improvements in the fuel economy of production vehicles;

(4) The impact of a change on average fuel economy is not solely due to a greater ability of manufacturers to reflect in average fuel economy those design changes expected to have comparable effects on in-use fuel economy;

(5) The test procedure change is required by EPA or is a change initiated by EPA in its laboratory and is not a change implemented solely by a manufacturer in its own laboratory.

(g)(1) Alcohol dual fuel automobiles and natural gas dual fuel automobiles must provide equal or greater energy efficiency while operating on alcohol or natural gas as while operating on gasoline or diesel fuel to obtain the CAFE credit determined in paragraphs (c)(2)(v) and (vi) of this section. The following equation must hold true:

$E_{alt}/E_{pet} > \text{or} = 1$

Where:

$E_{alt} = [FE_{alt}/(NHV_{alt} \times D_{alt})] \times 10^6$ = energy efficiency while operating on alternative fuel rounded to the nearest 0.01 miles/million BTU.

$E_{pet} = [FE_{pet}/(NHV_{pet} \times D_{pet})] \times 10^6$ = energy efficiency while operating on gasoline or diesel (petroleum) fuel rounded to the nearest 0.01 miles/million BTU.

$FE_{alt}$ is the fuel economy [miles/gallon for liquid fuels or miles/100 standard cubic feet for gaseous fuels] while operated on the alternative fuel as determined in § 600.113–08(a) and (b);

$FE_{pet}$ is the fuel economy [miles/gallon] while operated on petroleum fuel (gasoline or diesel) as determined in § 600.113(a) and (b);

$NHV_{alt}$ is the net (lower) heating value [BTU/lb] of the alternative fuel;

$NHV_{pet}$ is the net (lower) heating value [BTU/lb] of the petroleum fuel;

$D_{alt}$ is the density [lb/gallon for liquid fuels or lb/100 standard cubic feet for gaseous fuels] of the alternative fuel;

$D_{pet}$ is the density [lb/gallon] of the petroleum fuel.

(i) The equation must hold true for both the FTP city and HFET highway fuel economy values for each test of each test vehicle.

(ii)(A) The net heating value for alcohol fuels shall be premeasured using a test method which has been approved in advance by the Administrator.

(B) The density for alcohol fuels shall be determined per ASTM D 1298 (incorporated by reference at § 600.011).

(iii) The net heating value and density of gasoline are to be determined by the manufacturer in accordance with § 600.113(f).

(2) [Reserved]

(3) Alcohol dual fuel passenger automobiles and natural gas dual fuel passenger automobiles manufactured during model years 1993 through 2019 must meet the minimum driving range requirements established by the Secretary of Transportation (49 CFR part 538) to obtain the CAFE credit determined in paragraphs (c)(2)(v) and (vi) of this section.

(h) For model years 1993 and later, and for each category of automobile identified in paragraph (a) of this section, the maximum increase in average fuel economy determined in paragraph (c) of this section attributable to alcohol dual fuel automobiles and natural gas dual fuel automobiles shall be as follows:

| Model year | Maximum Increase (mpg) |
|---|---|
| 1993–2014 | 1.2 |
| 2015 | 1.0 |
| 2016 | 0.8 |
| 2017 | 0.6 |
| 2018 | 0.4 |
| 2019 | 0.2 |
| 2020 and later | 0 |

(1) The Administrator shall calculate the increase in average fuel economy to determine if the maximum increase provided in paragraph (h) of this section has been reached. The Administrator shall calculate the average fuel economy for each category of automobiles specified in paragraph (a) of this section by subtracting the average fuel economy values calculated in accordance with this section by assuming all alcohol dual fuel and natural gas dual fuel automobiles are operated exclusively on gasoline (or diesel) fuel from the average fuel economy values determined in paragraphs (b)(2)(vi), (b)(2)(vii), and (c) of this section. The difference is limited to the maximum increase specified in paragraph (h) of this section.

(2) [Reserved]

(i) [Reserved]

[71 FR 77955, Dec. 27, 2006, as amended at 74 FR 61554, Nov. 25, 2009; 76 FR 39567, July 6, 2011]

## § 600.510–12 Calculation of average fuel economy and average carbon-related exhaust emissions.

(a)(1) Average fuel economy will be calculated to the nearest 0.1 mpg for the categories of automobiles identified in this section, and the results of such calculations will be reported to the Secretary of Transportation for use in determining compliance with the applicable fuel economy standards.

(i) An average fuel economy calculation will be made for the category of passenger automobiles as determined by the Secretary of Transportation. For example, categories may include, but are not limited to domestically manufactured and/or non-domestically manufactured passenger automobiles as determined by the Secretary of Transportation.

(ii) [Reserved]

(iii) An average fuel economy calculation will be made for the category of trucks as determined by the Secretary of Transportation. For example, categories may include, but are not limited to domestically manufactured trucks, non-domestically manufactured trucks, light-duty trucks, medium-duty passenger vehicles, and/or heavy-duty trucks as determined by the Secretary of Transportation.

(iv) [Reserved]

(2) Average carbon-related exhaust emissions will be calculated to the nearest one gram per mile for the categories of automobiles identified in this section, and the results of such calculations will be reported to the Administrator for use in determining compliance with the applicable $CO_2$ emission standards.

(i) An average carbon-related exhaust emissions calculation will be made for passenger automobiles.

(ii) An average carbon-related exhaust emissions calculation will be made for light trucks.

(b) For the purpose of calculating average fuel economy under paragraph (c) of this section and for the purpose of calculating average carbon-related exhaust emissions under paragraph (j) of this section:

(1) All fuel economy and carbon-related exhaust emissions data submitted in accordance with § 600.006(e) or § 600.512(c) shall be used.

(2) The combined city/highway fuel economy and carbon-related exhaust emission values will be calculated for each model type in accordance with § 600.208 except that:

(i) Separate fuel economy values will be calculated for model types and base levels associated with car lines for each category of passenger automobiles and light trucks as determined by the Secretary of Transportation pursuant to paragraph (a)(1) of this section.

(ii) Total model year production data, as required by this subpart, will be used instead of sales projections;

(iii) [Reserved]

(iv) The fuel economy value will be rounded to the nearest 0.1 mpg;

(v) The carbon-related exhaust emission value will be rounded to the nearest gram per mile; and

(vi) At the manufacturer's option, those vehicle configurations that are self-compensating to altitude changes may be separated by sales into high-altitude sales categories and low-altitude sales categories. These separate sales categories may then be treated (only for the purpose of this section) as separate configurations in accordance with the procedure of § 600.208–12(a)(4)(ii).

(3) The fuel economy and carbon-related exhaust emission values for each vehicle configuration are the combined fuel economy and carbon-related exhaust emissions calculated according to § 600.206–12(a)(3) except that:

(i) Separate fuel economy values will be calculated for vehicle configurations associated with car lines for each category of passenger automobiles and light trucks as determined by the Secretary of Transportation pursuant to paragraph (a)(1) of this section.

(ii) Total model year production data, as required by this subpart will be used instead of sales projections; and

(iii) The fuel economy value of diesel-powered model types will be multiplied by the factor 1.0 to convert gallons of diesel fuel to equivalent gallons of gasoline.

(c) Except as permitted in paragraph (d) of this section, the average fuel economy will be calculated individually for each category identified in paragraph (a)(1) of this section as follows:

(1) Divide the total production volume of that category of automobiles; by

(2) A sum of terms, each of which corresponds to a model type within that category of automobiles and is a fraction determined by dividing the number of automobiles of that model type produced by the manufacturer in the model year; by

(i) For gasoline-fueled and diesel-fueled model types, the fuel economy calculated for that model type in accordance with paragraph (b)(2) of this section; or

(ii) For alcohol-fueled model types, the fuel economy value calculated for that model type in accordance with paragraph (b)(2) of this section divided by 0.15 and rounded to the nearest 0.1 mpg; or

(iii) For natural gas-fueled model types, the fuel economy value calculated for that model type in accordance with paragraph (b)(2) of this section divided by 0.15 and rounded to the nearest 0.1 mpg; or

(iv) For alcohol dual fuel model types, for model years 1993 through 2019, the harmonic average of the following two terms; the result rounded to the nearest 0.1 mpg:

(A) The combined model type fuel economy value for operation on gasoline or diesel fuel as determined in § 600.208–12(b)(5)(i); and

(B) The combined model type fuel economy value for operation on alcohol fuel as determined in § 600.208–12(b)(5)(ii) divided by 0.15 provided the requirements of paragraph (g) of this section are met; or

(v) For natural gas dual fuel model types, for model years 1993 through 2019, the harmonic average of the following two terms; the result rounded to the nearest 0.1 mpg:

(A) The combined model type fuel economy value for operation on gasoline or diesel as determined in § 600.208–12(b)(5)(i); and

(B) The combined model type fuel economy value for operation on natural gas as determined in § 600.208–12(b)(5)(ii) divided by 0.15 provided the requirements of paragraph (g) of this section are met.

(d) The Administrator may approve alternative calculation methods if they are part of an approved credit plan under the provisions of 15 U.S.C. 2003.

(e) For passenger automobile categories identified in paragraph (a)(1) of this section, the average fuel economy calculated in accordance with paragraph (c) of this section shall be adjusted using the following equation:

$$AFE_{adj} = AFE[((0.55 \times a \times c) + (0.45 \times c) + (0.5556 \times a) + 0.4487)/((0.55 \times a) + 0.45)] + IW$$

Where:

$AFE_{adj}$ = Adjusted average combined fuel economy, rounded to the nearest 0.1 mpg;

AFE = Average combined fuel economy as calculated in paragraph (c) of this section, rounded to the nearest 0.0001 mpg;

a = Sales-weight average (rounded to the nearest 0.0001 mpg) of all model type highway fuel economy values (rounded to the nearest 0.1 mpg) divided by the sales-weighted average (rounded to the nearest 0.0001 mpg) of all model type city fuel economy values (rounded to the nearest 0.1 mpg). The quotient shall be rounded to 4 decimal places. These average fuel economies shall be determined using the methodology of paragraph (c) of this section.

c = 0.0014;

$IW = (9.2917 \times 10^{-3} \times SF_{3IWC} \times FE_{3IWC}) - (3.5123 \times 10^{-3} \times SF_{4ETW} \times FE_{4IWC})$.

NOTE: Any calculated value of IW less than zero shall be set equal to zero.

$SF_{3IWC}$ = The 3000 lb. inertia weight class sales divided by total sales. The quotient shall be rounded to 4 decimal places.

$SF_{4ETW}$ = The 4000 lb. equivalent test weight category sales divided by total sales. The quotient shall be rounded to 4 decimal places.

$FE_{4IWC}$ = The sales-weighted average combined fuel economy of all 3000 lb. inertia weight class base levels in the compliance category. Round the result to the nearest 0.0001 mpg.

$FE_{4IWC}$ = The sales-weighted average combined fuel economy of all 4000 lb. inertia weight class base levels in the compliance category. Round the result to the nearest 0.0001 mpg.

(f) The Administrator shall calculate and apply additional average fuel economy adjustments if, after notice and opportunity for comment, the Administrator determines that, as a result of test procedure changes not previously considered, such correction is necessary to yield fuel economy test results that are comparable to those obtained under the 1975 test procedures. In making such determinations, the Administrator must find that:

(1) A directional change in measured fuel economy of an average vehicle can be predicted from a revision to the test procedures;

(2) The magnitude of the change in measured fuel economy for any vehicle or fleet of vehicles caused by a revision to the test procedures is quantifiable from theoretical calculations or best available test data;

(3) The impact of a change on average fuel economy is not due to eliminating the ability of manufacturers to take advantage of flexibility within the existing test procedures to gain measured improvements in fuel economy which are not the result of actual improvements in the fuel economy of production vehicles;

(4) The impact of a change on average fuel economy is not solely due to a greater ability of manufacturers to reflect in average fuel economy those design changes expected to have comparable effects on in-use fuel economy;

(5) The test procedure change is required by EPA or is a change initiated by EPA in its laboratory and is not a change implemented solely by a manufacturer in its own laboratory.

(g)(1) Alcohol dual fuel automobiles and natural gas dual fuel automobiles must provide equal or greater energy efficiency while operating on alcohol or natural gas as while operating on gasoline or diesel fuel to obtain the CAFE credit determined in paragraphs (c)(2)(iv) and (v) of this section or to obtain the carbon-related exhaust emissions credit determined in paragraphs (j)(2)(ii) and (iii) of this section. The following equation must hold true:

$$E_{alt}/E_{pet} \geq 1$$

Where:

$E_{alt} = [FE_{alt}/(NHV_{alt} \times D_{alt})] \times 10^6$ = energy efficiency while operating on alternative fuel rounded to the nearest 0.01 miles/million BTU.

$E_{pet} = [FE_{pet}/(NHV_{pet} \times D_{pet})] \times 10^6$ = energy efficiency while operating on gasoline or diesel (petroleum) fuel rounded to the nearest 0.01 miles/million BTU.

$FE_{alt}$ is the fuel economy [miles/gallon for liquid fuels or miles/100 standard cubic feet for gaseous fuels] while operated on the alternative fuel as determined in § 600.113–12(a) and (b).

$FE_{pet}$ is the fuel economy [miles/gallon] while operated on petroleum fuel (gasoline or diesel) as determined in § 600.113–12(a) and (b).

$NHV_{alt}$ is the net (lower) heating value [BTU/lb] of the alternative fuel.

$NHV_{pet}$ is the net (lower) heating value [BTU/lb] of the petroleum fuel.

$D_{alt}$ is the density [lb/gallon for liquid fuels or lb/100 standard cubic feet for gaseous fuels] of the alternative fuel.

$D_{pet}$ is the density [lb/gallon] of the petroleum fuel.

(i) The equation must hold true for both the FTP city and HFET highway fuel economy values for each test of each test vehicle.

(ii)(A) The net heating value for alcohol fuels shall be premeasured using a test method which has been approved in advance by the Administrator.

(B) The density for alcohol fuels shall be premeasured using ASTM D 1298 (incorporated by reference at § 600.011).

(iii) The net heating value and density of gasoline are to be determined by the manufacturer in accordance with § 600.113.

(2) [Reserved]

(3) Alcohol dual fuel passenger automobiles and natural gas dual fuel passenger automobiles manufactured during model years 1993 through 2019 must meet the minimum driving range requirements established by the Secretary of Transportation (49 CFR part 538) to obtain the CAFE credit determined in paragraphs (c)(2)(iv) and (v) of this section.

(h) For model years 1993 and later, and for each category of automobile identified in paragraph (a)(1) of this section, the maximum increase in average fuel economy determined in paragraph (c) of this section attributable to alcohol dual fuel automobiles and natural gas dual fuel automobiles shall be as follows:

| Model year | Maximum increase (mpg) |
|---|---|
| 1993–2014 | 1.2 |
| 2015 | 1.0 |
| 2016 | 0.8 |
| 2017 | 0.6 |
| 2018 | 0.4 |
| 2019 | 0.2 |
| 2020 and later | 0.0 |

(1) The Administrator shall calculate the increase in average fuel economy to determine if the maximum increase provided in paragraph (h) of this section has been reached. The Administrator shall calculate the average fuel economy for each category of automobiles specified in paragraph (a)(1) of this section by subtracting the average fuel economy values calculated in accordance with this section by assuming all alcohol dual fuel and natural gas dual fuel automobiles are operated exclusively on gasoline (or diesel) fuel from the average fuel economy values determined in paragraph (c) of this section. The difference is limited to the maximum increase specified in paragraph (h) of this section.

(2) [Reserved]

(i) For model years 2012 through 2015, and for each category of automobile identified in paragraph (a)(1) of this section, the maximum decrease in average carbon-related exhaust emissions determined in paragraph (j) of this section attributable to alcohol dual fuel automobiles and natural gas dual fuel automobiles shall be calculated using the following formula, and rounded to the nearest tenth of a gram per mile:

$$\text{Maximum Decrease} = \frac{8887}{\left[\frac{8887}{FltAvg} - MPG_{MAX}\right]} - FltAvg$$

Where:

FltAvg = The fleet average CREE value in grams per mile, rounded to the nearest whole number, for passenger automobiles or light trucks determined for the applicable model year according to paragraph (j) of this section, except by assuming all alcohol dual fuel and natural gas dual fuel automobiles are operated exclusively on gasoline (or diesel) fuel.

$MPG_{MAX}$ = The maximum increase in miles per gallon determined for the appropriate model year in paragraph (h) of this section.

(1) The Administrator shall calculate the decrease in average carbon-related exhaust emissions to determine if the maximum decrease provided in this paragraph (i) has been reached. The Administrator shall calculate the average carbon-related exhaust emissions for each category of automobiles specified in paragraph (a) of this section by subtracting the average carbon-related exhaust emission values determined in paragraph (j) of this section from the average carbon-related exhaust emission values calculated in accordance with this section by assuming all alcohol dual fuel and natural gas dual fuel automobiles are operated exclusively on gasoline (or diesel) fuel. The difference is limited to the maximum decrease specified in paragraph (i) of this section.

(2) [Reserved]

(j) The average carbon-related exhaust emissions will be calculated individually for each category identified in paragraph (a)(1) of this section as follows:

(1) Divide the total production volume of that category of automobiles into:

(2) A sum of terms, each of which corresponds to a model type within that category of automobiles and is a product determined by multiplying the number of automobiles of that model type produced by the manufacturer in the model year by:

(i) For gasoline-fueled and diesel-fueled model types, the carbon-related exhaust emissions value calculated for that model type in accordance with paragraph (b)(2) of this section; or

(ii)(A) For alcohol-fueled model types, for model years 2012 through 2015, the carbon-related exhaust emissions value calculated for that model type in accordance with paragraph (b)(2) of this section multiplied by 0.15 and rounded to the nearest gram per mile, except that manufacturers complying with the fleet averaging option for $N_2O$ and $CH_4$ as allowed under § 86.1818 of this chapter must perform this calculation such that $N_2O$ and $CH_4$ values are not multiplied by 0.15; or

(B) For alcohol-fueled model types, for model years 2016 and later, the carbon-related exhaust emissions value calculated for that model type in accordance with paragraph (b)(2) of this section; or

(iii)(A) For natural gas-fueled model types, for model years 2012 through 2015, the carbon-related exhaust emissions value calculated for that model type in accordance with paragraph (b)(2) of this section multiplied by 0.15 and rounded to the nearest gram per mile, except that manufacturers complying with the fleet averaging option for $N_2O$ and $CH_4$ as allowed under § 86.1818 of this chapter must perform this calculation such that $N_2O$ and $CH_4$ values are not multiplied by 0.15; or

(B) For natural gas-fueled model types, for model years 2016 and later, the carbon-related exhaust emissions value calculated for that model type in accordance with paragraph (b)(2) of this section; or

(iv) For alcohol dual fuel model types, for model years 2012 through 2015, the arithmetic average of the following two terms, the result rounded to the nearest gram per mile:

(A) The combined model type carbon-related exhaust emissions value for operation on gasoline or diesel fuel as determined in § 600.208–12(b)(5)(i); and

(B) The combined model type carbon-related exhaust emissions value for operation on alcohol fuel as determined in § 600.208–12(b)(5)(ii) multiplied by 0.15 provided the requirements of paragraph (g) of this section are met, except that manufacturers complying with the fleet averaging option for $N_2O$ and $CH_4$ as allowed under § 86.1818 of this chapter must perform this calculation such that $N_2O$ and $CH_4$ values are not multiplied by 0.15; or

(v) For natural gas dual fuel model types, for model years 2012 through 2015, the arithmetic average of the following two terms; the result rounded to the nearest gram per mile:

(A) The combined model type carbon-related exhaust emissions value for operation on gasoline or diesel as determined in § 600.208–12(b)(5)(i); and

(B) The combined model type carbon-related exhaust emissions value for operation on natural gas as determined in § 600.208–12(b)(5)(ii) multiplied by 0.15

provided the requirements of paragraph (g) of this section are met, except that manufacturers complying with the fleet averaging option for $N_2O$ and $CH_4$ as allowed under § 86.1818 of this chapter must perform this calculation such that $N_2O$ and $CH_4$ values are not multiplied by 0.15.

(vi) For alcohol dual fuel model types, for model years 2016 and later, the combined model type carbon-related exhaust emissions value determined according to the following formula and rounded to the nearest gram per mile:

$$CREE = (F \times CREE_{alt}) + ((1 - F) \times CREE_{gas})$$

Where:

F = 0.00 unless otherwise approved by the Administrator according to the provisions of paragraph (k) of this section;

$CREE_{alt}$ = The combined model type carbon-related exhaust emissions value for operation on alcohol fuel as determined in § 600.208–12(b)(5)(ii); and

$CREE_{gas}$ = The combined model type carbon-related exhaust emissions value for operation on gasoline or diesel fuel as determined in § 600.208–12(b)(5)(i).

(vii) For natural gas dual fuel model types, for model years 2016 and later, the combined model type carbon-related exhaust emissions value determined according to the following formula and rounded to the nearest gram per mile:

$$CREE = (F \times CREE_{alt}) + ((1 - F) \times CREE_{gas})$$

Where:

F = 0.00 unless otherwise approved by the Administrator according to the provisions of paragraph (k) of this section;

$CREE_{alt}$ = The combined model type carbon-related exhaust emissions value for operation on natural gas as determined in § 600.208–12(b)(5)(ii); and

$CREE_{gas}$ = The combined model type carbon-related exhaust emissions value for operation on gasoline or diesel fuel as determined in § 600.208–12(b)(5)(i).

(k) *Alternative in-use weighting factors for dual fuel model types.* Using one of the methods in either paragraph (k)(1) or (2) of this section, manufacturers may request the use of alternative values for the weighting factor F in the equations in paragraphs (j)(2)(vi) and (vii) of this section. Unless otherwise approved by the Administrator, the manufacturer must use the value of F that is in effect in paragraphs (j)(2)(vi) and (vii) of this section.

(1) Upon written request from a manufacturer, the Administrator will determine and publish by written guidance an appropriate value of F for each requested alternative fuel based on the Administrator's assessment of real-world use of the alternative fuel. Such published values would be available for any manufacturer to use. The Administrator will periodically update these values upon written request from a manufacturer.

(2) The manufacturer may optionally submit to the Administrator its own demonstration regarding the real-world use of the alternative fuel in their vehicles and its own estimate of the appropriate value of F in the equations in paragraphs (j)(2)(vi) and (vii) of this section. Depending on the nature of the analytical approach, the manufacturer could provide estimates of F that are model type specific or that are generally applicable to the manufacturer's dual fuel fleet. The manufacturer's analysis could include use of data gathered from on-board sensors and computers, from dual fuel vehicles in fleets that are centrally fueled, or from other sources. The analysis must be based on sound statistical methodology and must account for analytical uncertainty. Any approval by the Administrator will pertain to the use of values of F for the model types specified by the manufacturer.

[75 FR 25714, May 7, 2010, as amended at 76 FR 39567, July 6, 2011]

### § 600.511–08 Determination of domestic production.

(a) Except with advance approval of the Administrator, an automobile shall be considered domestically produced in any model year if it is included within a domestically produced car line (car line includes station wagons for purposes of this paragraph), unless the assembly of such automobile is completed in Canada or Mexico and such automobile is not imported into the United States prior to the expiration of 30 days following the end of the model year. For purposes of this paragraph a car line will be considered domestically

produced if the following ratio is less than 0.25:

(1) The sum of the declared value, as defined in § 600.502, of all of the imported components installed or included on automobiles produced within such a car line within a given model year plus the cost of transportation and insuring such components to the United States port of entry, the Mexican port of entry (when paragraph (b)(3) of this section applies), or the Canadian port of entry but exclusive of any customs duty, divided by

(2) The cost of production, as defined in § 600.502, of automobiles within such car line.

(b) For the purposes of calculations under this subpart with respect to automobiles manufactured during any model year,

(1) An average exchange rate for the country of origin of each imported component shall be used that is calculated by taking the mean of the exchange rates in effect at the end of each quarter set by the Federal Reserve Bank of New York for twelve calendar quarters prior to and including the calendar quarter ending one year prior to the date that the manufacturer submits the calculation of the preliminary average for such model year. Such rate, once calculated, shall be in effect for the duration of the model year. Upon petition of a manufacturer, the Administrator may permit the use of a different exchange rate where appropriate and necessary.

(2) For automobiles for which paragraph (b)(3) of this section does not apply pursuant to the schedule in paragraph (b)(4), components shall be considered imported unless they are either:

(i) Wholly the growth, product, or manufacture of the United States and/or Canada, or

(ii) Substantially transformed in the United States or Canada into a new and different article of commerce.

(3) For automobiles for which this paragraph applies pursuant to the schedule in paragraph (b)(4) of this section, components shall be considered imported unless they are either:

(i) Wholly the growth, product, or manufacture of the United States and/or Canada and/or Mexico, or

(ii) Substantially transformed in the United States and/or Canada and/or Mexico into a new and different article of commerce.

(4) Paragraphs (b)(4) (i) through (v) of this section set forth the schedule according to which paragraph (b)(3) of this section applies for all automobiles manufactured by a manufacturer and sold in the United States, wherever assembled.

(i) With respect to a manufacturer that initiated the assembly of automobiles in Mexico before model year 1992, the manufacturer may elect, at any time between January 1, 1997, and January 1, 2004, to have paragraph (b)(3) of this section apply to all automobiles it manufactures, beginning with the model year commencing after the date of such election.

(ii) With respect to a manufacturer initiating the assembly of automobiles in Mexico after model year 1991, paragraph (b)(3) of this section shall apply to all automobiles it manufactures, beginning with the model year commencing after January 1, 1994, or the model year commencing after the date that the manufacturer initiates the assembly of automobiles in Mexico, whichever is later.

(iii) With respect to a manufacturer not described by paragraph (b)(4) (i) or (ii) of this section assembling automobiles in the United States or Canada but not in Mexico, the manufacturer may elect, at any time between January 1, 1997, and January 1, 2004, to have paragraph (b)(3) of this section apply to all automobiles it manufactures, beginning with the model year commencing after the date of such election, except that if such manufacturer initiates the assembly of automobiles in Mexico before making such election, this paragraph shall not apply, and the manufacturer shall be subject to paragraph (b)(4)(ii) of this section.

(iv) With respect to a manufacturer not assembling automobiles in the United States, Canada, or Mexico, paragraph (b)(3) of this section shall apply to all automobiles it manufactures, beginning with the model year commencing after January 1, 1994.

(v) With respect to a manufacturer authorized to make an election under

paragraph (b)(4) (i) or (iii) of this section which has not made that election within the specified period, paragraph (b)(3) of this section shall apply to all automobiles it manufactures, beginning with the model year commencing after January 1, 2004.

(5) All elections under paragraph (b)(4) of this section shall be made in accordance with the procedures established by the Secretary of Transportation pursuant to 49 U.S.C. 32904(b)(3)(C).

(c) If it is determined by the Administrator at some date later than the date of entry that the declared value of such imported components did not represent fair market value at the date of entry, through U.S. Bureau of Customs appraisals, the Administrator may review the determination made pursuant to paragraph (a) of this section as to whether the pertinent car lines which utilize such components were correctly included within the manufaturer's domestically-produced or foreign-produced fleets. If such a determination was in error due to misrepresentation of the valuation of imported components at the date of entry, the Administrator may recalculate the manufacturer's average for the affected model year, according to § 600.510, to reflect the correct valuation of such imported components in each affected car line.

(d)–(e) [Reserved]

[42 FR 45662, Sept. 12, 1977, as amended at 43 FR 39376, Sept. 5, 1978; 59 FR 679, Jan. 6, 1994; 59 FR 33914, July 1, 1994; 74 FR 61554, Nov. 25, 2009. Redesignated at 76 FR 39569, July 6, 2011]

### § 600.512–08 Model year report.

(a) For each model year, the manufacturer shall submit to the Administrator a report, known as the model year report, containing all information necessary for the calculation of the manufacturer's average fuel economy. The results of the manufacturer calculations and summary information of model type fuel economy values which are contained in the average calculation shall be submitted to the Secretary of the Department of Transportation, National Highway and Traffic Safety Administration.

(b)(1) The model year report shall be in writing, signed by the authorized representative of the manufacturer and shall be submitted no later than 90 days after the end of the model year.

(2) The Administrator may waive the requirement that the model year report be submitted no later than 90 days after the end of the model year. Based upon a request by the manufacturer, if the Administrator determines that 90 days is insufficient time for the manufacturer to provide all additional data required as determined in § 600.507, the Administrator shall establish a date by which the model year report must be submitted.

(3) Separate reports shall be submitted for passenger automobiles and light trucks (as identified in § 600.510).

(c) The model year report must include the following information:

(1) All fuel economy data used in the FTP/HFET-based model type calculations under § 600.208–08, and subsequently required by the Administrator in accordance with § 600.507;

(2) All fuel economy data for certification vehicles and for vehicles tested for running changes approved under § 86.1842–01 of this chapter;

(3) Any additional fuel economy data submitted by the manufacturer under § 600.509;

(4) A fuel economy value for each model type of the manufacturer's product line calculated according to § 600.510(b)(2);

(5) The manufacturer's average fuel economy value calculated according to § 600.510(c);

(6) A listing of both domestically and nondomestically produced car lines as determined in § 600.511 and the cost information upon which the determination was made; and

(7) The authenticity and accuracy of production data must be attested to by the corporation, and shall bear the signature of an officer (a corporate executive of at least the rank of vice-president) designated by the corporation. Such attestation shall constitute a representation by the manufacturer that the manufacturer has established reasonable, prudent procedures to ascertain and provide production data that are accurate and authentic in all material respects and that these procedures have been followed by employees of the manufacturer involved in the reporting

process. The signature of the designated officer shall constitute a representation by the required attestation.

(8) For 2008–2010 light truck model year reports, the average fuel economy standard or the ''required fuel economy level'' pursuant to 49 CFR part 533, as applicable. Model year reports for light trucks meeting required fuel economy levels pursuant to 49 CFR 533.5(g) and (h) shall include information in sufficient detail to verify the accuracy of the calculated required fuel economy level. Such information is expected to include but is not limited to, production information for each unique footprint within each model type contained in the model year report and the formula used to calculate the required fuel economy level. Model year reports for required fuel economy levels shall include a statement that the method of measuring vehicle track width, measuring vehicle wheelbase and calculating vehicle footprint is accurate and complies with applicable Department of Transportation requirements.

(9) For 2011 and later model year reports, the ''required fuel economy level'' pursuant to 49 CFR parts 531 or 533, as applicable. Model year reports shall include information in sufficient detail to verify the accuracy of the calculated required fuel economy level, including but is not limited to, production information for each unique footprint within each model type contained in the model year report and the formula used to calculate the required fuel economy level. Model year reports shall include a statement that the method of measuring vehicle track width, measuring vehicle wheelbase and calculating vehicle footprint is accurate and complies with applicable Department of Transportation requirements.

[71 FR 77957, Dec. 27, 2006, as amended at 74 FR 61554, Nov. 25, 2009]

### § 600.512–12 Model year report.

(a) For each model year, the manufacturer shall submit to the Administrator a report, known as the model year report, containing all information necessary for the calculation of the manufacturer's average fuel economy and all information necessary for the calculation of the manufacturer's average carbon-related exhaust emissions.

(1) The results of the manufacturer calculations and summary information of model type fuel economy values which are contained in the average fuel economy calculation shall also be submitted to the Secretary of the Department of Transportation, National Highway and Traffic Safety Administration.

(2) The results of the manufacturer calculations and summary information of model type carbon-related exhaust emission values which are contained in the average calculation shall be submitted to the Administrator.

(b)(1) The model year report shall be in writing, signed by the authorized representative of the manufacturer and shall be submitted no later than 90 days after the end of the model year.

(2) The Administrator may waive the requirement that the model year report be submitted no later than 90 days after the end of the model year. Based upon a request by the manufacturer, if the Administrator determines that 90 days is insufficient time for the manufacturer to provide all additional data required as determined in § 600.507, the Administrator shall establish an alternative date by which the model year report must be submitted.

(3) Separate reports shall be submitted for passenger automobiles and light trucks (as identified in § 600.510).

(c) The model year report must include the following information:

(1)(i) All fuel economy data used in the FTP/HFET-based model type calculations under § 600.208, and subsequently required by the Administrator in accordance with § 600.507;

(ii) All carbon-related exhaust emission data used in the FTP/HFET-based model type calculations under § 600.208, and subsequently required by the Administrator in accordance with § 600.507;

(2) (i) All fuel economy data for certification vehicles and for vehicles tested for running changes approved under § 86.1842 of this chapter;

(ii) All carbon-related exhaust emission data for certification vehicles and for vehicles tested for running changes approved under § 86.1842 of this chapter;

(3) Any additional fuel economy and carbon-related exhaust emission data submitted by the manufacturer under § 600.509;

(4)(i) A fuel economy value for each model type of the manufacturer's product line calculated according to § 600.510–12(b)(2);

(ii) A carbon-related exhaust emission value for each model type of the manufacturer's product line calculated according to § 600.510–12(b)(2);

(5)(i) The manufacturer's average fuel economy value calculated according to § 600.510–12(c);

(ii) The manufacturer's average carbon-related exhaust emission value calculated according to § 600.510–12(j);

(6) A listing of both domestically and nondomestically produced car lines as determined in § 600.511 and the cost information upon which the determination was made; and

(7) The authenticity and accuracy of production data must be attested to by the corporation, and shall bear the signature of an officer (a corporate executive of at least the rank of vice-president) designated by the corporation. Such attestation shall constitute a representation by the manufacturer that the manufacturer has established reasonable, prudent procedures to ascertain and provide production data that are accurate and authentic in all material respects and that these procedures have been followed by employees of the manufacturer involved in the reporting process. The signature of the designated officer shall constitute a representation by the required attestation.

(8) [Reserved]

(9) The ''required fuel economy level'' pursuant to 49 CFR parts 531 or 533, as applicable. Model year reports shall include information in sufficient detail to verify the accuracy of the calculated required fuel economy level, including but is not limited to, production information for each unique footprint within each model type contained in the model year report and the formula used to calculate the required fuel economy level. Model year reports shall include a statement that the method of measuring vehicle track width, measuring vehicle wheelbase and calculating vehicle footprint is accurate and complies with applicable Department of Transportation requirements.

(10) The ''required fuel economy level'' pursuant to 49 CFR parts 531 or 533 as applicable, and the applicable fleet average $CO_2$ emission standards. Model year reports shall include information in sufficient detail to verify the accuracy of the calculated required fuel economy level and fleet average $CO_2$ emission standards, including but is not limited to, production information for each unique footprint within each model type contained in the model year report and the formula used to calculate the required fuel economy level and fleet average $CO_2$ emission standards. Model year reports shall include a statement that the method of measuring vehicle track width, measuring vehicle wheelbase and calculating vehicle footprint is accurate and complies with applicable Department of Transportation and EPA requirements.

(11) A detailed (but easy to understand) list of vehicle models and the applicable in-use CREE emission standard. The list of models shall include the applicable carline/subconfiguration parameters (including carline, equivalent test weight, road-load horsepower, axle ratio, engine code, transmission class, transmission configuration and basic engine); the test parameters (ETW and a, b, c, dynamometer coefficients) and the associated CREE emission standard. The manufacturer shall provide the method of identifying EPA engine code for applicable in-use vehicles.

[75 FR 25717, May 7, 2010, as amended at 76 FR 39569, July 6, 2011]

### § 600.513–08 Gas Guzzler Tax.

(a) This section applies only to passenger automobiles sold after December 27, 1991, regardless of the model year of those vehicles. For alcohol dual fuel and natural gas dual fuel automobiles, the fuel economy while such automobiles are operated on gasoline will be used for Gas Guzzler Tax assessments.

(1) The provisions of this section do not apply to passenger automobiles exempted for Gas Guzzler Tax assessments by applicable Federal law and

regulations. However, the manufacturer of an exempted passenger automobile may, in its discretion, label such vehicles in accordance with the provisions of this section.

(2) For 1991 and later model year passenger automobiles, the combined FTP/HFET-based model type fuel economy value determined in § 600.208 used for Gas Guzzler Tax assessments shall be calculated in accordance with the following equation, rounded to the nearest 0.1 mpg:

$$FE_{adj} = FE[((0.55 \times a_g \times c) + (0.45 \times c) + (0.5556 \times a_g) + 0.4487)/((0.55 \times a_g) + 0.45)] + IW_g$$

Where:

$FE_{adj}$ = Fuel economy value to be used for determination of gas guzzler tax assessment rounded to the nearest 0.1 mpg.

FE = Combined model type fuel economy calculated in accordance with § 600.208, rounded to the nearest 0.0001 mpg.

$a_g$ = Model type highway fuel economy, calculated in accordance with § 600.208, rounded to the nearest 0.0001 mpg divided by the model type city fuel economy calculated in accordance with § 600.208, rounded to the nearest 0.0001 mpg. The quotient shall be rounded to 4 decimal places.

c = gas guzzler adjustment factor = $1.300 \times 10^{-3}$ for the 1986 and later model years.

$IW_g = (9.2917 \times 10^{-3} \times SF_{3IWCG}FE_{3IWCG}) - (3.5123 \times 10^{M3} \times SF_{4ETWG} \times FE_{4IWCG})$.

NOTE: Any calculated value of IW less than zero shall be set equal to zero.

$SF_{3IWCG}$ = The 3000 lb. inertia weight class sales in the model type divided by the total model type sales; the quotient shall be rounded to 4 decimal places.

$SF_{4ETWG}$ = The 4000 lb. equivalent test weight sales in the model type divided by the total model type sales, the quotient shall be rounded to 4 decimal places.

$FE_{3IWCG}$ = The 3000 lb. inertial weight class base level combined fuel economy used to calculate the model type fuel economy rounded to the nearest 0.0001 mpg.

$FE_{4IWCG}$ = The 4000 lb. inertial weight class base level combined fuel economy used to calculate the model type fuel economy rounded to the nearest 0.001 mpg.

(b)(1) For passenger automobiles sold after December 31, 1990, with a combined FTP/HFET-based model type fuel economy value of less than 22.5 mpg (as determined in § 600.208), calculated in accordance with paragraph (a)(2) of this section and rounded to the nearest 0.1 mpg, each vehicle fuel economy label shall include a Gas Guzzler Tax statement pursuant to 49 U.S.C. 32908(b)(1)(E). The tax amount stated shall be as specified in paragraph (b)(2) of this section.

(2) For passenger automobiles with a combined general label model type fuel economy value of:

| At least * * * | but less than * * * | the Gas Guzzler Tax statement shall show a tax of * * * |
|---|---|---|
| (i) 22.5 | | $0 |
| (ii) 21.5 | 22.5 | $1,000 |
| (iii) 20.5 | 21.5 | $1,300 |
| (iv) 19.5 | 20.5 | $1,700 |
| (v) 18.5 | 19.5 | $2,100 |
| (vi) 17.5 | 18.5 | $2,600 |
| (vii) 16.5 | 17.5 | $3,000 |
| (viii) 15.5 | 16.5 | $3,700 |
| (ix) 14.5 | 15.5 | $4,500 |
| (x) 13.5 | 14.5 | $5,400 |
| (xi) 12.5 | 13.5 | $6,400 |
| (xii) — | 12.5 | $7,700 |

[76 FR 39569, July 6, 2011]

### § 600.514–12 Reports to the Environmental Protection Agency.

This section establishes requirements for automobile manufacturers to submit reports to the Environmental Protection Agency regarding their efforts to reduce automotive greenhouse gas emissions.

(a) *General Requirements.* (1) For each model year, each manufacturer shall submit a pre-model year report.

(2) The pre-model year report required by this section for each model year must be submitted before the model year begins and before the certification of any test group, no later than December 31 of the calendar year two years before the model year. For example the pre-model year report for the 2012 model year must be submitted no later than December 31, 2010.

(3) Each report required by this section must:

(i) Identify the report as a pre-model year report;

(ii) Identify the manufacturer submitting the report;

(iii) State the full name, title, and address of the official responsible for preparing the report;

(iv) Be submitted to: Director, Compliance and Innovative Strategies Division, U.S. Environmental Protection Agency, 2000 Traverwood, Ann Arbor, Michigan 48105;

(v) Identify the current model year;

(vi) Be written in the English language; and

(vii) Be based upon all information and data available to the manufacturer approximately 30 days before the report is submitted to the Administrator.

(b) *Content of pre-model year reports.* (1) Each pre-model year report must include the following information for each compliance category for the applicable future model year and to the extent possible, two model years into the future:

(i) The manufacturer's estimate of its footprint-based fleet average $CO_2$ standards (including temporary lead time allowance alternative standards, if applicable);

(ii) Projected total and model-level production volumes for each applicable standard category;

(iii) Projected fleet average $CO_2$ compliance level for each applicable standard category; and the model-level $CO_2$ emission values which form the basis of the projection;

(iv) Projected fleet average $CO_2$ credit/debit status for each applicable standard category;

(v) A description of the various credit, transfer and trading options that will be used to comply with each applicable standard category, including the amount of credit the manufacturer intends to generate for air conditioning leakage, air conditioning efficiency, off-cycle technology, and various early credit programs;

(vi) A description of the method which will be used to calculate the carbon-related exhaust emissions for any electric vehicles, fuel cell vehicles and plug-in hybrid vehicles;

(vii) A summary by model year (beginning with the 2009 model year) of the number of electric vehicles, fuel cell vehicles and plug-in hybrid vehicles using (or projected to use) the advanced technology vehicle incentives program;

(viii) The methodology which will be used to comply with $N_2O$ and $CH_4$ emission standards; and

(ix) Other information requested by the Administrator.

(2) Manufacturers must submit, in the pre-model year report for each model year in which a credit deficit is generated (or projected to be generated), a compliance plan demonstrating how the manufacturer will comply with the fleet average $CO_2$ standard by the end of the third year after the deficit occurred.

[75 FR 25718, May 7, 2010]

## APPENDIX I TO PART 600—HIGHWAY FUEL ECONOMY DRIVING SCHEDULE

[ SPEED (MPH) VS TIME (SEC) ]

| SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Sample On | 50 | 38.6 | 100 | 48.5 | 150 | 44.1 | 200 | 43.4 | 250 | 48.0 | 300 | 33.4 | 350 | 59.0 |
| 1 | 0.0 | 51 | 39.3 | 101 | 48.8 | 151 | 44.3 | 201 | 43.2 | 251 | 48.0 | 301 | 35.6 | 351 | 58.9 |
| 2 | 0.0 | 52 | 40.0 | 102 | 49.1 | 152 | 44.4 | 202 | 43.2 | 252 | 48.0 | 302 | 37.5 | 352 | 58.8 |
| 3 | 2.0 | 53 | 40.7 | 103 | 49.2 | 153 | 44.6 | 203 | 43.1 | 253 | 48.1 | 303 | 39.1 | 353 | 58.6 |
| 4 | 4.9 | 54 | 41.4 | 104 | 49.1 | 154 | 44.7 | 204 | 43.0 | 254 | 48.2 | 304 | 40.2 | 354 | 58.4 |
| 5 | 8.1 | 55 | 42.2 | 105 | 49.1 | 155 | 44.9 | 205 | 43.0 | 255 | 48.2 | 305 | 41.1 | 355 | 58.2 |
| 6 | 11.3 | 56 | 42.9 | 106 | 49.0 | 156 | 45.2 | 206 | 43.1 | 256 | 48.1 | 306 | 41.8 | 356 | 58.1 |
| 7 | 14.5 | 57 | 43.5 | 107 | 49.0 | 157 | 45.7 | 207 | 43.4 | 257 | 48.6 | 307 | 42.4 | 357 | 58.0 |
| 8 | 17.3 | 58 | 44.0 | 108 | 49.1 | 158 | 45.9 | 208 | 43.9 | 258 | 48.9 | 308 | 42.8 | 358 | 57.9 |
| 9 | 19.6 | 59 | 44.3 | 109 | 49.2 | 159 | 46.3 | 209 | 44.0 | 259 | 49.1 | 309 | 43.3 | 359 | 57.6 |
| 10 | 21.8 | 60 | 44.5 | 110 | 49.3 | 160 | 46.8 | 210 | 43.5 | 260 | 49.1 | 310 | 43.8 | 360 | 57.4 |
| 11 | 24.0 | 61 | 44.8 | 111 | 49.4 | 161 | 46.9 | 211 | 42.6 | 261 | 49.1 | 311 | 44.3 | 361 | 57.2 |
| 12 | 25.8 | 62 | 44.9 | 112 | 49.5 | 162 | 47.0 | 212 | 41.5 | 262 | 49.1 | 312 | 44.7 | 362 | 57.1 |
| 13 | 27.1 | 63 | 45.0 | 113 | 49.5 | 163 | 47.1 | 213 | 40.7 | 263 | 49.1 | 313 | 45.0 | 363 | 57.0 |
| 14 | 28.0 | 64 | 45.1 | 114 | 49.5 | 164 | 47.6 | 214 | 40.0 | 264 | 49.0 | 314 | 45.2 | 364 | 57.0 |
| 15 | 29.0 | 65 | 45.4 | 115 | 49.4 | 165 | 47.9 | 215 | 40.0 | 265 | 48.9 | 315 | 45.4 | 365 | 56.9 |
| 16 | 30.0 | 66 | 45.7 | 116 | 49.1 | 166 | 48.0 | 216 | 40.3 | 266 | 48.2 | 316 | 45.5 | 366 | 56.9 |
| 17 | 30.7 | 67 | 46.0 | 117 | 48.9 | 167 | 48.0 | 217 | 41.0 | 267 | 47.7 | 317 | 45.8 | 367 | 56.9 |
| 18 | 31.5 | 68 | 46.3 | 118 | 48.6 | 168 | 47.9 | 218 | 42.0 | 268 | 47.5 | 318 | 46.0 | 368 | 57.0 |
| 19 | 32.2 | 69 | 46.5 | 119 | 48.4 | 169 | 47.8 | 219 | 42.7 | 269 | 47.2 | 319 | 46.1 | 369 | 57.0 |
| 20 | 32.9 | 70 | 46.8 | 120 | 48.1 | 170 | 47.3 | 220 | 43.1 | 270 | 46.7 | 320 | 46.5 | 370 | 57.0 |
| 21 | 33.5 | 71 | 46.9 | 121 | 47.7 | 171 | 46.7 | 221 | 43.2 | 271 | 46.2 | 321 | 46.8 | 371 | 57.0 |
| 22 | 34.1 | 72 | 47.0 | 122 | 47.4 | 172 | 46.2 | 222 | 43.4 | 272 | 46.0 | 322 | 47.1 | 372 | 57.0 |
| 23 | 34.6 | 73 | 47.1 | 123 | 47.3 | 173 | 45.9 | 223 | 43.9 | 273 | 45.8 | 323 | 47.7 | 373 | 57.0 |
| 24 | 34.9 | 74 | 47.2 | 124 | 47.5 | 174 | 45.7 | 224 | 44.3 | 274 | 45.6 | 324 | 48.3 | 374 | 57.0 |
| 25 | 35.1 | 75 | 47.3 | 125 | 47.8 | 175 | 45.5 | 225 | 44.7 | 275 | 45.4 | 325 | 49.0 | 375 | 57.0 |

[ SPEED (MPH) VS TIME (SEC) ]

| SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | 35.7 | 76 | 47.2 | 126 | 47.9 | 176 | 45.4 | 226 | 45.1 | 276 | 45.2 | 326 | 49.7 | 376 | 57.0 |
| 27 | 35.9 | 77 | 47.1 | 127 | 48.0 | 177 | 45.3 | 227 | 45.4 | 277 | 45.0 | 327 | 50.3 | 377 | 56.9 |
| 28 | 35.8 | 78 | 47.0 | 128 | 47.9 | 178 | 45.0 | 228 | 45.8 | 278 | 44.7 | 328 | 51.0 | 378 | 56.8 |
| 29 | 35.3 | 79 | 46.9 | 129 | 47.9 | 179 | 44.0 | 229 | 46.5 | 279 | 44.5 | 329 | 51.7 | 379 | 56.5 |
| 30 | 34.9 | 80 | 46.9 | 130 | 47.9 | 180 | 43.1 | 230 | 46.9 | 280 | 44.2 | 330 | 52.4 | 380 | 56.2 |
| 31 | 34.5 | 81 | 46.9 | 131 | 48.0 | 181 | 42.2 | 231 | 47.2 | 281 | 43.5 | 331 | 53.1 | 381 | 56.0 |
| 32 | 34.6 | 82 | 47.0 | 132 | 48.0 | 182 | 41.5 | 232 | 47.4 | 282 | 42.8 | 332 | 53.8 | 382 | 56.0 |
| 33 | 34.8 | 83 | 47.1 | 133 | 48.0 | 183 | 41.5 | 233 | 47.3 | 283 | 42.0 | 333 | 54.5 | 383 | 56.0 |
| 34 | 35.1 | 84 | 47.1 | 134 | 47.9 | 184 | 42.1 | 234 | 47.3 | 284 | 40.1 | 334 | 55.2 | 384 | 56.1 |
| 35 | 35.7 | 85 | 47.2 | 135 | 47.3 | 185 | 42.9 | 235 | 47.2 | 285 | 38.6 | 335 | 55.8 | 385 | 56.4 |
| 36 | 36.1 | 86 | 47.1 | 136 | 46.0 | 186 | 43.5 | 236 | 47.2 | 286 | 37.5 | 336 | 56.4 | 386 | 56.7 |
| 37 | 36.2 | 87 | 47.0 | 137 | 43.3 | 187 | 43.9 | 237 | 47.2 | 287 | 35.8 | 337 | 56.9 | 387 | 56.9 |
| 38 | 36.5 | 88 | 46.9 | 138 | 41.2 | 188 | 43.6 | 238 | 47.1 | 288 | 34.7 | 338 | 57.0 | 388 | 57.1 |
| 39 | 36.7 | 89 | 46.5 | 139 | 39.5 | 189 | 43.3 | 239 | 47.0 | 289 | 34.0 | 339 | 57.1 | 389 | 57.3 |
| 40 | 36.9 | 90 | 46.3 | 140 | 39.2 | 190 | 43.0 | 240 | 47.0 | 290 | 33.3 | 340 | 57.3 | 390 | 57.4 |
| 41 | 37.0 | 91 | 46.2 | 141 | 39.0 | 191 | 43.1 | 241 | 46.9 | 291 | 32.5 | 341 | 57.6 | 391 | 57.4 |
| 42 | 37.0 | 92 | 46.3 | 142 | 39.0 | 192 | 43.4 | 242 | 46.8 | 292 | 31.7 | 342 | 57.8 | 392 | 57.2 |
| 43 | 37.0 | 93 | 46.5 | 143 | 39.1 | 193 | 43.9 | 243 | 46.9 | 293 | 30.6 | 343 | 58.0 | 393 | 57.0 |
| 44 | 37.0 | 94 | 46.9 | 144 | 39.5 | 194 | 44.3 | 244 | 47.0 | 294 | 29.6 | 344 | 58.1 | 394 | 56.9 |
| 45 | 37.0 | 95 | 47.1 | 145 | 40.1 | 195 | 44.6 | 245 | 47.2 | 295 | 28.8 | 345 | 58.4 | 395 | 56.6 |
| 46 | 37.0 | 96 | 47.4 | 146 | 41.0 | 196 | 44.9 | 246 | 47.5 | 296 | 28.4 | 346 | 58.7 | 396 | 56.3 |
| 47 | 37.1 | 97 | 47.7 | 147 | 42.0 | 197 | 44.8 | 247 | 47.9 | 297 | 28.6 | 347 | 58.8 | 397 | 56.1 |
| 48 | 37.3 | 98 | 48.0 | 148 | 43.1 | 198 | 44.4 | 248 | 48.0 | 298 | 29.5 | 348 | 58.9 | 398 | 56.4 |
| 49 | 37.8 | 99 | 48.2 | 149 | 43.7 | 199 | 43.9 | 249 | 48.0 | 299 | 31.4 | 349 | 59.0 | 399 | 56.7 |

| SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 400 | 57.1 | 450 | 58.2 | 500 | 54.7 | 550 | 55.8 | 600 | 48.3 | 650 | 50.2 | 700 | 54.2 | 750 | 26.8 |
| 401 | 57.5 | 451 | 58.1 | 501 | 54.6 | 551 | 55.6 | 601 | 48.0 | 651 | 50.7 | 701 | 54.5 | 751 | 24.5 |
| 402 | 57.8 | 452 | 58.0 | 502 | 54.4 | 552 | 55.4 | 602 | 47.9 | 652 | 51.1 | 702 | 54.8 | 752 | 21.5 |
| 403 | 58.0 | 453 | 58.0 | 503 | 54.3 | 553 | 55.2 | 603 | 47.8 | 653 | 51.7 | 703 | 55.0 | 753 | 19.5 |
| 404 | 58.0 | 454 | 58.0 | 504 | 54.3 | 554 | 55.1 | 604 | 47.7 | 654 | 52.2 | 704 | 55.5 | 754 | 17.4 |
| 405 | 58.0 | 455 | 58.0 | 505 | 54.2 | 555 | 55.0 | 605 | 47.9 | 655 | 52.5 | 705 | 55.9 | 755 | 15.1 |
| 406 | 58.0 | 456 | 58.0 | 506 | 54.1 | 556 | 54.9 | 606 | 48.3 | 656 | 52.1 | 706 | 56.1 | 756 | 12.4 |
| 407 | 58.0 | 457 | 58.0 | 507 | 54.1 | 557 | 54.6 | 607 | 49.0 | 657 | 51.6 | 707 | 56.3 | 757 | 9.7 |
| 408 | 58.0 | 458 | 57.9 | 508 | 54.1 | 558 | 54.4 | 608 | 49.1 | 658 | 51.1 | 708 | 56.4 | 758 | 7.0 |
| 409 | 57.9 | 459 | 57.9 | 509 | 54.0 | 559 | 54.2 | 609 | 49.0 | 659 | 51.0 | 709 | 56.5 | 759 | 5.0 |
| 410 | 57.8 | 460 | 58.0 | 510 | 54.0 | 560 | 54.1 | 610 | 48.9 | 660 | 51.0 | 710 | 56.7 | 760 | 3.3 |
| 411 | 57.7 | 461 | 58.1 | 511 | 54.0 | 561 | 53.8 | 611 | 48.0 | 661 | 51.1 | 711 | 56.9 | 761 | 2.0 |
| 412 | 57.7 | 462 | 58.1 | 512 | 54.0 | 562 | 53.4 | 612 | 47.1 | 662 | 51.4 | 712 | 57.0 | 762 | 0.7 |
| 413 | 57.8 | 463 | 58.2 | 513 | 54.0 | 563 | 53.3 | 613 | 46.2 | 663 | 51.7 | 713 | 57.3 | 763 | 0.0 |
| 414 | 57.9 | 464 | 58.3 | 514 | 54.0 | 564 | 53.1 | 614 | 46.1 | 664 | 52.0 | 714 | 57.7 | 764 | 0.0 |
| 415 | 58.0 | 465 | 58.3 | 515 | 54.0 | 565 | 52.9 | 615 | 46.1 | 665 | 52.2 | 715 | 58.2 | 765 | Sample Off |
| 416 | 58.1 | 446 | 58.3 | 516 | 54.0 | 566 | 52.6 | 616 | 46.2 | 666 | 52.5 | 716 | 58.8 | | |
| 417 | 58.4 | 467 | 58.2 | 517 | 54.1 | 567 | 52.4 | 617 | 46.9 | 667 | 52.8 | 717 | 59.1 | | |
| 418 | 58.9 | 468 | 58.1 | 518 | 54.2 | 568 | 52.2 | 618 | 47.8 | 668 | 52.7 | 718 | 59.2 | | |
| 419 | 59.1 | 469 | 58.0 | 519 | 54.5 | 569 | 52.1 | 619 | 49.0 | 669 | 52.6 | 719 | 59.1 | | |
| 420 | 59.4 | 470 | 57.8 | 520 | 54.8 | 570 | 52.0 | 620 | 49.7 | 670 | 52.3 | 720 | 58.8 | | |
| 421 | 59.8 | 471 | 57.5 | 521 | 54.9 | 571 | 52.0 | 621 | 50.6 | 671 | 52.3 | 721 | 58.5 | | |
| 422 | 59.9 | 472 | 57.1 | 522 | 55.0 | 572 | 52.0 | 622 | 51.5 | 672 | 52.4 | 722 | 58.1 | | |
| 423 | 59.9 | 473 | 57.0 | 523 | 55.1 | 573 | 52.0 | 623 | 52.2 | 673 | 52.5 | 723 | 57.7 | | |
| 424 | 59.8 | 474 | 56.6 | 524 | 55.2 | 574 | 52.1 | 624 | 52.7 | 674 | 52.7 | 724 | 57.3 | | |
| 425 | 59.6 | 475 | 56.1 | 525 | 55.2 | 575 | 52.0 | 625 | 53.0 | 675 | 52.7 | 725 | 57.1 | | |
| 426 | 59.4 | 476 | 56.0 | 526 | 55.3 | 576 | 52.0 | 626 | 53.6 | 676 | 52.4 | 726 | 56.8 | | |
| 427 | 59.2 | 477 | 55.8 | 527 | 55.4 | 577 | 51.9 | 627 | 54.0 | 677 | 52.1 | 727 | 56.5 | | |
| 428 | 59.1 | 478 | 55.5 | 528 | 55.5 | 578 | 51.6 | 628 | 54.1 | 678 | 51.7 | 728 | 56.2 | | |
| 429 | 59.0 | 479 | 55.2 | 529 | 55.6 | 579 | 51.4 | 629 | 54.4 | 679 | 51.1 | 729 | 55.5 | | |
| 430 | 58.9 | 480 | 55.1 | 530 | 55.7 | 580 | 51.1 | 630 | 54.7 | 680 | 50.5 | 730 | 54.6 | | |
| 431 | 58.7 | 481 | 55.0 | 531 | 55.8 | 581 | 50.7 | 631 | 55.1 | 681 | 50.1 | 731 | 54.1 | | |
| 432 | 58.6 | 482 | 54.9 | 532 | 55.9 | 582 | 50.3 | 632 | 55.4 | 682 | 49.8 | 732 | 53.7 | | |
| 433 | 58.5 | 483 | 54.9 | 533 | 56.0 | 583 | 49.8 | 633 | 55.4 | 683 | 49.7 | 733 | 53.2 | | |
| 434 | 58.4 | 484 | 54.9 | 534 | 56.0 | 584 | 49.3 | 634 | 55.0 | 684 | 49.6 | 734 | 52.9 | | |
| 435 | 58.4 | 485 | 54.9 | 535 | 56.0 | 585 | 48.7 | 635 | 54.5 | 685 | 49.5 | 735 | 52.5 | | |
| 436 | 58.3 | 486 | 54.9 | 536 | 56.0 | 586 | 48.2 | 6.36 | 53.6 | 686 | 49.5 | 736 | 52.0 | | |
| 437 | 58.2 | 487 | 54.9 | 537 | 56.0 | 587 | 48.1 | 637 | 52.5 | 687 | 49.7 | 737 | 51.3 | | |
| 438 | 58.1 | 488 | 55.0 | 538 | 56.0 | 588 | 48.0 | 638 | 50.2 | 688 | 50.0 | 738 | 50.5 | | |
| 439 | 58.0 | 489 | 55.0 | 539 | 56.0 | 589 | 48.0 | 6.39 | 48.2 | 689 | 50.2 | 739 | 49.5 | | |
| 440 | 57.9 | 490 | 55.0 | 540 | 56.0 | 590 | 48.1 | 640 | 46.5 | 690 | 50.6 | 740 | 48.5 | | |
| 441 | 57.9 | 491 | 55.0 | 541 | 56.0 | 591 | 48.4 | 641 | 46.2 | 691 | 51.1 | 741 | 47.6 | | |
| 442 | 57.9 | 492 | 55.0 | 542 | 56.0 | 592 | 48.9 | 642 | 46.0 | 692 | 51.6 | 742 | 46.8 | | |
| 443 | 57.9 | 493 | 55.0 | 543 | 56.0 | 593 | 49.0 | 643 | 46.0 | 693 | 51.9 | 743 | 45.6 | | |
| 444 | 57.9 | 494 | 55.1 | 544 | 56.0 | 594 | 49.1 | 644 | 46.3 | 694 | 52.0 | 744 | 44.2 | | |

| SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH | SEC | MPH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 445 | 58.0 | 495 | 55.1 | 545 | 56.0 | 595 | 49.1 | 645 | 46.8 | 695 | 52.1 | 745 | 42.5 | | |
| 446 | 58.1 | 496 | 55.0 | 546 | 56.0 | 596 | 49.0 | 646 | 47.5 | 696 | 52.4 | 746 | 39.2 | | |
| 447 | 58.1 | 497 | 54.9 | 547 | 55.9 | 597 | 49.0 | 647 | 48.2 | 697 | 52.9 | 747 | 35.9 | | |
| 448 | 58.2 | 498 | 54.9 | 548 | 55.9 | 598 | 48.9 | 648 | 48.8 | 698 | 53.3 | 748 | 32.6 | | |
| 449 | 58.2 | 499 | 54.8 | 549 | 55.9 | 599 | 48.6 | 649 | 49.5 | 699 | 53.7 | 749 | 29.3 | | |

[42 FR 45667, Sept. 12, 1977]

## APPENDIX II TO PART 600—SAMPLE FUEL ECONOMY CALCULATIONS

(a) This sample fuel economy calculation is applicable to 1978 through 1987 model year automobiles.

(1) Assume that a gasoline-fueled vehicle was tested by the Federal Emission Test Procedure and the following results were calculated:

HC=.139 grams/mile
CO=1.59 grams/mile
$CO_2$=317 grams/mile

According to the procedure in §600.113–78, the city fuel economy or $MPG_c$, for the vehicle may be calculated by substituting the HC, CO, and $CO_2$ grams/mile values into the following equation.

$$MPG_c = \frac{2421}{(0.866 \times HC) + (0.429 \times CO) + (0.273 \times CO_2)}$$

$$MPG_c = \frac{2421}{(0.866 \times 1.39) + (0.429 \times 1.59) + (0.273 \times 317)}$$

$MPG_c$=27.7

(2) Assume that the same vehicle was tested by the Federal Highway Fuel Economy Test Procedure and calculation similar to that shown in paragraph (a) by this appendix resulted in a highway fuel economy or $MPG_h$ of 36.9. According to the procedure in §600.113, the combined fuel economy (called $MPG_{c/h}$) for the vehicle may be calculated by substituting the city and highway fuel economy values into the following equation:

$$MPG_{c/h} = \frac{1}{\frac{0.55}{MPG_c} + \frac{0.45}{MPG_h}}$$

$$MPG_{c/h} = \frac{1}{\frac{0.55}{27.7} + \frac{0.45}{36.9}}$$

$$MPG_{c/h} = 31.2$$

(b) This sample fuel economy calculation is applicable to 1988 and later model year automobiles.

(1) Assume that a gasoline-fueled vehicle was tested by the Federal Emission Test Procedure and the following results were calculated:

HC = .139 grams/mile.
CO = 1.59 grams/mile.
$CO_2$ = 317 grams/mile.

(2) Assume that the test fuel used for this test had the following properties:

SG = 0.745.
CWF = 0.868.
NHV = 18,478 Btu/lb.

(3) According to the procedure in §600.113–08, the city fuel economy or $MPG_c$, for the

vehicle may be calculated by substituting the HC, CO, and $CO_2$ gram/mile values and the SG, CWF, and NHV values into the following equation:

$$MPG_c = (5174 \times 10^4 \times CWF \times SG) / [((CWF \times HC) + (0.429 \times CO + (0.273 \times CO_2)) ((0.6 \times SG \times NHV) + 5471)]$$

Example:

$$MPG_c = (5174 \times 10^4 \times 0.868 \times 0.745) / [(0.868 \times .139 + 0.429 \times 1.59 + 0.273 \times 317)(0.6 \times 0.745 \times 18478 + 5471)]$$

$$MPG_c = 27.9$$

(4) Assume that the same vehicle was tested by the Federal Highway Fuel Economy Test Procedure and a calculation similar to that shown in (b)(3) of this section resulted in a highway fuel economy of $MPG_h$ of 36.9. According to the procedure in § 600.210–08(c) or § 600.210–12(c), the combined fuel economy (called $MPG_{comb}$) for the vehicle may be calculated by substituting the city and highway fuel economy values into the following equation:

$$MPG_{comb} = \frac{1}{\frac{0.55}{MPG_c} + \frac{0.45}{MPG_h}}$$

$$MPG_{comb} = \frac{1}{\frac{0.55}{27.9} + \frac{0.45}{36.9}}$$

$$MPG_{comb} = 31.3$$

[51 FR 37852, Oct. 24, 1986, as amended at 71 FR 77958, Dec. 27, 2006; 76 FR 39570, July 6, 2011]

## APPENDIX III TO PART 600—SAMPLE FUEL ECONOMY LABEL CALCULATION

Suppose that a manufacturer called Mizer Motors has a product line composed of eight car lines. Of these eight, four are available with the 3.0 liter, 6 cylinder, sequential multi-point fuel injection, 4-valve per cylinder, and 3-way catalyst engine. These four car lines are:

Ajax
Boredom III
Dodo
Castor (Station Wagon)

A. A car line is defined in subpart A (with additional guidance provided in EPA Advisory Circular 89) as a group of vehicles within a make or division which has a degree of commonality in construction. Car line does not consider any level of decor or opulence and is not generally distinguished by such characteristics as roofline, number of doors, seats, or windows. Station wagons and light duty trucks are, however, identified separately from the remainder of each car line. In other words, a Castor station wagon would be considered a different car line than the normal Castor car line made up of sedans, coupes, etc.

B. The engine considered here is defined as a basic engine in subpart A of this part (with additional guidance provided in EPA Advisory Circular 83A). A basic engine is a unique combination of manufacturer, engine displacement, number of cylinders, fuel system, catalyst usage and other engine and emission control system characteristics specified by the Administrator. A model type is a unique combination of car line, basic engine, and transmission class. Thus Ajax is a car line but Ajax 3.0 liter, 6 cylinder manual four-speed transmission is a model type whereas Ajax 3.0 liter, 6 cylinder automatic three-speed transmission is a different model type.

C. The following calculations provide an example of the procedures described in subpart C of this part for the calculation of vehicle configuration and model type fuel economy values. In order to simplify the presentation, only city fuel economy values are included (as determined by either the derived 5-cycle method or vehicle-specific 5-cycle based method). The procedure is identical for highway and combined fuel economy values.

Step I. Input data as supplied by the manufacturer or as determined from testing conducted by the Administrator.

Manufacturer—Mizer Motors

Basic Engine: (3.0 liter, 6 cylinder, sequential multi-point fuel injection, 4-valve per cylinder, 3-way catalyst).

| Test vehicle carline | Engine code | Trans | Inertia weight | Axle ratio | Harmonically averaged. city MPG | Specific label MPG [1] | Vehicle config. sales |
|---|---|---|---|---|---|---|---|
| Ajax | 1 | M–4 | 3500 | 2.73 | 16.1001 | 16 | 15,000 |
| Ajax | 2 | A–3 | 3500 | 2.56 | 15.9020 | 16 | 35,000 |
| Boredom III | 4 | M–4 | 4000 | 3.08 | 14.2343 | 14 | 10,000 |
| Ajax | 3 | M–4 | 4000 | 3.36 | 15.0000 | 15 | 15,000 |

| Test vehicle carline | Engine code | Trans | Inertia weight | Axle ratio | Harmonically averaged. city MPG | Specific label MPG [1] | Vehicle config. sales |
|---|---|---|---|---|---|---|---|
| Boredom III | 8 | A–3 | 4000 | 2.56 | 13.8138 | 14 | 25,000 |
| Boredom III | 5 | A–3 | 4500 | 3.08 | 13.2203 | 13 | 20,000 |
| Castor | 5 | A–3 | 5000 | 3.08 | 10.6006 | 11 | 40,000 |

[1] The vehicle configuration fuel economy values, rounded to the nearest mile per gallon, are the fuel economy values that would be used on specific labels for that vehicle configuration.

Step II. Group vehicle fuel economy and sales data according to base level combinations within this basic engine.

| Base level | Transmission class | Inertia weight | Miles per gallon | Projected vehicle configuration sales |
|---|---|---|---|---|
| A | Manual-4 | 3,500 | 16.1001 | 15,000 |
| B | Automatic-3 | 3,500 | 15.9020 | 35,000 |
| C | Manual-4 | 4,000 | 14.2343 | 10,000 |
| C | Manual-4 | 4,000 | 15.0000 | 15,000 |
| D | Automatic-3 | 4,000 | 13.8138 | 25,000 |
| E | Automatic-3 | 4,500 | 13.2203 | 20,000 |
| F | Automatic-3 | 5,000 | 10.6006 | 40,000 |

Step III. Determine base level fuel economy values.

A. For all the base levels except the base level which includes 4,000 pound, manual four-speed transmission data, the base level fuel economy is as noted in Step II since only one vehicle configuration was tested within each of these base levels.

| | |
|---|---|
| 3,500 lb/M4 transmission. | 16.1001 mpg. |
| 3,500 lb/A3 transmission. | 15.9020 mpg. |
| 4,000 lb/A3 transmission. | 13.8138 mpg. |
| 4,500 lb/A3 transmission. | 13.2203 mpg. |
| 5,000 lb/A3 transmission. | 10.6006 mpg. |

B. Since data from more than one vehicle configuration are included in the 4,000-pound, manual four-speed transmission base level, this fuel economy is harmonically averaged in proportion to the percentage of total sales of all vehicle configurations tested within that base level represented by each vehicle configuration tested within that base level.

$$\text{Base level fuel economy} = \frac{1}{\left[\begin{array}{l}\text{Fraction of total sales of configurations}\\ \text{tested represented by}\\ \text{configuration No. 1 sales}\end{array}\right]\left[\dfrac{1}{\begin{array}{l}\text{Configuration}\\ \text{No. 1 fuel economy}\end{array}}\right] + \left[\begin{array}{l}\text{Fraction of total sales}\\ \text{of configurations tested}\\ \text{represented by configuration}\\ \text{No. 2 sales}\end{array}\right]\left[\dfrac{1}{\begin{array}{l}\text{Configuration}\\ \text{No. 2 1 fuel economy}\end{array}}\right]}$$

Base level: M4 transmission, 4000 pounds:

$$\frac{1}{\left[\dfrac{10000}{25000}\right]\dfrac{1}{14.2343} + \left[\dfrac{15000}{25000}\right]\dfrac{1}{15.0000}} = 14.6840 \text{ miles per gallon}$$

Therefore, the 4000 pound, M4 transmission fuel economy is 14.6840 miles per gallon.

Note that the car line of the test vehicle using a given engine makes no difference—only the weight and transmission do.

Step IV. For each model type offered by the manufacturer with that basic engine, determine the sales fraction represented by each inertia weight/transmission class combination and the corresponding fuel economy.

| | | | |
|---|---|---|---|
| Ajax | M4 | 0.4000 at 3,500 lb | 16.1001 |
| | | 0.6000 at 4,000 lb | 14.6840 |
| | A3 | 0.3000 at 3,500 lb | 15.9020 |
| | | 0.7000 at 4,000 lb | 13.8138 |
| Dodo | M4 | 0.4000 at 3,500 lb | 16.1001 |
| | | 0.6000 at 4,000 lb | 14.6840 |
| | A3 | 0.3000 at 3,500 lb | 15.9020 |
| | | 0.7000 at 4,000 lb | 13.8138 |
| Boredom III | M4 | 1.0000 at 4,000 lb | 14.6840 |
| | A3 | 0.2500 at 4,000 lb | 13.8138 |
| | | 0.7500 at 4,500 lb | 13.2203 |
| Castor | A3 | 0.2000 at 4,500 lb | 13.2203 |
| | | 0.8000 at 5,000 lb | 10.6006 |

Step V. Determine fuel economy for each model type (that is, car line/basic engine/transmission class combination).

Ajax, 3.0 liter, 6 cylinder, A3 transmission, model type MPG is calculated as follows:

$$\frac{1}{\left[\frac{\text{The fraction of Ajax vehicles using the 3.0 liter, 6 cylinder engine which fall in the 3500 lb inertia weight class with an A3 transmission}}{\text{Fuel economy for 3.0 liter, 6 cylinder 3500 lb A3 transmission base level}}\right] + \left[\frac{\text{The fraction of Ajax vehicles using the 3.0 liter, 6 cylinder engine which fall in the 4000 lb inertia weight class with an A3 transmission}}{\text{Fuel economy for 3.0 liter 6 cylinder 4000 lb A3 transmission base level}}\right]}$$

$$= \frac{1}{\left[\frac{0.3000}{15.9020}\right] + \left[\frac{0.7000}{13.8138}\right]} = 14.3803 \text{ mpg, which rounds to 14 MPG}^{1}$$

Similarly, Ajax and Dodo 3.0 liter, 6 cylinder, M4 model type MPG is calculated as follows:

$$\frac{1}{\left[\frac{0.4000}{16.1001}\right] + \left[\frac{0.6000}{14.6840}\right]} = 15.2185, \text{ which rounds to 15 MPG}^{1}$$

Dodo 3.0 liter, 6 cylinder, A3 model type MPG is calculated as follows:

$$= \frac{1}{\left[\frac{0.3000}{15.9020}\right] + \left[\frac{0.7000}{13.8138}\right]} = 14.3803 \text{ mpg, which rounds to 14 MPG}^{1}$$

Boredom III 3.0 liter 6 cylinder M4 model type MPG = 14.6840 mpg, which rounds to 15 mi./gal[1]

Boredom III 3.0 liter, 6 cylinder, A3 model type MPG is calculated as follows:

$$\frac{1}{\left[\frac{0.2500}{13.8138}\right] + \left[\frac{0.7500}{13.2203}\right]} = 13.3638, \text{ which rounds to 13 MPG}^{1}$$

Castor 3.0 liter, 6 cylinder, A3 model type MPG is calculated as follows:

$$\frac{1}{\left[\frac{0.2000}{13.2203}\right] + \left[\frac{0.8000}{10.6006}\right]} = 11.0381, \text{ which rounds to 11 MPG}^{1}$$

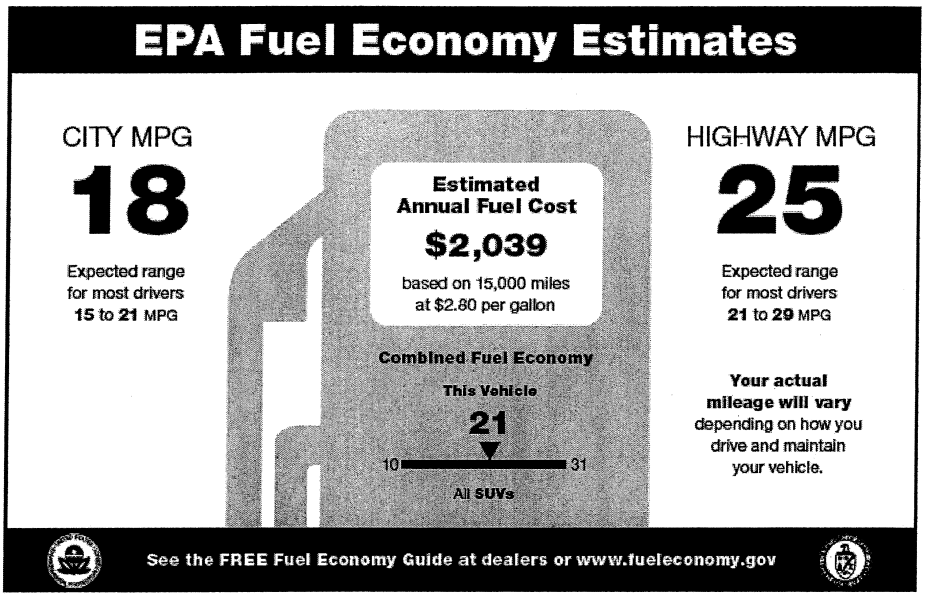
Note that even though no Dodo was actually tested, this approach permits its fuel economy figure to be estimated, based on the inertia weight distribution of projected Dodo sales within a specific engine and transmission grouping.

[71 FR 77958, Dec. 27, 2006]

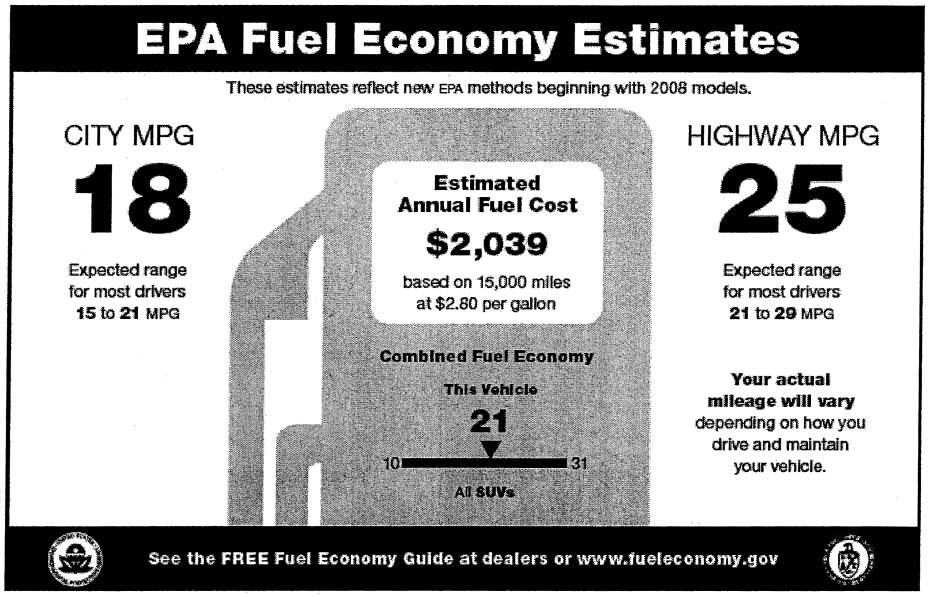
## APPENDIX IV TO PART 600—SAMPLE FUEL ECONOMY LABELS FOR 2008 THROUGH 2012 MODEL YEAR VEHICLES

A. Gasoline (or diesel)-fueled vehicle label

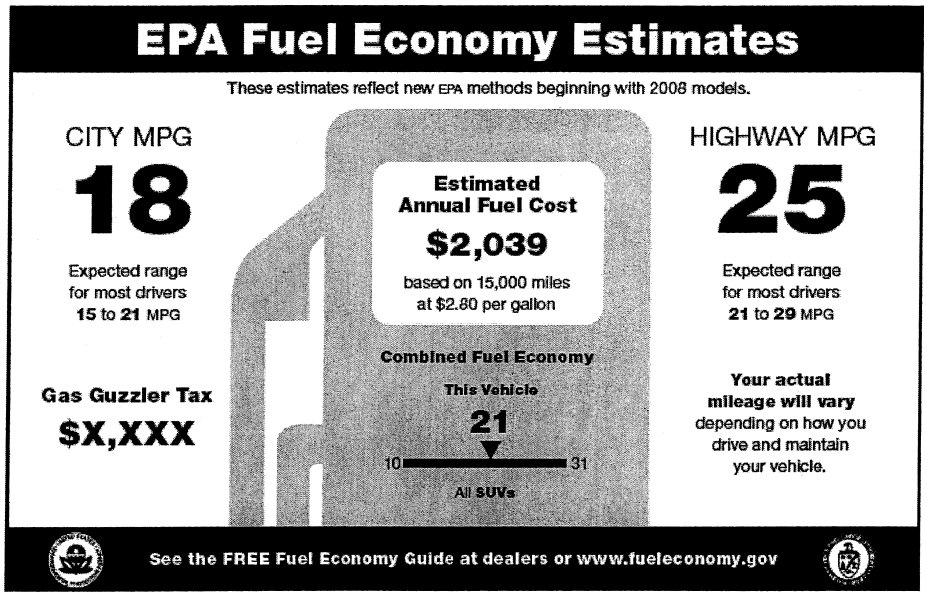
[1]The model type fuel economy values rounded to the nearest mile per gallon, are the fuel economy values listed in the EPA Fuel Economy Guide and used on the general labels (window stickers) for production vehicles for that model year.



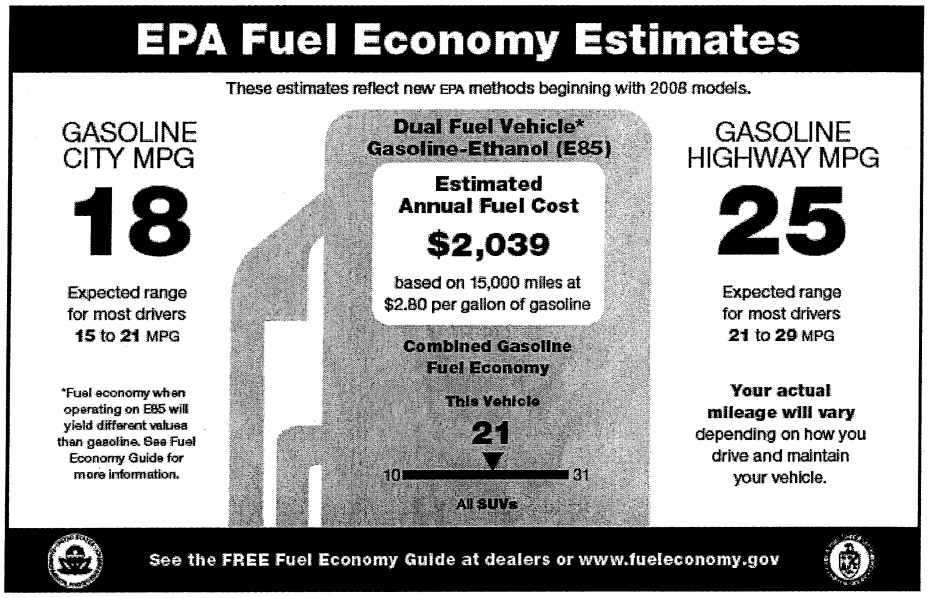

B. Gasoline (or diesel)-fueled vehicle label (with transitional text statement for MY 2008 and 2009 vehicles only)



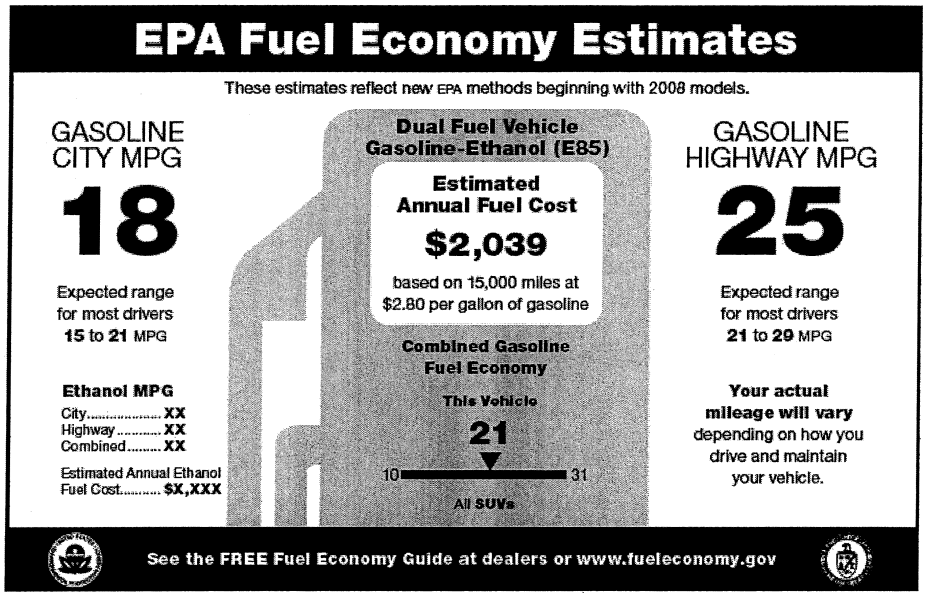

C. Gasoline-fueled Gas Guzzler vehicle label



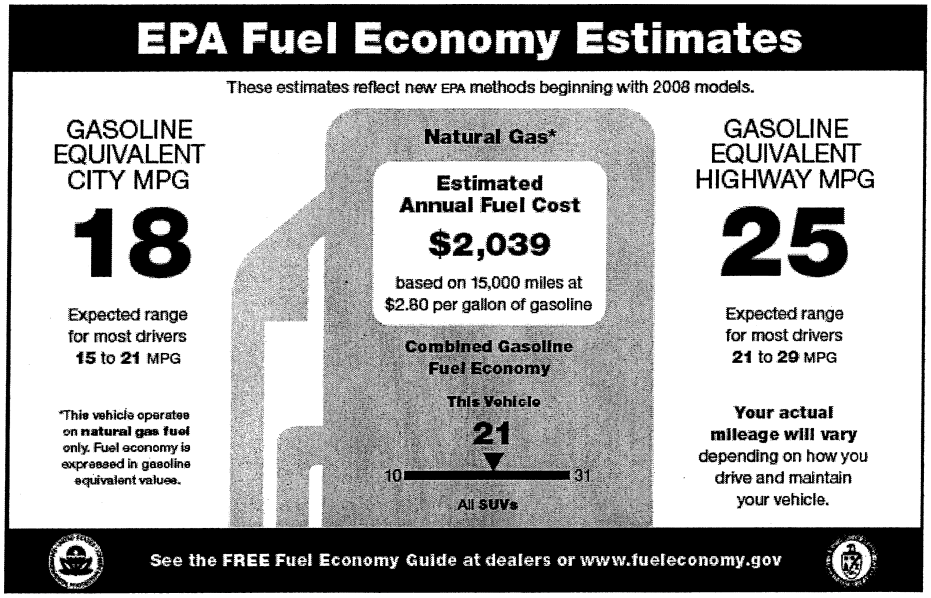

D. Dual Fuel Vehicle Label (Ethanol/Gasoline)
Option 1—without alternate fuel economy)



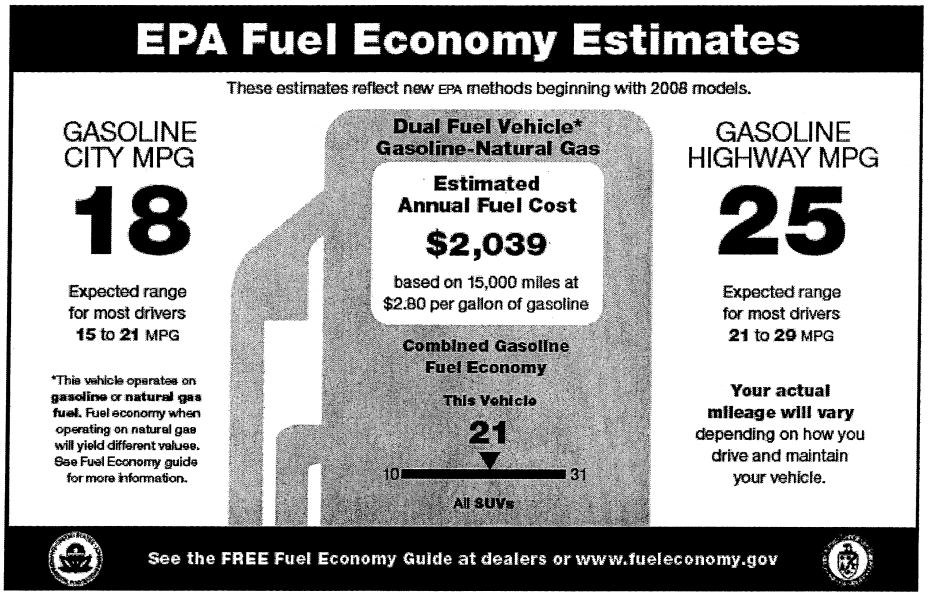

Option 2—with alternate fuel economy



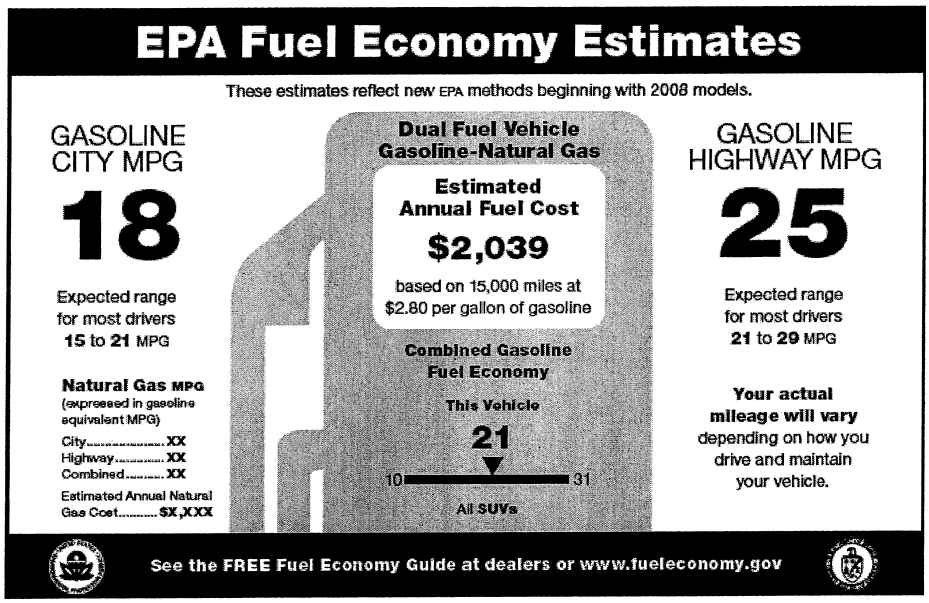

E. Natural Gas Vehicle Label



F. Dual Fuel Natural Gas Label
Option 1—without alternate fuel economy




Option 2—With alternate fuel economy



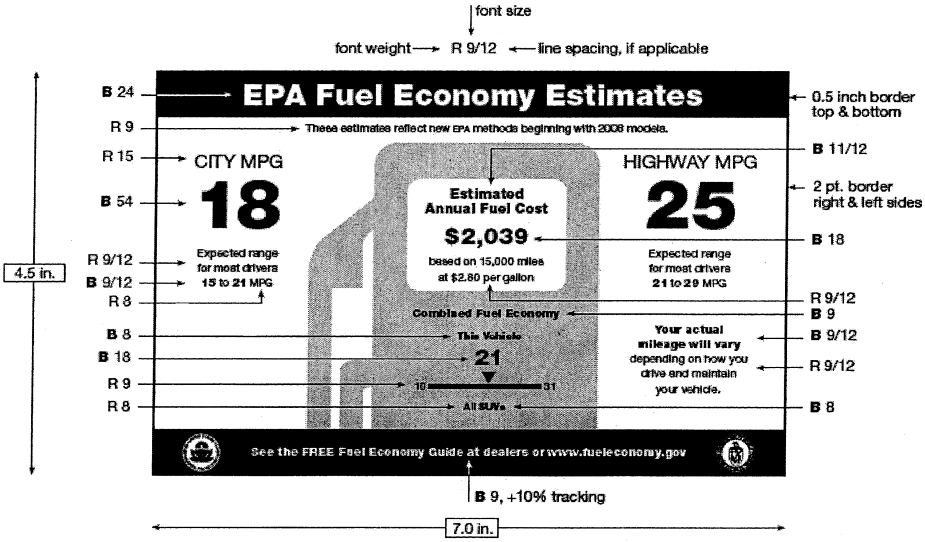

[71 FR 77961, Dec. 27, 2006]

## APPENDIX V TO PART 600—FUEL ECONOMY LABEL STYLE GUIDELINES FOR 2008 THROUGH 2012 MODEL YEAR VEHICLES

A. Format Guidelines for Gasoline (or Diesel) Vehicles

## Gasoline Fuel Economy Label

Set all copy in either the Helvetica or Arial font family — do not mix.
Use only Regular/Roman (R) and **Black** weights (**B**) — not bold, thin, italic or other font styles.




Combined fuel economy bar is a 4 pt. (0.056 in.) rule that is 90 pt. (1.25 in.) long.
Indicator triangle above bar is from Windings 3 at 14 pt. size. If drawn, 12 pt. (0.167 in.) each side.

B. Format Guidelines for Ethanol and Natural Gas Dual Fuel Vehicles. Unless otherwise indicated, the format specifications in appendix V. A. apply.

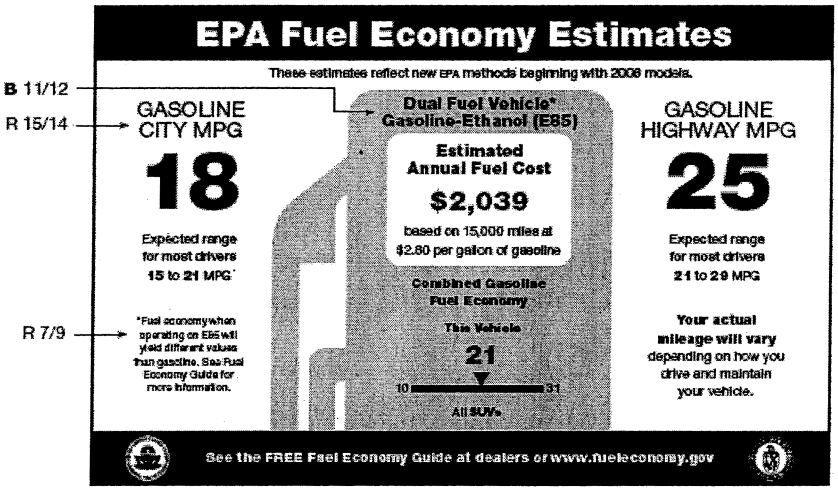
# Dual Fuel Vehicle: Gasoline-Ethanol

BASIC FUEL ECONOMY LABEL

Set all copy in either the Helvetica or Arial font family — do not mix.
Use only Regular/Roman (R) and **Black** weights (**B**) — not bold, thin, italic or other font styles.

font size

font weight → R 9/12 ← line spacing, if applicable



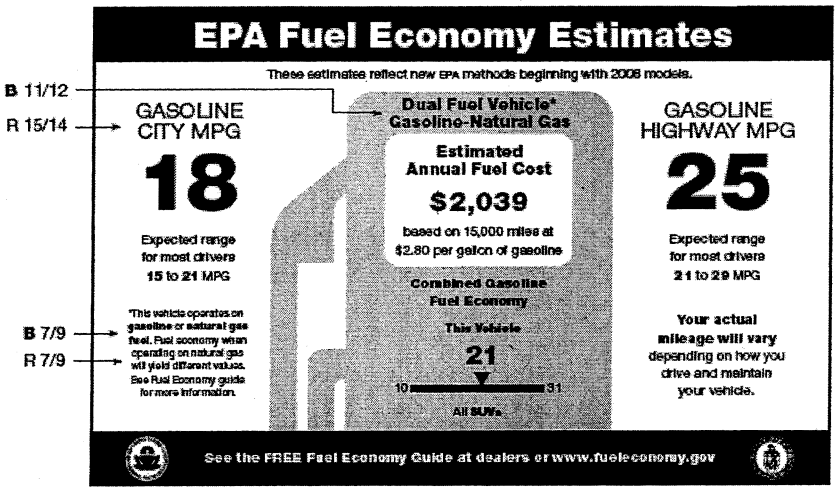
## Dual Fuel Vehicle: Gasoline-Natural Gas

BASIC FUEL ECONOMY LABEL

Set all copy in either the Helvetica or Arial font family — do not mix.
Use only Regular/Roman (R) and **Black** weights (**B**) — not bold, thin, italic or other font styles.

font size

font weight → R 9/12 ← line spacing, if applicable



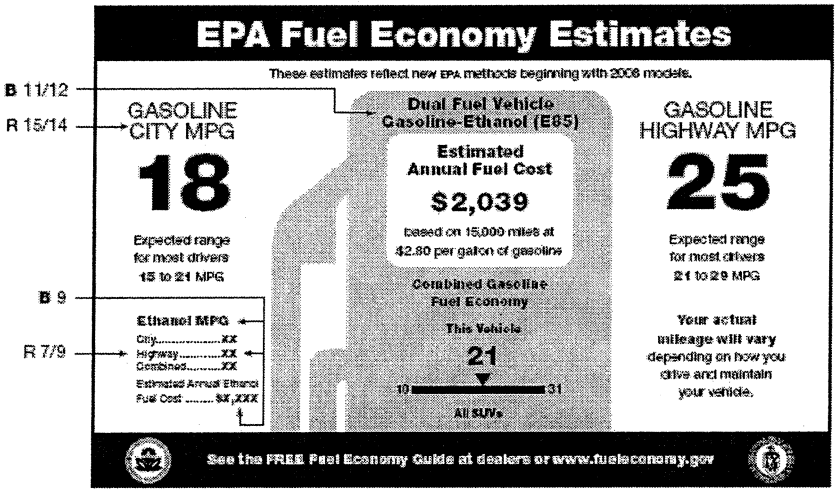
# Dual Fuel Vehicle: Gasoline-Ethanol

WITH ETHANOL MILEAGE INFORMATION

Set all copy in either the Helvetica or Arial font family — do not mix.
Use only Regular/Roman (R) and **Black** weights (**B**) — not bold, thin, italic or other font styles.

font size

font weight → R 9/12 ← line spacing, if applicable



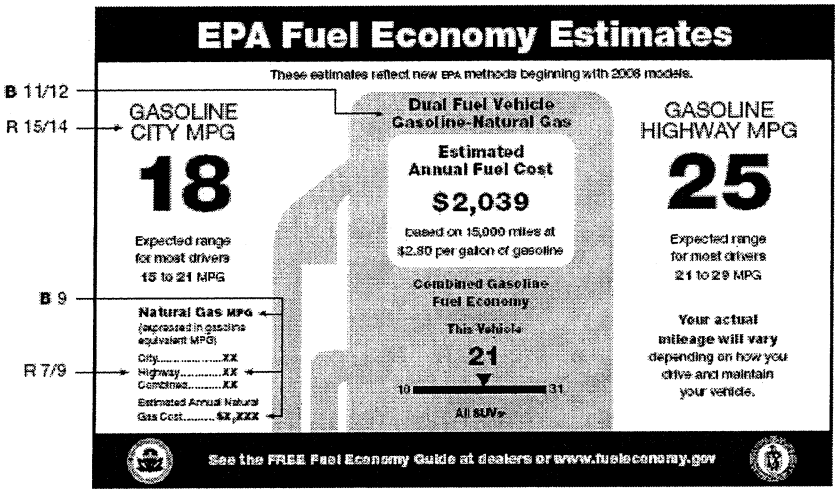
## Dual Fuel Vehicle: Gasoline-Natural Gas

WITH NATURAL GAS MILEAGE INFORMATION

Set all copy in either the Helvetica or Arial font family — do not mix.
Use only Regular/Roman (R) and **Black** weights (**B**) — not bold, thin, italic or other font styles.

font size

font weight → R 9/12 ← line spacing, if applicable




C. Format Guidelines showing Gas Guzzler. Unless otherwise indicated, the format specifications in appendix V. A. apply.

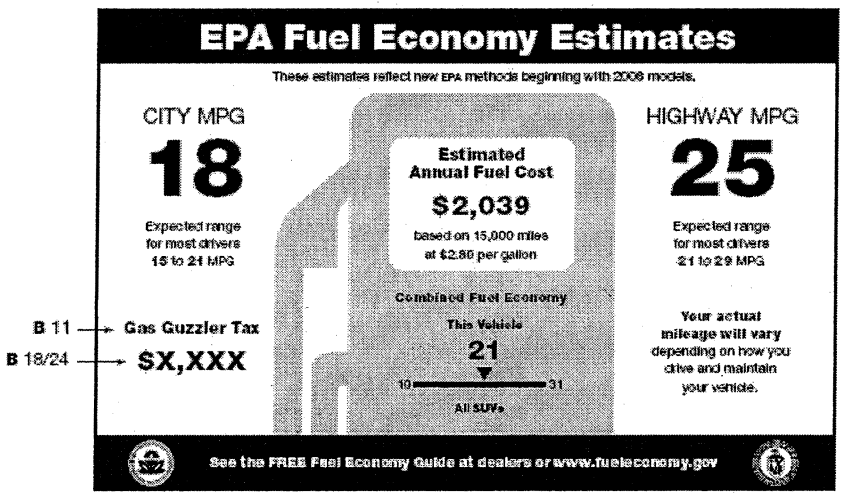
# Gasoline Fuel Economy Label

WITH GAS GUZZLER TAX

Set all copy in either the Helvetica or Arial font family — do not mix.
Use only Regular/Roman (R) and **Black** weights (**B**) — not bold, thin, italic or other font styles.

font size

font weight → R 9/12 ← line spacing, if applicable



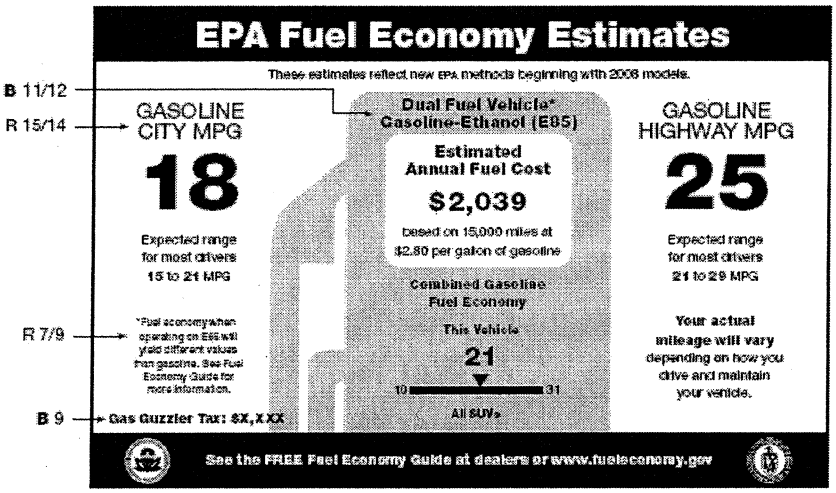
## Dual Fuel Vehicle: Gasoline-Ethanol

WITH GAS GUZZLER TAX

Set all copy in either the Helvetica or Arial font family — do not mix.
Use only Regular/Roman (R) and **Black** weights (**B**) — not bold, thin, italic or other font styles.

font size

font weight → R 9/12 ← line spacing, if applicable




D. Format Guidelines for Natural Vehicles. Unless otherwise indicated, the format specifications in appendix V. A. apply.

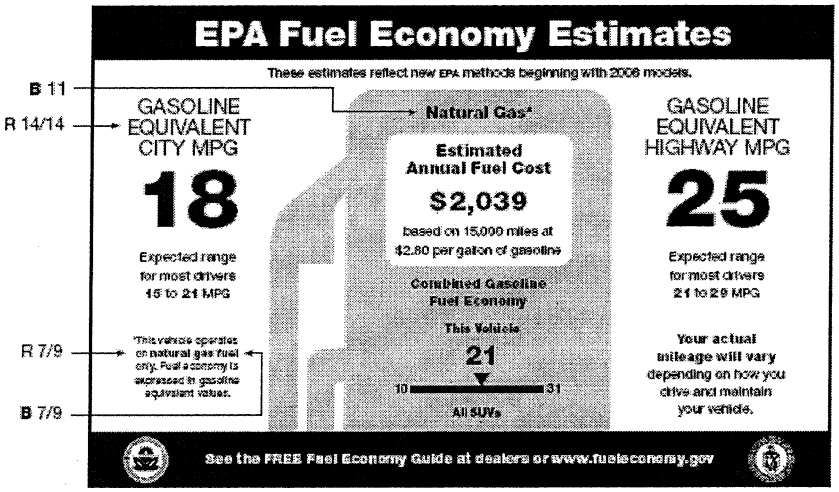
## Alternative Fuel Vehicle: Natural Gas

BASIC FUEL ECONOMY LABEL

Set all copy in either the Helvetica or Arial font family — do not mix.
Use only Regular/Roman (R) and **Black** weights (**B**) — not bold, thin, italic or other font styles.

font size

font weight → R 9/12 ← line spacing, if applicable

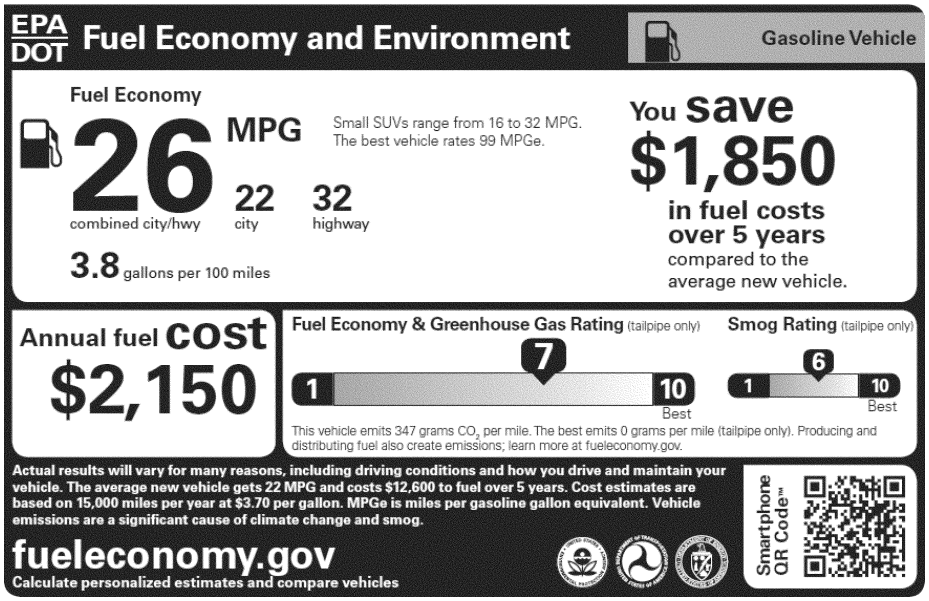



[71 FR 77965, Dec. 27, 2006]

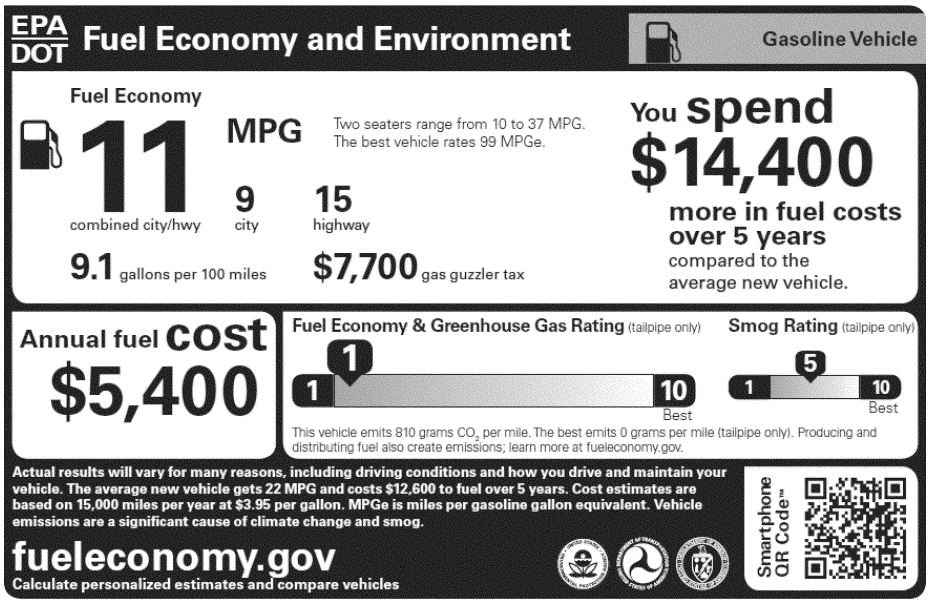
### Appendix VI to Part 600—Sample Fuel Economy Labels and Style Guidelines for 2013 and Later Model Years

This appendix illustrates label content and format for 2013 and later model years. Manufacturers must make a good faith effort to conform to these templates and follow these formatting specifications. EPA will make available electronic files for creating labels.

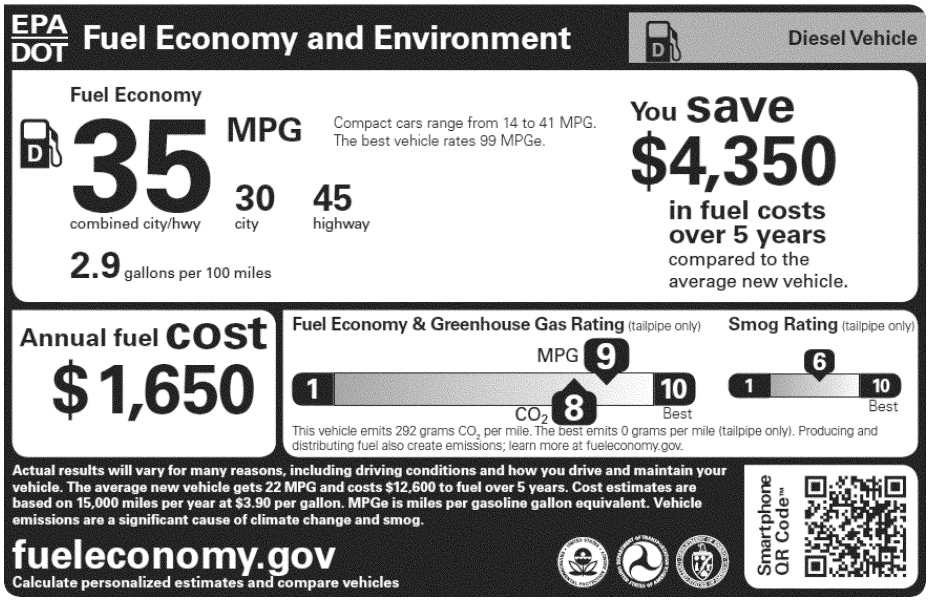
A. Gasoline-Fueled Vehicles, Including Hybrid Gasoline-Electric Vehicles With No Plug-In Capabilities



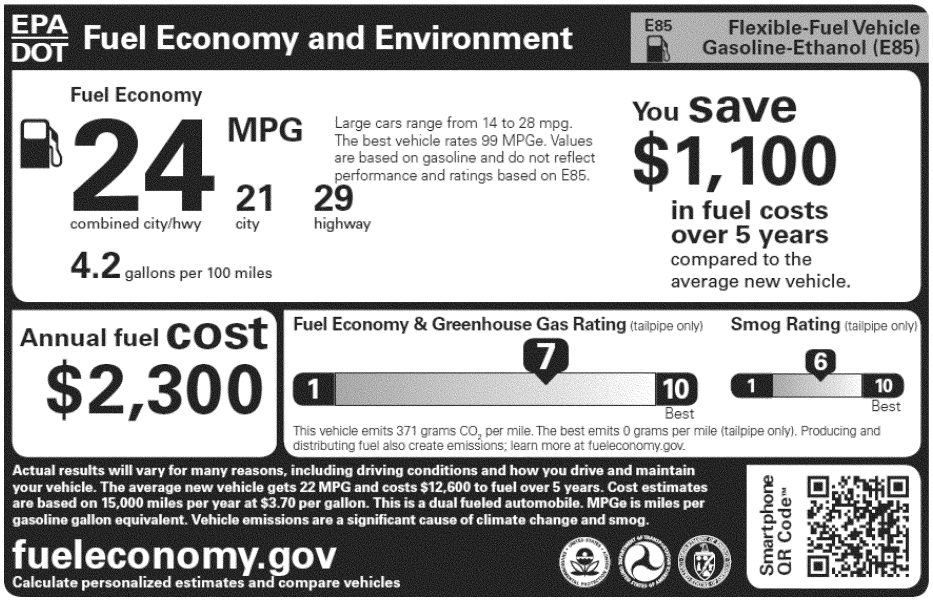

B. Gasoline-Fueled Vehicles, Including Hybrid Gasoline-Electric Vehicles with No Plug-In Capabilities, with Gas Guzzler Tax



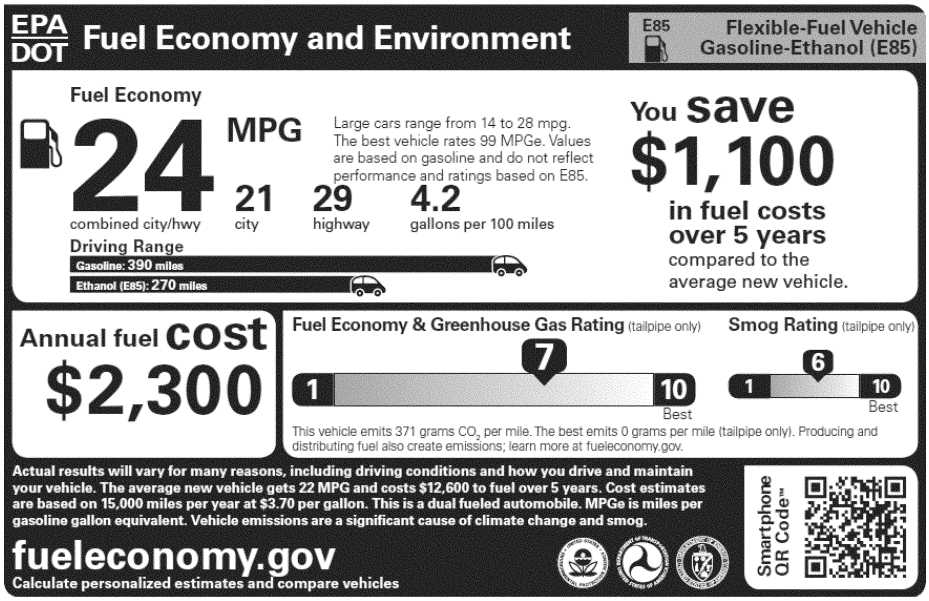
C. Diesel-Fueled Vehicles, Including Hybrid Diesel-Electric Vehicles with No Plug-In Capabilities



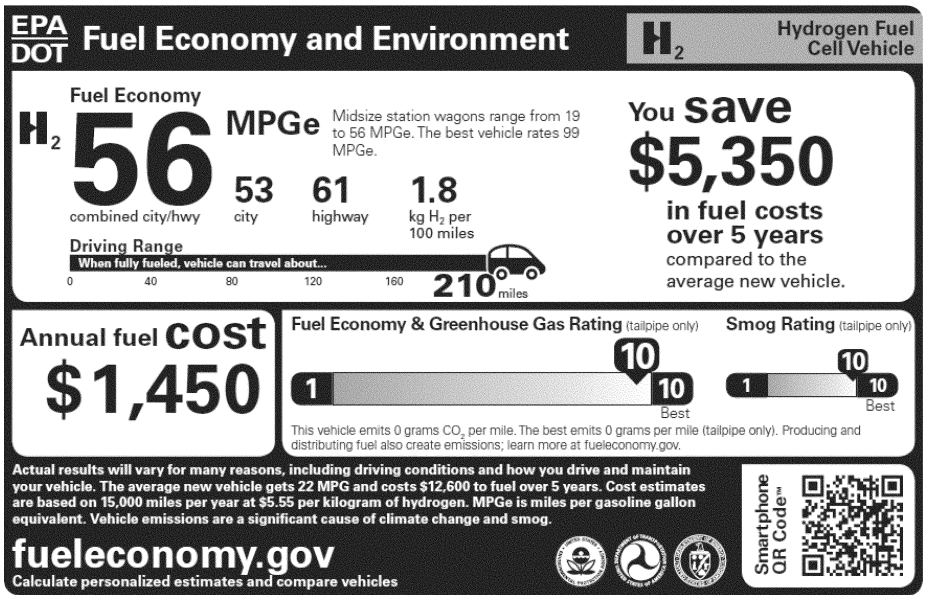

D. Dual Fuel Vehicle Label (Ethanol/Gasoline)



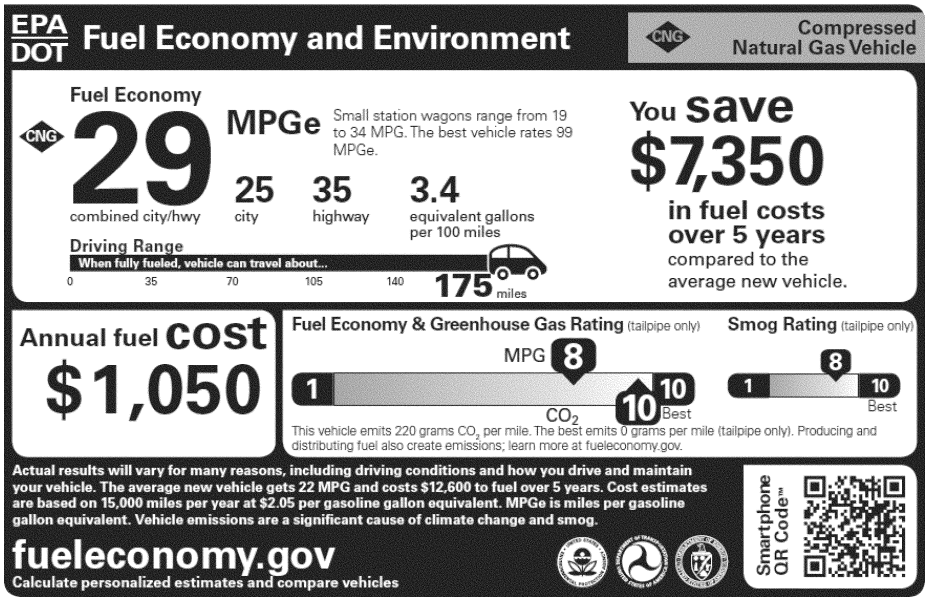
E. DUAL FUEL VEHICLE LABEL (ETHANOL/GASOLINE) WITH OPTIONAL DISPLAY OF DRIVING RANGE VALUES



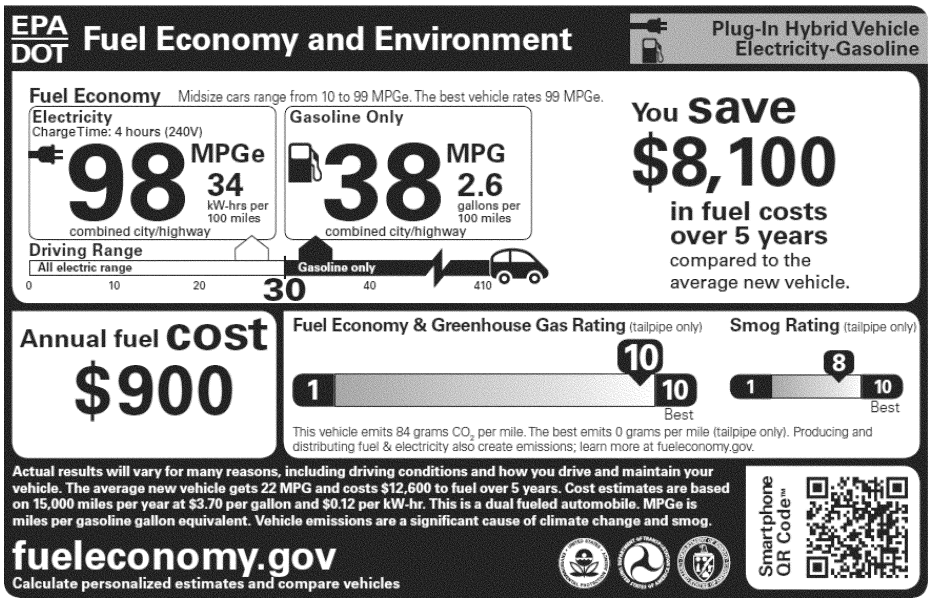

F. HYDROGEN FUEL CELL VEHICLE LABEL



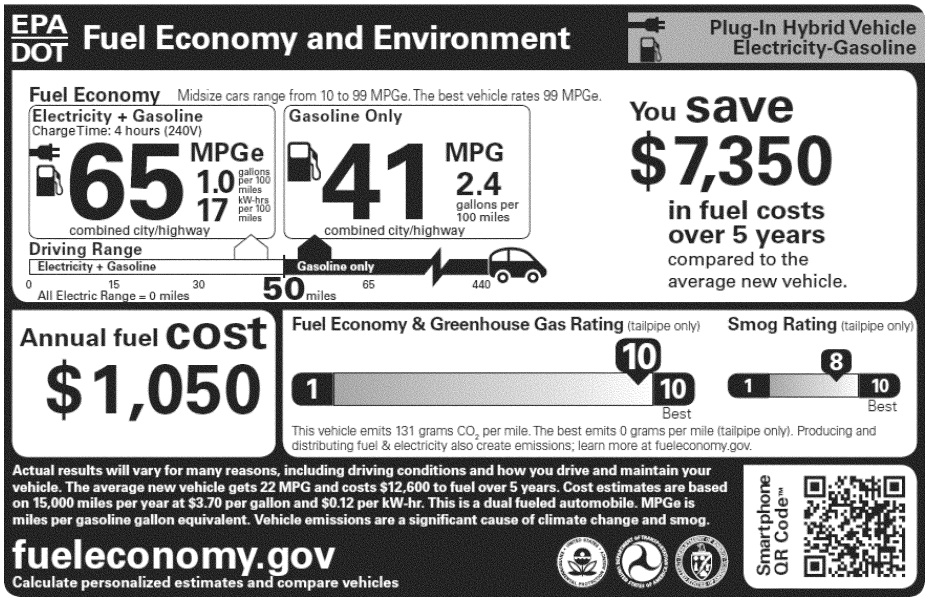
G. Natural Gas Vehicle Label



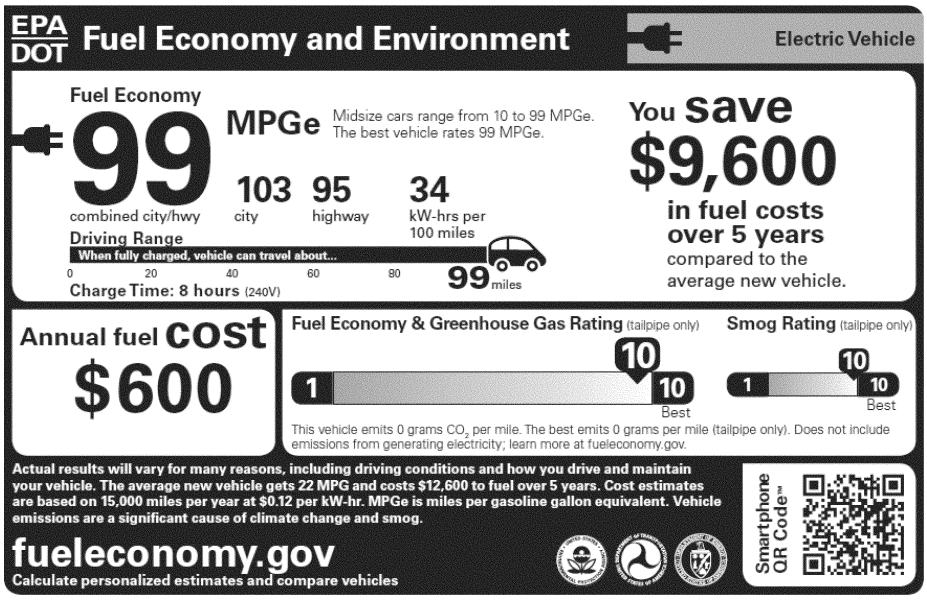

H. Plug-in Hybrid Electric Vehicle Label, Series PHEV



I. PLUG-IN HYBRID ELECTRIC VEHICLE LABEL, BLENDED PHEV




J. ELECTRIC VEHICLE LABEL



K. STYLE GUIDELINES

(a) Fuel economy labels must be printed on white or very light paper. Any label markings for which colors are not specified must be in black and white as shown. Some portions of the label must be filled with a blue or blue-shaded color as specified in subpart D of this part. Use the color blue defined in CMYK values of 40c–10m–0y–0k, or it may be specified as Pantone 283.

(b) Use a Univers font from Adobe or another source that properly reproduces the labels as shown in the samples. Use Light (L), Roman (R), Bold (B) or Black (Bl) font weights as noted. Font size is shown in points, followed by leading specifications in points to indicate line spacing (if applicable). Use white characters in black fields; use black characters in all other places. Unless noted otherwise, text is left-justified with a 1.6 millimeter margin. Some type may need tracking adjustments to fit in the designated space.

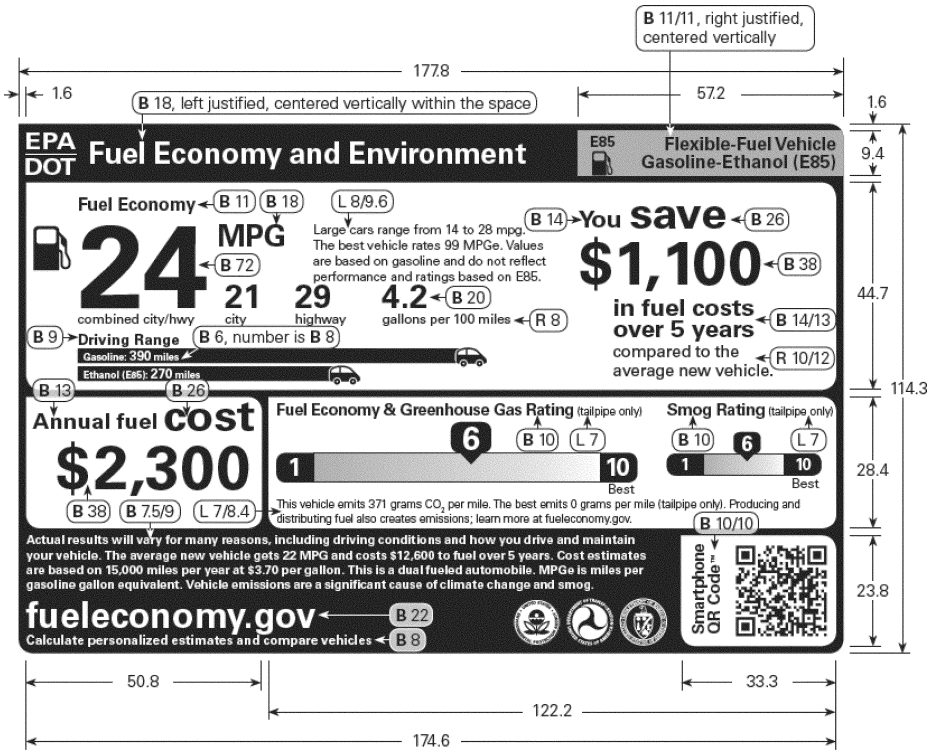
(c) Use the following conventions for lines and borders:

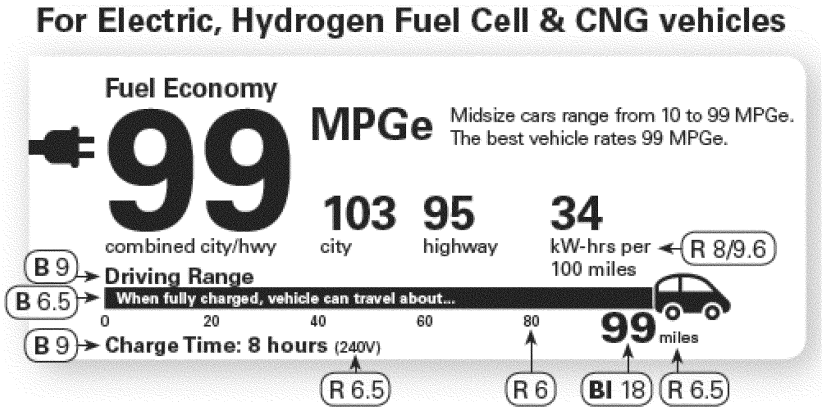
(1) Narrow lines defining the border or separating the main fields are 1.6 millimeter thick.

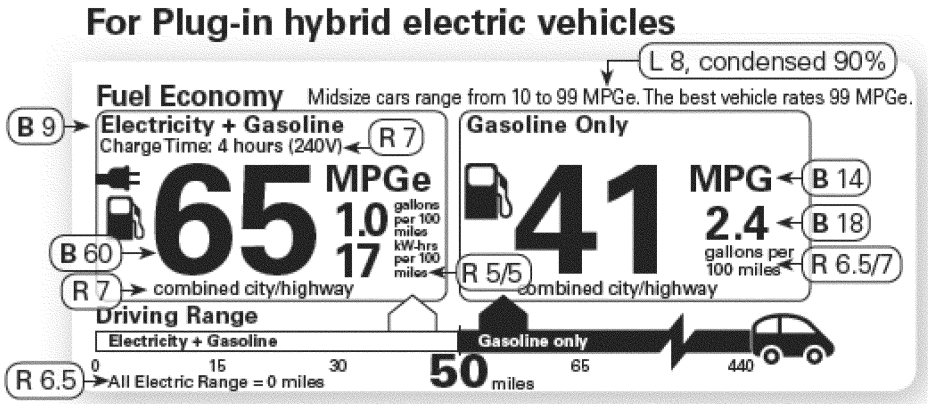
(2) Each rectangular shape or area, including the overall label outline, has an upper left corner that is square (0 radius). All other corners have a 3.2 millimeter radius.

(d) Fuel and vehicle icons, range and slider bars, and agency names and logos are available electronically.

(e) The following figures illustrate the formatting specifications:






[76 FR 39570, July 6, 2011]

APPENDIX VII TO PART 600 [RESERVED]

# PART 610—FUEL ECONOMY RETROFIT DEVICES

TEST PROCEDURES AND EVALUATION CRITERIA

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AUTHORITY: Sec. 511, Motor Vehicle Information and Cost Savings Act, as amended (sec. 301, Pub. L. 94–163, 89 Stat. 915 (15 U.S.C. 2011)).

SOURCE: 44 FR 17946, Mar. 23, 1979, unless otherwise noted.

TEST PROCEDURES AND EVALUATION CRITERIA

## Subpart A—General Provisions

### § 610.10 Program purpose.

(a) The purpose of an evaluation program initiated under these rules is to determine, in accordance with standardized procedures, the performance of various retrofit devices applicable to automobiles for which fuel economy improvement claims are made, and to compile and disseminate the results of the evaluation. It should be stressed that the role of this program will be the generation, analysis and dissemination of technical data, and not the approval or certification of retrofit devices.

(1) Through engineering or statistical analysis of data from vehicle tests, the evaluation program will determine the effects on fuel economy, exhaust emissions, durability and driveability of the applicable vehicles due to the installation or use of the devices. The evaluation program will also include additional procedures, whenever determined by the Administrator as necessary, to evaluate the durability of the devices themselves, their effects on vehicle durability or other effects only evident over the course of extended mileage accumulation.

(b) Data generated in an evaluation program by the Administrator of the Environmental Protection Agency (EPA) are public information and will be published in the FEDERAL REGISTER and elsewhere for use by the Federal Trade Commission and the public. The results of any evaluation conducted by the Administrator may be used in any subsequent investigation or enforcement action in the event that a device is marketed in violation of Federal or state law.

### § 610.11 Definitions.

(a) Except as specifically defined below, all terms used in this part which are defined in 40 CFR part 86 or 40 CFR part 600 shall have the meanings provided therein.

(1) ''Retrofit device'' or ''device'' means:

(i) Any component, equipment, or other device (except a flow measuring instrument or other driving aid, or lubricant or lubricant additive) which is designed to be installed in or on an automobile as an addition to, as a replacement for, or through alteration or modification of, any original component, or other devices; or

(ii) Any fuel additive which is to be added to the fuel supply of an automobile by means other than fuel dispenser pumps; and

(iii) Which any manufacturer, dealer, or distributor of such device represents will provide higher fuel economy than would have resulted with the automobile as originally equipped, as determined under rules of the Administrator.

(2) ''Automobile'' means any four-wheeled vehicle propelled by fuel which is manufactured primarily for use on public streets, roads, and highways (except any vehicle operated exclusively on a rail or rails), and which is rated at 6,000 lbs. gross vehicle weight or less.

(3) ''Fuel economy'' means the average number of miles traveled by an automobile per gallon of gasoline (or equivalent amount of other fuel) consumed, as determined by the Administrator in accordance with procedures established under subpart D or F.

(4) ''Manufacturer'' means a person or company which is engaged in the business of producing or assembling, and which has primary control over the design specifications, of a retrofit device for which a fuel economy improvement claim is made.

(5) ''Retrofit'' means the addition of a new item, modification or removal of an existing item of equipment beyond that of regular maintenance, on an automobile after its initial manufacture.

(6) ''Federal Test Procedure'' or ''City Fuel Economy Test'' means the test procedures specified in 40 CFR part 86, except as those procedures are modified in these protocols.

(7) ''Highway Fuel Economy Test'' means the test procedure described in § 600.111(b).

(8) ''Operator'' means any person who installs, services or maintains a retrofit device in an automobile or who operates an automobile with a retrofit device installed.

(9) ''Device integrity'' means the durability of a device and effect of its malfunction on vehicle safety or other parts of the vehicle system.

(10) ''Test data'' means any information which is a quantitative measure of any aspect of the behavior of a retrofit device.

(11) ''Testing agent'' means any person who develops test data on a retrofit device.

(12) ''Preconditioning'' means the operation of an automobile through one (1) EPA Urban Dynamometer Driving Schedule, described in 40 CFR part 86.

(13) ''Configuration'' means the mechanical arrangement, calibration and condition of a test automobile, with particular respect to carburetion, ignition timing, and emission control systems.

(14) ''Baseline configuration'' means the unretrofitted test configuration, tuned in accordance with the automobile manufacturer's specifications.

(15) ''Adjusted configuration'' means the test configuration after adjustment of engine calibrations to the retrofit specifications, but excluding retrofit hardware installation.

(16) ''Retrofitted configuration'' means the test configuration after adjustment of engine calibrations to the retrofit specifications *and* after all retrofit hardware has been installed.

(17) ''Data fleet'' means a fleet of automobiles tested at ''zero device-miles'' in ''baseline configuration,'' the ''retrofitted configuration'' and in some cases the ''adjusted configuration,'' in order to determine the changes in fuel economy and exhaust emissions due to the ''retrofitted configuration,'' and where applicable the changes due to the ''adjusted configuration,'' as compared to the fuel economy and exhaust emissions of the ''baseline configuration.''

(18) ''Durability fleet'' means a fleet of automobiles operated for mileage accumulation used to assess deterioration effects associated with the retrofit device.

(19) ''Zero device-miles'' means the period of time between retrofit installation and the accumulation of 100 miles of automobile operation after installation.

(20) ''Independent laboratory'' means a test facility operated independently of any motor vehicle, motor vehicle engine, or retrofit device manufacturer capable of performing retrofit device evaluation tests. Additionally, the laboratory shall have no financial interests in the outcome of these tests other than a fee charged for each test performed.

(21) ''Evaluation program'' or ''program'' means the sequence of analyses and tests prescribed by the Administrator as described in § 610.13 in order to evaluate the performance of a retrofit device.

(22) ''Preliminary analysis'' means the engineering analysis performed by EPA prior to testing prescribed by the Administrator based on data and information submitted by a manufacturer or available from other sources.

[44 FR 17946, Mar. 23, 1979, as amended at 49 FR 18489, May 1, 1984]

### § 610.12 Program initiative.

A retrofit device evaluation program will be initiated as follows:

(a) At the request of the Federal Trade Commission (FTC) when it has reason to believe that fuel economy representation made for a retrofit device being marketed may be inadequate,

(b) At the EPA Administrator's initiative, or

(c) Upon the application of any manufacturer of a retrofit device (or prototype thereof) for which a fuel economy improvement claim is made.

### § 610.13 Program structure.

(a) Each device evaluation program will consist of up to three phases:

(1) A preliminary analysis of available information and test data on the device to be performed by the EPA Administrator;

(2) Designing and conducting of a sequence of tests to determine device effectiveness if considered necessary by virtue of the Administrator's preliminary analysis; and

(3) Publication in the FEDERAL REGISTER, and submission to the Department of Transportation and to the Federal Trade Commission, of a summary of the results of any tests conducted under subparts C through F, or if none were conducted, then a summary of the results of the preliminary analysis conducted under subpart B; together with the Administrator's conclusions as to the effect of the tested retrofit device on fuel economy and exhaust emissions, and as to any other information that the Administrator determines is relevant in evaluating such device.

(b) Each of the above phases may, as appropriate, include the use of statistically valid sample sizes and statistical evaluation of measured results.

### § 610.14 Payment of program costs.

(a) All costs incurred in an evaluation program initiated at the request of the FTC or at the Administrator's initiative, including the cost of purchasing any necessary quantity of the device under evaluation, will be borne by the United States.

(b) For those evaluation programs initiated at the request of a manufacturer of a retrofit device, should the Administrator test the device, or cause the device to be tested, as part of the evaluation, then that manufacturer shall supply, at his own expense, one or more samples of the device to the Administrator and shall be liable for the costs of testing which are incurrred by the Administrator. The manufacturer shall also be liable for the cost of any preliminary testing at an independent testing laboratory performed as part of the evaluation program. Apart from the costs of testing a device, EPA shall be responsible for costs of formulating its engineering evaluation of a device.

[44 FR 17946, Mar. 23, 1979, as amended at 49 FR 18838, May 3, 1984]

### § 610.15 Eligibility for participation.

Participation in an evaluation program initiated under § 610.12(c) will be available to any person or company who agrees to follow the procedures set forth in these protocols. Failure to conform to any aspect of these protocols, without the approval of the Adminstrator, may be interpreted as withdrawal from participation in the program.

### § 610.16 Applicant's responsibilities.

Each applicant for evaluation under § 610.12(c) will be responsible for the following:

(a) Submission of an application, in the format specified by the Administrator, prior to initiation of the evaluation. A separate application shall be made for each different device. The application shall be made to the Administrator (or his delegate) by the manufacturer and shall be updated and corrected by amendment if deemed necessary by EPA.

(b) The application shall be in writing, signed by an authorized representative of the manufacturer, and shall include the following:

(1) Identification and description of the device covered by the application, including drawings, schematics and information on the theory of operation.

(2) Vehicles or engines to which the device is applicable and a description of the types of vehicles or engines to which it is not applicable, e.g., would not provide a benefit, a benefit less than claimed for the device in general, or would result in a safety hazard or damage to the engine. If the reason for inapplicability is safety or damage related, this must be explained as required by paragraph (b)(7) of this section.

(3) Installation or usage instructions, including degree of knowledge required by persons making the installation and the tools and equipment required.

(4) A statement of recommended maintenance, degree of knowledge required for that maintenance, and the tools and equipment required to perform the maintenance.

(5) All data regarding exhaust emissions regulated by EPA under § 202 of the Clean Air Act and fuel economy test data on the device or product available to the applicant.

(6) All information available to the applicant concerning whether the device in its operation, function, or malfunction may cause an automobile using that device to emit into the ambient air any substance other than pollutants regulated by EPA under section 202 of the Clean Air Act (*i.e.*, hydrocarbons, carbon monoxide, and oxides of nitrogen), or natural gaseous atmospheric constituents (such as carbon dioxide, or water vapor) in a quantity differing from that emitted in the operation of the automobile without the device.

(7) All information available to the applicant concerning whether and under what conditions the device in its operation, function or malfunction may result in damage to an automobile or endanger its occupants or persons or property in close proximity to the automobile.

(c) Shipment to the EPA's Motor Vehicle Emission Laboratory, or other test site designated by the Administrator, of the devices being evaluated in the quantity specified by the Administrator.

(d) Complete copies of the application and of any amendments thereto shall be submitted in such multiple copies as the Administrator may require.

### § 610.17 Application format.

(a) Device manufactures who apply for evaluation of a fuel economy retrofit device should use the standard application format, in order to allow the Administrator to compile relevant data on specific devices and to allow timely response to applications. Application formats are available from and submissions shall be made to:

Director, Emission Control Technology Division, Environmental Protection Agency, 2565 Plymouth Road, Ann Arbor, Michigan 48105. Attn: Fuel Economy Retrofit Device Evaluation.

(b) Four weeks should be allowed for analysis of the application and preparation of a response. As indicated in other sections of this part, this response will include the evaluation of the device according to the criteria discussed in subpart B of this part. The results of the Administrator's evaluation will be made public.

## Subpart B—Evaluation Criteria for the Preliminary Analysis

### § 610.20 General.

The Administrator will employ the following criteria for evaluating the accuracy of fuel economy representations made with respect to retrofit devices:

(a) Device functional category;
(b) Device integrity;
(c) Operator interaction effects;
(d) Validity of test data;
(e) Evaluation of test data;

as these concepts are explained in §§ 610.21 through 610.25 respectively.

### § 610.21 Device functional category and vehicle system effects.

(a) The devices evaluated in this program are organized into categories for purposes of definition and establishment of evaluation criteria and test procedures, and to indicate which vehicle functional characteristics (other than fuel economy) may be adversely affected by installation or use of the device.

(b) A device's category will be based on:

(1) Engineering principles governing operation of the device;

(2) Interaction between the device and specific vehicle/engine operating characteristics; and

(3) Constraints with respect to vehicle applicability of the device.

(c) The device categories and the vehicle functional characteristics which may be adversely affected are noted for each device category in Table I. The notation for each characteristic is as follows:

Exhaust emissions.....1
Driveability.....2
Durability .....3

Performance ..... 4

TABLE 1

| Device categories | Characteristics adversely affected |
|---|---|
| **Fuel-Air System** | |
| Carburetors and fuel injection systems | All. |
| Air-fuel ratio modifiers (e.g., air bleeds) | All. |
| Atomization devices (acoustic and mechanical). | All. |
| Vapor Injectors | All. |
| Choke controls | 1, 2, and 4. |
| Air filters | 1, 2, and 4. |
| Fuel-air distribution systems (intake manifolds). | 1, 2, and 4. |
| Fuel pressure regulators | All. |
| **Ignition System** | |
| Spark plugs | All. |
| Spark timing control systems | All. |
| Spark duration control systems | 1, 4. |
| Spark energy sources | 1, 4. |
| **Emission Control Systems** | |
| Exhaust gas recirculation (EGR) systems | All. |
| After-treatment devices | 1, 2, and 4. |
| **Drivetrain** | |
| Tires | 1. |
| Overdrive units | All. |
| Torque converter lockups | 1, 2, and 4. |
| **Exhaust System** | |
| Headers | 1. |
| Tuned exhaust systems | 1. |
| **Accessories** | |
| Cooling fan or cooling fan couplings | 1. |
| Cold start aids (e.g., engine heaters) | 1. |
| **Lubrication** | |
| Oil filters | 3. |
| **Vehicle Body** | |
| Aerodynamic drag reduction devices | 1. |
| **Miscellaneous** | |
| Modification to valve timing | All. |
| Retrofit prechambers | All. |
| Fuel additives | All. |
| Other miscellaneous | Potentially all. |

(d) In the absence of sufficient information from the device manufacturer on this topic or if the Administrator's preliminary analysis indicates that testing is necessary to determine the nature or extent of possible adverse effects of device installation and use on vehicle operation and performance, the Administrator will require such tests to be conducted prior to the publication of a complete evaluation of the device.

[44 FR 17946, Mar. 23, 1979, as amended at 49 FR 18489, May 1, 1984]

## § 610.22 Device integrity.

The integrity of a device will be evaluated with respect to:

(a) The extent to which device manufacture is standardized by means of drawings, specifications, and other fabrication and quality assurance controls;

(b) The degree of sensitivity of device effectiveness to deterioration under exposure to normal operating conditions.

(c) The susceptibility of the device to deterioration of effectiveness under abnormal operating conditions;

(d) The effect upon its surroundings of device malfunction which may be reasonably anticipated to occur in actual use; and

(e) The extent to which test data support (b), (c) and (d).

## § 610.23 Operator interaction effects.

The device will also be evaluated with respect to:

(a) The degree of sensitivity of device effectiveness to variances in installation, operation and maintenance;

(b) The adequacy of manufacturer-furnished instructions for minimizing variances in installation, operation and maintenance;

(c) The extent to which device installation or use, or the effects of such installation or use, relate to Federal emission control regulations;

(d) Effects on the performance, safety, or occupant comfort of the retrofitted vehicle, and on that of other vehicles; and

(e) The relationship between total cost of ownership of the device (purchase price plus maintenance costs) and the cost savings realizable from its fuel economy effects.

## § 610.24 Validity of test data.

The Administrator will make a determination as to the validity of manufacturer-furnished test data on the basis of:

(a) The correlation between the test procedures used by the manufacturer or testing agent and the procedures prescribed in subpart D;

(b) The choice of test vehicle(s) as representative of the manufacturer's claim for operation and/or principles of operation;

(c) The degree of control exercised over ambient and operating conditions in the tests, including vehicle calibrations;

(d) Accuracy and precision of the measurement techniques and instrumentation used in the tests;

(e) Disclosure of all test data acquired on the device, whether representing positive, negative, or inconclusive results;

(f) Qualifications and independence of the testing agent; and

(g) The extent to which test data include evaluation of the durability of the device, or its effect on vehicle durability.

### § 610.25 Evaluation of test data.

Valid manufacturer-furnished test data will be evaluated with respect to:

(a) Vehicle applicability;

(b) Dependence of device effects upon vehicle type;

(c) Device effects on fuel economy, and on emissions, with statistical or other caveats as established by the data base;

(d) Definition of claims which can be made based on the available data; and

(e) Substantiation of specified claims made by the manufacturer.

## Subpart C—Test Requirement Criteria

### § 610.30 General.

(a) If the Administrator determines, by the criteria given in subpart B, that the claims made for a device are not supported by existing test data or other information, the Administrator will request the manufacturer to furnish additional information, and may design a test program to investigate those areas where claims appear to be erroneous or unsupported or where adverse effects due to use of the device are suspected.

(b) In cases where the Administrator determines on the basis of the preliminary analysis that a device either can have no significant beneficial effect on fuel economy, or will have an adverse effect on emissions, he may elect not to design a test program or test the device and to publish only his preliminary analysis and conclusions.

(c) If the evaluation was initiated upon application of a manufacturer (as described in § 610.12(c)) and the manufacturer elects not to have the device tested, the Administrator's preliminary analysis and conclusions will be published.

(d) For each device that the Agency intends to test, the Administrator will give the manufacturer prior notice by mail of the Agency's intent to test the device and provide the manufacturer the opportunity to attend the test sessions and to comment on the specific test design and results.

[44 FR 17946, Mar. 23, 1979, as amended at 49 FR 18489, May 1, 1984]

### § 610.31 Vehicle tests for fuel economy and exhaust emissions.

(a) The tests described in subpart D, E, or F may be conducted if existing data or other information are insufficient to support claims for a device in any of these areas:

(1) Degree of improvement in fuel economy

(2) Effect on exhaust emissions

(3) Vehicle applicability

(b) The Administrator may determine that, in certain cases, tests using engine dynamometers are adequate for determining the effect of a device. Examples of such cases are given below.

(1) *Long-term effects*. In some cases, it may be necessary for the engine to operate for several thousand miles before the effectiveness can be adequately measured. In such cases an engine dynamometer will permit a less expensive and better controlled durability and economy test than one in which a vehicle must be driven on a durability route and then tested on a chassis dynamometer or test track.

(2) *Durability requirements*. Aspects of engine durability can be efficiently determined using specialized engine testing rather than through durability mileage accumulation in a vehicle. A number of standard engine tests are presently used which can be incorporated into this requirement.

(c) When in the judgment of the Administrator a device cannot satisfactorily be evaluated using either dynamometer or track versions of the City Fuel Economy Test and the Highway

Fuel Economy Test, the Administrator will select or design other procedures.

### § 610.32 Test fleet selection.

(a) The composition and size of the test fleet will be determined by the Administrator. In a device evaluation program initiated at the request of the FTC, the composition and size of the test fleet will be determined by the Administrator in consultation with the FTC.

(b) The goal of the test fleet selection will be the provision of a data base adequate to give the Administrator reasonable confidence in the conclusions to be reached.

(c) Once the number of vehicles to be tested has been determined, the Administrator will specify the test fleet makeup by make, model, model year, engine displacement and carburetor, transmission type, and such other factors as he may deem relevant to the testing program.

### § 610.33 Durability tests.

The Administrator may determine that a device under evaluation will require durability testing in addition to the basic evaluation testing for device effectiveness. This requirement may be necessary for several reasons:

(a) A retrofit device manufacturer may claim that some mileage accumulation may be needed before the full effectiveness of the device can be obtained. If such claims are made, durability testing as described in subpart E may be performed. To determine whether the effectiveness change during the mileage accumulation is a function of the device or of the mileage accumulation alone, in some durability tests it may be necessary to run the mileage accumulation on vehicles with and without the device. Due to the high cost of durability testing and in particular of such duplicate testing, it will be used only where it is judged by the Administrator to be necessary.

(b) A device may have a limited life expectancy or be such that it requires replacement or adjustment at a prescribed mileage interval. Confirmatory durability tests may be run to assess whether such mileage intervals are proper and effective.

(c) A device may be suspected of having an adverse effect on the durability of the engine to which it is applied. After identification of a potential failure mode, durability tests may be conducted to investigate any changes in engine characteristics associated with that failure mode. Examples are valve problems, deterioration in spark plug life, increase in carburetor or combustion chamber deposits, or increased engine wear. If it is not possible to directly measure the change in the suspect characteristic, then a durability run may be made as described in subpart E, in which fuel economy and exhaust emissions are periodically checked during the accumulation of up to 15,000 miles.

(d) A critical item which can influence fuel economy is vehicle maintenance. Any durability test program used in evaluation of the effectiveness of a fuel economy device will be designed to differentiate maintenance effects from the effect of the device. Any maintenance associated with the device operation will be rigidly controlled. If the maintenance appears to be a significant factor in the effectiveness of a device, then it may be necessary to run a control test on vehicles without the device installed where the same maintenance is performed to quantify any incremental effect of that maintenance.

### § 610.34 Special test conditions.

If the Administrator determines that a device may have potentially detrimental effects on the operation of a vehicle when operated in ambient conditions outside the range specified in 40 CFR part 86, or if the device manufacturer claims a fuel economy improvement in such conditions, additional tests may be performed. These tests will determine whether the device will significantly limit the operational usefulness of the vehicle and will assess the claimed fuel economy benefit.

(a) *Extreme temperatures.* As required by the Administrator, tests will be conducted at extreme ambient temperature conditions to determine the effect due to devices (e.g. engine heaters) for which fuel economy improvements at extreme temperatures are made. For other devices it may be necessary to

determine whether the cold starting and driving capability of device-equipped vehicles is affected sufficiently to make them dangerous, or whether fuel economy characteristics at extreme temperatures are significantly worse than before the device was installed.

(b) *High altitude.* Devices for which specific claims of improved fuel economy at high altitude are made may be tested using the procedures in subpart D, at altitudes above 4000 feet. For other devices, testing at high altitude may be necessary for determining whether a device will make the vehicle less useful or efficient when operated at various altitudes. The Administrator will determine when such testing is required.

### § 610.35 Driveability and performance tests.

If the Administrator determines that driveability and performance of a vehicle may be adversely affected by the use of a device, a number of automobiles to be determined by the Administrator will be subjected to the driveability and performance tests discussed in §§ 610.62 and 610.63, respectively.

## Subpart D—General Vehicle Test Procedures

### § 610.40 General.

Two chassis dynamometer test procedures, the Federal Test Procedure and the Highway Fuel Economy Test will generally be used to evaluate the effectiveness of the devices supplemented by steady state or engine dynamometer tests where warranted. Under unusual circumstances, other test procedures, durability test procedures or special test procedures such as track versions of the City and Highway fuel economy tests may be used. These procedures are described in subparts E and F.

### § 610.41 Test configurations.

(a) In order to measure the effectiveness of a retrofit device at least two, and in some cases, three vehicle configurations defined in § 610.11 will be tested. Each vehicle will be tested at least twice in each configuration, as determined by the Administrator.

(b) The first test configuration is a baseline configuration. In this configuration the baseline or unretrofitted vehicle emissions will be measured.

(c) A second test configuration, an adjusted configuration, may be required at the discretion of the Administrator if a device requires both hardware and engine parameter modifications to achieve the fuel economy improvement. If, in the Administrator's judgment, based on a review of the available information, the combined effects of retrofit hardware installation and parametric adjustment could be substantially duplicated by parametric adjustment alone, then the Administrator may specify a second test, to evaluate such adjustment exclusive of the retrofit hardware.

(d) The third series of tests, in the retrofitted configuration, will evaluate the full retrofit system installed on the vehicle.

### § 610.42 Fuel economy measurement.

(a) Fuel consumption will be measured by:

(1) The carbon balance method, or

(2) Gravimetric or volumetric methods. In the gravimetric and volumetric methods, fuel consumption is determined by weighing the fuel source before and after a test, or by measuring the volume of fuel consumed during a test. Since the distance traveled during the tests is known, the fuel economy, in miles per gallon, can be calculated. Gravimetric and volumetric methods require the use of special test equipment in addition to the emissions measuring equipment.

(b) The carbon balance procedure for measuring fuel consumption relates the carbon products in the exhaust to the amount of fuel burned during the test. This method will be the one used to measure fuel economy unless track or road tests are employed.

(c) Three values of fuel economy will be reported: for city driving ('75 FTP), for highway driving (HFET), and the combined city/highway value calculated according to this equation:

$$MPG_{combined} = 1 / \left[ \frac{0.55}{MPG_{city}} + \frac{0.45}{MPG_{hwy}} \right]$$

### § 610.43 Chassis dynamometer procedures.

(a)(1) *1975 Federal Test Procedure*. Vehicle exhaust emissions and fuel economy under urban driving conditions will be measured according to the Federal emission test procedure described in 40 CFR part 86, subpart B, which is known as the 1975 Federal Test Procedure ('75 FTP). However, the following modifications will be employed:

(i) No evaporative emission loss, as specified by 40 CFR part 86 need be measured (with the exception of devices modifying or disconnecting existing evaporative control devices in such a manner as would be expected to adversely affect their evaporative emission control performance).

(ii) Vehicle preconditioning shall consist of operation of the vehicle through one (1) EPA Urban Dynamometer Driving Schedule. This preconditioning must be done at least 12 hours, but no earlier than 36 hours before the emission test.

(iii) While the test fuel must meet the specifications outlined in 40 CFR part 86, fuel conditioning as specified for evaporative emission test procedures is not required.

(b) *Highway Fuel Economy Test*. The test vehicle is fully warmed up at the start of the highway Fuel Economy Test which is ordinarily run immediately following the Federal Emission Test Procedure. The test procedure to be followed for generation of highway fuel economy data is that specified in § 600.111.

(c) *Steady state tests*. Constant speed, road load tests may be conducted to help give insight into operational differences and exhaust emission and fuel economy changes due to a retrofit device. Speeds between 0 (engine idling) and 60 mpg will be investigated, with a time period at each speed long enough to ensure that engine operation has stabilized.

## Subpart E—Durability Test Procedures

### § 610.50 Test configurations.

(a) In addition to the tuneup to manufacturer's specifications per § 610.41, all vehicles in the durability fleet will have installed the following new parts: Air, oil, and fuel filters, spark plugs, points, condenser, rotor, distributor cap, PCV valve, and emission control devices such as vacuum control valves and EGR valves.

(b) Vehicles included in the durability fleet will be subjected at zero device-miles to the same test sequence for fuel economy and exhaust emissions as specified in subpart D. Subsequently, they will be tested at 3,000 device-mile intervals, up to and including the final mileage point of 15,000 device-miles. Testing at these mileage points will be performed with the vehicle equipped with the full retrofit system.

(c) After the 15,000-mile test the vehicle will be tuned as necessary and the device adjusted to the manufacturer's specifications as required. The fully restored retrofitted configuration will then be tested. The device will then be removed from the vehicle and the vehicle set to vehicle manufacturer's specifications. A tuned baseline test will then be conducted.

### § 610.51 Mileage accumulation procedure.

(a) Except as otherwise provided in this part, the mileage accumulation procedure will be that provided in 40 CFR part 86. This mileage accumulation schedule, or a suitable alternate procedure approved by the Administrator, will be used.

(b) Fuel used in the accumulation of mileage will be commercial fuel available in the retail market and shall conform to the requirements of 40 CFR part 86 for mileage accumulation fuel.

(1) The requirements of this paragraph may be modified by the Administrator when it is a fuel or fuel additive that is being tested.

### § 610.52 Maintenance.

(a) Maintenance during the durability evaluation can best be considered in three separate categories:

(1) Normal scheduled vehicle maintenance,

(2) Unscheduled vehicle maintenance, and

(3) Retrofit maintenance.

(b) Normal scheduled vehicle maintenance is the periodic service specified in the original owner's manual supplied

to the owner at the time of new vehicle purchase.

(1) Normal periodic engine oil changes, vehicle lubrication, and oil filter changes, as specified in the original owner's manual, will be performed during durability mileage accumulation.

(2) For purposes of this part, the following items of normally scheduled vehicle maintenance will not be performed during the durability mileage accumulation:

(i) Normal tune-up items:

(A) Spark plugs.

(B) Condenser.

(C) Rotor.

(D) Distributor cap.

(ii) Air Cleaner element.

(iii) PCV Inspection.

(iv) Dwell and timing check.

(v) Charging circuit check.

(3) Periodic maintenance items specified in the original owner's manual, other than those listed above, may be performed if found to be necessary by the Administrator.

(c) *Unscheduled maintenance.* Because the vehicles used for durability evaluation in this program will probably have considerable mileage accumulation and unknown maintenance prior to inclusion in the program, it can be anticipated that certain vehicle and engine failures may occur, which may be unrelated to the retrofit device. Unscheduled maintenance will be performed only in those cases where a significant and obvious driveability problem has been reported by the driver of the vehicle.

(1) Correction of the following problems will be made as soon as the problems occur:

(i) Tire replacement (same size and type).

(ii) Vehicle body repairs (remote from engine and retrofit).

(iii) Windshield wipers.

(iv) Fluid levels unrelated to retrofit.

(v) Brakes.

(vi) Hoses unrelated to retrofit.

(vii) Belts unrelated to retrofit.

(viii) Suspension failures.

(ix) Wheel alignment.

(x) Steering.

(xi) Wheel bearings.

(xii) Non-engine electrical system.

(xiii) Drivetrain components (U-joints, axles, transmission adjustments, etc.)

(2) Other unscheduled maintenance of the engine or drivetrain may be made as directed by the Administrator. Upon notification of a need for unscheduled maintenance, the Administrator may decide that before and after maintenance fuel economy tests are required.

(d) *Retrofit maintenance.* Maintenance of the retrofit device will normally not be performed during the accumulation of durability mileage of 15,000 miles. However, certain retrofit devices may require periodic maintenance that is directly related to device function. An example is the periodic addition of fluid to the reservoir of a vapor injector. The Administrator will determine whether periodic maintenance will be allowed, based on his review of available information including the device manufacturer's maintenance instructions to the consumer.

(e) A log of all maintenance shall be kept for every vehicle. These logs will be summarized in the final report by the Administrator.

## Subpart F—Special Test Procedures

### § 610.60 Non-standard ambient conditions.

(a) *Extreme temperatures.* For vehicles required to be tested at extreme temperatures, the test sequence described in § 610.41 will be performed using either test track or dynamometer, in ambient temperatures outside the 60° to 90° range specified in § 610.64 as determined by the Administrator. The driveability tests described in § 610.62 may also be performed at non-standard temperatures, as determined to be necessary by the Administrator.

(b) *High altitudes.* Vehicles required to be tested at high altitudes will undergo the tests described in § 610.43 if necessary, on either test track or dynamometer as determined by the Administrator. One test location, at an elevation of no less than 4000 feet, will be selected.

### § 610.61 Engine dynamometer tests.

The Administrator will choose a test procedure or procedures from various

engine dynamometer durability test procedures used by research organizations in government, the oil industry, engine manufacturing companies, and independent laboratories.

### § 610.62 Driveability tests.

Driveability assessment (at normal ambient temperatures) of the baseline configuration, of the adjusted configuration (if required by the Administrator), and of the fully retrofitted configuration may be conducted at zero device-miles for all vehicles included in the durability fleet, and at approximately zero device-miles at low ambient temperatures (0 °F–20 °F). Driveability evaluation procedures will be provided by the Administrator when necessary.

### § 610.63 Performance tests.

The effect of a device on a vehicle's performance will be determined by performing wide-open-throttle 0 to 60 mph acceleration tests (at normal ambient temperatures) on the baseline vehicle configuration, on the adjusted configuration (if required), and on the fully retrofitted configuration. Tests will be conducted on a dry, level, smooth-surfaced test track, with appropriate speed-time measuring equipment, on as many vehicles as determined to be necessary.

### § 610.64 Track test procedures.

(a) Cases may arise where it will be necessary to evaluate the fuel economy effects of a retrofit device on a test track, because the effect of the device cannot be adequately tested using the chassis dynamometer procedures. (An obvious example is a device that changes the aerodynamic drag of the test vehicle.) In such cases, testing will be performed on a dry, level, smooth-surfaced test track for such dimensions that the speeds required by the city and highway fuel economy tests may be safely achieved.

(1) Because aerodynamic drag is not a linear function of velocity, it will be necessary to limit testing to times when the wind velocity is less than 5 mph, with gusts less than 10 mph.

(2) Testing will also be limited to ambient temperatures between 60° and 90 °F, and to times when the ambient temperature remains reasonably constant during individual tests. Temperature differences between tests of baseline and retrofit configurations will also be minimized.

(3) Exhaust emissions will not be measured during track testing.

(4) Fuel economy of a vehicle running on a track will be measured using either a volumetric or gravimetric procedure approved by the Administrator.

(5) Vehicle speed and distance will be measured with a ''fifth wheel'' type of device. Suitable apparatus will be used to generate a permanent record (strip chart recorder, etc.) of the vehicle speed versus time.

(b) *City fuel economy test.* Although essentially the same procedures will be used for track testing as for dynamometer testing, some modifications will be necessary to insure safe operation of the test vehicle and to adjust to the requirements of track testing.

(1) An assistant to the driver will be necessary to steer the vehicle, so that the driver will not be distracted from following the speed-time schedules used in the Federal test procedure.

(2) The test vehicle will be preconditioned within the same time constraints given in § 610.43(a)(1)(ii). Preconditioning may take place either on the track or on a dynamometer. The 12-hour soak after preconditioning will take place in an area where the ambient temperature will remain within the 60° to 90 °F range, indoors, if necessary.

(3) The vehicle will be transported to the test track without being started. If the distance from soak area to track is no greater than one-quarter mile, then the vehicle may be pushed or towed to the track. Otherwise the vehicle must be transported by truck or trailer.

(4) Fuel economy will be determined by either a gravimetric or volumetric method.

(c) *Highway fuel economy test.* The highway test will follow the city fuel economy test in the same manner as in dynamometer tests (§ 610.43(b)). Fuel economy will be measured by gravimetric or volumetric methods.

(d) *Steady state tests.* Steady state tests on the track will be run in the same manner as on the dynamometer

except that fuel economy will be measured by gravimetric or volumetric methods.

### § 610.65 Other test procedures.

The Administrator may, pursuant to § 610.31(c), choose a test procedure or procedures from those used by research organizations in government, the oil industry, engine manufacturing companies, and independent laboratories. If none of these is deemed suitable, the Administrator may, in consultation with the party requesting the test, design a dynamometer, track or road test to measure the effects of the device.

## PARTS 611–699 [RESERVED]