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PART II



ENVIRONMENTAL PROTECTION AGENCY

■

**EMISSION
REGULATIONS FOR NEW
GASOLINE-FUELED
HEAVY DUTY ENGINES**

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL
PROTECTION AGENCY

[FRL 335-3]

PART 85—CONTROL OF AIR POLLUTION
FROM NEW MOTOR VEHICLES AND
NEW MOTOR VEHICLE ENGINESSubpart H—Emission Regulations for New
Gasoline-Fueled Heavy Duty Engines

The need for a number of technical amendments has been identified. These amendments and corrections are set forth in this publication and are described in the table below.

The Agency finds that good cause exists for omitting as unnecessary a notice of proposed rulemaking, public rulemaking procedure, and postponement of effective date in the issuance of these amendments, in that (1) they are designed to correct and clarify the regulations; (2) the changes primarily standardize and improve test and calculation procedures in those areas where the current regulations have been interpreted inconsistently among manufacturers; and (3) to the extent substantive revisions are made they are procedural and do not affect either the stringency of, or the burden of complying with, the standards.

The Agency does, however, wish to call attention to an amendment in § 85.774-5 (a) which adds catalytic converter and thermal reactor characteristics as determinants of engine families. Although not presently used as emission control systems on gasoline-fueled heavy duty engines, the addition of such systems in future model years may increase the amount of testing performed by the manufacturers with the promulgation of this amendment. Accordingly, the Agency will accept comments on the amendment to § 85.774-5(a) which adds catalytic converter and thermal reactor characteristics for a period of thirty days from the date of this publication. If, on the basis of a review of these comments, the Administrator determines that the amendment should be revised, he will publish such notification in the FEDERAL REGISTER on or before March 31, 1975. Comments may be submitted in quadruplicate to the Administrator, Environmental Protection Agency, Attention: Mobile Source Air Pollution Control, Office of Air and Waste Management, Washington, D.C. 20460. Comments submitted shall be available for public inspection during normal business hours at the Office of Public Affairs, Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

Since numerous technical amendments have been made to the subpart since November 15, 1972 recompliation, the entire subpart applicable to gasoline-fueled heavy duty engines is included in this publication of technical amendments.

EXPLANATION OF TECHNICAL AMENDMENT CHANGES

Section	Change	Reason
85.701	Update model year	These technical amendments are applicable to 1974 and later model year gasoline-fueled heavy duty engines and all references to 1973 model year engines have been deleted.
85.702(a) (8)	Update section reference	Do.
85.702(a) (22)	Correct spelling	Error in Feb. 27, 1974, publication.
85.703	Add abbreviations for cubic inch displacement and exhaust gas recirculation.	These abbreviations are commonly used and were not previously included.
85.704(a) (1)	Update section reference	These technical amendments are applicable to 1974 and later model year gasoline-fueled heavy duty engines and all references to 1973 model year engines have been deleted.
85.704(a) (2)	Add provision (2)(v), that the vehicle manufacturer is responsible for supplying engine maintenance instructions to the ultimate purchaser and must obtain Administrator approval for any modifications to these instructions.	Amplifies responsibility of vehicle manufacturers under sec. 85.774-38 to provide maintenance instructions to ultimate purchasers.
85.705	Delete references to sec. 85.773	These technical amendments are applicable to 1974 and later model year gasoline-fueled heavy duty engines and all references to 1973 model year engines have been deleted.
85.774-1	Expand section title to clarify model year covered.	1974 gasoline-fueled heavy duty engine emission standards also apply to later model year engines.
85.774-2(b)	Correct paragraph identification	Error in Nov. 15, 1972, publication.
85.774-5(a)	Add provisions listing criteria for division into engine families which were formerly included only by reference to subpart A. Also expands subparagraph (a)(2) to explicitly include catalytic converters and thermal reactors.	Permits engine family classification without the need for referring to subpart A. Although not presently used on gasoline-fueled heavy duty engines, catalytic converters, and thermal reactors may be incorporated as heavy duty engine emission standards became more stringent. Since engines with and without such devices can be expected to have significantly different deterioration and emission characteristics, it is appropriate that such engines be classed in engine families on the basis of those characteristics.
85.774-5(b) (2)	Remove reference to "1974" and make it applicable to appropriate model year.	1974 gasoline-fueled heavy duty engine emission standards also apply to later model year engines.
85.774-5(b) (4)	Replace "engine-system combination" with "engine displacement-exhaust emission control system combination".	Clarifies selection criteria.
85.774-5(d)	Remove reference to "1974" and make it applicable to appropriate model year.	1974 gasoline-fueled heavy duty engine emission standards also apply to later model year engines.
85.774-6	Reorganize into logical subgroupings involving scheduled maintenance, routine service, and unscheduled maintenance with added provisions clarifying the type of work permitted in each maintenance category. Emphasize that unscheduled maintenance shall not render the engine unrepresentative.	Clarifies the maintenance provisions.
85.774-6(a) (1) (i)	Change scheduled maintenance on durability engines to require the frequency of such maintenance to be comparable to actual in-use intervals which will be determined by the engine manufacturer, provided maintenance is not performed more frequently than every 875 hours of dynamometer operation.	Less stringent scheduled maintenance criteria is justified in light of data presented to EPA which indicates that the scheduled maintenance interval provision was not comparable to actual in-use maintenance intervals.
85.774-7(d)	Expand to include data reporting procedures: specify time allowed for transmittal of test results.	Clarifies procedures: places a more reasonable requirement on time limit.
85.774-7(g) (2)	Correct reference from paragraph sec. 85.770-10 to sec. 85.774-10.	Error in Nov. 15, 1972 publication.
85.774-7(h)	Add provision to prohibit any unauthorized testing of certification engines.	Unauthorized testing of certification engines has not been allowed in past practice, provision makes such prohibition explicit. Error was overlooked in June 28, 1973 amendments.
85.774-9(b)	Change "average concentrations" to "average brake-specific emission values".	Clarifies the test procedure.
85.774-9(c)	Clarify engine configuration during testing.	Error in Jan. 21, 1974, amendments.
85.774-10	Change section reference from sec. 85.775-10 to sec. 85.774-10.	
85.774-11(a) (2)	Delete provision regarding test speeds other than 2,000 r/min; increase speed tolerance during first 4 seconds of each mode.	Provision is unnecessary since such special test procedures are addressed in sec. 85.774-8; increase is necessary to allow for limitations in existing dynamometer equipment.
85.774-13(a)	Add provision that exact conformance with schematic is not necessary.	Recognizes that other configurations of the required components can produce accurate results.
85.774-13(b) (12)	Correct wording.	Error in previous publication.
85.774-14(i)	Specify "during each mode".	Clarifies the test procedure.
85.774-14(k)	Delete provisions concerning automatic marker.	Information is specified elsewhere in this section.
85.774-14(l)	Add the provision that 1-second time intervals be indicated on all recorder charts.	Facilitates the interpretation of recorder charts.
85.774-16	Rewrite and reorganize section to clarify the engine storage and preconditioning requirements prior to testing, the sample probe configuration for dual exhaust systems, the engine warmup operation and the details of hydrocarbon "hangup" test. Define minimum acceptable chart speeds for recording required parameters.	Clarifies the test procedure.

Section	Change	Reason
85.774-17	Rewrite and reorganize section to clarify the chart reading techniques and the method to be followed in converting chart readings to concentration values.	Clarify chart reading technique.
85.774-18(d)	Specify horsepower values to be used during idle and closed throttle modes.	Clarifies calculation technique.
85.774-18(a)	Change paragraph reference letter from o to e.	Error in previous publication.
85.774-28(c) (1) (i) (c)	Add provision specifying additional data to be used in determining the deterioration factors.	Makes provision consistent with criteria specified in sec. 85.774-6(a) (5) (iii); clarifies what test results are to be used in the deterioration factor calculation.
85.774-28(c) (1) (ii)	Clarify calculation procedures and the number of significant figures to be used.	Clarifies calculation procedures.
85.774-28(c) (1) (iii)	Clarify procedure for calculation of deterioration factor.	Do.
85.774-28(c) (2)	Specify number of significant figures to be used.	Do.
85.774-28(c) (3)	Change "emissions" to "emission values"; clarify determination of significant figures.	Do.
85.774-29	Adds the provision that test engines shall be within the production tolerance as shown on the engine label prior to the official test. Also clarifies the maintenance and adjustments which may be performed with the advanced approval of the Administrator.	Provision allows test engines to be tested in the condition that they are expected to operate in-use. Clarify test procedure.
85.774-30(a) (2)	Correct spelling. ("covers").	Error in Feb. 27, 1974 amendments.
85.774-30(b) (1) (ii)	Replace "engine-system" with "engine displacement-exhaust emission control system".	Clarifies the provision that certain test engines will represent all engines of the same displacement-exhaust emission control system combination.
85.774-33	Correct error in recompilation and in section references in paragraph (a).	Error in Nov. 15, 1972 publication.
85.774-35(a) (4) (vi)	Change reference to "1974" to "19".	Makes the label specifications applicable to future model years.
85.774-38(a)	Delete references to "ultimate" when referring to the purchaser.	Engine manufacturers are to supply maintenance instructions to the vehicle manufacturers.
85.774-38(a) (3)	Add provision that the written instructions for the new motor vehicle engine maintenance may include maintenance in addition to that performed on the corresponding durability engine under sec. 85.774-6 (a) and (b) (2) provided the maintenance is reasonable and necessary.	Provides for reasonable and necessary maintenance instructions.

Part 85, Chapter I, Title 40 of the Code of Federal Regulations as applicable beginning with the 1974 model year is amended as follows, effective on February 27, 1975. Sections 85.774-5(a) (2) (viii) and (ix) are amended effective March 31, 1975.

Dated: February 12, 1975.

JOHN QUARLES,
Acting Administrator.

Subpart H—Emission Regulations for New Gasoline-Fueled Heavy Duty Engines

85.701	General applicability.	85.774-13	Sampling and analytical system measuring exhaust emissions.
85.702	Definitions.	85.774-14	Information to be recorded.
85.703	Abbreviations.	85.774-15	Calibration and instrument checks.
85.704	General standards; Increase in emissions; unsafe conditions.	85.774-16	Dynamometer test run.
85.706	Hearings on certification.	85.774-17	Chart reading.
85.706	Maintenance of records; submission of information; right of entry.	85.774-18	Calculations.
		85.774-19	through
		85.774-27	[Reserved]
		85.774-28	Compliance with emission standards.
85.774-1	Emission standards for 1974 and later model year engines.	85.774-29	Testing by the Administrator.
85.774-2	Application for certification.	85.774-30	Certification.
85.774-3	Approval of application for certification; test fleet selections.	85.774-31	Separate certification.
85.774-4	Required data.	85.774-32	Addition of an engine after certification.
85.774-5	Test engines.	85.774-33	Changes to an engine covered by certification.
85.774-6	Maintenance.	85.774-34	Alternative procedure for notification of additions and changes.
85.774-7	Service accumulation and emission measurements.	85.774-35	Labeling.
85.774-8	Special test procedures.	85.774-36	[Reserved]
85.774-9	Test procedures.	85.774-37	Production engines.
85.774-10	Gasoline fuel specifications.	85.774-38	Maintenance instructions.
85.774-11	Dynamometer operation cycle and equipment.	85.774-39	Submission of maintenance instructions.
85.774-12	Dynamometer procedures.		

AUTHORITY: Secs. 202, 206, 207, 208, 301(a), Clean Air Act, as amended (42 U.S.C. 1857f-1, 1857f-5, 1857f-5a, 1857f-6, 1857g(a)).

Subpart H—Emission Regulations for New Gasoline-Fueled Heavy Duty Engines

§ 85.701 General applicability.

The provisions of this subpart are applicable to new gasoline-fueled heavy duty engines beginning with the 1974 model year.

§ 85.702 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 A of Title II of the Clean Air Act, 42 U.S.C. 1857f-1 through f-7, as amended by Public Law 91-604.

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

(3) "Model year" means the manufacturer's annual production period (as determined by the Administrator) which includes January 1 of such calendar year: *Provided*, That if the manufacturer has no annual production period, the term "model year" shall mean the calendar year.

(4) "Gross vehicle weight" means the manufacturer's gross weight rating for the individual vehicle.

(5) "Heavy duty vehicle" means any motor vehicle either designed primarily for transportation of property and rated at more than 6,000 pounds GVW or designed primarily for transportation of persons and having a capacity of more than 12 persons.

(6) "Heavy duty engine" means any engine which the engine manufacturer could reasonably expect to be used for motive power in a heavy duty vehicle.

(7) "System" includes any motor vehicle engine modification which controls or causes the reduction of substances emitted from motor vehicle engines.

(8) "Engine family" means the basic classification unit of a manufacturer's product line used for the purpose of test fleet selection and determined in accordance with § 85.774-5(a).

(9) "Engine-system combination" means an engine family-exhaust emission control system-fuel evaporative emission control system (where applicable) combination.

(10) "Fuel system" means the combination of fuel tank, fuel pump, fuel lines, and carburetor, or fuel injection components, and includes all fuel system vents and fuel evaporative emission control systems.

(11) "Crankcase emissions" means airborne substances emitted to the atmosphere from any portion of the engine crankcase ventilation or lubrication systems.

(12) "Exhaust emissions" means substances emitted to the atmosphere from any opening downstream from the exhaust port of a motor vehicle engine.

(13) Zero (0) hours means that point after normal assembly line operations and adjustments and before one additional operating hour has been accumulated.

(14) "Calibrating gas" means a gas of known concentration which is used to establish the response curve of an analyzer.

(15) "Span gas" means a gas of known concentration which is used routinely to set the output level of an analyzer.

(16) "Oxides of Nitrogen" means the sum of the nitric oxide and nitrogen dioxide contained in a gas sample as if the nitric oxide were in the form of nitrogen dioxide.

(17) "Useful life" means a period of use of 5 years or of 50,000 miles of vehicle operation or 1,500 hours of engine operation (or an equivalent period of 1,500 hours of dynamometer operation), whichever first occurs.

(18) "Scheduled maintenance" means any adjustment, repair, removal, disassembly, cleaning, or replacement of engine components or systems which is performed on a periodic basis to prevent part failure or vehicle (if the engine were installed in a vehicle) malfunction.

(19) "Unscheduled maintenance" means any adjustment, repair, removal, disassembly, cleaning, or replacement of engine components or systems which is performed to correct a part failure or vehicle (if the engine were installed in a vehicle) malfunction.

(20) "EPA Enforcement Officer" means any officer or employee of the Environmental Protection Agency so designated in writing by the Administrator (or by his designee).

(21) "Auxiliary Emission Control Device (AECD)" means any element of design which senses temperature, vehicle speed, engine RPM, transmission gear, manifold vacuum, or any other parameter for the purpose of activating, modulating, delaying or deactivating the operation of any part of the emission control system.

(22) "Defeat Device" means an AECD that reduces the effectiveness of the emission control system under conditions which may reasonably be expected to be encountered in normal urban vehicle operation and use, unless (1) such conditions are substantially included in the Federal emission test procedure, or (2) the need for the AECD is justified in terms of protecting the vehicle against damage or accident, or (3) the AECD does not go beyond the requirement of engine starting.

§ 85.703 Abbreviations.

The abbreviations used in this subpart have the following meanings in both capital and lowercase:

ASTM—American Society for Testing and Materials.
 BHP—Brake horsepower.
 BSCO—Brake specific carbon monoxide.
 BSHC—Brake specific hydrocarbons.
 BSNO—Brake specific oxides of nitrogen.
 C.—Centigrade.
 C.F.H.—Cubic feet per hour.
 C.F.M.—Cubic feet per minute.
 C.I.D.—Cubic inch displacement.
 CO₂—Carbon dioxide.
 CO—Carbon monoxide.
 Conc.—Concentration.
 CT—Closed Throttle.
 EGR—Exhaust Gas Recirculation.
 EP—End point.
 F.—Fahrenheit.
 FL—Full load.
 Gal.—U.S. Gallon(s).
 Gm.—Gram(s).
 GVW—Gross vehicle weight.
 H₂O—Water.

HC—Hydrocarbon(s).
 Hg—Mercury.
 IBP—Initial boiling point.
 Max.—Maximum.
 Min.—Minimum.
 N₂—Nitrogen.
 NDIR—Nondispersive infrared.
 NO—Nitric oxide.
 NO₂—Nitrogen dioxide.
 NO_x—Oxides of nitrogen.
 Pb.—Lead.
 P.P.M.—Parts per million by volume.
 PTA—Part throttle accel.
 PTD—Part throttle decel.
 R.P.M.—Revolutions per minute.
 RVP—Reid vapor pressure.
 Sec.—Second(s).
 WOT—Wide open throttle.
 "—Inches.
 °—Degrees.
 Σ—Summation.

§ 85.704 General standards: Increase in emissions; unsafe conditions.

(a) (1) Every new motor vehicle engine manufactured for sale, sold, offered for sale, introduced or delivered for introduction into commerce, or imported into the United States for sale or resale which is subject to any of the standards prescribed in this subpart shall be covered by a certificate of conformity issued pursuant to § 85.774-2 through 85.774-4 and § 85.774-29 through 85.774-34 of this subpart.

(2) No heavy duty vehicle manufacturer shall take any of the action specified in section 203(a) (1) of the Act with respect to any gasoline-fueled heavy duty vehicle which uses an engine which has not been certified as meeting applicable standards. Such manufacturer shall provide to the Administrator prior to the beginning of each model year a statement signed by an authorized representative which includes the following information:

(i) A description of the vehicles which will be produced subject to this section;
 (ii) Identification of the engines used in the vehicles;
 (iii) Projected sales data on each vehicle engine combination;
 (iv) A statement that the engines will not be modified by the vehicle manufacturer or a detailed specification of any changes which will be made. Changes made solely for the purpose of mounting an engine in a vehicle need not be included.

(v) A statement that the engine maintenance instructions supplied by the engine manufacturer in compliance with § 85.774-38 will be furnished to the ultimate purchaser. If these maintenance instructions are modified, a detailed description of the modifications and a justification for each must be provided to the Administrator for review and approval. The Administrator will notify the manufacturer of his determination whether the modified instructions are reasonable and necessary to insure the proper functioning of the emission control system.

(b) (1) Any system installed on or incorporated in a new motor vehicle engine to enable such vehicle to conform to standards imposed by this subpart:

(i) Shall not in its operation or function cause the emission into the ambient

air of any noxious or toxic substance that would not be emitted in the operation of such engine without such system, except as specifically permitted by regulation; and

(ii) Shall not in its operation, function, or malfunction result in any unsafe condition endangering the motor vehicle, its occupants, or persons or property in close proximity to the vehicle.

(2) Every manufacturer of new motor vehicle engines subject to any of the standards imposed by this subpart shall, prior to taking any of the actions specified in section 203(a) (1) of the Act, test or cause to be tested motor vehicle engines in accordance with good engineering practice to ascertain that such test engines will meet the requirements of this section for the useful life of the engine.

§ 85.705 Hearings on certification.

(a) (1) After granting a request for a hearing under § 85.774-3 or 85.774-30, 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 § 85.774-3 or 85.774-30, the hearing shall be held as soon as practicable at a time and place fixed by the Administrator or by the Presiding Officer.

(4) In the case of any hearing requested pursuant to § 85.774-30(c) (5) (i), the Administrator may in his discretion direct that all argument and presentation of evidence be concluded within such fixed period not less than 30 days as he may establish from the date that the first written offer of a hearing is made to the manufacturer. To expedite proceedings, the Administrator may direct that the decision of the Presiding Officer (who may, but need not be the Administrator himself) shall be the final EPA decision.

(b) (1) Upon his appointment pursuant to paragraph (a) of this section, the Presiding Officer will establish a hearing file. The file shall consist of the notice issued by the Administrator under § 85.774-3 or § 85.774-30, together with any accompanying material, the request for a hearing and the supporting data submitted therewith and all documents relating to the request for certification and all documents submitted therewith, and correspondence and other data material to the hearing.

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

(c) An applicant may appear in person, or may be represented by counsel or by any other duly authorized representative.

(d) (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 him to consider the following:

(i) Simplification 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.

(e) (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 title 18 U.S.C. 1001 which imposes penalties for knowingly making false statements for representations, or using false documents in any matter within the jurisdiction of any department or agency of the United States.

(3) Any witness 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 authenticity, 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 shall be reported as part of the record unless otherwise ordered by him.

(f) (1) The Presiding Officer shall make an initial decision which shall include written findings and conclusions and the reasons or basis therefor on all the 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 shall 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 Administrator shall 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.

§ 85.706 Maintenance of records; submission of information; right of entry.

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

(1) *General records.* (i) (A) Identification and description of all certification engines for which testing is required under this subpart. (B) A description of all emission control systems which are installed on or incorporated in each certification engine. (C) A description of all procedures used to test each certification engine. (ii) A properly filed application for certification, following the format prescribed by the US EPA for the appropriate model year, fulfills each of the requirements of this paragraph (a) (1).

(2) *Individual records.* (i) A brief history of each motor vehicle engine used for certification under this subpart in the form of a separate booklet or other document for each separate engine in which shall be recorded:

(A) In the case where a current production engine is modified for use as a certification engine, a description of the process by which the engine was selected, and of the modifications made, giving specifically the place of modification and the person(s) in charge of modification. In the case where the certification engine is not derived from a current production engine, a general description of the build-up of the engine (e.g., experimental heads were cast and machined according to supplied drawings, etc.) giving specifically the place of engine assembly and the person(s) in charge of engine assembly. In both cases above, a description of the origin and selection process for the carburetor, distributor, and fuel system, emission control components, and exhaust aftertreatment device shall be included. The required descriptions shall specify the steps taken to assure that the certification engine with respect to its fuel system, emission control components, exhaust aftertreatment device, or any other device or component that can reasonably be expected to influence exhaust emissions will be representative of production engines and that either all component and/or engine construction processes, component inspection and selection techniques, and assembly techniques employed in constructing such engines are reasonably likely to be implemented for production engines or that they are as closely analogous as practicable to planned construction and assembly processes.

(B) A complete record of all emission tests performed under §§ 85.774-9 through 85.774-18 (except tests performed by EPA directly), including all individual worksheets and/or other documentation relating to each such test, or exact copies thereof; the date, time, purpose, and location of each test, the number of hours accumulated on the engine when the test began and ended, and the names of supervisory personnel responsible for the conduct of the test.

(C) The date and times of each service accumulation listing both the number of operating hours accumulated and the name of each dynamometer operator.

(D) If used, the record of any devices employed to record the engine RPM, and/or horsepower and/or torque in relationship to engine operating time.

(E) A record and description of all maintenance and other servicing performed, giving the date and time of the maintenance or service, the reason for it, the person authorizing it, and the names of supervisory personnel responsible for the conduct of the maintenance or service. The description shall indicate whether or not EPA specifically consented to the work and, if EPA did not, shall list the provision of this subpart which authorizes its performance.

(F) A record and description of each test performed to diagnose engine or emissions control system performance, giving the date and time of the test, the reason for it, the person authorizing it, and the names of supervisory personnel responsible for the conduct of the test.

(G) The dates and times that the engine was idle in storage, and in transit or transport.

(H) A brief description of any significant events affecting the engine during any time in the period covered by the history not described by an entry under one of the previous headings including such extraordinary events as accidents involving the engine or dynamometer runaway.

(i) Each such history shall be started on the date that the first of any of the selection or build up activities in paragraph (a) (2) (i) (A) of this section occurred with respect to the certification engine, shall be updated each time the operational status of the engine changes or additional work is done on it, and shall be kept in a designated location.

(3) This paragraph shall apply to the extent practicable to certification testing of engines for the 1975 model year and in full to all subsequent model years.

(4) All records required to be maintained under this subpart shall be retained by the manufacturer for a period of six (6) years after issuance of all certificates of conformity to which they relate. Records may be retained as hard copy or reduced to microfilm, punch cards, etc., depending on the record retention procedures of the manufacturer. *Provided*, That in every case all the information contained in the hard copy shall be retained.

(b) The manufacturer of any new motor vehicle engine subject to any of the standards prescribed in this subpart shall submit to the Administrator at the time of issuance by the manufacturer copies of all instructions or explanations regarding the use, repair, adjustment, maintenance, or testing of such engine relevant to the control of crankcase or exhaust emissions, issued by the manufacturer for use by other manufacturers, assembly plants, distributors, dealers, and ultimate purchasers: *Provided*, That any material not translated into the Eng-

lish language need not be submitted unless specifically requested by the Administrator.

(c) (1) Any manufacturer who has applied for certification of a new motor vehicle engine subject to certification tests under this subpart shall admit or cause to be admitted any EPA Enforcement Officer during operating hours on presentation of credentials to any of the following:

(i) Any facility where any such tests or any procedures or activities connected with such tests are or were performed.

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

(iii) Any facility where any construction process or assembly process used in the modification or buildup of such an engine into a certification engine is taking place.

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

(2) Upon admission to any facility referred to in paragraph (c) (1) of this section, any EPA Enforcement Officer shall be allowed:

(i) To inspect and monitor any part or aspect of such procedures, activities, and testing facilities, including, but not limited to, monitoring engine preconditioning, emissions tests and service accumulation, maintenance, and engine storage procedures; and to verify correlation or calibration of test equipment;

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

(iii) To inspect and/or photograph any part or aspect of any such certification engine and any components to be used in the construction thereof.

(3) In order to allow the Administrator to determine whether or not production motor vehicle engines conform in all material respects to the design specification which applied to those engines described in the application for certification for which a certificate of conformity has been issued and to standards prescribed under section 202 of the Act, any manufacturer shall admit any EPA Enforcement Officer on presentation of credentials to both:

(1) Any facility where any document, design, or procedure relating to the translation of the design and construction of engines and emission related components described in the application for certification or used for certification testing into production engines is located or carried on; and

(ii) Any facility where any motor vehicle engines to be introduced into commerce are manufactured or assembled.

(4) On admission to any such facility referred to in paragraph (c) (3) of this section, any EPA Enforcement Officer shall be allowed:

(i) to inspect and monitor any aspects of such manufacture or assembly and other procedures;

(ii) to inspect and make copies of any such records, documents or designs; and

(iii) to inspect and photograph any part or aspect of any such new motor

vehicle engine and component used in the assembly thereof that are reasonably related to the purpose of his entry.

(5) Any EPA Enforcement Officer shall be furnished by those in charge of a facility being inspected with such reasonable assistance as he may request to help him discharge any function listed in this paragraph. Each applicant for or recipient of certification is required to cause those in charge of a facility operated for its benefit to furnish such reasonable assistance without charge to EPA whether or not the applicant controls the facility.

(6) The duty to admit or cause to be admitted any EPA Enforcement Officer applies whether or not the applicant owns or controls the facility in question and applies both to domestic and to foreign manufacturers and facilities. EPA will not attempt to make any inspections which it has been informed that local law forbids. However, if local law makes it impossible to do what is necessary to insure the accuracy of data generated at a facility, no informed judgment that an engine is certifiable or is covered by a certificate can properly be based on that data. It is the responsibility of the manufacturer to locate its testing and manufacturing facilities in jurisdictions where this situation will not arise.

(7) For purposes of this paragraph:

(i) "Presentation of credentials" shall mean display of the document designating a person as an EPA enforcement Officer.

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

(iii) Where facilities or areas other than those covered by paragraph (c) (7) (i) of this section are concerned, "operating hours" shall mean all times during which an assembly line is in operation or all during which testing, maintenance, service, accumulation, production or compilation of records, or any other procedure or activity relating to certification testing, to translation of engine designs from the test stage to the production stage, or to engine manufacture or assembly is being carried out in a facility.

(iv) "Reasonable assistance" includes, but is not limited to, clerical, copying, interpretation and translation services, the making available on request of personnel of the facility being inspected during their working hours to inform the EPA Enforcement Officer of how the facility operates and to answer his questions, and the performance on request of emissions tests on any engine which is being, has been, or will be used for certification testing. Such tests shall be non-destructive, but may require appropriate service accumulation. A manufacturer may be compelled to cause the personal appearance of any employee at such a facility before an EPA Enforcement Officer by written request for his appearance, signed by the Assistant Administrator for Enforcement and General Counsel,

served on the manufacturer. Any such employee who has been instructed by the manufacturer to appear, will be entitled to be accompanied, represented, and advised by counsel. No counsel who accompanies, represents, or advises an employee compelled to appear may accompany, represent, or advise any other person in the investigation.

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

§ 85.774-1 Emission standards for 1974 and later model year engines.

(a) (1) Exhaust emissions from new gasoline-fueled heavy duty engines shall not exceed:

(i) *Hydrocarbons plus oxides of nitrogen (as NO_x)*. 16 grams per brake horsepower hour.

(ii) *Carbon monoxide*. 40 grams per brake horsepower hour.

(2) The standards set forth in paragraph (a) (1) of this section refer to a composite sample representing the operating cycle set forth in § 85.774-9 through § 85.774-18 and measured in accordance with those procedures.

(b) [Reserved]

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any new motor vehicle engine subject to this subpart.

(d) Every manufacturer of new motor vehicle engines subject to the standards prescribed in this subpart shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motor vehicle engines in accordance with test procedures prescribed in § 85.774-9 through § 85.774-18 to ascertain that such test engines meet the requirements of paragraphs (a) and (c) of this section.

§ 85.774-2 Application for certification.

(a) An application for a certificate of conformity to the regulations applicable to any new motor vehicle engine shall be made to the Administrator by the manufacturer and shall be kept current and accurate by amendment.

(b) The application shall be in writing, signed by an authorized representative of the manufacturer, and shall include the following:

(1) Identification and description of the engines covered by the application and a description of their emission control system and fuel system components. This shall include a detailed description of each auxiliary emission control device (AECD) to be installed in or on any certification test engine.

(2) Projected U.S. sales data sufficient to enable the Administrator to select a test fleet representative of the engines for which certification is requested.

(3) A description of the test equipment and fuel proposed to be used.

(4) A description of the proposed service accumulation procedure for durability testing.

(5) A statement of recommended maintenance and procedures necessary

to assure that the engines covered by a certificate of conformity in operation conform to the regulations, and a description of the program for training of personnel for such maintenance, and the equipment required.

(6) At the option of the manufacturer, the proposed composition of the emission data and durability data test fleet.

(c) Complete copies of the application, and of any amendments thereto, and all notifications under §§ 85.774-32, 33, and 34 shall be submitted in such multiple copies as the Administrator may require.

§ 85.774-3 Approval of application for certification; test fleet selections.

(a) After a review of the application for certification and any other information which the Administrator may require, the Administrator may approve the application and select a test fleet in accordance with § 85.774-5.

(b) The Administrator may disapprove in whole or in part an application for certification for reasons including incompleteness, inaccuracy, inappropriate proposed service accumulation procedures, test equipment, or fuel, and incorporation of defeat devices on engines described by the application.

(c) Where any part of an application is rejected the Administrator shall notify the manufacturer in writing and set forth the reasons for such rejection. Within 30 days following receipt of such notification, the manufacturer may request a hearing on the Administrator's determination. The request shall be in writing, signed by an authorized representative of the manufacturer and shall include a statement specifying the manufacturer's objection to the Administrator's determinations, and data in support of such objections. If, after the review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, he shall provide the manufacturer a hearing in accordance with § 85.705 with respect to such issue.

§ 85.774-4 Required data.

The manufacturer shall perform the tests required by the applicable test procedures, and submit to the Administrator the following information:

(a) Durability data on such engines tested in accordance with the applicable test procedures of this subpart, and in such numbers as therein specified, which will show the performance of the systems installed on or incorporated in the engine for extended operation, as well as a record of all pertinent maintenance performed on the test engines.

(b) Emissions data on such engines tested in accordance with the applicable emission test procedures of this subpart and in such numbers as therein specified, which will show their emissions after 0 hours, and 125 hours of operation.

(c) A description of tests performed to ascertain compliance with the general standards in § 85.774-1 and the data derived from such tests.

(d) A statement that the test engines with respect to which data are submitted have been tested in accordance with the

applicable test procedures, that they meet the requirement of such tests, and that, on the basis of such tests, they conform to the requirements of the regulations in this subpart. If such statements cannot be made with respect to any engine tested, the engine shall be identified, and all pertinent test data relating thereto shall be supplied.

§ 85.774-5 Test engines.

(a) (1) The engines covered by the application for certification will be divided into groupings of engines which are expected to have similar emission characteristics throughout their useful life. Each group of engines with similar emission characteristics shall be defined as a separate engine family.

(2) To be classed in the same engine family, engines must be identical in all the following respects:

(i) The cylinder bore center-to-center dimensions.

(ii) The dimension from the centerline of the crankshaft to the centerline of the camshaft.

(iii) The dimension from the centerline of the crankshaft to the top of the cylinder block head face.

(iv) The cylinder block configuration (air cooled or water cooled; L-6, 90° V-8, etc.).

(v) The location of intake and exhaust valves and the valve sizes (within a 1/8-inch range on the valve head diameter).

(vi) The method of air aspiration.

(vii) The combustion cycle.

(viii) Catalytic converter characteristics.

(ix) Thermal reactor characteristics.

(3) Engines identical in all the respects listed in subparagraph (2) of this paragraph may be further divided into different engine families if the Administrator determines that they may be expected to have different emission characteristics. This determination will be based upon a consideration of the following features of each engine:

(i) The bore and stroke.

(ii) The surface-to-volume ratio of the nominally dimensioned cylinder at the top dead center position.

(iii) The intake manifold induction port size and configuration.

(iv) The exhaust manifold port size and configuration.

(v) The intake and exhaust valve sizes.

(vi) The fuel system.

(vii) The camshaft timing and ignition timing characteristics.

(4) Where engines are of a type which cannot be divided into engine families based upon the criteria listed in subparagraphs (2) and (3) of this paragraph, the Administrator will establish families for those engines based upon the features most related to their emission characteristics.

(b) Emission data engines:

(1) Engines will be chosen to be run for emission data based upon the engine family groupings. Within each engine family, the requirements of this paragraph must be met.

(2) Engines of each engine family will be divided into engine displacement-exhaust-emission control system combi-

nations. A projected sales volume will be established for each combination for the applicable model year. One engine of each combination will be selected in order of decreasing projected sales volume until 70 percent of the projected sales of a manufacturer's total production of engines of that family is represented, or until a maximum of four engines is selected. The engines selected for each combination will be specified by the Administrator as to fuel system.

(3) The Administrator may select a maximum of two additional engines within each engine family based upon features indicating that they may have the highest emission levels of the engines in that engine family. In selecting these engines, the Administrator will consider such features as the exhaust emission control system, induction system characteristics, ignition system characteristics, fuel system, rated horsepower, rated torque, and compression ratio.

(4) If the engines selected in accordance with paragraphs (b) (2) and (3) of this section do not represent each engine displacement-exhaust emission control system combination, then one engine of each engine displacement-exhaust emission control system combination not represented shall be selected by the Administrator.

(c) Durability data engines:

(1) A durability data engine will be selected by the Administrator to represent each engine-system combination. The engine selected shall be of the displacement with the largest projected sales volume of engines with that exhaust emission control system in that engine family and will be designated by the Administrator as to fuel system.

(2) [Reserved]

(3) A manufacturer may elect to operate and test additional engines to represent any engine-system combination. The additional engines must be of the same engine displacement and fuel system as the engine selected for that combination in accordance with the provisions of subparagraph (1) of this paragraph. Notice of an intent to run additional engines shall be given to the Administrator not later than 30 days following notification of the test fleet selection.

(4) Any manufacturer whose projected sales of new motor vehicle engines subject to this subpart for the applicable model year is less than 700 engines may request a reduction in the number of test engines determined in accordance with the foregoing provisions of this section. The Administrator may agree to such lesser number as he determines will meet the objectives of this procedure.

(5) In lieu of testing an emission data or durability data engine selected under paragraph (b) or (c) of this section and submitting data therefor, a manufacturer may, with the prior written approval of the Administrator, submit data on a similar engine for which certification has previously been obtained.

(6) For purposes of testing under § 85.774-7(g), the Administrator may require additional emission data engines and durability data engines identical in

all material respects to engines selected in accordance with paragraphs (b) and (c) of this section: *Provided*, That the number of engines selected shall not increase the size of either the emission data fleet or the durability data fleet by more than 20 percent or one engine, whichever is greater.

§ 85.774-6 Maintenance.

(a) (1) Scheduled maintenance may be performed on durability engines only under the following provisions. (i) Major engine tuneups to manufacturer's specifications may be performed no more frequently than every 375 hours of scheduled dynamometer operation, provided no tuneups are performed after 1375 hours of scheduled dynamometer operation. The maintenance to be performed on the durability engines shall be requested in the application for certification and shall be specified at the same intervals in the maintenance instructions which will be furnished to the ultimate purchaser of the vehicle in which the engine, which is represented by the test engine, is installed. (For equivalent dynamometer hours, engine hours, and mileage intervals, see § 85.702(17)). A scheduled major engine tuneup shall be restricted to items (A) through (L) of this section and shall be conducted in a manner consistent with service instructions and specifications provided by the manufacturer for use by the customer service personnel. The following items may be inspected, replaced, cleaned, adjusted, and/or serviced as required:

- (A) Ignition system.
- (B) Cold starting enrichment system (includes fast idle speed setting).
- (C) Curb idle speed and air/fuel mixture.
- (D) Drive belt tension on engine accessories.
- (E) Valve lash.
- (F) Inlet air and exhaust gas control valves.
- (G) Engine bolt torque.
- (H) Spark plugs.
- (I) Fuel filter and air filter.
- (J) Crankcase emission control system.
- (K) Fuel evaporative emission control system.
- (L) Exhaust gas recirculation system.

(ii) Change of engine oil, and change or service of oil filter will be allowed at the equivalent intervals that will be specified in the manufacturer's maintenance instructions.

(iii) Readjustment of the engine idle speed (curb idle and fast idle) may be performed, in addition to during scheduled major engine tuneups, once during the first 125-hours of engine operation.

(2) Unscheduled maintenance may be performed on durability engines, except as provided in paragraph (a) (5) (i) of this section, only under the following provisions:

(i) Any persistently misfiring spark plug may be replaced, in addition to replacement at scheduled major engine tuneup points.

(ii) Readjustment of the engine cold starting enrichment system may be per-

formed if there is a problem of stalling or if there is visible black smoke.

(iii) Readjustment of the engine idle speed (curb idle and fast idle) may be performed, in addition to that performed as scheduled maintenance under paragraph (a) (1) of this section, if the idle speed exceeds the manufacturer's recommended idle speed by 300 r.p.m. or more, or if there is a problem of stalling.

(iv) The idle mixture may be reset, other than during scheduled major engine tuneups, only with the advance approval of the Administrator.

(3) [Reserved]

(4) [Reserved]

(5) Any other engine, emission control system, or fuel system adjustment, repair, removal, disassembly, cleaning or replacement on durability engines shall be performed only with the advance approval of the Administrator.

(i) In the case of unscheduled maintenance such approval will be given if the Administrator:

(A) Has made a preliminary determination that part failure or system malfunction, or the repair of such failure or malfunction, does not render the engine unrepresentative of engines in use, and does not require direct access to the combustion chamber, except for spark plug, fuel injection component, or removable prechamber removal or replacement; and

(B) Has made a determination that the need for maintenance or repairs is indicated by an overt indication of malfunction such as persistent misfire, engine stall, overheating, fluid leakage, loss of oil pressure, excessive fuel consumption or excessive power loss.

(ii) Emission measurements may not be used as a means of determining the need for unscheduled maintenance under paragraph (a) (5) (i) (A).

(iii) Requests for authorization of scheduled maintenance of emission control-related components not specifically authorized to be maintained by these regulations must be made prior to the beginning of durability testing. The Administrator will approve the performance of such maintenance if the manufacturer makes a satisfactory showing that the maintenance will be performed on engines in use.

(6) If the Administrator determines that part failure or system malfunction occurrence and/or repair rendered the engine unrepresentative of engines in use, the engine shall not be used as a durability engine.

(b) (1) Scheduled maintenance on emission data engines is limited to the adjustment of idle speed once before the 125-hour test point, provided the idle speed is outside the manufacturer's specifications to be shown on the engine label (see § 85.774-35(a) (4) (iv)).

(2) Any other engine, emission control system, or fuel system adjustment, repair, removal, disassembly, cleaning, or replacement shall be performed only with the advance approval of the Administrator.

(c) [Reserved]

(d) (1) Complete emission tests (see §§ 85.774-10 through 85.774-27) are re-

quired, unless waived by the Administrator, before and after:

(1) Scheduled maintenance approved for durability engines.

(ii) Unscheduled maintenance which may reasonably be expected to affect emissions.

(2) The tests before and after scheduled maintenance, which are performed on durability engines prior to 117 hours, are waived. The test before scheduled maintenance, which is performed on durability engines after 117 hours and prior to 133 hours, is waived. The after-maintenance test must be run and the results used in the deterioration factor calculation in accordance with § 85.774-28 (c) (1) (i) (B).

(3) The idle speed reset and any scheduled maintenance on the emission data engine shall be performed prior to the 125-hour test. The before maintenance and after-maintenance tests associated with idle speed reset and scheduled maintenance on the emission data engine are waived.

(4) Test data required by this paragraph shall be air posted to the Administrator within 72 hours (or delivered within five working days), along with a complete record of all pertinent maintenance.

(5) When unscheduled maintenance is approved, a preliminary engineering report, unless waived by the Administrator, shall be supplied within three working days. A final engineering report shall be delivered within ten working days after the completion of the emission tests. The Administrator may approve an extension of the time requirements for the final engineering report.

(6) All test data, maintenance reports, and required engineering reports shall be compiled and provided to the Administrator in accordance with § 85.774-4.

(e) The Administrator shall be given the opportunity to verify the existence of an overt indication of part failure and/or engine malfunction (e.g., misfire, stall).

(f) Equipment, instruments, or tools may not be used to identify malfunctioning, maladjusted, or defective engine components unless the same or equivalent equipment, instruments, or tools will be available to dealerships and other service outlets and

(1) Are used in conjunction with scheduled maintenance on such components,

(2) Are used subsequent to the identification of an engine failure or malfunction, as provided in paragraph (a) (5) (i) of this section for durability engines or paragraph (b) of this section for emission data engines, or

(3) Unless specifically authorized by the Administrator.

§ 85.774-7 Service accumulation and emission measurements.

The engine dynamometer service accumulation schedule will consist of several operating conditions which give the same percentage of time at various manifold vacuums and the modes as speci-

fied in the emission test cycle. The average speed shall be between 1,650 and 1,700 r.p.m. Subject to the requirements as to average speed, there must be operation at speeds in excess of 3,200 r.p.m. (but not in excess of governed speed for governed engines or rated speed for non-governed engines) for a cumulative maximum of 0.5 percent of the actual cycle time, excluding time in transient conditions. Maximum cycle time shall be 15 minutes. A cycle approved in advance by the Administrator shall be used.

(a) Emission data engines: Each emission data engine shall be operated for 125 hours with all emission control systems installed and operating. Emission tests shall be conducted at zero and 125 hours. Evaporative emission controls need not be connected provided normal operating conditions are maintained in the engine induction system.

(b) Durability data engines: Each durability data engine shall be operated, with all emission control systems installed and operating, for 1,500 hours. Emission measurements, as prescribed, shall be made at zero hours and at each 125-hour interval. Evaporative emission controls need not be connected provided normal operating conditions are maintained in the induction systems.

(c) All tests required by this subpart to be conducted after 125 hours of operation or at any multiple of 125 hours may be conducted at any accumulated number of hours within 8 hours of 125 hours or the appropriate multiple of 125 hours, respectively.

(d)(1) The results of each emission test shall be supplied to the Administrator within 72 hours (or delivered within five working days). The manufacturer shall furnish to the Administrator an explanation for voiding any test. The Administrator will determine if voiding the test was appropriate based upon the explanation given by the manufacturer for the voided test. If a manufacturer conducts multiple tests at any test point at which the data are intended to be used in the calculation of the deterioration factor, the number of tests must be the same at each point and may not exceed three valid tests. Tests between test points may be conducted as required by the Administrator. Data from all tests (including voided tests) shall be air posted to the Administrator within 72 hours (or delivered within five working days). In addition, all test data shall be compiled and provided to the Administrator in accordance with § 85.774-4. Where the Administrator conducts a test on a durability engine at a prescribed test point, the results of that test will be used in the calculation of the deterioration factor.

(2) The results of all emission tests shall be recorded and reported to the Administrator using two places to the right of the decimal point. These numbers shall be rounded in accordance with the "Rounding Off Method" specified in ASTM E 29-67.

(e) Whenever the manufacturer proposes to operate and test an engine which

may be used for emission or durability data, he shall provide the zero-hour test data to the Administrator and make the engine available for such testing under § 85.774-29 as the Administrator may require, before beginning to accumulate hours on the engine. Failure to comply with this requirement will invalidate all test data later submitted for this engine.

(f) Once a manufacturer begins to operate an emission data or durability data engine, as indicated by compliance with paragraph (e) of this section, he shall continue to run the engine to 125 hours or 1,500 hours, respectively, and the data from the engine will be used in the calculations under § 85.774-19. Discontinuation of an engine shall be allowed only with the prior written consent of the Administrator.

(g)(1) The Administrator may elect to operate and test any test engine during all or any part of the service accumulation and testing procedure. In such cases, the manufacturer shall provide the engine(s) to the Administrator with all information necessary to conduct the testing.

(2) The test procedures (§ 85.774-10 through § 85.774-18) will be followed by the Administrator. The Administrator will test the engines at each test point. Maintenance may be performed by the manufacturer under such conditions as the Administrator may prescribe.

(3) The data developed by the Administrator for the engine-system combination shall be combined with any applicable data supplied by the manufacturer on other engines of that combination to determine the applicable deterioration factors for the combination. In the case of a significant discrepancy between data developed by the Administrator and that submitted by the manufacturer, the Administrator's data shall be used in the determination of deterioration factors.

(h) Emission testing of any type with respect to any certification engine other than that specified in this subpart is not allowed except as such testing may be specifically authorized by the Administrator.

§ 85.774-8 Special test procedures.

The Administrator may, on the basis of a written application therefor by a manufacturer, prescribe test procedures, other than those set forth in this subpart, for any motor vehicle engine which

he determines is not susceptible to satisfactory testing by the procedures set forth herein.

§ 85.774-9 Test procedures.

The procedures described in this and subsequent sections will be the test program to determine the conformity of engines with the standards set forth in § 85.774-1.

(a) The test consists of prescribed sequences of engine operating conditions to be conducted on an engine dynamometer. The exhaust gases generated during engine operation are sampled continuously for specific component analysis through the analytical train. The test is applicable to engines equipped with catalytic or direct-flame afterburners, induction system modifications, or other systems, or to uncontrolled engines.

(b) The test is designed to determine the brake-specific emissions of hydrocarbons, carbon monoxide, and oxides of nitrogen during a truck driving pattern in a metropolitan area as simulated on an engine dynamometer. The test consists of two warmup cycles and two hot cycles. The average brake-specific emission values for the warmup cycles and the hot cycles are combined to yield the reported values.

(c) When an engine is tested for exhaust emissions or is operated for durability testing on an engine dynamometer, the fan and optional belt driven accessories will not be installed. Evaporative emission controls need not be connected if data are provided to show that normal operating conditions are maintained in the engine induction system.

(d) Except in cases of component malfunction or failure, all emission control systems installed on or incorporated in a new motor vehicle engine shall be functioning during all procedures in this subpart. Maintenance to correct component failure or malfunction shall be authorized in accordance with § 85.774-6.

§ 85.774-10 Gasoline specifications.

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

Item	ASTM designation	Leaded	Unleaded
Octane, Research minimum	D1656	100	96
Pb. (organic), grams/U.S. gallons		1.4 minimum	0.00-0.05
Distillation range	D86		
IBP, °F		75-95	75-95
10 percent point, °F		120-135	120-135
50 percent point, °F		200-230	200-230
90 percent point, °F		300-325	300-325
EP, °F (maximum)		415	415
Sulfur, weight percent, maximum	D1266	0.10	0.10
Phosphorus, grams/U.S. gallons, maximum		0.01	0.005
RVP, pound	D823	8.0-9.2	8.0-9.2
Hydrocarbon composition	D1319		
Olefins, percent, maximum		10	10
Aromatics, percent, maximum		35	35
Saturates		Remainder	Remainder

(b) Fuels representative of commercial fuels which will be generally available through retail outlets shall be used in service accumulation. For unleaded fuel, the minimum lead content shall be 0.02 grams per U.S. gallon and the minimum phosphorus content shall be 0.002 grams per U.S. gallon. For leaded fuel, the minimum lead content shall be 1.4 grams per U.S. gallon, except that where the Administrator determines that engines represented by a test engine will be operated using fuels of different lead content than that prescribed in this paragraph, he may

consent in writing to use of a fuel with a different lead content. The octane rating of the fuel used shall be no higher than 4.0 research octane numbers above the minimum recommended by the manufacturer.

§ 85.774-11 Dynamometer operation cycle and equipment.

(a) (1) The following nine-mode cycle shall be followed in dynamometer operation tests of gasoline-fueled heavy duty engines.

Sequence No.	Mode	Manifold Vacuum	Time In Mode-Sees.	Cumulative Time-Sees.	Weighting factors
1	Idle	16" Hg.	70	70	0.232
2	Cruise	16" Hg.	23	93	.077
3	PTA	16" Hg.	44	137	.147
4	Cruise	16" Hg.	23	160	.077
5	PTD	19" Hg.	17	177	.067
6	Cruise	19" Hg.	24	201	.077
7	L	20" Hg.	23	224	.077
8	CT	16" Hg.	23	247	.077
9	CT	16" Hg.	43	290	.143

(2) The engine dynamometer shall be operated at a constant speed of 2,000 r.p.m. \pm 100 r.p.m. (Speed deviations, not to exceed 200 r.p.m., will be allowed during the first four seconds of each mode.)

(3) The idle operating mode shall be carried out at the manufacturer's recommended engine speed. The CT operating mode shall be carried out at the same engine speed as in paragraph (b) of this section.

(4) If the specified manifold vacuum can not be reached during the PTD mode, the engine shall be operated at closed throttle during that mode. If the specified manifold vacuum can not be reached during the FL mode, the engine shall be operated at wide open throttle during that mode.

(b) The following equipment shall be used for dynamometer tests.

(1) An engine dynamometer capable of maintaining constant speed \pm 100 r.p.m. from full throttle to closed throttle motoring.

(2) A chassis-type exhaust system or substantially equivalent exhaust system shall be used.

(3) A radiator typical of that used with the engine in a vehicle, or other means of engine cooling which will maintain the engine operating temperatures at approximately the same temperature

as would the radiator, shall be used. An auxiliary fixed speed fan may be used to maintain engine cooling during sustained operation on the dynamometer.

§ 85.774-12 Dynamometer procedures.

An initial 5-minute idle, two warmup cycles, and two hot cycles constitute a complete dynamometer run. Idle modes may be run at the beginning and end of each test, thus eliminating the need to change speed between cycles. One idle mode preceding the first cycle and one following the fourth cycle is sufficient. The results of the first idle shall be used for calculation of the second cycle emissions and the fourth idle results shall be used for calculation of the third cycle emissions.

§ 85.774-13 Sampling and analytical system for measuring exhaust emissions.

(a) *Schematic drawing.* The following (fig. H774-1) is a schematic drawing of the exhaust gas sampling and analytical system which shall be used for testing under the regulations in this subpart. Since various configurations of the required components can produce accurate results, exact conformance with this schematic is not required.

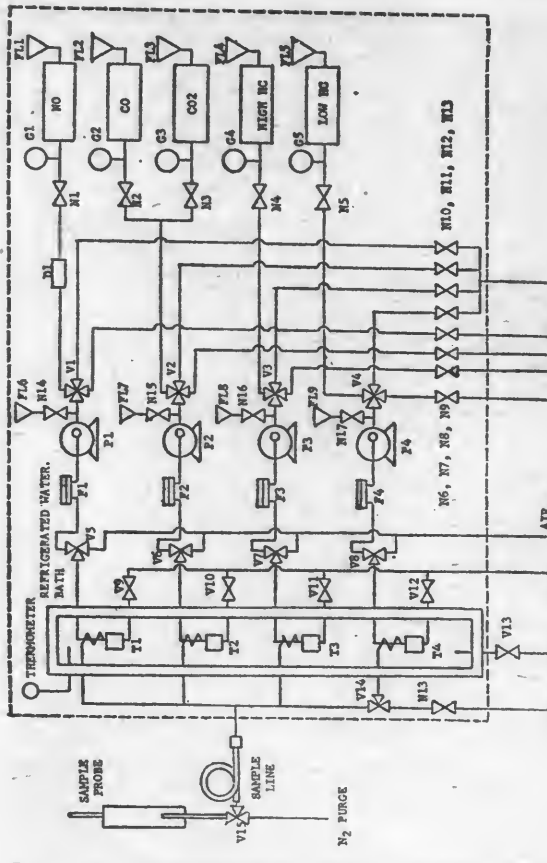


FIGURE H774-1. -- Flow schematic of exhaust gas analysis system employed in Federal facilities:

- (b) Component description. The following components shall be used in sampling and analytical systems for testing under the regulations in this subpart. Other types of sampling and analytical systems may be used if shown to yield equivalent results and if approved in advance by the Administrator.
- (1) Flowmeters FL1, FL2, FL3, FL4, and FL5 for indicating the sample flow rate through the analyzers.
 - (2) Nitric oxide NDIR analyzer.
 - (3) Carbon monoxide NDIR analyzer.
 - (4) Carbon dioxide NDIR analyzer.
 - (5) High-range hydrocarbon NDIR analyzer.
 - (6) Low-range hydrocarbon NDIR analyzer.
 - (7) Pressure gauges G1, G2, G3, G4, and G5 for indicating the analyzer sample pressure.
 - (8) Needle valves N1, N2, N3, N4, and N5 for regulating the sample flow rate to the analyzers.
 - (9) Drier D1 for removing water vapor from the sample.
 - (10) Needle valves N6, N7, N8, N9, N10, N11, N12, and N13 for regulating the flow rates of N₂ and span gases to the analyzers.
 - (11) Ball valves V1, V2, V3, and V4 for directing either sample or span gases to the analyzers.
 - (12) Needle valves N14, N15, N16, and N17 regulate the sample flow rate through the bypass system.
 - (13) Flowmeters FL6, FL7, FL8, and FL9 for indicating the flow rate through the bypass system.
 - (14) Pumps P1, P2, P3, and P4 for forcing the sample through the analyzers.
 - (15) Filters F1, F2, F3, and F4 for removing contaminants from sample prior to analysis.
 - (16) Ball valves V5, V6, V7, and V8 for directing sample gas to the analyzers or for backflushing the sampling system with air or nitrogen.
 - (17) Toggle valves V9, V10, V11, V12, and V13 for draining the condensate traps and the refrigerated bath.
 - (18) Traps T1, T2, T3, and T4 for separating condensed water vapor from the cooled sample gases.

(19) Ball valve V14 for diverting air to the low-range hydrocarbon analyzer during periods of high hydrocarbon concentrations in the exhaust sample.

(20) Needle valve N18 for regulating the air flow to the low-range hydrocarbon analyzer during purge conditions.

(21) Thermometer for indicating the bath temperature.

(22) Refrigerated water bath for cooling the sample gases.

(23) Sample line for connecting the analysis system to the sample probe.

(24) Sample probe for extracting a sample of the exhaust downstream of the muffler.

(25) Ball valve V15 for directing nitrogen through the sampling system.

§ 85.774-14 Information to be recorded.

The following information shall be recorded with respect to each test:

- (a) Test number.
- (b) System tested (brief description).
- (c) Date and time of day for each part of the test schedule.
- (d) Instrument Operator.
- (e) Driver or Operator.
- (f) Engine Make—identification number—date of manufacture—number of hours—engine displacement—engine family—idle r.p.m.—number carburetors—number of carburetor venturils.
- (g) All pertinent instrument information such as tuning—gain—serial numbers—detector numbers—range.
- (h) Barometric pressure, intake air temperature and humidity and, as applicable, the temperature of the air in front of the radiator during the test.

(i) Brake horsepower and fuel consumption during each mode.

(j) Analyzer responses, continuously recorded with zero, span and sample traces identified on each chart.

(k) Intake manifold vacuum and engine r.p.m. continuously recorded on the same chart.

(l) The analyzer recorders and the manifold vacuum-engine r.p.m. recorder shall be provided with automatic markers which indicate one second intervals. Chart paper preprinted with one second intervals may be used in lieu of the automatic markers provided the use of the correct chart speeds is verified on the charts for each test run.

§ 85.774-15 Calibration and instrument checks.

(a) The instrument assembly shall be calibrated at least once every 30 days, using the same flow rate as when sampling exhaust and proceeding as follows:

- (1) Tune analyzers.
- (2) Zero the analyzers with zero grade air or nitrogen. The allowable zero gas impurity concentrations should not exceed 10 p.p.m. equivalent carbon response, 10 p.p.m. carbon monoxide and 1 p.p.m. nitric oxide. Set the instrument

gain to give the desired range. Normal operating ranges are as follows:

Low-range hydrocarbon analyzer.	0-1,000 p.p.m. hexane equivalent.
High-range hydrocarbon analyzer.	0-10,000 p.p.m. hexane equivalent.
CO analyzer-----	0-10 percent CO.
CO ₂ analyzer-----	0-16 percent CO.
NO analyzer-----	0-4,000 p.p.m. NO.

Lower operating ranges may be used as required.

(3) Calibrate with the following calibration gases. Flow rates should be set at 10 c.f.h. on the hydrocarbon and nitric oxide analyzers and 5 c.f.h. on the carbon monoxide and carbon dioxide analyzers. The concentrations given indicate nominal concentrations, and actual concentrations should be known to within ±2 percent of true value. Purified N₂ is used as the diluent.

Low range HC analyzer—Hexane equivalent ¹	High range HC analyzer—Hexane equivalent	NO analyzer—NO	CO and CO ₂ analyzers—Blend of CO and CO ₂ containing—	CO plus CO ₂
p.p.m.	p.p.m.	p.p.m.	Mole percent	Mole percent
100-----	6.0-----	250-----	0.5	16.0
200-----	1,000-----	500-----	1.0	15.0
300-----	1,500-----	750-----	2.0	14.0
400-----	2,500-----	1,000-----	3.0	13.0
600-----	4,000-----	1,500-----	4.0	12.0
800-----	6,000-----	2,000-----	6.0	10.0
1,000-----	8,000-----	2,500-----	8.0	8.0
	10,000-----	3,000-----	10.0	6.0
		3,500-----	-----	-----
		4,000-----	-----	-----

¹ The hexane equivalent of propane, when used as the normalizing gas for calibrating nondispersive infrared analyzers, is prescribed to be 0.52 (propane concentration × 0.52=hexane equivalent concentration). Minimum storage temperature of the cylinders shall be 60° F.; minimum use temperature shall be 68° F.

(4) Compare values with previous curves. Any significant change reflects some problem in the system. Locate and correct problem, and recalibrate. Use best judgment in selecting curve for data reduction.

(5) Check response of hydrocarbon analyzer to 100 percent CO₂. If response is greater than 0.5 percent full scale, refill filter cells with 100 percent CO₂ and recheck. Note any remaining response on chart. If response still exceeds 0.5 percent, replace detector.

(6) Check response of hydrocarbon analyzers to nitrogen saturated with water at ambient temperature. Record ambient temperature. If the low-range instrument response exceeds 5 percent of full scale with saturated nitrogen at 75° F., replace the detector. If the high-range response exceeds 0.5 percent of full scale, check detector on low-range instrument, then reject if response exceeds 5 percent of full scale at 75° F.

(b) The following daily instrument check shall be performed, allowing a minimum of 2 hours warmup for infrared analyzers. (Power is normally left on continuously; but, when instruments

are not in use, chopper motor is turned off.):

(1) Zero on clean nitrogen introduced at analyzer inlet. Obtain a stable zero on the amplifier meter and recorder. Recheck after test.

(2) Introduce the span gas and set the analyzer gain to match the response to the value indicated by the calibration curve. In order to avoid a correction for sample cell pressure, use the same flow rate as that used to calibrate the analyzer. The span gas should produce a signal from 80 to 100 percent of the full scale response. The concentration of the span gas should be known within ±2 percent of the actual gain. If gain has shifted by more than 3 percent of scale, check tuning. If necessary, check calibration. Recheck after test. Record actual concentrations on chart.

(3) Check nitrogen zero, repeat the procedure in paragraphs (b) (1) and (2) of this section if required.

(4) Check flow rates and pressures.

§ 85.774-16 Dynamometer test run.

(a) (1) Mount test engine on the engine dynamometer.

(2) Start the engine and precondition it by operation over one or more cycles prescribed for service accumulation (§ 85.774-7) or dynamometer operation (§ 85.774-11) until the engine has reached normal operating conditions. The engine shall not be exposed to precipitation or condensation after preconditioning.

(3) The engine shall be turned off and allowed to stand for at least 1 hour, but not more than 2 hours, at an ambient temperature of 60° F to 86° F.

(b) The following steps shall be taken for each test:

(1) Maintain the ambient temperature between 68° F and 86° F.

(2) Calibrate exhaust emission analyzer assembly.

(3) Check the condition of the drier in the nitric oxide analyzer sampling line. Replace the drying agent if necessary.

(4) Insert the sample line at least 2 feet into the tailpipe. When this is not possible, a tailpipe extension should be used. Where dual exhaust tailpipes are employed, a sample probe shall be inserted in each exhaust tailpipe and the two probes shall be connected to form a common sample line. The variation between the two sample probe lengths shall be no greater than four inches. The sample probes shall be inserted in the same manner, made from the same material, and have the same diameter and configuration.

(5) Start cooling system, if it is to be used.

(6) Start the engine and operate within the manufacturer's r.p.m. specifications for off-idle operation.

(7) Return the engine throttle control to the normal idle position, start sample flow and recorders. A minimum chart speed of 6 inches per minute shall be used.

(8) Run four nine-mode cycles.

(c) Upon completion of the test, purge the sample line with nitrogen to establish a constant hydrocarbon "hangup" level. The hydrocarbon concentration shall drop to 5 percent or less of full scale within 10 seconds and 3 percent or less of full scale within 3 minutes or the test is invalid. Check calibration of exhaust emission instruments. A drift in excess of 2 percent of full scale in the calibration of any one of the exhaust emission analyzers will invalidate the test results.

§ 85.774-17 Chart reading.

The exhaust gas analyzer recorder response always lags the engine's operation because of a variable exhaust system delay and a fixed sample system delay. Therefore, the analyzer responses for each mode may not be located on the charts at a point corresponding to the exact time of the mode. For each warm-up or hot cycle to be evaluated, proceed as follows:

(a) Determine whether the cycle was run in accordance with the procedure specified in § 85.774-11 by observing either chart pips, speed trace, manifold vacuum trace, or concentration traces. The test will be invalidated if there is a deviation by more than:

- (1) two seconds from the specified time for the CT mode, or
- (2) 0.3 inch Hg during the cruise and PTD modes, or more than 0.2 inch Hg during the PTA and FL modes from the specified mode vacuums during the last ten seconds of a mode, or
- (3) 200 r.p.m. during the first four seconds of each mode, or 100 r.p.m. during the remainder of each mode.

(b) Time correlate the hydrocarbon, carbon monoxide, carbon dioxide, and nitric oxide charts. Determine the location on the chart of analyzer response corresponding to each mode. Determine and compensate for trace abnormalities.

(c) Locate the last 3 seconds of the HC, CO, CO₂, and NO traces obtained from the 3 inch, 10 inch, 16 inch, 19 inch and idle modes. Divide this portion of each trace into a minimum of three segments of equal length. Determine the chart reading at the end of each segment to within 0.5 percent of full scale. Convert these readings into concentration values. Determine the average of these values.

(d) The values recorded for the initial idle mode are used for both warmup cycles 1 and 2. The final idle mode values are applied to hot cycles 3 and 4.

(e) Locate the HC, CO, CO₂, and NO closed throttle mode traces. Divide each trace into a minimum of 43 segments of equal length. Determine the chart reading at the end of each segment to within 0.5 percent of full scale. Convert these

readings into concentration values. Determine the average of these values.

(f) Direct computer analysis of analyzer output may be utilized provided that the analysis is sufficiently similar to the above procedures to result in comparable data results and the analyzer output is continuously recorded at a chart speed of at least 3 inches per minute with an automatic marker being used to identify the time intervals during which data are accepted by the computer for processing.

§ 85.774-18 Calculations.

The final reported test results shall be derived through the following steps:

(a) Determine total carbon (TC) equivalent concentration in accordance with the following:

$$TC = \%CO_2 + \%CO + (1.8 \times 6)\%HC$$

(b) Calculate the mass emission for HC (HC_{mode}), CO (CO_{mode}), and NO_x (NO_{xmode}) in grams per hour for each mode as follows:

$$(1) HC_{mode} = 10.8 \times 10^{-4} \times HC_{mode} \text{ (p.p.m.)} \times \frac{\text{Fuel consumption (gms./hr.)}}{TC}$$

$$(2) CO_{mode} = 2.02 \times CO_{mode} (\%) \times \frac{\text{Fuel consumption (gms./hr.)}}{TC}$$

$$(3) NO_{xmode} = 3.32 \times 10^{-4} \times NO_{xmode} \text{ (p.p.m.)} \times \frac{\text{Fuel consumption (gms./hr.)}}{TC}$$

(c) Multiply the HC_{mode}, CO_{mode}, and NO_{xmode} values for each mode by the appropriate weighting factors.

(d) Multiply the measured brake horsepower values for each mode by the appropriate weighting factors. Horsepower for the idle and closed throttle mode shall be defined as "zero" for calculation purposes. (Negative values are not used.)

(e) Calculate the brake specific emissions for HC, CO, and NO_x for each cycle as follows:

$$(1) BSHC = \frac{\sum(HC_{mode} \times WF)}{\sum(\text{Measured BHP} \times WF)}$$

$$(2) BSCO = \frac{\sum(CO_{mode} \times WF)}{\sum(\text{Measured BHP} \times WF)}$$

$$(3) BSNO_x = \frac{\sum(NO_{xmode} \times WF)}{\sum(\text{Measured BHP} \times WF)}$$

(f) Average the composite BSHC, BSCO, BSNO_x emissions of the first and second cycles.

(g) Average the composite BSHC, BSCO, and BSNO_x emissions of the third and fourth cycles.

(h) Combine the results of (f) and (g) according to the formula: $0.35 \times \text{composite of (f)} + 0.65 \times \text{composite of (g)}$.

(i) Correct the BSNO_x value for the humidity at test conditions by multiplying by conversion factor "K" where:

$$K = 0.634 + 0.00654H - 0.0000222H^2$$

H = Humidity at test conditions, grain H₂O/lb. dry air.

§§ 85.774-19—85.774-27 [Reserved]

§ 85.774-28 Compliance with emission standards.

(a) The exhaust emission standards in § 85.774-1 apply to the emissions of engines for their useful life.

(b) Since emission control efficiency decreases with the accumulation of hours on the engine, the emission level of an engine which has accumulated 1,500 hours of dynamometer operation will be used as the basis for determining compliance with the standards.

(c) The procedure for determining compliance of a new engine with exhaust emission standards is as follows:

(1) Separate emission deterioration factors shall be determined from the emission results of the durability data engines for each engine-system combination. Separate factors shall be established for CO and for the combined emissions of HC and NO_x.

(i) The applicable results to be used in determining the deterioration factors for each combination shall be:

(A) All emission data from the tests required under § 85.774-7(b), except the zero-hour tests. This shall include the official test results, as determined in

§ 85.774-29, for all tests conducted on all durability engines of the combination selected under § 85.774-5(c) (including all engines elected to be operated by the manufacturer under § 85.774-5(c)(3)).

(B) All emission data from the tests conducted before and after maintenance provided in § 85.774-6(a)(1)(i).

(C) All emission data from the tests conducted before and after maintenance provided in § 85.774-6(a)(5)(iii) if emission tests were conducted.

(ii) All applicable emission results for (A) HC+NO_x and (B) CO shall be plotted as a function of durability hours which shall be consistently rounded to the nearest hour. Emission data shall have two figures to the right of the decimal. The best fit straight lines ((A) HC+NO_x and (B) CO), fitted by the method of least squares, shall be drawn through these data points. The interpolated 125-hour and 1500-hour points on each line, rounded to whole numbers in accordance with ASTM E 29-67, must be within the standards specified in § 85.774-1 or the data shall not be used in the calculation of a deterioration factor, unless no applicable data points exceed the standards.

(iii) The interpolated values shall be used to calculate a deterioration factor as follows:

Factor—Exhaust emissions interpolated to 1500-hours minus the exhaust emissions interpolated to 125-hours.
(Negative deterioration factors shall be considered zero.)

(2) The appropriate deterioration factor, carried out to two places to the right of the decimal point, shall be added to the exhaust emission test results, carried out to two places to the right of the decimal point, for each emission data engine.

(3) The emission values to compare with the standards shall be the adjusted emission values of paragraph (c) (2) of this section rounded to whole numbers in accordance with ASTM E 29-67 for each emission data engine.

(4) Every test engine of an engine family must comply with all applicable standards, as determined in paragraph (c) (3) of this section, before any engine in that family will be certified.

§ 85.774-29 Testing by the Administrator.

(a) The Administrator may require that any one or more of the test engines be submitted to him, at such place or places as he may designate, for the purpose of conducting emissions tests. The Administrator may specify that he will conduct such testing at the manufacturer's facility, in which case instrumentation and equipment specified by the Administrator shall be made available by the manufacturer for test operations. Any testing conducted at a manufacturer's facility pursuant to this paragraph shall be scheduled by the manufacturer as promptly as possible.

(b) (1) Whenever the Administrator conducts a test on a test engine the results of that test, unless subsequently invalidated by the Administrator, shall comprise the official data for the engine at that prescribed test point and the manufacturer's data for that prescribed test point shall not be used in determining compliance with emission standards.

(2) Whenever the Administrator does not conduct a test on a test engine at a test point, the manufacturer's test data will be accepted as the official data for that test point: *Provided*, That if the Administrator makes a determination based on testing under paragraph (a) of this section, that there is a lack of correlation between the manufacturer's test equipment and the test equipment used by the Administrator, no manufacturer's test data will be accepted for purposes of certification until the reasons for the lack of correlation are determined and the validity of the data is established by the manufacturer. *And further provided*, That if the Administrator has reasonable basis to believe that any test data submitted by the manufacturer is not accurate or has been obtained in violation of any provision of this part, the Administrator may refuse to accept that data as the official data pending retesting or submission of further information.

(3) (i) The emission data engine presented to the Administrator for testing

shall be calibrated within the production tolerances applicable to the manufacturer's specifications to be shown on the engine label (see § 85.774-35(a) (4) (v)) as specified in the application for certification. If the Administrator determines that an engine is not within such tolerances, the engine shall be adjusted at the facility designated by the Administrator prior to the test and an engineering report shall be submitted to the Administrator describing the corrective action taken. Based on the engineering report the Administrator will determine if the engine shall be used as an emission data engine.

(ii) If the Administrator determines that the test data developed under paragraph (b) (3) (i) would cause the emission data engine to fail due to excessive 125-hour emission values or by the application of the appropriate deterioration factor, then the following procedure shall be observed:

(A) The manufacturer may request a retest. Before the retest, the engine may be readjusted to manufacturer's specifications, if these adjustments were made incorrectly prior to the first test, and other maintenance or repairs may be performed in accordance with § 85.774-6. All work on the engine shall be done at such location and under such conditions as the Administrator may prescribe.

(B) The engine will be retested by the Administrator and the results of this test shall comprise the official data for the emission data engine.

(4) If sufficient durability data are not available at the time of any emission test conducted under paragraph (a) of this section to enable the Administrator to determine whether an emission data engine would fail, the manufacturer may request a retest in accordance with the provisions of paragraphs (b) (3) (i) (A) and (B) of this paragraph. If the manufacturer does not promptly make such request, he shall be deemed to have waived the right to a retest. A request for retest must be made before the manufacturer removes the engine from the test premises.

§ 85.774-30 Certification.

(a) (1) If, after a review of the test reports and data submitted by the manufacturer, data derived from any inspection carried out under § 85.706(c), and any other pertinent data or information, the Administrator determines that a test engine(s) meets the requirements of the Act and of this subpart, he will issue a certificate of conformity with respect to such engine(s) except in cases covered by paragraph (c) of this section.

(2) Such certificate will be issued for such period not to exceed one model year as the Administrator may determine and upon such terms as he may deem necessary to assure that any new motor vehicle engine covered by the certificate will meet the requirements of the Act and of this subpart. Each such certificate shall contain the following language:

This certificate covers only those new motor vehicle engines which conform, in all material respects, to the design specifications that applied to those engines described in the application for certification and which are

produced during the ---- model year production period of the said manufacturer, as defined in 40 CFR 85.702(a) (3).

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 85.706(c) which concern either the engine certified, or any production engine covered by this certificate, or any production engine which when completed will be claimed to be covered by this certificate. Failure to comply with all the requirements of § 85.706(c) with respect to any such engine may lead to revocation or suspension of this certificate as specified in 40 CFR 85.774-30(c). It is also a term of this certificate that this certificate may be revoked or suspended for the other reasons stated in § 85.774-30(c).

(b) (1) The Administrator will determine whether an engine covered by the application complies with applicable standards by observing the following relationships:

(i) A test engine selected under § 85.774-5(b) (2) and (4), shall represent all engines in the same engine family of the same engine displacement-exhaust emission control system combination.

(ii) A test engine selected under § 85.774-5(b) (3) shall represent all engines in the same engine family of the same engine displacement-exhaust emission control system combination.

(iii) A test engine selected under § 85.774-5(c) (1), shall represent all engines of the same engine-system combination.

(2) The Administrator will proceed as in paragraph (a) of this section with respect to the engines belonging to an engine family all of which comply with applicable standards.

(3) If, after a review of the test reports and data submitted by the manufacturer, data derived from any additional testing conducted pursuant to § 85.774-29, data or information derived from any inspection carried out under § 85.706(c), or any other pertinent data or information, the Administrator determines that one or more test engines of the certification test fleet do not meet applicable standards, he will notify the manufacturer in writing, setting forth the basis for his determination. Within 30 days following receipt of the notification, the manufacturer may request a hearing on the Administrator's determination. The request shall be in writing, signed by an authorized representative of the manufacturer and shall include a statement specifying the manufacturer's objections to the Administrator's determination, and data in support of such objections. If, after a review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, he shall provide the manufacturer a hearing in accordance with § 85.705 with respect to such issue.

(4) The manufacturer may, at his option, proceed with any of the following alternatives with respect to any engine family represented by a test engine(s) determined not in compliance with applicable standards:

(i) Request a hearing under § 85.705, or

(ii) Delete from the application for certification the engines represented by the failing test engine. (Engines so deleted may be included in a later request for certification under § 85.774-32.) The Administrator will then select in place of each failing engine an alternate engine chosen in accordance with selection criteria employed in selecting the engine that failed, or

(iii) Modify the test engine and demonstrate by testing that it meets applicable standards. Another engine which is in all material respects the same as the first engine, as modified, shall then be operated and tested in accordance with applicable test procedures.

(5) If the manufacturer does not request a hearing or present the required data under subparagraph (4) of this paragraph, the Administrator will deny certification.

(c) (1) Notwithstanding the fact that any certification engine(s) may comply with other provisions of this subpart, the Administrator may withhold or deny the issuance of a certificate of conformity (or suspend or revoke any such certificate which has been issued) with respect to any such engine(s) if:

(i) The manufacturer submits false or incomplete information in his application for certification thereof; or

(ii) The manufacturer renders inaccurate or invalid any test data which he submits pertaining thereto or otherwise circumvents the intent of the Act or of this subpart with respect to such engine; or

(iii) Any EPA Enforcement Officer is denied access on the terms specified in § 85.706(c) to any facility or portion thereof which contains any of the following:

(A) The engine, or

(B) Any components used or considered for use in its modification or build up into a certification engine, or

(C) Any production engine which is or will be claimed by the manufacturer to be covered by the certificate, or

(D) Any step in the construction of an engine described in (C) of this subdivision, or

(E) Any records, documents, reports or histories required by this part to be kept concerning any of the above.

(iv) Any EPA Enforcement Officer is denied "reasonable assistance" (as defined in § 85.706(c)) in examining any of the items listed in paragraph (c) (1) (iii) of this section.

(2) The sanctions of withholding, denying, revoking, or suspending of a certificate may be imposed for the reasons in paragraphs (c) (1) (i), (ii), (iii), or (iv) of this section only when the infraction is substantial.

(3) In any case in which a manufacturer knowingly submits false or inaccurate information or knowingly renders inaccurate or invalid any test data or commits any other fraudulent acts and such acts contribute substantially to the Administrator's decision to issue a certificate of conformity, the Administrator may deem such certificate void ab initio.

(4) In any case in which certification of an engine is proposed to be withheld, denied, revoked, or suspended under paragraph (c) (1) (iii), or (c) (1) (iv) of this section, and in which the Administrator has presented to the manufacturer involved reasonable evidence that a violation of § 85.706(c) in fact occurred, the manufacturer, if he wishes to contend that, even though the violation occurred, the engine in question was not involved in the violation to a degree that would warrant withholding, denial, revocation, or suspension of certification under either paragraph (c) (1) (iii) or (c) (1) (iv) of this section, shall have the burden of establishing that contention to the satisfaction of the Administrator.

(5) Any revocation or suspension of certification under paragraph (c) (1) of this section shall:

(i) Be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with § 85.705 hereof.

(ii) Extend no further than to forbid the introduction into commerce of engines previously covered by the certification which are still in the hands of the manufacturer, except in cases of such fraud or other misconduct as makes the certification invalid ab initio.

(6) The manufacturer may request in the form and manner specified in paragraph (b) (3) of this section that any determination made by the Administrator under paragraph (c) (1) of this section to withhold or deny certification be reviewed in a hearing conducted in accordance with § 85.705. If the Administrator finds after a review of the request and supporting data, that the request raises a substantial factual issue, he shall grant the request with respect to such issue.

§ 85.774-31. Separate certification.

Where possible a manufacturer should include in a single application for certification all engines for which certification is required. A manufacturer may, however, choose to apply separately for certification of part of his product line. The selection of test engines and the computation of test results will be determined separately for each application.

§ 85.774-32. Addition of an engine after certification.

(a) If a manufacturer proposes to add to his product line an engine of the same engine-system combination as engines previously certified but which was not described in the application for certification when the test engine(s) representing other engines of that combination was certified, he shall notify the Administrator. Such notification shall be in advance of the addition unless the manufacturer elects to follow the procedure described in § 85.774-34. This notification shall include a full description of the engine to be added.

(b) The Administrator may require the manufacturer to perform such tests on the engine(s) representing the engine to be added which would have

been required if the engine had been included in the original application for certification.

(c) If, after a review of the test reports and data submitted by the manufacturer, and data derived from any testing conducted under § 85.774-29, the Administrator determines that the test engine(s) meets all applicable standards, the appropriate certificate will be amended accordingly. If the Administrator determines that the test engine(s) does not meet applicable standards, he will proceed under § 85.774-30(b).

§ 85.774-33. Changes to an engine covered by certification.

(a) The manufacturer shall notify the Administrator of any change in production engines in respect to any of the parameters listed in §§ 85.774-5(a) (2) and (3), giving a full description of the change. Such notification shall be in advance of the change unless the manufacturer elects to follow the procedure described in § 85.774-34.

(b) Based upon the description of the change, and data derived from such testing as the Administrator may require or conduct, the Administrator will determine whether the engine, as modified, would still be covered by the certificate of conformity then in effect.

(c) If the Administrator determines that the outstanding certificate would cover the modified engines, he will notify the manufacturer in writing. Except as provided in § 85.774-34, the change may not be put into effect prior to the manufacturer's receiving this notification. If the Administrator determines that the modified engines would not be covered by the certificate then in effect, then the modified engines shall be treated as additions to the product line subject to § 85.774-32.

§ 85.774-34. Alternative procedure for notification of additions and changes.

(a) A manufacturer may, in lieu of notifying the Administrator in advance of an addition of an engine under § 85.774-32 or a change in an engine under § 85.774-33, notify him concurrently with the making of the change if the manufacturer believes the addition or change will not require any testing under the appropriate section. Upon notification to the Administrator, the manufacturer may proceed to put the addition or change into effect.

(b) The manufacturer may continue to produce engines as described in the notification to the Administrator for a maximum of 30 days, unless the Administrator grants an extension in writing. This period may be shortened by a notification in accordance with paragraph (c) of this section.

(c) If the Administrator determines, based upon a description of the addition or change, that no test data will be required, he will notify the manufacturer in writing of the acceptability of the addition or change. If the Administrator determines that test data will be required, he will notify the manufacturer

to rescind the change within 5 days of receipt of the notification. The Administrator will then proceed as in § 85.774-32 (b) and (c), or § 85.774-33 (b) and (c) as appropriate.

(d) Election to produce engines under this section will be deemed to be a consent to recall all engines which the Administrator determines under § 85.774-32(c) do not meet applicable standards, and to cause such nonconformity to be remedied at no expense to the owner.

§ 85.774-35 Labeling.

(a) (1) The manufacturer of any heavy duty gasoline-fueled engine subject to the standards prescribed in § 85.744-1 shall, at the time of manufacture, affix a permanent, legible label, of the type and in the manner described below, containing the information hereinafter provided, to all production models of such engines available for sale to the public and covered by a certificate of conformity under § 85.774-30(a).

(2) The plastic or metal label shall be welded, bonded, or otherwise permanently attached to the engine in a position in which it will be readily visible after installation in the vehicle.

(3) The label shall be attached to an engine part necessary for normal engine operation and not normally requiring replacement during engine life.

(4) The label shall contain the following information lettered in the English language in block letters and numerals which shall be of a color that contrasts with the background of the label:

(i) The label heading: Engine Exhaust Emission Control Information;

(ii) Full corporate name and trademark of manufacturer;

(iii) Engine displacement (in cubic inches) and engine family identification;

(iv) Date of engine manufacture (month and year);

(v) Engine tuneup specifications and adjustments as recommended by the manufacturer, including idle speed, ignition timing, and the idle air-fuel mixture setting procedure and value (e.g., idle CO, idle air-fuel ratio, idle speed drop) and valve lash. These specifications should indicate the proper transmission position during tuneup and what accessories (e.g., air conditioner), if any, should be in operation;

(vi) The statement: "This Engine Conforms to U.S. Environmental Protection Agency Regulations Applicable to 19— Model Year Gasoline-Fueled Heavy Duty Engines."

(b) The provisions of this section shall not prevent a manufacturer from also reciting on the label that such engine conforms to any applicable State emission standards for new motor vehicle engines or any other information that such manufacturer deems necessary for, or useful to, the proper operation and satisfactory maintenance of the vehicle or engine.

(c) The label may be made up of one or more pieces provided that all pieces are permanently attached to the same engine part.

§ 85.774-36 [Reserved]

§ 85.774-37 Production engines.

(a) Any manufacturer obtaining certification under this subpart shall supply to the Administrator, upon his request, a reasonable number of production engines selected by the Administrator which are representative of the engines, emission control systems, fuel systems, and transmissions offered and typical of production models available for sale under the certificate. These engines shall be supplied for testing at such time and place and for such reasonable periods as the Administrator may require. Engines supplied under this paragraph may be required to be mounted in chassis and appropriately equipped for operation on a chassis dynamometer.

(b) Any manufacturer obtaining certification under this subpart shall notify the Administrator, on a quarterly basis, of the number of engines of each engine family-engine displacement-exhaust emission control system-fuel system combination produced for sale in the United States during the preceding quarter.

§ 85.774-38 Maintenance instructions.

(a) The manufacturer shall furnish or cause to be furnished to the purchaser of each new motor vehicle engine subject to the standards prescribed in § 85.774-1, written instructions for the maintenance and use of the engine by the purchaser as may be reasonable and necessary to assure the proper functioning of emission control systems.

(1) Such instructions shall be provided for those engine components listed

in Appendix VI to this part (and for any other components) to the extent that maintenance of these components is necessary to assure the proper functioning of emission control systems.

(2) Such instructions shall be in clear, and to the extent practicable, nontechnical language.

(3) Such instructions shall specify the performance of all scheduled maintenance performed by the manufacturer under § 85.774-6(a). Scheduled maintenance in addition to that performed on the durability engine under § 85.774-6(a) may be recommended for reasons such as to offset the effects of operating conditions which differ from the dynamometer durability cycle or to increase the life of the engine beyond 1500 hours (or the equivalent). The instructions may schedule maintenance on a calendar time basis and/or a mileage basis in addition to the engine service time basis that was followed by the manufacturer under § 85.774-6(a).

(b) The maintenance instructions required by this section shall contain a general description of the documentation which the manufacturer will require from the ultimate purchaser or any subsequent purchaser as evidence of compliance with the instructions.

§ 85.774-39 Submission of maintenance instructions.

(a) The manufacturer shall provide to the Administrator, no later than the time of the submission required by § 85.774-4, a copy of the maintenance instructions which the manufacturer proposes to supply to the ultimate purchaser in accordance with § 85.774-38(a). The Administrator will review such instructions to determine whether they are reasonable and necessary to assure the proper functioning of the engine's emission control systems. The Administrator will notify the manufacturer of his determination whether such instructions are reasonable and necessary to assure the proper functioning of the emission control systems.

(b) Any revision to the maintenance instructions which will affect emissions shall be supplied to the Administrator at least 30 days before being supplied to the ultimate purchaser unless the Administrator consents to a lesser period of time.

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