federal register

FRIDAY, SEPTEMBER 10, 1976

PART IV:

ENVIRONMENTAL PROTECTION AGENCY

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FUEL ECONOMY TESTING; CALCULATION AND EXHAUST EMISSIONS TEST PROCEDURES FOR 1977–1979 MODEL YEAR AUTOMOBILES

Interim Final Rule Making and Proposed Rule Making

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

[FRL 603-5]

PART 86—CONTROL OF AIR POLLUTION FROM NEW MOTOR VEHICLE ENGINES: CERTIFICATION AND TEST PROCEDURES

PART 600—FUEL ECONOMY OF MOTOR VEHICLES

Fuel Economy Testing for 1978 Model Year Automobiles and Calculation Procedures for 1977 and Subsequent Model Year Automobiles; Exhaust Emissions Test Procedures for 1978 Model Year Automobiles and Light Duty Trucks

I. SYNOPSIS OF ACTION

On December 22, 1975, the President signed the Energy Policy and Conservation Act, Pub. L. 94-163, 89 Stat. 871. Title III of this Act amends the Motor Vehicle Information and Cost Savings Act, 15 U.S.C. 1901 et seq. (hereinafter referred to as "the Act") for the purpose of regulating the fuel economy of automobiles. This notice relates primarily to Section 501 of the Act relating to definitions and Section 503 which requires the Administrator of EPA to promulgate rules prescribing testing and calculation procedures which will be used for computation of automobile manufacturers' fuel economy averages for 1978 and subsequent model years. These manufacturer's average fuel economy values will be used by the Secretary of Transportation (hereinafter referred to as "the Secretary") to determine compliance with the minimum fuel economy standards prescribed in Section 502 of the Act.

Due to the time constraints and statutory requirements more fully explained below, this notice contains both *interim final* fuel economy testing and calculation procedures for the 1978 model year and proposed procedures for 1979 and subsequent model years.

In addition to the interim final promulgation of the regulations applicable to the 1978 model year, several provisions which were previously proposed for the 1977 model year (41 FR 21002, May 21, 1976) are being published as final for 1977 in this rulemaking, rather than with the regulations requiring the labeling of 1977 and subsequent model year automobiles, as they are essential to the understanding and implementation of this action.

These procedures provide means by which EPA will test automobiles, or cause them to be tested, and calculate an average fuel economy for each manufacturer's product line. EPA will select test vehicles from among all of the various combinations of models, engines, transmissions and drive trains offered for sale by the manufacturers. Since there are many thousands of such combinations, EPA will not be collecting data from every such combination. However, a high percentage of the vehicles in each manufacturer's product line will be *represented* by EPA test vehicle selections. In general, the increase in the number of test vehicles over the number now being tested for emissions certification and fuel economy labeling purposes will be quite modest.

In addition to fuel economy testing and calculation procedures, EPA is hereby promulgating and proposing changes to the test procedures used for measuring both exhaust emissions and city fuel economy for 1978 model year automobiles and light duty trucks. These changes are intended to improve the accuracy or representativeness of the tests, but not to affect their stringency.

A detailed explanation of the actions taken herein and the reasons for EPA's promulgation of final regulations for the 1978 model year without the prior issuance of a formal Notice of Proposed Rule Making (NPRM) are set forth below.

II. 1978 FINAL RULE MAKING

Section 503 of the Act provides that "Testing and calculation procedures applicable to a model year * * * shall be promulgated not less than 12 months prior to the model year to which such procedures apply." Section 502 of the Act provides that fuel economy standards will first go into effect for the 1978 model year. Thus, final regulations are required by the Act to be promulgated no later than twelve months prior to the beginning of the 1978 model year.

The Act provides a definition of model year for individual manufacturers, but not for the industry as a whole. EPA, in consultation and coordination with the Department of Transportation (DOT), has determined that no specific date can be deemed the beginning of a model year for the entire industry. However, for the domestic manufacturers (whose model years traditionally begin earlier than importers') model year production has in the past generally begun in August. Consequently, for the purposes of the statutory deadline in Section 503 of the Act, EPA finds that the 1978 model year will begin no earlier than August, 1977, and that these regulations are required to be promulgated during August, 1976, to the extent that they are applicable to the 1978 model year.

The Energy Policy and Conservation Act was enacted on December 22, 1975, as noted previously. Since then considerable time and intensive interagency effort have been devoted to developing, drafting and reviewing these regulations. During this same period, regulations have been prepared pursuant to Section 506 of the Act for the mandatory fuel economy labeling program. An NPRM was issued for labeling on May 21, 1976, 41 FR 21002. EPA has consulted and coordinated with DOT and has consulted with the Federal Energy Administration and the Federal Trade Commission as required by the Act. The complexity of the issues that had to be resolved and the efforts required to prepare this action and coordinate it with the other interested agencies, together with the deadline in the Act, have made it impossible to issue rules for 1978 with prior issuance of an NPRM.

Section 553 of Title 5 of the United States Code (pertaining to administrative procedure) provides for the promulgation of regulations without prior issuance of an NPRM, "when the agency for good cause finds (and incorporates the finding and a brief statement of reasons therefor in the rules issued) that notice and public procedure thereon are impracticable, unnecessary, or contrary to the public interest." For the reasons cited above, EPA finds that issuance of an NPRM and provision of a public comment period for the 1978 model year are impracticable. EPA further finds that failure to promulgate regulations prior to the end of August, 1976 would risk rendering the 1978 fuel economy standards substantially unenforceable (at least for those manufacturers beginning production in August) and that this result would be contrary to the public interest as articulated by the Congress in the Act.

Nevertheless, EPA has made every effort to inform interested parties of its plans and has attempted to receive comments from these parties prior to taking this action. Various drafts have been offered directly to industry members, trade associations, consumer groups and environmental groups and were placed on the public record at EPA. The availability of the drafts was announced at an open meeting held on March 17, 1976 by EPA (pursuant to notice published in the FEDERAL REGISTER, 41 FR 6121, February 11, 1976) and the contents of early drafts were explained by EPA at the meeting. Comments were solicited and received, and numerous consultations have taken place between EPA staff, Department of Transportation staff and various interested parties.

In a series of consultations with interested parties who had reviewed drafts of this action, including manufacturers and the other interested agencies, several significant deficiencies were brought to EPA's attention regarding the form and content of the drafts. The direction ultimately taken by EPA in formulating this action, the criteria used for evaluating alternative courses of action available to EPA, and the drafting of the regulatory provisions now contained in this action were all significantly affected by these consultations.

Thus, the procedures set forth *for the 1978 model year* in Part 86, Subparts A and B are final and the procedures set forth for the 1977 and 1978 model years in Part 600 are *final*. All of the regulatory provisions contained in this notice which are applicable beginning in 1979 are *proposed* and will be amended in accordance with the record of this proceeding or as otherwise appropriate. Based on comments received, EPA will endeavor to issue any necessary and appropriate amendments for 1978 which are technical or clerical in nature or which will otherwise not prejudice the interests of affected parties.

III. EFFECTIVE DATES

The regulatory provisions contained in this action become effective as follows:

(1) The provisions applicable to the 1978 model year in Parts 86 and 600: §§ 86.078-37; 86.113-78, 86.114-78, 86.121-78, 86.123-78, 86.135-78, 86.136-78, 86.137-78, 86.142-78, 86.144-78, 600.101-78 through 600.113-78 and 600.501-78 through 600.512-78 are hereby promulgated on an *interim final* basis for the 1978 model year;

(2) The provisions listed above in Parts 86 and 600 are hereby *proposed* for 1979 and subsequent model years.

(3) The provisions in §§ 86.079-2, 86.079-24, 86.113-79, 86.129-79 pertaining to test procedures changes are *not* effective for the 1978 model years, but are *proposed* for 1979 and subsequent model years.

(4) Section 600.511-80 is hereby *proposed* for the 1980 model year.

In addition to the sections enumerated above, some provisions included in this notice for 1977 implementation were originally proposed by EPA in connection with another action required by the Act. On May 21, 1976, EPA issued an NPRM relating to the fuel economy labeling program required by Section 506 of the Act. See, *Fuel Economy Regulations and Test Procedures for 1977 and Later Model Automobiles*, 41 FR 21002 (hereafter referred to as the "labeling regulations.") These labeling regulations contain certain definitions and procedures essential to the calculation of manufacturer's fuel economy averages.

It was originally intended that the labeling regulations would be promulgated before the regulations contained in this notice, but this has become impossible. Therefore, certain provisions contained in the labeling regulations have been included in this notice for 1977 implementation. These include the provisions in Part 600, Subparts A and C [except §§ 600.005, 600.007(e), 600.206 (b) and (c) and 600.207 (c) and (d)]. Comments were solicited and received from manufacturers on certain of these provisions. One comment expressed the concern that the use of EPA approved data might constitute acceptance of the data's validity by the manufacturer and would, as a consequence, jeopardize the right to appeal under § 600.009-77. It is the Agency's opinion that the only position consistent with the preservation of a manufacturer's right to appeal is that manufacturers who contest the fuel economy data to be used on the fuel economy label must label their vehicles with the fuel economy data determined and/or approved by the Administrator and may sell vehicles with this label, but that the use of this fuel economy data does not constitute acceptance of the data's validity or in any way prejudice the manufacturer's right to appeal pursuant to § 600.009-77.

Other comments were received questioning the requirement of section 600.207 that manufacturers must supply test results from vehicles representing the highest production volume configuration in each base level not otherwise represented by a test vehicle. It was pointed out that the highest selling configuration might not be readily derived from already existing test vehicles through the changing of components or through testing at alternative weights, both options available under the regulations. Consequently, it was suggested that EPA accept data from such a derivative, even though a car so derived from an existing test vehicle might not represent the highest selling configuration in an otherwise unrepresented base level. EPA does not anticipate this to occur except in relatively rare cases. In most instances, untested base levels will be subject to representation by test results from an already tested vehicle which has been simply altered as to some components or which will be tested at multiple inertia weights. Thus the burden imposed on the industry by this section of the regulations is quite small. On the other hand, it is important that base levels be represented by those vehicles which most closely approximate the fuel economy of the base level as a whole, i.e., the highest selling configuration. EPA is compromising by accepting data from certification vehicles to represent base levels even though the certification vehicles may not represent highest sellers. This is being done so that multiple testing within a base level is not required for labeling. However, in cases in which there is no data for a base level, it is only reasonable that EPA require the most representative configuration to be tested, particularly in light of the modest burden this entails.

Comments were also received concerning the degree of decimal precision to be employed in calculating fuel economy values. Some commenters made the erroneous argument that all test results and calculations should be expressed to the highest degree of precision possible since, in a unique situation, two different final fuel economy results could be calculated. What they did not point out, however, is that increasing precision, i.e., the number of decimal places reported, does not necessarily improve accuracy. EPA has determined that a single test on a vehicle provides fuel economy information accurate to the nearest whole MPG.

Since the individual test results are accurate to the nearest whole MPG, accepted data reduction methodology indicates that for the purpose of subsequent calculations, fuel economy test values may be expressed to one more decimal place, i.e., the nearest tenth of a mile per gallon. This rationale and methodology were employed consistently in the proposed regulations which, therefore, do not require revision for the reporting provisions of fuel economy test values.

However, the Agency recognizes that in certain unique circumstances, the practice of rounding off each intermediate calculation to the nearest 0.1 MPG could result in a different and perhaps less accurate final general label value. Therefore, in order to minimize even the slight possibility of introducing error due to successive round-off, all intermediate calculated values will be rounded to a four decimal place precision (i.e., 0.0001 MPG). The final report values (e.g., general and specific label values) will continue to be rounded off to the nearest whole MPG.

The high level of coordination and cooperation between EPA and interested parties concerning the received comments and all aspects of this action has enabled the promulgation of these provisions for 1977 and subsequent model years along with the sections enumerated earlier.

IV. OTHER STATUTORY REQUIREMENTS

These regulations fulfill the requirements of the Energy Policy and Conservation Act imposed upon EPA regarding testing and calculation procedures for determining a manufacturer's average fuel economy. Regulations for fuel economy labeling as required by the Act for 1977 and later model years have previously been proposed by EPA, as noted above. Final labeling regulations for the 1976 model year are promulgated on March 19, 1976 (41 FR 11506). Procedures for testing and evaluation of retrofit fuel economy devices under Section 511 of the Act will be issued by EPA by separate notice to follow.

As required by the Act, consultation and coordination between EPA and the Department of Transportation (DOT) have been carried out. In addition, EPA has consulted with the Federal Energy Administration (FEA) and various other interested parties as noted above.

Comments are hereby requested from interested parties on the provisions set forth below. Comments on either the proposed actions for 1979 and subsequent model years or the interim final action for 1978 will be considered. However, amendments to the 1978 interim final regulations will only be made to the following limited extent:

(1) That any such changes are necessary and appropriate, and

(2) That any such changes will prejudice the interests of parties affected thereby, or

(3) That such changes are merely technical or clerical in nature.

V. TESTING, SAMPLING AND CALCULATION PROCEDURES

The following is a more detailed explanation of the regulatory provisions contained in this action which set forth the means by which EPA will select cars for testing, test the cars or cause them to be tested, and calculate fuel economy averages for each manufacturer of passenger automobiles.

A. *Basic Definitions.* Several basic definitions are employed throughout this preamble and the regulations themselves. EPA believes that an introductory discussion of these terms is therefore in order so that the reader might better understand this action. (Each of these terms is defined formally in the regulations which follow this preamble.)

The Act specifies fuel economy standards for passenger automobiles. A *passenger automobile* is any automobile which is rated at 6000 pounds gross vehicle weight or less and which the Secretary of DOT determines is manufactured primarily for use in the transportation of not more than 10 individuals. (Under the provisions of Section 501 of the Act, the Secretary of Transportation can expand the definition to include heavier vehicles.) All passenger automobiles so designated by the Secretary will be included in the calculation of each manufacturer's fuel economy average.

For fuel economy purposes, the first major subdivision of a manufacturer's product line is *car line*. A *car line* denotes a group of vehicles within a make or car division which has a degree of commonality in construction. Car line does not consider any level of decor or opulence and is generally not distinguished by characteristics such as roof line, number of doors, seats or windows, although station wagons are considered distinct car lines from sedans. For example, in the *1976 EPA/FEA Gas Mileage Guide for New Car Buyers*, Buick, a division of General Motors, had listed nine car lines: Electra, Skylark, Opel, Century/Regal, Century Wagon, LeSabre, Estate Wagon, Skyhawk and Riviera.

Within any car line, a number of model types may exist. *Model type* means a unique combination of car line, basic engine, and transmission class. This definition of model type incorporates two key parameters which most affect fuel economy *and* which are capable of being understood and used by the average consumer. Thus, a major function of model type is to provide a meaningful concept for publishing fuel economy information (since model type corresponds to nameplates known to the general public) as well as being used to calculate manufacturers' average fuel economy.

An additional system of classification is used for subdividing a manufacturer's product line into smaller groups for determining test requirements, both for the purpose of calculating manufacturers' averages and for calculating fuel economy label values. This alternative system classifies each manufacturer's product line into base levels. A *base level* is a unique combination of inertia weight class, basic engine and transmission class. (Note that base level is nearly the same as model type except that weight is substituted for car line.) The fuel economy for each model type is simply the sales-weighted, harmonic average[1] of the fuel economy of each base level comprising the model type. The significance of the concept of base level is that the vehicle characteristics which define a base level are those that most profoundly affect fuel economy. At least one vehicle from each base level produced by the manufacturer must be tested in order to calculate the fuel economy results for a manufacturer. Again using the Buick example, a typical base level would be a 3500 pound vehicle, 231 cubic inch, 6 cylinder engine with 2 barrel carburetor, catalyst, and manual transmission. *Basic engine* distinguishes engines of a particular displacement, number of cylinders, fuel system, and catalyst usage. *Transmission class* is the basic type of transmission, i.e., manual, automatic, or semiautomatic.

An additional level of delineation is necessary to identify individual test vehicles. Base levels are subdivided into vehicle configurations. A *vehicle configuration* is defined as a unique combination of inertia weight class, basic engine, and transmission class (all of which determine a base level) plus engine code, transmission configuration, and axle ratio. *Engine code* goes beyond the definition of basic engine by isolating different variations of carburetor, distributor, and other key engine and emission control system components. *Transmission* configuration considers more than just manual or automatic and distinguishes transmissions by their number of forward gears, e.g., three-speed manual and four-speed manual. An example of a vehicle configuration is 3500 pound, 231 cubic inch, 6 cylinder, 2 barrel carburetor engine of engine code 4, with catalyst, 4-speed manual transmission and 2.56 axle ratio.

As more fully explained below, the individual vehicles which will be tested pursuant to these rules will be specified as *vehicle configurations*. Data from the vehicle configurations tested within a *base level* will be combined (weighted as to production projections or actual production figures) to arrive at a fuel economy value for each base level. These base level values will in turn be combined to yield fuel economy values for each model type. Pursuant to the Act, each manufacturer's fuel economy average will be the harmonic, production-weighted average fuel economy of that manufacturer's model types.

B. *Calculation of Average Fuel Economy*. Beginning with the 1978 model year, the average fuel economy of passenger automobiles produced by each manufacturer is required to be no less than 18.0 miles per gallon (MPG), with the standard gradually increasing to 27.5 MPG in 1985. (The Secretary has authority to adjust these standards somewhat under circumstances specified in the Act.) Failure to meet the standard applicable in any given year subjects a manufacturer to a civil penalty. However, this penalty can be offset by a credit if the manufacturer exceeded the applicable standard in the year previous to the violation or if he exceeds the standard in the year following the violation.

The penalties provided for in the Act are quite substantial—five dollars for each passenger automobile produced for each 0.1 MPG that the applicable standard exceeds the manufacturer's average fuel economy for that year. Credits are assessed by a similar formula at the same rates. For a manufacturer who failed to meet the standard by a mere one tenth of a mile per gallon in a year in which he produced five million passenger automobiles, the penalty specified by the Act would be 25 million dollars. (However, the penalties accruing to the nation as a result of this failure would amount to *23.2 million* fewer gallons of fuel available for consumption each year and an additional annual cost to the American public of $15,000,000[2])

Due to the potential for such large penalties and credits based on shifts of tenths of an MPG, and due to the potentially large differences in aggregate fuel consumption that small changes in average fuel economies may represent, it is in the interest of both the government and the industry that manufacturers' calculated fuel economy averages be as truly representative of manufacturers' product line fuel economies as practicable. An inadequate testing and calculation plan could result in the imposition of an undue financial burden on a manufacturer in the form of large, unwarranted penalties, or costly and unwarranted vehicle modifications, or production shifts if the calculated value were too low. Alternatively an incorrectly high calculated average could deprive the nation of the total fuel savings envisioned by the Act and could inappropriately give the manufacturer a credit.

EPA's role in this program is to measure the fuel economy of manufacturers' passenger automobiles, to calculate manufacturer's fuel economy averages and to transmit these data and calculations to DOT so that the Secretary can make determinations of compliance and assess penalties as required.

The calculated manufacturers' average fuel economies are a function of three factors—production figures, the mathematical methodology used and the vehicle test data included in the calculation. Production data are discussed at more length below. The mathematical methodology is not an issue since the Act specifies that the average will be the harmonic, production-weighted average of the model type fuel economies determined for each manufacturer. The last of these factors, the vehicle test data to be included, is not so precisely specified in the Act.

Although the Act does not specify which cars EPA must test for the purposes of calculating manufacturers' averages under Section 503, it does provide some guidance. EPA is directed to conduct fuel economy tests for the purposes of this section in conjunction with emissions tests carried out under Section 206 of the Clean Air Act, 42 U.S.C. 1857 f-5, to the extent practicable. Since it is essential to know that fuel economy data is being derived from a vehicle that also meets the emission standards as required by the Clean Air Act, and since the emissions test is identical to the urban fuel economy test, and since urban fuel economy and emissions measurements are made simultaneously, Congress' instructions in this regard are well taken. However, Congress also provided the Administrator of EPA with general authority to issue regulations prescribing the means by which fuel economy values will be measured and averages calculated. EPA has found it necessary to use this general authority to augment the fleet of cars tested for emissions purposes in order to have tested a fleet which will be representative of manufacturers' product lines for fuel economy purposes as well as emissions.

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[1] The harmonic average *fuel economy* is computed by taking the inverse of average *fuel consumption* where consumption is expressed as gallons per mile.

[2] This assumes five million cars produced, a standard of 18.0 MPG, average annual mileage accumulation of 15,000 miles and an average fuel cost of $0.65 per gallon.

For emissions purposes, EPA groups manufacturers' various designs by those characteristics most significant to emissions performance, rather than fuel economy. EPA then selects individual designs for testing according to the requirements of the Clean Air Act. Since the emissions standards only require EPA to make a pass/fail determination, rather than to quantify the degree of passage or failure, and since every design tested must meet the emissions standards in order to be sold, EPA selects many designs for testing which are judged to be the least likely within an emissions category or grouping of designs (known as "engine families") to pass the emissions test.

For the purpose of calculating manufacturer's fuel economy averages, EPA's testing needs are quite different from those under the Clean Air Act. In the first instance, EPA must group manufacturers' designs by those characteristics which most affect fuel economy. Since some vehicle characteristics affect fuel economy more than emissions, and vice versa, these groupings are not always consistent with engine families. Moreover, under Section 503 of the Act, EPA must quantify the degree of passage or failure for a manufacturer's entire line; how an individual car performs is not at issue. Thus, an emissions test fleet containing a disproportionate number of cars judged to be the least likely to meet emissions standards (which coincidentally are likely to have somewhat low fuel economies relative to many cars with higher sales volumes) is not representative of a manufacturer's overall production for fuel economy purposes. For these reasons, EPA has found it necessary to augment the fleet of cars tested for emissions in order to provide a data base from which fuel economy averages can be calculated with enough accuracy to enable the Administrator to have a reasonable basis for the values calculated and to enable the Secretary to bring successful enforcement of actions.

The emissions test fleet is already augmented by the addition of cars used for fuel economy labeling purposes. This practice has been proposed to continue under Section 506 of the Act in the labeling program for 1977 and later years. (See, 41 FR 21002, May 21, 1976.) However, the addition of these cars alone is not adequate for the purposes of Section 503 of the Act since some configurations with high production volumes would still not be tested. Under the labeling program, fuel economy estimates are rounded to the nearest whole MPG. This provides a means by which consumers can compare the relative fuel economy of new cars, a purpose for which greater precision is not required. However, the data used to generate these whole MPG values cannot provide the precision needed to make Section 503 determinations (with their potentially enormous consequences) and consequently would not provide a reasonable basis for assessing penalties.

VI. ALTERNATIVE APPROACHES TO THE SELECTION OF FUEL ECONOMY TEST VEHICLES

Several alternative approaches to the selection of fuel economy test vehicles (hereinafter referred to as "fuel economy data vehicles") were examined by EPA in close coordination and consultation with DOT. EPA employed the following criteria in selecting among the various alternative approaches to picking fuel economy data vehicles:

(1) The degree to which the resulting fleet of test vehicles would yield a *calculated* average *representative* of the manufacturer's actual fleet average;[3]

(2) The enforceability of a penalty assessed on the basis of a manufacturer's calculated value being below the standard;

(3) The degree to which the vehicle selection scheme would permit a manufacturer to respond with mid-year product design or production mix changes to remedy a potential non-compliance situation; and

(4) The resources required by both industry and EPA to conduct the necessary testing (for which the public ultimately pays).

All of the alternatives considered for augmenting the emissions and labeling test fleets fall into one of two categories. Either they amount to the accumulation of data intended to provide a statistically valid sampling of the manufacturer's vehicles, or they provide a representative, rather than statistical, sample of each manufacturer's line. However, just as an approach only employing emissions program data could not seriously be considered for calculating manufacturer's averages, a pure statistical sampling approach was quickly dismissed as a possibility. EPA and DOT did, however, consider in detail several alternative means of sampling which were variations on either the representative sampling scheme (herein adopted) or which were hybrids combining aspects of both representative and statistical sampling. These two basic alternatives, the adopted approach and the hybrid, are discussed below. Alternative 1, the hybrid "Statistical Sampling Approach," specifies the minimum number of vehicles which would have to be tested to determine an average fuel economy for each manufacturer at a predetermined level of accuracy and statistical confidence. Alternative 2, the "Representative Approach" specifies a relatively low level of additional testing, over and above emissions and fuel economy labeling testing, and provides manufacturers with secure base fuel economy values, i.e., the measured fuel economy of each base level does not change unless the production mix changes or the manufacturer elects to make mid-year design changes.

STATISTICAL SAMPLING APPROACH

In this approach manufacturers must test the minimum number of vehicles required to calculate average fuel economy values to a predetermined level of confidence. This minimum number is a function of:

(1) Base level variability,

(2) Minimum incremental accuracy required,

(3) Manufacturer's calculated average fuel economy,

(4) Desired confidence level about the average,

(5) The level of the standard.

EPA and DOT examined several types of statistical sampling approaches against the criteria enumerated above. All of these sampling plans suffered from the same problems, i.e., if enough cars were to be tested to ensure the enforceability of the standard, each manufacturer would have to test a great many cars and the manufacturer would not know his precise fuel economy until it was too late to make mid-year changes which would either bring him into compliance or at least reduce the degree by which he failed to meet the standard. Under the best of these variants of statistical sampling, by 1985, most manufacturers would have to test thousands of cars annually and for the industry as a whole, the test burden would be tens, if not hundreds, of thousands of cars (even though only manufacturers whose average was close to, or below, the standard would have to conduct a full test program). The cost of such an extensive program of testing, exclusive of the costs of new test facilities which would have to be built, would be in the hundreds of millions of dollars.

(A more detailed discussion of the statistical sampling schemes analyzed by EPA and DOT is available on the public record of this rule making proceeding.)

EPA has rejected the use of a statistical sampling plan for the following reasons:

(1) The number of tests required to be conducted would be much more costly than is justified, if not altogether prohibitive.

(2) The value of a statistical sampling plan is primarily that it is possible to preselect a test fleet which characterizes the fleet produced by a manufacturer and measure the fuel economy of that fleet within specified confidence intervals. However, in order to keep the level of testing down to even the infeasible numbers referred to above, it is necessary to assume a degree of variability within base levels which cannot be verified. (It

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[3] A manufacturer's actual fleet average is the average fuel economy that would be measured *using the prescribed test procedures* if every car produced were actually tested.

would take more testing to prove this variability for each base level than to calculate the average itself.) Thus a manufacturer could challenge a calculated average on the grounds that EPA's assumed variability was lower than the manufacturer's actual variability and that EPA consequently had not caused enough cars to be tested.

(3) Due to the large number of cars that would have to be tested, manufacturers could not conduct all of the requisite tests prior to, or early in, the model year. Testing would have to be distributed throughout the model year and might have to extend beyond the end of production for the model year. Consequently, manufacturers would not know if they had met the standard applicable to a given year until it was too late to change the mix of designs in their product lines (to increase the number of cars of configurations with good fuel economy they were producing) or to effect design changes to improve fuel economy. Since the purpose of the Act is to reduce fuel consumption and not to collect penalties, it is essential that manufacturers' opportunities to comply not be curtailed in this way.

Unlike *statistical* approaches to sampling, representative sampling plans rely on the testing of enough cars within each base level so that the fuel economy of production vehicles within each base level is adequately represented by the vehicles tested. An additional feature of the particular representative sampling plan agreed to in the course of consultation and coordination between EPA and DOT is that fuel economy values for base levels would not change during a model year unless the proportions of the different designs in the product line changed or the manufacturer elected to make changes in the designs themselves (the latter known as "running changes").

Under the adopted representative sampling plan, EPA would make a preliminary calculation of each manufacturer's average fuel economy soon after the beginning of the model year. This calculation would employ five sources of data (weighted according to their contribution to total projected production) as follows:

(1) Original emission certification test vehicles ("emission data vehicles");

(2) Vehicles required to be tested for fuel economy labeling;

(3) Vehicles representing running changes made early in the year which are required to be tested for emissions purposes;

(4) Vehicles representing high production volume configurations in significant base levels;

(5) Vehicles submitted voluntarily by the manufacturer.

After this preliminary calculation is made, manufacturers will have the option of petitioning the Administrator to be exempted from providing additional test data representing running changes implemented after the preliminary calculation is made. The exemption would be granted if EPA determined that the preliminary average was sufficiently above the standard so that, in spite of any reasonably foreseeable changes in the production mix and the potential change in the average due to running changes, there would be little likelihood that the manufacturer would be below the applicable standard in the year for which the calculation was being made *and* so that there would be little likelihood that the manufacturer would need a credit in the following year. (As noted earlier, the Act contains a provision offsetting penalties for failure to meet applicable standards if the standards for the prior year of failure or following the year of failure were exceeded.)

EPA will establish criteria for the granting of such exemptions based on the number of cars tested prior to the calculation of the preliminary average, the applicable standard, the potential for change in the average due to running changes, and other factors as appropriate. Comments are requested on the criteria that should be used for making these determinations and the manner of their application.

EPA at one time considered granting such petitions for exemption only if, based on the preliminary calculation of a manufacturer's average, the manufacturer, was not only in no danger of failing to meet the standard in a given year (so that no penalty would be assessed), but if the manufacturer was also already clearly meeting the standard for the following year (so that no credit would be necessary).

Thus, it is not EPA's intention to require unnecessary testing in situations in which the preliminary data is adequate. If a manufacturer is in no danger of failing to meet a standard or of needing a credit to offset a penalty which might be assessed in the future, irrespective of production mix or running changes, no useful purpose is served by requiring the manufacturer to incur the costs of a full test program. However, if there may either be a penalty or credit based on a test program, the preliminary calculation would be inadequate as a manufacturer could artificially inflate a credit or reduce the size of a penalty by manipulating his production projections or his running changes.

EPA now believes, and DOT concurs, that these interests are adequately addressed if exemptions from full testing are granted under either of the following conditions:

(1) Based on the preliminary calculation of a manufacturer's average (with the application of the types of criteria noted above), there is a high degree of assurance that the manufacturer is meeting, and will continue to meet, the standards both for a given year and the following year; or

(2) Based on the preliminary calculation as above, there is a high degree of assurance that the manufacturer is meeting and will continue to meet the standard only for a given year (but may need a credit in the following year), if the manufacturer waives any credit that might be based on the preliminary calculation.

If a manufacturer fails to obtain an exemption, the agency would require that each running change implemented during the model year be evaluated for possible effects on the fuel economy of "significant" base levels.[4] EPA is requiring that data for the configuration representing the most production units that are affected by the running change and that are also within the top 90 percent (based on proportion of production) of a significant base level be submitted. These data could be the results of testing or derived by an analytical technique such as an approved regression analysis.

Based upon data available from the 1976 model year certification and labeling programs, an average of less than 5 additional vehicles per manufacturer would be required to represent 90 percent of the projected production of the significant base levels for the four large domestic manufacturers. However, insufficient data exist to accurately assess the additional test burden resulting from evaluating mid-year design changes, although it is possible to predict that this testing will be well within the limits of feasibility. Furthermore, the number of running change tests required will be ultimately within the control of the manufacturers since running changes themselves are not required by any regulations.

The required resource levels for this approach are reasonable and consistent with apparent Congressional intent. This approach should be at least as enforceable as any feasible statistical approach since any manufacturer who does not believe that the testing required by EPA provides a reasonable basis for making compliance determinations may submit additional data as provided in the Act.

Not only is the direct economic cost of this approach less than that of the statistical approach as a result of a lower test volume, but the lower number of required tests will provide the manufacturers with the opportunity to make mid-year adjustments that might be necessary to meet the fuel economy standard. A requirement for as large a number of tests as required under the statistical approach would dictate the distribution of mandated testing over the entire model year due to limited test facilities. Under the statistical approach the manufacturer would be placed in the untenable position of not knowing the fuel economy values used in calculating his average until half-way or even later into the model year. If then he found out that he was in jeopardy of failing the standard, little time would be left to correct the situation except through drastic production mix shifts. By providing this fuel economy data information early in the model year, the representative approach minimizes these problems and gives manufacturers more flexibility and opportunity to meet standards by either shifting model mix or by making mid-year design modifications.

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[4] A significant base level is any that represents 1 percent or more of a manufacturer's production.

The selected approach has an additional advantage over the statistical approach in that it makes optimum use of certification and labeling test volume. All certification and fuel economy labeling data are used to meet test data requirements which might have to be satisfied by different vehicles under other sampling plans. Furthermore, by permitting exemptions to running change testing, the number of manufacturers involved in higher levels of testing will be greatly reduced.

Having examined these alternative methods of sampling manufacturers' product lines, EPA found, as indicated by the preceding discussion, that only the Representative Approach is feasible and meets the criteria set forth previously to an adequate degree. Consequently, this is the approach being promulgated for the 1978 model year and proposed for subsequent model years. Nevertheless, EPA is hereby specifically requesting comments on various aspects of this method of sampling manufacturers' product lines, in addition to general comments on this and other issues involved in this action. Manufacturers are requested to comment on the fuel economy test variability they would anticipate seeing within each of their respective base levels and the components and sources of that variability. Manufacturers are further requested to comment on the testing and cost implications of the recommended plan, e.g., the expected number of required test vehicles and vehicle tests that will have to be provided as a result of this action, the availability of sufficient test capacity, and the costs of complying with these regulations itemized as to such individual costs as vehicle procurement, fuel economy testing and mileage accumulation. Finally, comments are most particularly requested on the enforceability of the standards given a compliance testing program such as that adopted herein, i.e., the acceptability of fuel economy averages derived from such a sampling plan as forming the bases for the assessment of penalties and credits.

VII. 40 CFR PART 86 PROCEDURE CHANGES

A. *1978 Model Year Test Procedure Changes.* Effective for the 1978 model year and proposed for 1979 and later model years, the following six amendments are considered relatively straightforward and will provide a more accurate measurement of the fuel economy and exhaust emission levels of the test vehicles. EPA contemplates no adjustment of the emission or fuel economy standards due to these changes as the changes only serve to improve the accuracy of the test measurement or to make the test fuel more representative of commercially available fuel. These changes will have insignificant testing cost impacts.

(1) *Quarterly production reports.*—The previous requirement for reporting vehicle production on a quarterly basis has yielded information which has not been sufficiently definitive to assess what vehicle configurations are being produced. The previously required level of definition did not provide production information based on vehicle parameters such as axle ratio, engine and emission control system calibrations, or vehicle car line. Furthermore, the quarterly production report can provide, with some modification, vehicle production information necessary to provide support to emissions and fuel economy related programs and, for the 1978 model year, information required to calculate the manufacturers' average fuel economy values.

The modifications are intended to make the quarterly production reports more useful in supporting both emissions and fuel economy programs (and are essential for calculating manufacturers' averages) with only a single reporting requirement on the manufacturer.

(2) *Measure the actual distance traveled.*—The actual distance traveled by a vehicle during a test will be measured and used in the calculation of grams/mile and miles/gallon values. Currently, the nominal test cycle distances of 7.5 miles for the city cycle and 10.2 miles for the highway cycle are used. The proposed change is intended to accurately weigh the emission levels and fuel usage by the actual miles traveled rather than by an arbitrarily fixed distance. This change in no way affects the actual performance of the vehicle, but merely measures this performance more accurately.

(3) *Increase the Number of Calibration Gases.* The number of HC and NOx calibration gases is increased from 2 to 6. This change will improve the confidence in the accuracy with which the progressively lower levels of HC and NOx are measured.

(4) *Change the Diesel Fuel Specification.* The Diesel fuel specification is being changed to drop the allowable use of No. 1 Diesel fuel which is not commonly available for light duty automotive use. Only No. 2 Diesel fuel will be allowed. No. 2 Diesel fuel is commonly available, has generally been used in past certification programs, and is specified by manufacturers for customer use in all currently marketed Diesels for light duty automotive applications.

(5) *Specify Separate Procedures for Cold and Hot Start Failures.* Current regulations only specify a single test procedure to be followed should a vehicle fail to easily start during the test. The 1975 Federal Test Procedure includes both a cold start and a hot start. The proposed test procedure change will delineate separate procedures to follow should a vehicle fail to cold start or hot start. The proposed change will apply the present procedure to cold start failure only. A new hot start procedure will be incorporated into the regulations to cover those very infrequent hot start failures. These changes will serve to provide further delineation of procedures which have been followed by EPA and which have commonly been accepted by the automotive industry.

Comments were received from manufacturers regarding ambiguities in the wording used in earlier drafts of this action relating to the implementation of this change in test procedure. EPA has responded to these concerns and the current language reflects these changes.

(6) *Allow Use of Overdrive.* The current regulations require that vehicles equipped with overdrive or free-wheeling units be used according to manufacturer's recommendations. The test procedure regulations are hereby being amended so that they no longer disallow the use of overdrive units, but do require that these units be used according to manufacturers' recommendations. In addition, free-wheeling units are no longer required to be locked out of operation. Thus, the regulations will now recognize and give the same credit to the fuel economy benefits of an overdrive unit as is realized in actual use.

B. *1979 and Later Model Year Proposed Changes.* Beginning with the 1979 model year (to allow comment and sufficient lead time for implementation), several major test procedure changes are proposed without implementation in 1978. Each of these test procedure changes will provide a more accurate simulation of what the vehicle "sees" during actual on-the-road operation. Although these test procedure changes could be expected to affect exhaust emissions and fuel economy on a specific vehicle, no directional change in either average exhaust emissions or fuel economy is expected when looking at the entire population of vehicles. For example, if all the 1976 model year vehicles currently being sold were tested under both the existing and the proposed test procedures, the average exhaust emission levels and fuel economy would be for all practical purposes the same. Since no necessary or intended directional shift in either exhaust emission or fuel economy will result from these test procedure changes, it will not be necessary to apply a correction factor to the fuel economy test values in order to yield comparable results to the 1975 test procedures as required by the Act.

(1) *Use of More Accurate Road Load Simulation.* Another change proposed for the 1979 model year is a revised method for setting the dynamometer power absorber. The dynamometer power absorber setting simulates the vehicle road load. This is accomplished by setting the dynamometer power absorber to a value that reflects all major components of total road load of the vehicle; vehicle weight, aerodynamic drag of the vehicle and losses resulting from free-rolling friction of the non-driving tires and wheels. When the vehicle is operated on a dynamometer, the driving tires dissipate more power on the curved roll surface(s) than is dissipated on a flat road surface. This additional power dissipation must be subtracted from vehicle road load to obtain the appropriate dynamometer power absorber setting.

Where twin-roll dynamometers are in use, the additional power dissipated by the driving tires, over and above normal power dissipation on a flat road surface, is assumed to adequately compensate for the power dissipation attributed to non-driving tires and wheels. Therefore, in calculating the total vehicle road load, the additional power dissipation caused by the curved roll surfaces need not be subtracted. With this assumption the dynamometer power absorber setting represents the aerodynamic drag of the vehicle.

The aerodynamic drag of a vehicle is a function of the vehicle frontal area, body shape, protuberances and other aerodynamic factors. Since the vehicle weight and external size tend to be related, the weight can be used as an indirect predictor of vehicle aerodynamic drag. Vehicle weight is currently used to predict the dynamometer power absorber setting. The functional form of the prediction system is:

$$P=aW^3+bW+c$$

Where:

P=Dynamometer power absorber setting

W=Vehicle weight

a, b and c are predetermined constants

A relationship such as this, based upon weight only, is satisfactory only so long as most vehicles have about the same weight-to-size correlation that existed when the prediction system was developed. However, the recent emphasis on fuel efficient vehicles has resulted in criticism of this simplified method for selecting the proper dynamometer setting since the manufacturer does not receive credit for aerodynamic improvements. Automobile manufacturers have commented in the past that the flat surface rolling resistance advantage of radial tires is not reflected on the dynamometer. Consequently, criticism has been received that the current dynamometer adjustment procedure does not reflect the fuel economy advantages of radial tires. It should be parenthetically noted that the manufacturers currently have the option of measuring actual road load power and requesting that this empirical value be used to set the dynamometer.

In response to these criticisms and in recognition of the fact that the original data base is already six years old, the EPA conducted a track test program using approximately 70 light-duty vehicles and 15 light-duty trucks. The trucks were tested with various payloads, resulting in a total of approximately 60 light-duty truck tests.

As a result of this test program a system to predict the dynamometer power absorber setting as a function of vehicle weight, frontal area, protuberances and tire type was developed and is being proposed. An equation is proposed for both twin roll dynamometers (with nominal roll diameters of 8–9″) and single roll dynamometers (with nominal roll diameters of 48″).

Comments on, and data relating to, this proposed approach for determining dynamometer power absorber settings are requested. The data most needed are those relating to tire-road and tire-roll effects. Information and test data are also requested regarding the simulation of air conditioner operation.

(2) *Reduction in Inertia Weight Test Increments.* The second change proposed for the 1979 model year is to reduce the range of inertia weight test intervals. Currently, the inertia intervals are quite broad, 250 pound intervals for inertia settings up through 2750 pounds, and 500 pound intervals for settings from 3000 to 5500 pounds. Manufacturers argue that even relatively significant weight reductions may go unrewarded, particularly if a vehicle is near the upper end of a class. They also contend that little incentive exists to reduce vehicle weight if they do not receive credit for their action in terms of the testing procedure. On the other hand, relatively minor weight reductions would receive substantial reward if the vehicle were just above the lower end of the class. Manufacturers have every incentive to make these minor changes. Reducing the intervals by half, from 250 to 125 pounds and 500 to 250 pounds would provide incentive for the manufacturers to engage in vehicle weight reduction programs that would result in real fuel economy benefits. This change would also reduce weight-related test errors to 0.4 MPG or less.

Reducing the inertia weight test increments would have a significant impact upon test facilities. Test dynamometers would require physical modifications to allow implementation of smaller inertia weight intervals. This change is proposed for 1979 rather than 1978 because it is doubtful that a sufficient number of dynamometers used by EPA or manufacturers could be modified in time for 1978 model year testing.

One other aspect of this change merits consideration. Currently vehicles are selected to represent the dynamometer inertia intervals. Increasing the number of inertia intervals need not require a corresponding increase in the number of vehicles chosen as test vehicles, but this increase would result if the selection criterion were not revised appropriately. Without revision, the number of test vehicles required may nearly double. The current method of calculating fuel economy values, manufacturers' average values and label values, requires at least one vehicle per inertia weight class. Consideration will be given to revising this such that the number of test vehicles does not increase appreciably *and such large increases are not contemplated by these proposals. Interested parties, particularly manufacturers, are invited to comment on this aspect of reducing the inertia weight test increments.*

As in the first change, since there is no directional trend to the changes (any given vehicle is just as likely to go into a "heavier" new class as it is likely to go into a "lighter" class) there is no need to adjust the emissions or fuel economy baselevels. This change only serves to more accurately represent the real emission and fuel economy results of the vehicle.

(3) *Definition of option and model, and revision of optional equipment usage.*—The fourth minor change proposed for the 1979 model year includes revisions to emission certification procedures. The current emission regulations lack definitions for model and for option, although both terms are used in the text of the regulations. The lack of a definition for these terms has led to disagreement between EPA and the manufacturers over the interpretation of the certification requirements. One specific area where controversy exists is that of the manufacturer's product line description. The variety of interpretation of the terms "model" and "option" has led to a lack of consistency in manufacturers' applications for certification. This lack of specificity when referring to "options" may also affect fuel economy values. The current procedure requires that test vehicles includes equipment if 33 percent or more of the vehicles in an engine family are projected to be sold with that equipment. This causes many vehicles to be tested at unrepresentative road load and inertia weights, which can result in somewhat unrepresentative fuel economy values.

The definitions proposed for model and option, and the additional related definitions, are intended to clarify the certification requirements and to bring about consistency in the related programs.

The previous certification requirements concerning optional equipment usage as they impacted test vehicle equipment, vehicle inertia weight class and road load air conditioning factor were based on the usage of optional equipment on greater than 33 percent of the engine family. This provision was initially instituted in the 1972 model year regulations as an attempt to more accurately characterize the manufacturer's product lines during testing, on the basis of typical in-use vehicles.

Recently, the engine family basis for definitions relating to optional equipment usage has proven inadequate in making certification vehicles represent in-use vehicles. Some vehicles have been required to be equipped in a manner not typical of in-use vehicles of the same configuration (but typical of vehicles within the engine family).

The proposal to revise the basis for decisions related to optional equipment usage from "engine family" to "car line" should improve the accuracy of the representation of the manufacturers' product lines by their respective test vehicles without having any directional effect on emission or fuel economy results.

(4) *Revise the Fuel Octane Requirements.*—The fuel octane requirements for mileage accumulation and emission testing are being changed to allow use of a lower octane fuel. This change will bring the allowable fuel octane requirements more in line with the fuel commercially available to the consumer and with the minimum octane levels recommended to the purchaser. Thus, this change will allow a more representative assessment of in-use vehicle performance.

VIII. DETERMINATION OF DOMESTIC PRODUCTION

Under certain circumstances, Section 503 of the Act provides that separate fuel economy averages will be calculated for manufacturers' domestic and imported vehicles in cases wherein a manufacturer's product line includes both. This section further provides that the Administrator of EPA may prescribe rules for determining how passenger automobiles will be classified as either foreign or domestic. EPA has found it necessary to define a procedure by which this determination will be made so that all manufacturers will be treated in the same manner and so that manufacturers may plan for future model years in which this determination may become critical to the question of whether or not their domestic production meets the fuel economy standards.

IX. REQUEST FOR COMMENTS

Manufacturers and other interested parties may participate in this rulemaking by submitting comments (in quadruplicate) to the Administrator, Environmental Protection Agency, Attention: Office of Mobile Source Air Pollution Control, 401 M Street, SW., Washington, D.C. 20460. All relevant material received on or before December 9, 1976, will be considered.

A copy of all public comments will be available for inspection and copying at the U.S. Environmental Protection Agency, Public Information Reference Unit, Room 2922 (EPA Library), 401 M Street, SW., Washington, D.C. 20460. As provided in 40 CFR Part 2, a reasonable fee may be charged for copying services.

In accordance with Executive Order 11821 a review of this action was undertaken to determine whether it met the criteria for a "major action" requiring preparation of an Inflationary Impact Statement. The review indicated that the costs and economic impacts of this action are far less than a "major" action and that therefore no IIS is required.

No significant environmental impacts are associated with this action.

X. TITLE AND STATUTORY AUTHORITY

The provisions of this notice pertaining to 40 CFR Part 600 are issued under the authority of Title V of the Motor Vehicle Information and Cost Savings Act, 15 U.S.C. 1901 et seq., as amended by Title III of the Energy Policy and Conservation Act, Pub. L. 94-163, Stat. 901.

The provisions of Part 86 are issued under the authority of sections 202, 206, 207, 208, and 301(a) of the Clean Air Act, as amended (42 U.S.C. 1857f-1, 1857f-5, 1857f-5a, 1857f-6, 1857g(a)).

Parts 86 and 600 of Chapter I, Title 40 of the Code of Federal Regulations are amended, or proposed to be amended as noted above, as follows, effective immediately and applicable as provided herein.

Dated: August 30, 1976

JOHN QUARLES,
Acting Administrator.

Part 86 of Chapter I, Title 40 of the Code of Federal Regulations is amended in Subparts A and B as follows:

1. It is proposed to add § 86.079-2 as follows:

§ 86.079-2 Definitions.

The following definitions apply beginning with the 1979 model year. Section 86.078-2 remains effective.

"Body Style" means a level of commonality in vehicle configuration as defined by number of doors and roof treatment (e.g., Sedan, Convertible, Fastback, Hatchback). Station Wagons and light trucks are identified as separate car lines.

"Drivetrain Configuration" means a unique combination of engine code, transmission configuration and axle ratio.

"Frontal Area" means the area enclosed by the geometrical projection of the vehicle, including tires, onto a plane perpendicular to the longitudinal axis of the vehicle.

"Model" means a specific combination of carline, body style, and drivetrain configuration.

"Option" means any available equipment or feature not standard equipment on a model.

"Public Introduction Date" means that date on which the manufacturer has released for retail sale vehicle configurations whose total projected model year production is estimated to be twenty-five percent or more of his total model year projected production volume.

"Standard Equipment" means those features or equipment which are marketed on a vehicle over which the purchaser can exercise no choice.

2. It is proposed to add a new § 86.079-24 as follows:

§ 86.079-24 Test vehicles and engines.

(a) through (f) inclusive (see paragraphs (a) through (f) of § 86.078-24).

(g) (1) This paragraph applies to light duty vehicles and light duty trucks.

(2) Where it is expected that more than 33 percent of a car line, within an engine-system combination, may be equipped with an item (whether that item is standard equipment or an option), the full estimated weight of that item shall be included in the curb weight computation of each vehicle available with that item in that carline, within that engine-system combination. Where it is expected that 33 percent or less of the carline, within an engine-system combination, will be equipped with an item (whether that item is standard equipment or an option) no weight for that item will be added in computing the curb weight for any vehicle in that carline, within that engine-system combination, unless that item is standard equipment on the vehicle. In the case of mutually exclusive options, only the weight of the heavier option will be added in computing the curb weight. Optional items weighing less than three pounds per item need not be considered.

(3) Where it is expected that more than 33 percent of a car line, within an engine-system combination, will be equipped with an item (whether that item is standard equipment or an option) that can reasonably be expected to influence emissions, then such items shall actually be installed, unless specifically excluded by the Administrator, on all emission data and durability data vehicles of that car line, within that engine-system combination, on which the items are intended to be offered in production. Items that can reasonably be expected to influence emissions are: air conditioning, power steering, power brakes, and other items determined by the Administrator.

(4) Where it is expected that 33 percent or less of a car line within an engine-system combination, will be equipped with an item (whether that item is standard equipment or an option) that can reasonably be expected to influence emissions, that item shall not be installed on any emission data vehicle or durability data vehicle of that car line, within that engine-system combination, unless that item is standard equipment on that vehicle or specifically required by the Administrator.

3. A new § 86.078-37 is added and reads as follows:

§ 86.078-37 Production vehicles and engines.

(a) (see paragraph (a) of § 86.077-37.)

(b) (1) Any manufacturer of light duty vehicles or light duty trucks, obtaining certification under this part shall notify the Administrator, on a quarterly basis, of the number of vehicles domestically produced for sale in the United States and the number of vehicles produced and imported for sale in the United States during the preceding quarter. A manufacturer may elect to provide this information every 60 days instead of quarterly, to combine it with the notification required under § 86.077-36. The notification must be submitted 30 days after the close of the reporting period. The vehicle production information required shall be submitted as follows:

(i) Total production volume expressed in terms of units produced.

(ii) Model type production volume, expressed for each model type in terms of units produced and as a percentage of total production.

(iii) Base level production volume, expressed for each base level in terms of units produced and as a percentage of (A) the total production of its respective model type(s) and, (B) total production.

(iv) Vehicle configuration production volume, expressed for each vehicle configuration in terms of units produced, and as a percentage of the total production of its respective base level. In addition, each vehicle configuration shall be identified by its appropriate engine-system combination.

(2) [See paragraph (b)(2) of § 86.077-37]

(c) [See paragraph (c) of § 86.077-37]

(d) The following definitions apply to this section:

(1) "Model Type" means a unique combination of car line, basic engine, and transmission class.

(2) "Base Level" means a unique combination of basic engine, inertia weight, and transmission class.

4. It is proposed to add a new section, § 86.113-79, to read as follows:

§ 86.113-79 Fuel specifications.

(a) *Gasoline.* (1) Gasoline having the following specifications will be used by the Administrator in exhaust and evaporative emission testing. Gasoline having the following specifications or substantially equivalent specifications approved by the Administrator, shall be used by the manufacturer in exhaust and evaporative testing, except that the lead and octane specifications do not apply.

Item	ASTM	Leaded	Unleaded
Octane, research, minimum	D2699	93	93
Sensitivity, minimum		9.0	7.5
Lead (organic), grams/U.S. gallon		[1] 1.4	0.00-0.05
Distillation range:			
IBP,[2] ° F	D86	75-95	75-95
10 pct point, ° F	D86	120-135	120-135
50 pct point, ° F	D86	200-230	200-230
90 pct point, ° F	D86	300-325	300-325
EP, ° F (maximum)	D86	415	415
Sulphur, weight percent, maximum	D1266	0.10	0.10
Phosphorus, grams/U.S. gallon, maximum		0.01	0.005
RVP [3] [4] pounds per square inch	D323	8.7-9.2	8.7-9.2
Hydrocarbon composition:			
Olefins, percent, maximum	D1319	10	10
Aeromatics, percent maximum	D1319	35	35
Saturates	D1319	(5)	(5)

[1] Minimum.
[2] For testing at altitudes above 1,219 m (4,000 ft) the specified range is 75-105.
[3] For testing which is unrelated to evaporative emission control, the specified range is 8.0-9.2.
[4] For testing at altitudes above 1,219 m (4,000 ft) the specified range is 7.9-9.2.
[5] Remainder.

(2) Gasoline representative of commercial gasoline which will be generally available through retail outlets shall be used in service accumulation. For leaded gasoline the minimum lead content shall be 1.4 grams per U.S. gallon, except that where the Administrator determines that vehicles represented by a test vehicle will be operated using gasoline of different lead content than that prescribed in this paragraph, he may consent in writing to use a gasoline with a different lead content. The octane rating of the gasoline used shall be no higher than 1.0 research octane number above the minimum recommended by the manufacturer and have a minimum sensitivity of 8.0 octane numbers, where sensitivity is defined as the Research octane number minus the Motor octane number. The Reid Vapor Pressure of the gasoline used shall be characteristic of the motor fuel used during the season in which the service accumulation takes place.

(3) The specification range of the gasoline to be used under paragraph (a) (2) of this section shall be reported in accordance with § 86.077-21(b) (3).

§ 86.113-78 [Amended]

5. § 86.113-78 is amended by revising the last sentence of the text and the table in paragraph (b) (2), and revising the last sentence of the text and the table in paragraph (b) (3) as follows:

(b) * * *

(2) * * * "Type 2D" grade diesel fuel shall be used.

Item	ASTM test method No.	Type 2-D
Cetane	D613	42-50
Distillation range	D86	
IBP, °F		340-400
10 pct point, °F		400-460
50 pct point, °F		470-540
90 pct point, °F		550-610
EP, °F		580-660
Gravity, °API	D287	33-37
Total sulfur, percent	D129 or D2622	0.2-0.5
Hydrocarbon composition	D1319	
Aromatics, percent (minimum).		27
Paraffins, naphthenes, olefins.		Remainder
Flashpoint °F (minimum)	D93	130
Viscosity, centistokes	D445	2.0-3.2

(3) * * * "Type 2-D" grade diesel fuel shall be used.

Item	ASTM test method No.	Type 2-D
Cetane (minimum)	D613	38-58
Distillation range:		
90 percent point, °F	D86	430-630
Gravity °API	D237	30-42
Total sulfur, percent (minimum).	D129 or D2622	0.2
Flashpoint, °F (minimum)	D93	130
Viscosity, centistokes	D455	1.5-4.5

* * * * *

6. § 86.114-78 is amended by adding paragraph (a) (7) to read as follows:

§ 86.114-78 Analytical gases.

(a) * * *

(7) The use of proportioning and precision blending devices to obtain the required analyzer gas concentrations is allowable provided their use has been approved in advance by the Administrator.

7. § 86.121-78 is amended by revising paragraph (b) (3) to read as follows:

§ 86.121-78 Hydrocarbon analyzer calibration.

* * * * *

(b) * * *

(3) Calibrate on each normally used operating range with propane in air calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of that range. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2 percent or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2 percent at any point, the best-fit non-linear equation which represents the data to within 2 percent of each test point shall be used to determine concentration.

8. § 86.123-78 is amended by revising paragraph (b) (3) to read as follows:

§ 86.123-78 Oxides of nitrogen analyzer calibration.

* * * * *

(b) * * *

(3) Calibrate on each normally used operating range with NO in N2 calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of that range. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2 percent or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2 percent at any point, the best-fit nonlinear equation which represents the data to within 2 percent of each test point shall be used to determine concentration.

9. It is proposed to add a new section, § 86.129-79, to read as follows:

§ 86.129-79 Dynamometer Adjustment To Stimulate Vehicle Inertia and Road Load.

(a) Flywheels, electrical or other means of simulating inertia as shown in the following table be used.

(1) *Light duty vehicles.*

Loaded vehicle weight (pounds)	Equivalent inertia weight (pounds)
Up to 1,062	1,000
1,063 to 1,187	1,125
1,188 to 1,312	1,250
1,313 to 1,437	1,375
1,438 to 1,562	1,500

Loaded vehicle weight (pounds)	Equivalent inertia weight (pounds)
1,563 to 1,687	1,625
1,688 to 1,812	1,750
1,813 to 1,937	1,875
1,938 to 2,062	2,000
2,063 to 2,187	2,125
2,188 to 2,312	2,250
2,313 to 2,437	2,375
2,438 to 2,562	2,500
2,563 to 2,687	2,625
2,688 to 2,812	2,750
2,813 to 2,937	2,875
2,938 to 3,062	3,000
3,063 to 3,187	3,125
3,188 to 3,312	3,250
3,313 to 3,437	3,375
3,438 to 3,562	3,500
3,563 to 3,687	3,625
3,688 to 3,812	3,750
3,813 to 3,937	3,875
3,938 to 4,125	4,000
4,126 to 4,375	4,250
4,376 to 4,625	4,500
4,626 to 4,875	4,750
4,876 to 5,125	5,000
5,126 to 5,375	5,250
5,376 to above	5,500

(2) *Light duty trucks*. The table in paragraph (a)(1) of this section shall apply to light duty trucks with loaded vehicle weights below 5,375 lbs. Above 5,375 lbs, the following table shall apply:

Loaded vehicle weight (pounds)	Equivalent inertia weight (pounds)
5376 to 5750	5,500
5751 to 6250	6,000
6251 to 6750	6,500
6751 to 7250	7,000
7251 to 7750	7,500
7751 to 8250	8,000
8251 to 8750	8,500
8751 to 9250	9,000
9251 to 9750	9,500
9751 to 10,000	10,000

(b) Power absorption unit adjustment.

(1) The power absorption unit shall be adjusted to reproduce road load power at 50 mph true speed. The indicated road load power setting shall take into account the dynamometer friction. The relationship between road load (absorbed) power and indicated road load power for a particular dynamometer shall be determined by the procedure outlined in § 86.118 or other suitable means.

(2) The dynamometer road load setting is determined from the equivalent inertia weight, the frontal area, the body shape, the vehicle protuberances and the tire type by the following equations. Alternately, the vehicle road load may be determined by a procedure proposed by the manufacturer and approved in advance by the Administrator.

(i) For light duty vehicles to be tested on a twin roll dynamometer (with nominal roll size of 8.65″ and 17″ nominal roll spacing[6]).

$$Hp=2.48+4.78\times10^{-1}A+1.73\times10^{-2}AS+1{,}56P+2.17\times10^{-4}TW$$

where:

Hp=the dynamometer power absorber setting at 50 mph (horsepower)
A=vehicle frontal area (ft.²)
S=vehicle shape factor (dimensionless)
P=vehicle protuberance factor (dimensionless)
T=tire type (0 for bias ply tires, −1 for radial ply)
W=vehicle equivalent inertia weight (lbs.) from the table in paragraph (a)

(A) The vehicle shape factor is given by:

$$S=\sum_{i=1}^{6}a_is_i$$

where the a_i weighting factors are:

$a_1=2$
$a_2=1$
$a_3=1$
$a_4=1$
$a_5=1$
$a_6=2$

and the s_i are defined in the following paragraphs.

(*1*) The shape factors consider the front deck of the vehicle, the rear deck, the front, rear and side surfaces and the transitions from these surfaces to the other vehicle surfaces. The front deck is defined as the horizontal or inclined surface extending forward from the foremost point of the windshield. The rear deck is defined to include all horizontal or inclined surfaces extending rearward from the rearmost point of the windshield. The front surface of the vehicle is defined as the vertical or nearly vertical surface at the front of the vehicle. The vehicle side surface is defined as the vertical or nearly vertical surface in a frontal view of the vehicle.

(*2*) The term s_1 describes the longitudinal sections of the front deck of the vehicle and their transition into the front surface (side view of the vehicle front deck).

$s_1=-1$ for those vehicles where the projected area of the front deck of the vehicle, which is inclined less than 30° from the horizontal, is at least 33% of the projected frontal area of the vehicle below the windshield-body transition.
$s_1=-1$ for those vehicles where the transition from the front deck to the front surface has a radius of curvature greater than 8″ in all longitudinal sections. (The curvature must subtend an angle greater than or equal to one radian to be considered.)
$s_1=0$ for those vehicles not satisfying the $s_1=-1$ criteria, but where the transition from the front deck to the front surface has a radius of curvature greater than 4″ but less than or equal to 8″ in all longitudinal sections. (The curvature must subtend an angle of greater than or equal to one radian to be considered.)
$s_1=+1$ for all other vehicles.

(*3*) The term s_2 describes the transition between the vehicle front and side surfaces through horizontal sections. (Top view of the vehicle front surface.)

$s_2=-1$ for those vehicles where the transition has a radius of curvature greater than 8″ in all horizontal sections. In addition there can be no protuberances on this surface.
$s_2=0$ for those vehicles where the transition has a radius of curvature greater than 4″ but less than 8″ in all horizontal sections. In addition, there can be no protuberances on this surface.
$s_2=+1$ for all other vehicles.

(*4*) The term s_3 describes the windshield surface, and the transition of this surface to the vehicle side surface through horizontal sections. (Top view.)

$s_3=-1$ for those vehicles where the radius of curvature of the transition from the center of the windshield to the side surface of the vehicle is greater than 8″.
$s_3=0$ for those vehicles where the radius of curvature of the transition from the center of the windshield to the side of the vehicle is greater than 4″ but less than or equal to 8″.
$s_3=+1$ for all other vehicles.

(*5*) The term s_4 describes the angle of inclination (from horizontal) of the windshield at the centerline.

$s_4=-1$ for vehicles where the angle of inclination is less than 30° from horizontal.
$s_4=0$ for vehicles where the angle of inclination is less than 60° but greater than or equal to 30° from horizontal.
$s_4=+1$ for vehicles not satisfying either of the above criteria.

(*6*) The term s_5 describes the transition of the side surface to the rear surface through horizontal sections. (Top view of the vehicle rear.)

$s_5=-1$ for those vehicles where at least 33% of the rear projected area of the vehicle have lines of intersection with horizontal longitudinal planes which form an angle of less than 20° from the longitudinal axis of the vehicle.
$s_5=0$ for those vehicles where at least 20% but less than 33% of the rear projected area of the vehicle have lines of intersection with horizontal longitudinal planes which form an angle of less than 20° with the longitudinal axis of the vehicle.
$s_5=+1$ for all other vehicles.

(*7*) The term s_6 describes the longitudinal sections of the rear deck of the vehicle and their transition into the rear surface. (Side view of the vehicle rear deck.)

$s_6=-2$ for those vehicles where greater than 50% of the projected rear areas of the vehicle have lines of intersection with vertical longitudinal section planes which are inclined less than 20° from the horizontal.
$s_6=-1$ for those vehicles where greater than 33% but less than or equal to 50% of the projected rear area of the vehicle has lines of intersection with vertical longitudinal section planes which are inclined less than 20° from the horizontal.
$s_6=0$ for those vehicles where greater than 33% of the projected rear area of the vehicle has lines of intersection with vertical longitudinal section planes which are inclined less than 45° from the horizontal.
$s_6=+1$ for those vehicles not satisfying the $s_6=-2$, $s_6=-1$ or $s_6=0$ criteria, but which have closed rear surfaces.
$s_6=+2$ for those vehicles with an open rear surface, (such as a pick-up bed).

(B) the protuberance factor is given by:

$$P=\sum_{i=1}^{7}b_ip_i$$

where the weighting factors b_i are:

$b_1=1.00$
$b_2=0.200$
$b_3=0.091$
$b_4=0.215$
$b_5=0.250$
$b_6=0.250$
$b_7=0.500$

The protuberance terms are:

$P_1=1$ if the vehicle is equipped with a roof rack
$P_2=$the number of protruding external aerials
$P_3=$the number of hood ornaments protruding more than 0.375 inch from the hood surface
$P_4=$the number of mirrors on the vehicle which are not located directly in the vehicle air stream, having aerodynamic shapes (where the longitudinal dimension exceeds the maximum transverse dimension).
$P_5=$the number of mirrors on the vehicle, not directly located in the vehicle air stream, but which do not meet the dimensional criterion of P_4.
$P_6=$the number of mirrors on the vehicle which are located in the vehicle air stream, having aerodynamic shapes (where the maximum longitudinal dimension exceeds the maximum transverse dimension.)

$p_7=$the number of mirrors on the vehicle not meeting the criteria of p_4, p_5, or p_6

(*1*) Protuberance terms p_1, p_2, & p_3 shall be zero if the vehicle is not equipped with such items. For protuberance terms p_4 through p_7, a mirrow shall be considered in the vehice air stream unless it is entirely behind the projection of the windshield surface and within 8″ of the vehicle side.

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[6] NOTE.—Dynamometers with roll specifications other than those shown may be used if the road load power settings can be shown to be equivalent and if approved in advance by the Administrator.

(ii) For light duty vehicles to be tested on a single, large roll dynamometer (with nominal roll diameter of 48 inches*):

$$H_p=2.48+4.78\times10^{-1}\ A+1.73\times10^{-2}\ AS+1.56P+(6.13\times10^{-4}+1.08\times10^{-4}T)W$$

All symbols in the above equation are defined in paragraph (b)(2)(i) of this section.

(iii) For light duty trucks to be tested on a twin roll dynamometer (with nominal roll size 8.65″ and 17″ nominal spacing[7]):

$$H_p=2.48+4.78\times10^{-1}A+1.73\times10^{-2}AS+1.56P+2.17\times10^{-4}TW$$

All symbols in the above equation are defined in paragraph (b)(2)(i) of this section.

(iv) For light duty trucks to be tested on a single, large roll dynamometer (with nominal roll diameter of 48 inches[8]):

$$H_p=2.48+4.78\times10^{-1}A+1.73\times10^{-2}AS+1.56+(6.13\times10^{-4}+1.08\times10^{-4}T)W$$

All symbols in the above equation are defined in paragraph (b)(2)(i).

(v) If vehicles exist within a car line within an engine-system combination with different shapes and protuberance factors, these factors shall be chosen such that less than 33% of the vehicles sold have a higher actual or expected road load than the value resulting from the methodology contained in this paragraph using the selected shape and protuberance factors.

(3) Where it is expected that more than 33 percent of a car ine within an engine-system combination will be equipped with air conditioning, per § 86.078-24(g)(2), the road load power as determined in paragraph (b)(2) of this section shall be increased by 10 percent for testing all test vehicles of that car line within that engine-system combination if those vehicles are intended to be offered with air conditioning in production.

10. § 86.135-78 is amended by adding paragraph (h) to read as follows:

§ 86.135-78 Dynamometer procedure.

* * * * *

(h) The driving distance as measured by counting the number of dynamometer roll or shaft revolutions, shall be determined for the transient cold start, stabilized cold start, and transient hot start phases of the test. The revolutions shall be measured on the same roll or shaft used for measuring the vehicle's speed.

11. § 86.136-78 is amended by revising paragraph (c) to read as follows:

§ 86.136-78 Engine starting and restarting.

* * * * *

(c) If the vehicle does not start after 10 seconds of cranking, cranking shall cease and the reason for failure to start shall be determined. The gas flow measuring device (or revolution counter) on the constant volume sampler (and the hydrocarbon integrator when testing diesel vehicles, see § 85.135 Dynamometer Test Runs) shall be turned off and the sample selector valves placed in the "standby" position during this diagnostic period. In addition, either the CVS should be turned off or the exhaust tube disconnected from the tailpipe during the diagnostic period. If failure to start is an operational error, the vehicle shall be rescheduled for testing from a cold start.

(1) If a failure to start occurs during the cold portion of the test and is caused by a vehicle malfunction corrective action of less than 30 minutes duration may be taken (according to § 86.077-25), and the test continued. The sampling system shall be reactivated at the same time cranking begins. When the engine starts, the driving schedule timing sequence shall begin. If failure to start is caused by vehicle malfunction and the vehicle cannot be started, the test shall be voided, the vehicle removed from the dynamometer, and corrective action may be taken according to § 86.077-25. The reasons for the malfunction (if determined) and the corrective action taken shall be reported.

(2) If a failure to start occurs during the hot start portion of the test and is caused by vehicle malfunction, the vehicle must be started within one minute of key on. The sampling system shall be reactivated at the same time cranking begins. When the engine starts, the driving schedule timing sequence shall begin. If the vehicle cannot be started within one minute of key on, the test shall be voided, the vehicle removed from the dynamometer, corrective action taken, (according to § 86.077-25), and the vehicle rescheduled for testing. The reason for the malfunction (if determined) and the corrective action taken shall be reported.

* * * * *

12. § 86.137-78 is amended by adding a second sentence to paragraph (b)(1), revising paragraph (b)(7), inserting a sentence after the first sentence of paragraph (b)(11), inserting a sentence after the first sentence of paragraph (b)(13), revising the second sentence of paragraph (b)(16), and adding a sentence at the end of paragraph (b)(17). § 86.137-78 is amended to read as follows:

§ 86.137-78 Dynamometer test runs.

* * * * *

(b) * * *

(1) * * * Reset and enable the roll revolution counter.

* * * * *

(7) Start the gas flow measuring device, position the sample selector valves to direct the sample flow into the "transient" exhaust sample bag and the "transient" dilution air sample bag (turn on the diesel hydrocarbon analyzer system integrator and mark the recorder chart, if applicable), turn the key on, and start cranking the engine.

* * * * *

(11) * * * Before the acceleration which is scheduled to occur at 510 seconds, record the measured roll or shaft revolutions and reset the counter or switch to a second counter.* * *

* * * * *

(13) * * * Record the measured roll or shaft revolutions and reset the counter.* * *

* * * * *

(16) * * * The key-on operation step described in paragraph (b)(7) of this section shall begin between 9 and 11 minutes after the end of the sample period for the cold start test.

(17) * * * Record the measured roll or shaft revolutions.

* * * * *

13. § 86.142-78 is amended by revising paragraph (f) and adding paragraph (p) to read as follows:

§ 86.142-78 Records required.

* * * * *

(f) Vehicle: ID number, Manufacturer, Model year, Standards, Engine family, Evaporative emissions family, Basic engine description (including displacement, number of cylinders, and catalysts usage), Fuel system (including number of carburetors, number of carburetor barrels, fuel injection type, and fuel tank(s) capacity and location), Engine code, Inertia weight class, Actual curb weight at zero miles, Actual road load at 50 mph, Transmission configuration, Axle ratio, Car line; Odometer reading, Idle rpm and Drive wheel tire pressure, as applicable.

* * * * *

(p) The driving distance for each of the three phases of the test, calculated from the measured roll of shaft revolutions.

14. Section 86.144-78 is amended by revising paragraph (a); adding two terms to the end of the text portion of paragraph (d)(1), revising the equation for humidity and adding two equations to the end of paragraph (d)(1); adding two equations to the end of paragraph (d)(2); adding two equations to the end of paragraph (d)(3); and revising paragraph (d)(4). § 86.144-78 is amended to read as follows:

§ 86.144-78 Calculations; exhaust emissions.

The final reported test results shall be computed by use of the following formula:

(a) For light duty vehicles and light duty trucks:

$$Y_{wm}=0.43\ ((Y_{ct}+Y_s)/(D_{ct}+D_s))+0.57\ ((Y_{ht}+Y_s)/(D_h+D_s))$$

Where:

Y_{wm}=Weighted mass emissions of each pollutant, i.e., HC, CO, NO_x or CO_2, in grams per vehicle mile.
Y_{ct}=Mass emissions as calculated from the "transient" phase of the cold start test, in grams per test phase.
Y_{ht}=Mass emissions as calculated from the "transient" phase of the hot start test, in grams per test phase.
Y_s=Mass emissions as calculated from the "stabilized" phase of the cold start test, in grams per test phase.
D_{ct}=The measured driving distance from the "transient" phase of the cold start test, in miles.
D_{ht}=The measured distance from the "transient" phase of the hot start test, in miles.
D_s=The measured driving distance from the "stabilized" phase of the cold start test, in miles.

[7,8] Dynamometers with roll specifications other than those shown may be used if the road load power settings can be shown to be equivalent and if approved in advance by the Administrator.

* * * * *

(d) * * *

(1) * * * $CO_{2d}=0.032\%$; $D_{ct}=3.598$ miles.

* * *

$H=(43.478)\ (48.2)\ (22.225)/[762-(22.225x48.2/100)]=62$ grains of water per pound of dry air.

* * *

$CO_{2conc}=1.43-.032\ (1-1/9.116)=1.402\%$

$CO_{2mass}=(2595.0)\ (51.85)\ (1.402/100)$
$=1886$ grams per test phase.

(2) * * *

$CO_{2mass}=2346$ grams per test phase.
$D_s=3.902$ miles.

(3) * * *

$CO_{2mass}=1758$ grams per test phase.
$D_{ht}=3.598$ miles.

(4) Weighted mass emission results:

$HC_{wm}=0.43\ [4.027+0.62)/(3.598+3.902)]+0.57\ [(0.51+0.62)/(3.598+3.902)]=0.352$ grams per vehicle mile.

$NO_{xwm}=0.43\ [(1.389+1.27)/(3.598+3.902)]+0.57\ [(1.38+1.27)/(3.598+3.902)]=.354$ grams per vehicle mile.

$CO_{wm}-0.43\ [(23.96+5.98)/(3.598+3.902)]+0.57\ [(5.01+5.98)/(3.598+3.902)]=2.55$ grams per vehicle mile.

$CO_{2wm}=0.43\ [(1886+2346)/(3.598+3.902)]+0.57\ [(1758+2346)/(3.598+3.902)]=555$ grams per vehicle mile.

Sec. 202, 206, 207, 208 and 301(a) of the Clean Air Act, as amended (42 U.S.C. 1857f-1, 1857f-5, 1857f-5a, 1857f-6, 1857g(a)).

15. 40 CFR Part 600 is added as follows:

Subpart A—Fuel Economy Regulations for 1977 and Later Model Year Automobiles—General Provisions

Sec.

600.001-77 General applicability.
600.002-77 Definitions.
600.003-77 Abbreviations.
600.004-77 Section numbering, construction.
600.005-77 [Reserved]
600.006-77 Data to be submitted.
600.007-77 Vehicle acceptability.
600.008-77 Review of fuel economy data, testing by the Administrator.
600.009-77 Hearings on acceptance of test data.

Subpart B—Fuel Economy Regulations for 1978 and Later Model Year Automobiles—Test Procedures

600.101-78 General applicability.
600.102-78 Definitions.
600.103-78 Abbreviations.
600.104-78 Section numbering, construction.
600.105-78 Record keeping.
600.106-78 Equipment requirements.
600.107-78 Fuel specifications.
600.108-78 Analytical gases.
600.109-78 EPA driving cycles.
600.110-78 Equipment calibration.
600.111-78 Test procedures.
600.112-78 Exhaust sample analysis.
600.113-78 Fuel economy calculations.

Subpart C—Fuel Economy Regulations for 1977 and Later Model Year Automobiles—Procedures for Calculating Fuel Economy Values

600.201-77 General applicability.
600.202-77 Definitions.
600.203-77 Abbreviations.
600.204-77 Section numbering, construction.
600.205-77 Record keeping.
600.206-77 Calculation and use of fuel economy values for a vehicle configuration.
600.207-77 Calculation and use of fuel economy values for a model type.

Subpart D [Reserved]

Subpart E [Reserved]

Subpart F—Fuel Economy Regulations for 1978 and Later Model Year Automobiles—Procedures for Determining Manufacturer's Average Fuel Economy

600.501-78 General applicability.
600.502-78 Definitions.
600.503-78 Abbreviations.
600.504-78 Section numbering, construction.
600.505-78 Record keeping.
600.506-78 Preliminary determination of manufacturer's average.
600.507-78 Running change data requirements.
600.508-78 Addition of a base level-data requirements.
600.509-78 Voluntary submission of additional data.
600.510-78 Determination of average fuel economy.
600.511-78 Determination of domestic production.
600.511-80 Determination of domestic production.
600.512-78 Independent audit of production data.
Appendix I—Highway Fuel Economy Driving Schedule.
Appendix II—Sample Test Value Calculation.

AUTHORITY: Title V of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1901 et seq.) as amended by Title III of the Energy Policy and Conservation Act, Pub. L. 94-163, 89 Stat. 871.

Subpart A—Fuel Economy Regulations for 1977 and Later Model Year Automobiles—General Provisions

§ 600.001-77 General applicability.

The provisions of this subpart are applicable to 1977 and later model year automobiles. The requirements apply to all automobiles of the respective model year regardless of the date of production.

§ 600.002-77 Definitions.

(a) As used in this subpart all terms not defined herein shall have the meaning given them in the Act:

(1) "Act" means Part I of Title V of the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1901 et seq.).

(2) "Administrator" means the Administrator of the Environmental Protection Agency or his authorized representative.

(3) "Secretary" means the Secretary of Transportation or his authorized representative.

(4) "Automobile" means any 4-wheeled vehicle propelled by fuel which is manufactured primarily for use on public streets, roads, or highways (except any vehicle operated on a rail or rails) and which is rated at 6,000 lbs gross vehicle weight or less or is a type of vehicle which the Secretary determines is substantially used for the same purposes.

(5) "Passenger Automobile" means any automobile which the Secretary determines is manufactured primarily for use in the transportation of no more than 10 individuals.

(6) "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.

(7) "Federal Emission Test Procedure" refers to the dynamometer driving schedule, dynamometer procedure, and sampling and analytical procedures described in Part 86 for the respective model year, which are used to derive city fuel economy data.

(8) "Federal Highway Fuel Economy Test Procedure" 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.

(9) "Fuel" means gasoline and diesel fuel.

(10) "Fuel Economy" means the average number of miles traveled by an automobile or group of automobiles per gallon of gasoline or diesel fuel consumed as computed in § 600.113 or § 600.207.

(11) "City Fuel Economy" means the fuel economy determined by operating a vehicle (or vehicles) over the driving schedule in the Federal Emission Test Procedure.

(12) "Highway Fuel Economy" means the fuel economy determined by operating a vehicle (or vehicles) over the driving schedule in the Federal Highway Fuel Economy Test Procedure.

(13) "Combined Fuel Economy" means 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.

(14) "Average Fuel Economy" means the production-weighted combined fuel economy value of all passenger automobiles produced by a manufacturer in a single model year as computed in § 600.510.

(15) "Certification Vehicle" means a vehicle which is selected under § 86.077-24(b) and used to determine compliance under § 86.077-30 for issuance of an original certificate of conformity.

(16) "Fuel Economy Data Vehicle" means a vehicle used for the purpose of determining fuel economy which is not a certification vehicle.

(17) "Label" means a sticker that contains fuel economy information and is affixed to new automobiles in accordance with Subpart D of this part.

(18) "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.

(19) "Model Type" means a unique combination of car line, basic engine, and transmission class.

(20) "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 gen-

erally 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.

(21) "Basic Engine" means a unique combination of manufacturer, engine displacement, number of cylinders, fuel system (as distinguished by number of carburetor barrels or use of fuel injection), catalyst usage, and other engine and emission control system characteristics specified by the Administrator.

(22) "Transmission Class" means the basic type of transmission, e.g., manual, automatic or semi-automatic.

(23) "Base Level" means a unique combination of basic engine, inertia weight, and transmission class.

(24) "Vehicle Configuration" means a unique combination of basic engine, engine code, inertia weight, transmission configuration, and axle ratio within a base level.

(25) "Engine Code" means a unique combination, within an engine-system combination (as defined in Part 86), of displacement, carburetor (or fuel injection) calibration, distributor calibration, choke calibration, auxiliary emission control devices and other engine and emission control system components specified by the Administrator.

(26) "Inertia Weight" means the inertia weight class into which a vehicle is grouped based on its loaded vehicle weight in accordance with the provisions of Part 86.

(27) "Transmission Configuration" means a unique combination, within a transmission class, of the number of forward gears, and, if applicable, overdrive. The Administrator may further subdivide a transmission configuration (based on such criteria as gear ratios, torque converter multiplication ratio, stall speed, shift calibration, etc.) if he determines that significant fuel economy differences exist within that transmission configuration.

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

(29) "Auxiliary Emission Control Devices (AECD)" means an element of design as defined in Part 86.

(30) "Rounded" means a number shortened to the specific number of decimal places in accordance with the "Round Off Method" specified in ASTM E 29-67.

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

(32) "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.

§ 600.003–77 Abbreviations.

(a) The abbreviations used in this subpart have the same meaning as those in 40 CFR Part 86, with the addition of the following: "MPG" means miles per gallon.

§ 600.004–77 Section numbering, construction.

The model year of initial applicability is indicated by the section number. The two digits following the hyphen designate the first model year for which a section is effective. A section is effective until superseded.

EXAMPLE: Section 600.111–78 applies to the 1978 and subsequent model years until superseded. If a section 600.111–81 is promulgated it would take effect beginning with the 1981 model year; § 600.111–78 would apply to model years 1978 through 1980.

§ 600.005–77 [Reserved]

§ 600.006–77 Data to be submitted.

(a) For certification vehicles the requirements of this section are considered to have been met.

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

(1) A description of the vehicle, exhaust emission test results, applicable deterioration factors, and adjusted exhaust emission levels.

(2) A statement of the origin of the vehicle including total mileage, mode of mileage accumulation, and modifications (if any) from 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 subparagraph may be satisfied by reference to the vehicle number and previous configuration.

(3) A description of all maintenance to engine, emission control system or fuel system components performed within 2000 miles prior to fuel economy testing.

(4) 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. (If calibrations for components were submitted previously as part of the description of another vehicle or configuration, the original submittal may be referenced.)

(5) A statement that the fuel economy data vehicle, with respect to which data are submitted:

(i) Has been tested in accordance with applicable test procedures,

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

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

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

(1) For each fuel economy data vehicle: all individual test results, including results of invalid and zero mile tests, and the harmonic average of all city fuel economy tests (except the results of invalid or zero mile tests) and the harmonic average fuel economy of all highway fuel economy tests (except the results of invalid or zero mile tests), conducted by the manufacturer.

(2) For a certification vehicle, as defined in this part and tested by the Administrator under Part 86 of this chapter: the city and highway fuel economy results from the test or tests on that vehicle.

(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, etc.).

(e) In lieu of submitting actual data from a test vehicle, a manufacturer may provide fuel economy values derived from an analytical expression, e.g., regression analysis. In order for fuel economy 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 § 86.077–21, the manufacturer shall submit a description of such procedures, equipment, and facilities.

§ 600.007–77 Vehicle acceptability.

(a) All certification vehicles and other vehicles tested to meet the requirements of Part 86 (other than those chosen per § 86.077–24(c)) are considered to have met the requirements of this section.

(b) Any vehicle not meeting the provisions of paragraph (a) 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. This requirement will be considered to have been met if the base vehicle (i.e., chassis and basic engine) has accumulated 10,000 or fewer miles. Components other than engine, emission control system, and drivetrain are not required to be the same components installed when the mileage was accumulated.

(2) A vehicle may be tested in different vehicle configurations by change of vehicle components, as specified in paragraph (b)(1), or by testing at different inertia weights or road load power settings. For the purpose of this part, each vehicle configuration will be considered a distinct vehicle and must be identified accordingly.

(3) The mileage on a fuel economy data vehicle must be, to the extent pos-

sible, accumulated according to § 86.077-26(a)(2).

(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. The deterioration factors established for the respective engine-system combination per § 86.077-28 will be used.

(5) The calibration information submitted under § 600.006(b) must be representative of the vehicle configuration for which the fuel economy data were submitted.

(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 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.

§ 600.008–77 Review of fuel economy data, testing by the administrator.

(a) Fuel economy data must be judged acceptable by the Administrator in order for the test results to be used for the purposes of Subpart C or F of this part. The Administrator will evaluate the acceptability of the fuel economy data from either a fuel economy data vehicle or a certification vehicle on the basis of the data submitted under § 600.006 or test data generated by the Administrator, as applicable, in accordance with good engineering practice.

(b) If, in the Administrator's judgment, the city and highway fuel economy results (or the harmonic averages, as applicable, if more than one test were conducted) for a fuel economy data vehicle, or for a certification vehicle, are reasonable and representative, the Administrator will accept the fuel economy data (or harmonic averages, as applicable, of the city and highway fuel economy data if more than one test was conducted) for use in Subpart C or F. In making this determination, the Administrator will, when possible, compare the results of a test vehicle to those of other similar test vehicles.

(c) If, in the Administrator's judgment, the city and highway fuel economy results (or the harmonic averages if more than one test were conducted) for a fuel economy data vehicle or for a certification vehicle are not reasonable or representative, the Administrator will notify the manufacturer in writing of his finding and require the manufacturer to submit the test vehicle(s) in question, at a place he may designate, for the purpose of fuel economy testing.

(d) The Administrator may require that any fuel economy data vehicle or certification vehicle be submitted, at a place he may designate, for the purpose of confirmation of fuel economy testing.

(e) For any fuel economy data vehicle that the Administrator has required to be submitted, at a place he may designate for the purpose of fuel economy testing, and for any certification vehicle, the Administrator will follow this procedure:

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

(2) If, in the Administrator's judgment, the comparison in paragraph (e)(1) of this section indicates a disparity in the data, the Administrator will repeat the city test or the highway test or both as applicable.

(i) 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 (e)(1) of this section.

(ii) If, in the Administrator's judgment, both comparisons in (2)(i) indicate a disparity in the data, the Administrator will repeat the city fuel economy test or highway fuel economy test or both as applicable until

(A) 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

(B) Four city tests or four highway tests or both, as applicable, are conducted by the Administrator in which a disparity in the data is indicated when compared as in paragraph (e)(2) of this section.

(3) 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.

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

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

(f) The fuel economy data determined by the Administrator under paragraph (e)(3) or (4) of this section, together with all other fuel economy data submitted for that vehicle under § 600.006 (c) or (e) will be evaluated for reasonableness and representativeness per paragraph (b) of this section. The fuel economy data which are determined to best meet the criteria of paragraph (b) of this section will be accepted for use in Subpart C or F.

(g) If, based on a review of the fuel economy data generated by testing under paragraph (e) 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 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.

§ 600.009–77 Hearings on acceptance of test data.

(a) If the Administrator rejects the use of a manufacturer's fuel economy data vehicle, in accordance with § 600.008 (e) or (g), or the use of fuel economy data, in accordance with § 600.008 (c), or (f), or with the determination of a vehicle configuration, in accordance with § 600.206(a), or with the identification of a car line, in accordance with § 600.207(d), or with the fuel economy label values approved by the Administrator under § 600.213(a) the manufacturer may, within 30 days following receipt of such notification, request a hearing on the Administrator's decision. The request may be in writing, signed by an authorized representative of the manufacturer and include a statement specifying the manufacturer's objections to the Administrator's determinations, and data in support of such objection. If, after the review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, the manufacturer shall have a hearing in accordance with the provisions of this section with respect to such issue.

(b)(1) After granting a request for a hearing under paragraph (a) of this section the Administrator will designate a Presiding Officer for the hearing.

(2) The General Counsel will represent the Environmental Protection Agency in any hearing under this section.

(3) If a time and place for the hearing has not been fixed by the Administrator under paragraph (a) of this section the hearing will be held as soon as practicable at a time and place fixed by the Administrator or by the Presiding Officer.

(c)(1) Upon his appointment pursuant to paragraph (a) of this section, the Presiding Officer shall establish a hearing file. The file consists of the notice issued by the Administrator under paragraph (a) of this section together with any accompanying material, the request for a hearing and the supporting data submitted therewith and correspondence and other data material to the hearing.

(2) The hearing file will be available for inspection by the applicant at the office of the Presiding Officer.

(d) A manufacturer may appear in person, or may be represented by counsel or by any other duly authorized representative.

(e)(1) The Presiding Officer upon the request of any party, or in his discretion, may arrange for a prehearing conference at a time and place specified by the Presiding Officer to consider the following:

(i) Simplification and clarification of the issues;

(ii) Stipulations, admissions of fact, and the introduction of documents;

(iii) Limitation of the number of expert witnesses;

(iv) Possibility of agreement disposing of all or any of the issues in dispute;

(v) Such other matters as may aid in the disposition of the hearing, including such additional tests as may be agreed upon by the parties.

(2) The results of the conference shall be reduced to writing by the Presiding Officer and made part of the record.

(f) (1) Hearings shall be conducted by the Presiding Officer in an informal but orderly and expeditious manner. The parties may offer oral or written evidence, subject to the exclusion by the Presiding Officer of irrelevant, immaterial and repetitious evidence.

(2) Witnesses will not be required to testify under oath. However, the Presiding Officer shall call to the attention of witnesses that their statements may be subject to the provisions of 19 U.S.C. 1001 which imposes penalties for knowingly making false statements or representations, or using false documents in any matter within the jurisdiction of any department or agency of the United States.

(3) Any witnesses may be examined or cross-examined by the Presiding Officer, the parties, or their representatives.

(4) Hearings shall be reported verbatim. Copies of transcripts of proceedings may be purchased by the applicant from the reporter.

(5) All written statements, charts, tabulations, and similar data offered in evidence at the hearing shall, upon a showing satisfactory to the Presiding Officer of their authority, relevancy, and materiality, be received in evidence and shall constitute a part of the record.

(6) Oral argument may be permitted in the discretion of the Presiding Officer and will be reported as part of the record unless otherwise ordered.

(g) (1) The Presiding Officer will make an initial decision which shall include written findings and conclusions and the reasons or basis therefor on all material issues of fact, law or discretion presented on the record. The findings, conclusions, and written decision shall be provided to the parties and made a part of the record. The initial decision shall become the decision of the Administrator without further proceedings unless there is an appeal to the Administrator or motion for review by the Administrator within 20 days of the date the initial decision was filed.

(2) On appeal from or review of the initial decision the Administrator will have all the powers which he would have in making the initial decision including the discretion to require or allow briefs, oral argument, the taking of additional evidence or the remanding to the Presiding Officer for additional proceedings. The decision by the Administration will include written findings and conclusions and the reasons or basis therefor on all the material issues of fact, law or discretion presented on the appeal or considered in the review.

(h) 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.

Subpart B—Fuel Economy Regulations for 1978 and Later Model Year Automobiles—Test Procedures

§ 600.101–78 General applicability.

The provisions of this subpart are applicable to 1978 and later model year automobiles.

§ 600.102–78 Definitions.

The definitions in § 600.002 apply to this subpart.

§ 600.103–78 Abbreviations.

The abbreviations in § 600.003 apply to this subpart.

§ 600.104–78 Section numbering, construction.

The section numbering system set forth in § 600.004 applies to this subpart.

§ 600.105–78 Record keeping.

The record keeping requirements set forth in § 600.005 apply to this subpart.

§ 600.106–78 Equipment requirements.

The requirements for test equipment to be used for all fuel economy testing are given in §§ 86.106, 86.107, 86.108, 86.109, and 86.111 of this chapter, as applicable.

§ 600.107–78 Fuel specifications.

(a) The test fuel specifications for gasoline-fueled automobiles are given in paragraph (a) (1) of § 86.113 of this chapter.

(b) The test fuel specifications for diesel automobiles are given in paragraphs (b) (1) and (2) of § 86.113 of this chapter.

§ 600.108–78 Analytical gases.

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

§ 600.109–78 EPA driving cycles.

(a) The driving cycle to be utilized for generation of the city fuel economy data is prescribed in § 86.115 of this chapter.

(b) The driving cycle to be utilized for generation of the highway fuel economy data is specified in this paragraph.

(1) The Highway Fuel Economy Driving Schedule is set forth in Appendix I to 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, 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 paragraph (c) of § 86.115 of this chapter.

§ 600.110–78 Equipment calibration.

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

§ 600.111–78 Test procedures.

(a) The test procedures to be followed for generation of the city fuel economy data are those prescribed in §§ 86.127 through 86.138 of this chapter, as applicable. (The evaporative loss portion of the test procedure may be omitted unless specifically required by the Administrator.)

(b) The test procedures to be followed for generation of the highway fuel economy data are those specified in § 600.111–78 (b) through (h) inclusive.

(1) The Highway Fuel Economy Dynamometer Procedure consists of a preconditioning highway driving sequence and a measured highway driving sequence.

(2) The highway fuel economy test 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 stops 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 emissions is collected continuously for subsequent analysis using a constant volume (variable dilution) sampler. Diesel dilute exhaust is continuously analyzed for hydrocarbons using a heated sample line and analyzer.

(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.

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

(d) Road load power and inertia weight determination—§ 86.129 of this chapter applies for determination of road load power and inertia weight for highway fuel economy testing.

(e) Vehicle preconditioning—The Highway Fuel Economy Dynamometer Procedure 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 evaporation loss test, if applicable) the vehicle should be preconditioned as in paragraph (e) (1) or (2) of this section, as applicable.

(1) 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.

(2) In unusual circumstances where additional preconditioning is desired by the manufacturer, the provisions of paragraph (a) (3) of § 86.132 of this chapter apply.

(f) Highway Fuel Economy Dynamometer Procedure—

(1) The dynamometer procedure consists of two cycles of the Highway Fuel Economy Driving Schedule (§ 600.109 (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.

(2) The provisions of paragraphs (b), (c), (e), (f), (g), and (h) of § 86.135 *Dynamometer procedure* of this chapter, apply for highway fuel economy testing.

(3) 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.

(4) 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.

(g) Engine starting and restarting—

(1) 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.

(2) False starts and stalls during the preconditioning cycle must be treated as in paragraphs (d) and (e) of § 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 § 86.077–25 of this chapter, and the vehicle may be rescheduled for test. The person taking the corrective action shall report the action so that the test records for the vehicle contain a record of the action.

(h) Dynamometer Test Run—The following steps must be taken for each test:

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

(2) Open the vehicle engine compartment cover and position the cooling fan(s) required. Manufacturers may request the use of additional cooling fans for additional engine compartment or under-vehicle cooling and for controlling high tire or brake temperatures during dynamometer operation.

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

(4) Equipment preparation—The provisions of paragraphs (b) (3) through (5) inclusive of § 86.137 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 be connected to the sample collection systems.

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

(6) When the vehicle reaches zero speed at the end of the preconditioning cycle, the driver has 13 seconds to prepare for the emission measurement cycle of the test. Reset and enable the roll revolution counter.

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

(8) 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.

§ 600.112–78 Exhaust sample analysis.

The exhaust sample analysis must be performed according to § 86.140 of this chapter.

§ 600.113–78 Fuel economy calculations.

The calculations of vehicle fuel economy values require the weighted grams/mile values for HC, CO, and CO_2 for the city fuel economy test and the grams/mile values for HC, CO, and CO_2 for the highway fuel economy test. The city and highway fuel economy values must be calculated by the procedures of this section. A sample calculation appears in Appendix II to this Part.

(a) Calculate the weighted grams/mile values for the city fuel economy test for HC, CO, and CO_2 as specified in § 86.144 of this chapter.

(b) (1) Calculate the mass values for the highway fuel economy test for HC, CO, and CO_2 as specified in paragraph (b) of § 86.144 of this chapter.

(2) Calculate the grams/mile values for the highway test for HC, CO, and CO_2 by dividing the mass values obtained in (b) (1) by the actual distance traveled, measured in miles, as specified in paragraph (h) of § 86.135 of this chapter.

(c) Calculate the city fuel economy and highway fuel economy from grams/mile values for HC, CO, and CO_2. The HC values (obtained per paragraph (a) or (b) as applicable) used in each calculation in this section are rounded to the nearest 0.01 grams/mile. The CO values (obtained per paragraph (a) or (b) as applicable) used in each calculation in this section are rounded to the nearest 0.1 grams/mile. The CO_2 values (obtained per paragraph (a) or (b) of this section as applicable) used in each calculation in this section are rounded to the nearest gram/mile.

(d) For gasoline-fueled automobiles, calculate the fuel economy in miles per gallon of gasoline by dividing 2421 by the sum of three terms:

(1) 0.866 multiplied by HC (in grams/mile as obtained in paragraph (c)),

(2) 0.429 multiplied by CO (in grams/mile as obtained in paragraph (c)), and

(3) 0.273 multiplied by CO_2 (in grams/mile as obtained in paragraph (c)).

Round to quotient to the nearest 0.1 mile per gallon.

(e) For diesel powered automobiles, calculate the fuel economy in miles per gallon of diesel fuel by dividing 2778 by the sum of three terms:

(1) 0.866 multiplied by HC (in grams/mile as obtained in paragraph (c) of this section),

(2) 0.429 multiplied by CO (in grams/mile as obtained in paragraph (c)), and

(3) 0.273 multiplied by CO_2 (in grams/mile as obtained in paragraph (c)).

Round the quotient to the nearest 0.1 mile per gallon.

Subpart C—Fuel Economy Regulations for 1977 and Later Model Year Automobiles—Procedures for Calculating Fuel Economy Values

§ 600.201–77 General applicability.

The provisions of this subpart are applicable to 1977 and later model year automobiles.

§ 600.202–77 Definitions.

The definitions in § 600.002 apply to this subpart.

§ 600.203–77 Abbreviations.

The abbreviations in § 600.003 apply to this subpart.

§ 600.204–77 Section numbering, construction.

The section numbering system set forth in § 600.004 applies to this subpart.

§ 600.205–77 Record keeping.

The record keeping requirements set forth in § 600.005 apply to this subpart.

§ 600.206–77 Calculation and use of fuel economy values for a vehicle configuration.

(a) Fuel economy values determined for each vehicle and as approved in § 600.008 (b) or (f) are used to determine city, highway, and combined fuel economy values for each vehicle configuration (as determined by the Administrator) for which data are available.

(1) If only one city fuel economy and one highway fuel economy value exist

for a vehicle configuration, those values, rounded to the nearest tenth of a mile per gallon, comprise the city fuel economy value and highway fuel economy value for that configuration.

(2) If more than one city fuel economy value and one highway fuel economy value exist for a vehicle configuration, all values for that vehicle configuration are harmonically averaged and rounded to the nearest 0.0001 of a mile per gallon for the city fuel economy values, and harmonically averaged and rounded to the nearest 0.0001 of a mile per gallon for the highway fuel economy values, in order to determine a city and a highway fuel economy value for that configuration.

(3) The combined fuel economy value for a vehicle configuration is calculated by harmonically averaging the city and highway fuel economy values, as determined in § 600.206(a) (1) and (2), weighted 0.55 and 0.45, respectively, and rounding to 0.0001 of a mile per gallon. A sample of this calculation appears in Appendix II to this Part.

§ 600.207–77 Calculation and use of 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(a) 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) The manufacturer shall supply model year sales projections for each vehicle configuration within each car line to the Administrator.

(i) Sales projections must be supplied separately for each vehicle configuration intended for sale in California and each configuration intended for sale in the rest of the states if required by the Administrator under paragraph (a)(1) of this section.

(ii) The sales projections must be updated as of the date a manufacturer requests that fuel economy calculations for a model type be made by the Administrator.

(iii) The requirements of this section may be satisfied by providing an amended application for certification, as described in § 86.007–21 of this chapter.

(3) Vehicle configuration fuel economy values, as determined in § 600.206(a), 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 have been tested, the vehicle configuration fuel economy values are harmonically averaged in proportion to the respective projected sales fraction (rounded to the nearest 0.0001) of each vehicle configuration and the resultant fuel economy value rounded to the nearest 0.0001 of a mile per gallon.

(iii) If the Administrator has not accepted test data for at least one vehicle configuration within each base level, the manufacturer shall submit (on or before the date the manufacturer requests the Administrator to calculate the respective general label values), data as specified in § 600.006. The fuel economy data submitted shall be for the vehicle configuration with the largest projected sales within the respective base level.

(4) The procedure specified in § 600.207(a) will be repeated for each base level, thus establishing city, highway, and combined fuel economy values for each base level.

(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.

(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 separately for vehicles intended for sale in California and for those 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 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 the base level, by

(ii) The 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.

Subpart D [Reserved]

Subpart E [Reserved]

Subpart F—Fuel Economy Regulations for 1978 and Later Model Year Automobiles—Procedures for Determining Manufacturer's Average Fuel Economy

§ 600.501–78 General applicability.

The provisions of this subpart are applicable to 1978 and later model year passenger automobiles.

§ 600.502–78 Definitions.

(a) The definitions in § 600.002 and the following definitions apply to this subpart.

(1) "Declared value" of imported components shall be 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, 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.

(2) "Cost of production" of a car line shall mean the aggregate of the products of:

(i) 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

(ii) The number of passenger cars within the car line produced during the part of the model year that the price list was in effect.

§ 600.503–78 Abbreviations.

The abbreviations in § 600.003 apply to this subpart.

§ 600.504–78 Section numbering, construction.

The section numbering procedure set forth in § 600.004 applies to this subpart.

§ 600.505–78 Record keeping.

The record keeping procedure set forth in § 600.005 applies to this subpart.

§ 600.506–78 Preliminary determination of manufacturer's average.

(a) The manufacturer shall submit for approval by the Administrator, no later than 10 days after his public introduction date, a determination of his preliminary average fuel economy value, calculated according to the procedures in § 600.510 except that:

(1) Sales projections will be used for the calculations in place of the production values, and must be updated at the time of the preliminary calculation.

(2) The fuel economy data used in the calculation shall be that approved by the Administrator as of the public introduction date including:

(i) All fuel economy data from original certification vehicles and fuel economy data vehicles as required by § 600.207,

(ii) Fuel economy data from all vehicles tested for running changes approved under § 86.077–23, and

(iii) Fuel economy data required by paragraph (c).

(b) Minimum data requirements will be established under paragraph (c) of this section for each base level with a sales fraction of 0.0100 or greater (known as a significant base level).

(1) The sales to be used in this determination are those in paragraph (a)(1) of this section.

(2) For the purposes of this section, the sales fraction for a base level shall be the quotient of projected sales of the base level divided by the manufacturer's total projected sales of passenger automobiles, where total projected sales are calculated according to § 600.511 except that projected sales are used in place of production values.

(c) For each significant base level identified in paragraph (b) of this section the manufacturer shall submit prior to public introduction, fuel economy data for those vehicle configurations, taken in order of decreasing sales (according to the projection submitted in paragraph (a) (1) of this section, whose sales total a minimum of 90 percent of the sales of that base level. For all other base levels, the minimum data requirements of § 600.207(a) (3) (iii) must be met.

(d) All fuel economy data submitted under this subpart must:

(1) Be determined by the test procedures specified in Subpart B or an approved analytical method as permitted under § 600.006(e), and

(2) Be accepted by the Administrator under the requirements of Supbart A.

§ 600.507–78 Running change data requirements.

(a) The manufacturer will be required to submit additional running change fuel economy data for any running change approved under § 86.077–23 which creates a new vehicle configuration in a significant base level originally identified for minimum data under § 600.506 (b), or subsequently identified in § 600.508(b), unless exempted by the Administrator.

(1) The manufacturer may petition the Administrator for an exemption from the requirement to submit additional running change fuel economy data.

(2) If the exemption is not granted, the Administrator will notify the manufacturer of the denial and the manufacturer shall submit running change fuel economy data as prescribed in this section.

(3) If the manufacturer is to generate a credit to be deducted from the amount of civil penalty which has been or may be asessed against him under section 507 (1) of the Act, the manufacturer shall submit additional running change fuel economy data required by this section.

(b) The additional fuel economy data required for a running change in paragraph (a) of this section will be determined based on the sales of the vehicle configurations in the affected base level as updated and submitted to the Administrator at the time of running change approval.

(1) Within each base level identified in paragraph (a) of this section, fuel economy data shall be submitted for the new vehicle configuration, created by the running change, with the greatest projected sales.

(2) Fuel economy data required by this section shall be submitted no later than 30 days after the manufacturer receives approval of the running change for those running changes approved after the calculation of the manufacturer's preliminary average, and no later than 90 days after the calculation of the preliminary average for those running changes approved prior to the calculation of the preliminary average.

(c) Any manufacturer required to submit data under this section as a result of an addition of a base level under § 600.508, must submit data on any running change identified by paragraph (a) of this section.

(1) Data identified by paragraph (a) of this section which were approved prior to the date of approval to add the base level which caused the recalculation of the preliminary average fuel economy value according to § 600.508, must meet the requirements of (b) of this section, except that the data may be submitted at any time before the final calculation of the manufacturer's average fuel economy value in § 600.510.

(2) Any running change identified by paragraph (a) of this section approved on or after that date, must be submitted according to paragraph (b) (2) of this section.

§ 600.508–78 Addition of a base level—data requirements.

(a) Any manufacturer who adds a base level to his product line at any time after the preliminary determination of his average fuel economy value in § 600.506, shall submit in accordance with the requirements of § 600.207, fuel economy and sales projection data for such base level.

(b) If a new base level being added has a sales fraction of 0.0100 or greater (as defined in § 600.506(b) (2)) using sales updated as of the date of receipt of approval to add the base level, the manufacturer shall:

(1) Submit to the Administrator the minimum data required for that base level in accordance with § 600.506(c), and then

(2) Recalculate and submit to the Administrator fuel economy values in accordance with procedures in § 600.506 except that all fuel economy data approved by the Administrator to date shall be used.

(c) If the total projected sales, updated as of the date of approval to add the latest base level, of all base levels added since the initial calculation in § 600.506 is equal to a sales fraction of 0.0300 or greater (as defined in § 600.506 (b) (4)), the manufacturer shall recalculate his average as in paragraph (b) (2).

(d) Any manufacturer required under paragraph (b) or (c) to perform a recalculation may be required by the Administrator to supply any additional data required under § 600.507 regardless of any exemption granted under § 600.507(a), based upon the results of that recalculation.

§ 600.509–78 Voluntary submission of additional data.

(a) The manufacturer may, at his option, submit data in addition to the data required by the Administrator.

(1) Additional fuel economy data may be submitted by the manufacturer for any vehicle configuration which is to be tested as required in § 600.506 or § 600.507 or for which fuel economy data were previously submitted under paragraph (a) (2) of this section.

(2) Within a base level, additional fuel economy data may be submitted by the manufacturer for any vehicle configuration which is not required to be tested by § 600.506 or § 600.507. Additional data which is submitted within a base level after the calculation of the manufacturer's preliminary average fuel economy must be submitted in rank order such that data is first submitted for all configurations with a higher sales fraction (as defined in § 600.506(b) (2)).

§ 600.510–78 Determination of average fuel economy.

(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.

(1) The model year report shall be submitted no later than 60 days after the report required in § 86.078–37 for the final production quarter.

(2) The Administrator may waive the requirement that the model year report be submitted within 60 days after the final quarterly production report. Based upon a request by the manufacturer, if the Administrator determines that 60 days is insufficient time for the manufacturer to provide all additional data required as determined in either § 600.506, 600.507, or 600.508, the Administrator shall establish a date by which the model year report must be submitted.

(3) The model year report must be in writing, signed by an authorized representative of the manufacturer and include the following information:

(i) All fuel economy data used in the preliminary calculation and subsequently required by the Administrator either under §§ 600.506, 600.507, or 600.508.

(ii) All fuel economy data for certification vehicles.

(iii) Any additional fuel economy data submitted by the manufacturer under § 600.509.

(iv) A fuel economy value for each model type for the manufacturer's product line calculated according to paragraph (d).

(v) The manufacturer's average fuel economy value calculated according to paragraph (e) of this section.

(vi) A listing of both domestically and non-domestically produced car lines as determined in § 600.511 and the cost information upon which the determination was made.

(vii) Passenger car production data verified by an independent audit as required by § 600.512.

(b) The fuel economy data utilized in the calculation of the manufacturer's average fuel economy under this subpart is the combined fuel economy value calculated according to § 600.206 for each vehicle configuration for which data has been submitted under paragraph (a) (3) (i), (ii), (iii) of this section.

(c) A fuel economy value for each base level is calculated according to § 600.207 with the exception that actual passenger automobile production data, as required by this subpart, is used instead of sales projections.

(d) A fuel economy value for each model type is calculated according to § 600.207 with the exception that:

(1) Annual passenger automobile production data, as required by this subpart, will be used instead of sales projections.

(2) The fuel economy value of diesel-powered model types will be multiplied by the factor 0.96 to convert gallons of diesel fuel to equivalent gallons of gasoline.

(3) The fuel economy value will be rounded to the nearest 0.0001 mpg.

(e) Average fuel economy will be determined separately for domestically produced and non-domestically produced passenger automobiles and is calculated by dividing:

(1) The total number of passenger automobiles produced in a given model year by a manufacturer, by

(2) A sum of terms, each term of which corresponds to a model type and is a fraction determined by dividing

(i) The number of passenger automobiles of a given model type produced by the manufacturer in the model year, by

(ii) The fuel economy calculated for the model type in accordance with *paragraph (d) of this section.*

(f) Any reference in this subpart to automobiles produced by a manufacturer shall be deemed to include all automobiles manufactured by persons who control, are controlled by, or are under common control with such manufacturer except those vehicles excluded by § 600.511.

§ 600.511–78 Determination of domestic production.

(a) In calculating average fuel economy under § 600.510, the Administrator will separate the total number of passenger automobiles produced by a manufacturer into the following two categories:

(1) Passenger automobiles which are domestically produced by the manufacturer plus passenger automobiles which are within the includable base import volume of the manufacturer.

(2) Passenger automobiles which are not domestically produced by the manufacturer, are imported by the manufacturer, and are not within the includable base import volume of the manufacturer.

(b) The Administrator will calculate the average fuel economy of each separate category, and, for purposes of this subpart, each category will be treated as if produced by a separate manufacturer.

(c) For purposes of this section:

(1) The term "includable base import volume," with respect to any manufacturer, is the number of passenger automobiles which is the lesser of

(i) The manufacturer's base import volume or

(ii) The number of passenger automobiles calculated by multiplying

(A) The quotient obtained by dividing the manufacturer's base import volume by the manufacturer's base production volume, times

(B) The total number of passenger automobiles produced by the manufacturer during such model year.

(2) The term "base import volume" means one-half the sum of:

(i) The total number of passenger automobiles which were not domestically produced by the manufacturer during the 1974 model year and which were imported by the manufacturer during the 1974 model year, plus

(ii) 133 percent of the total number of passenger automobiles which were not domestically produced by the manufacturer during the first 9 months of model year 1975 and which were imported by the manufacturer during that 9-month period.

(3) The term "base production volume" means one-half of the sum of

(i) The total number of passenger automobiles produced by the manufacturer during model year 1974 plus

(ii) 133 percent of the total number of passenger automobiles produced by the manufacturer during the first 9 months of model year 1975.

(d) For purposes of paragraphs (c) (2) and (c)(3) of this section, any passenger automobile imported during model year 1976, but prior to July 1, 1975, will be deemed to have been produced (and imported) during the first 9 months of model year 1975.

(e) 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 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 or 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.

(f) 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 (e) of this section as to whether the pertinent car lines which utilize such components were correctly included within the manufacturer'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.

(g) For purposes of calculations under this paragraph with respect to automobiles manufactured during any model year, 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 just prior to one year before the public introduction date of 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.

(h) Components shall be considered imported unless they are either:

(1) Wholly the growth, product or manufacture of the United States and/or Canada, or

(2) Substantially transformed in the United States or Canada into a new and different article of commerce.

(i) The fuel economy of each passenger automobile which is imported by a manufacturer and which is not domestically produced by the manufacturer will be deemed to be equal to the average fuel economy value determined by harmonically averaging, according to the number of passenger automobiles imported, the fuel economy of all passenger automobiles which are imported by the manufacturer and which are not domestically produced by the manufacturer.

§ 600.511–80 Determination of domestic production.

(a) In calculating average fuel economy under § 600.510 the Administrator shall separate the total number of passenger automobiles produced by a manufacturer into the following two categories:

(1) Passenger automobiles which are domestically produced by the manufacturer,

(2) Passenger automobiles which are not domestically produced by the manufacturer.

(b) The Administrator shall calculate the average fuel economy of each separate category, and, for purposes of this subpart, each category shall be treated as if produced by a separate manufacturer.

(c) 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 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 to be installed or included on automobiles within such car line plus the cost of transportation and insuring such components to the United States or Canadian port of entry but exclusive of any customs duty,

divided by

(2) The cost of production, as defined in § 600.502, of automobiles.

(d) 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 appraisal, the Administrator may review the determination made pursuant to paragraph (c) of this section as to whether the pertinent car lines which utilize such components were correctly included with the manufacturer'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 fuel economy for the affected model year, according to § 600.510, to reflect the correct valuation of such imported components in each affected car line.

(e) For purposes of calculations under this section with respect to automobiles manufactured during any model year, 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 just prior to one year before the public introduction of 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.

(f) Components shall be considered imported unless they are either:

(1) Wholly the growth, product or manufacture of the United States and/or Canada; or

(2) Substantially transformed in the United States or Canada into a new and different article of commerce.

(g) The fuel economy of each passenger automobile which is imported by a manufacturer and which is not domestically produced by the manufacturer will be deemed to be equal to the average fuel economy value determined by harmonically averaging, according to the number of passenger automobiles imported, the fuel economy of all passenger automobiles which are imported by the manufacturer and which are not domestically produced by the manufacturer.

§ 600.512 Independent audit of production data.

(a) Annual passenger automobile production data, as required by § 600.510(a) (3) must be audited by an independent accountant who will report on its accuracy.

(b) The Administrator will not recognize any person as an accountant who is not duly registered in good standing as such under the laws of the place of his residence or principal office.

(1) The Administrator will not recognize any accountant as independent:

(i) who is not in fact independent with respect to any manufacturer or any of its parents, entities, subsidiaries or other affiliates or,

(ii) who, during the period of his professional engagement to examine the production data being reported on or at the date of his report he or his firm or a member thereof had, or was committed to acquire, any direct financial interest in the manufacturer or any of its parents, entities, subsidiaries or other affiliates or,

(iii) who, during the period of his professional engagement to examine the production data being reported on, at the date of his report or during the period covered by the production data, he or his firm or a member thereof was connected as a promoter, underwriter, voting trustee, director, officer or employee of any manufacturer except that a firm will be deemed independent in regard to a particular manufacturer if a former officer or employee of such manufacturer is employed by the firm and such individual has completely disassociated himself from the manufacturer and its affiliates and does not participate in auditing production data of the manufacturer or its affiliates covering any period of his employment by the manufacturer.

(2) For the purposes of this subpart the term "member" means all partners in the firm and all professional employees participating in the audit or located in an office of the firm participating in a significant portion of the audit.

APPENDIX I.—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
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	34.6	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	44.6	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	56.1	757	9.1
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	466	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	49.9	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	636	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	639	48.2	689	50.2	739	49.5		
440	57.9	490	55.0	540	56.0	590	48.1	640	45.5	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		
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	48.6	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		

MON APR 22/74

SEC	KPH	SEC	KPH	SEC	KPH	SEC	KPH	SEC	KPH	SEC	KPH	SEC	KPH	SEC	KPH
400	91.8	450	93.6	500	88.0	550	89.7	600	77.5	650	80.7	700	87.2	750	43.1
401	92.5	451	93.5	501	87.8	551	89.6	601	77.2	651	81.5	701	87.7	751	39.6
402	93.0	452	93.4	502	87.5	552	89.1	602	77.0	652	82.2	702	88.1	752	35.5
403	93.3	453	93.3	503	87.4	553	88.8	603	76.8	653	83.2	703	88.5	753	31.3
404	93.3	454	93.3	504	87.3	554	88.6	604	76.7	654	83.9	704	89.3	754	27.9
405	93.3	455	93.3	505	87.2	555	88.6	605	77.0	655	84.4	705	89.9	755	24.3
406	93.3	456	93.3	506	87.1	556	88.3	606	77.7	656	83.9	706	90.2	756	20.0
407	93.3	457	93.3	507	87.0	557	87.9	607	79.4	657	83.0	707	90.6	757	15.6
408	93.2	458	93.2	508	87.0	558	87.5	608	79.9	658	82.3	708	90.8	758	11.2
409	93.1	459	93.2	509	86.9	559	87.2	609	79.9	659	82.1	709	90.9	759	8.0
410	92.9	460	93.3	510	86.9	560	87.0	610	79.6	660	82.1	710	91.2	760	5.3
411	92.6	461	93.4	511	86.9	561	86.5	611	79.1	661	82.2	711	91.5	761	3.2
412	92.8	462	93.5	512	86.9	562	85.9	612	79.7	662	82.6	712	91.7	762	1.0
413	92.9	463	93.6	513	86.9	563	85.7	613	79.2	663	83.1	713	92.[illegible]	763	0.0
414	93.1	464	93.7	514	86.9	564	85.6	614	79.1	664	83.5	714	92.9	764	0.0
415	93.3	465	93.8	515	86.9	565	85.1	615	79.1	665	84.0	715	93.6	765	SAMPLE OFF
416	93.5	466	93.8	516	86.9	566	84.7	616	79.3	666	84.4	716	94.6	YCH APR 22/74	
417	94.0	467	93.6	517	87.0	567	84.3	617	79.4	667	84.9	717	95.1		
418	94.7	468	93.4	518	87.2	568	84.0	618	79.9	668	84.8	718	95.2		
419	95.1	469	93.3	519	87.6	569	83.7	619	79.6	669	84.6	719	95.0		
420	95.5	470	93.0	520	88.1	570	83.6	620	80.0	670	84.1	720	94.6		
421	96.2	471	92.5	521	88.3	571	83.6	621	81.3	671	84.1	721	94.1		
422	96.3	472	91.8	522	88.5	572	83.6	622	82.8	672	84.2	722	93.5		
423	96.3	473	91.6	523	88.6	573	83.7	623	83.9	673	84.5	723	92.8		
424	96.2	474	91.1	524	88.7	574	83.6	624	84.7	674	84.8	724	92.2		
425	95.9	475	90.2	525	88.8	575	83.7	625	85.2	675	84.7	725	91.8		
426	95.5	476	90.1	526	88.9	576	83.6	626	86.2	676	85.3	726	91.4		
427	95.2	477	89.8	527	89.2	577	83.5	627	86.8	677	83.9	727	90.9		
428	95.0	478	89.3	528	89.3	578	83.1	628	87.0	678	83.2	728	90.3		
429	94.9	479	88.8	529	89.4	579	82.6	629	87.4	679	82.2	729	89.3		
430	94.7	480	88.6	530	89.6	580	82.2	630	88.8	680	81.2	730	87.5		
431	94.6	481	88.5	531	89.8	581	81.5	631	88.6	681	80.5	731	87.1		
432	94.2	482	88.4	532	89.9	582	80.8	632	87.2	682	80.1	732	86.3		
433	94.1	483	88.3	533	90.0	583	80.1	633	87.1	683	79.9	733	85.6		
434	94.0	484	88.3	534	90.1	584	79.2	634	86.5	684	79.7	734	85.0		
435	93.9	485	88.3	535	90.1	585	78.6	635	87.6	685	79.6	735	84.4		
436	93.8	486	88.3	536	90.1	586	77.5	636	86.3	686	79.6	736	83.5		
437	93.6	487	88.3	537	90.1	587	77.3	637	86.4	687	79.9	737	82.6		
438	93.4	488	88.4	538	90.1	588	77.2	638	83.7	688	80.4	738	81.2		
439	93.3	489	88.5	539	90.1	589	77.2	639	77.5	689	80.7	739	79.6		
440	93.2	490	88.5	540	90.1	590	77.3	640	76.8	690	81.3	740	78.0		
441	93.1	491	88.5	541	90.1	591	77.0	641	76.3	691	82.2	741	76.6		
442	93.1	492	88.5	542	90.1	592	76.6	642	76.0	692	82.9	742	75.3		
443	93.1	493	88.5	543	90.1	593	76.9	643	76.0	693	83.4	743	73.3		
444	93.2	494	88.6	544	90.1	594	77.0	644	76.5	694	83.6	744	71.0		
445	93.3	495	88.6	545	90.1	595	77.0	645	75.1	695	83.7	745	68.3		
446	93.4	496	88.5	546	90.0	596	76.9	646	76.4	696	84.2	746	63.1		
447	93.5	497	88.4	547	89.9	597	76.8	647	77.5	697	85.1	747	57.8		
448	93.6	498	88.3	548	89.9	598	76.6	648	78.5	698	85.7	748	52.5		
449	93.6	499	88.1	549	89.9	599	76.1	649	79.8	699	86.4	749	47.2		

APPENDIX II.—SAMPLE TEST VALUE CALCULATIONS

(a) Assume that a gasoline-fueled vehicle was tested by the Federal Emission Test Procedure and the following results were calculated:

HC=1.03 grams/mile
CO=6.74 grams/mile
CO_2=785 grams/mile

According to the procedure in § 600.113, the city fuel economy or MPG_c for the vehicle may be calculated by substituting the HC, CO, and CO_2 gram/mile values into the following equation.

$$MPG_c=\frac{2421}{(0.866\times HC)+(0.429\times CO)+(0.273\times CO_2)}$$

$$=\frac{2421}{(0.866\times 1.03)+(0.429\times 0.74)+(0.273\times 785)}$$

$$=\frac{2421}{218.1}$$

$$=11.1\ MPG$$

(b) Assume that the same vehicle was tested by the Federal Highway Fuel Economy Test Procedure and a calculation similar to that shown in (a) resulted in a highway fuel economy or MPG_h of 18.6. 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:

$$MPG_{c/h}=\frac{1}{\frac{0.55}{MPG_c}+\frac{0.45}{MPG_h}}$$

$$=\frac{1}{\frac{0.55}{11.1}+\frac{0.45}{18.6}}$$

$$=\frac{1}{0.0737}$$

$$MPG_{c/h}=13.6\ MPG$$

[FR Doc.76-26343 Filed 9-9-76;8:45 am]