CHAPTER 27B

SAMPLING AND ANALYTICAL PROCEDURES

Authority

N.J.S.A. 13:1D-5, 13:1D-9. 26:2C-8.

Source and Effective Date

R.1974 d.360. effective December 30, 1974.
See: 7 N.J.R. 48(a).

Executive Order No. 66(1978) Expiration Date

Chapter 27B, Sampling and Analytical Procedures, is exempt from Executive Order No. 66(1978).

Chapter Historical Note

Chapter 27B, Sampling and Analytical Procedures was adopted as R.1974 d.360. effective December 30. 1974. See: 7 N.J.R. 48(a). Chapter 27B was amended and Subchapters 2 and 3 were adopted by R.1975 d.76, effective March 20. 1975. See: 7 N.J.R. 144(a). Revisions which consolidated the prior text of Subchapter 3 (making it Reserved) with Subchapter 1 became effective June 21. 1986 as R.1986 d.121. See: 8 N.J.R. 223(a). Subchapter 4 became effective January 21, 1985 (operative July 1, 1985) as R.1985 d.3. See: 16 N.J.R. 2894(a), 17 N.J.R. 194(a). Subchapter 3, Air Test Method 3: Sampling and Analytical Procedures for the Determination of Volatile Organic Compounds from Source Operations, was adopted as R.1986 d.377, effective September 8, 1986 (operative October 10, 1986). See: 17 N.J.R. 2194(a), 18 N.J.R. 1800(a).

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SUBCHAPTER 1. SAMPLING AND ANALYTICAL PROCEDURES FOR DETERMINING EMISSIONS OF PARTICLES FROM MANUFACTURING PROCESSES AND FROM COMBUSTION OF FUELS

Authority

Unless otherwise expressly noted, all provisions of this Subchapter were adopted pursuant to authority of N.J.S.A. 26:2C-1 et seq. and were filed and became effective on December 30, 1974, as R.1974 d.360. See: 7 N.J.R. 48(a). Revisions to the original rules were filed and became effective on May 20, 1975, as R.1975 d.136. See: 7 N.J.R. 261(d). Further revisions were filed on April 21, 1976, as R.1976 d.121 to become effective on June 21, 1976. See: 8 N.J.R. 223(a).

7:27B–1.1 Definitions

The following words and terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise. Terms not defined in this section are intended to be used as defined in the New Jersey Air Pollution Control Act, N.J.S.A. 26:2C-1 et seq., and Chapter 27 in Title 7 of the New Jersey Administrative Code, or are used in their common engineering or scientific sense. Symbols and nomenclature are defined in Appendix 6.

"Bureau" means the Bureau of Air Pollution Control.

"Department" means the Department of Environmental Protection.

"Equipment diameter" means the diameter of a circular cross section having the same area as a noncircular cross section.

"Performance test" or "test" means a series of test runs used for the purpose of determining emissions of air contaminants to the outdoor atmosphere.

"Run" or "test run" means a single integrated measurement or procedure used for the purpose of collecting a sample of air contaminants emitted to the outdoor atmosphere during a specified time interval.

"Sample collector" means any device used to selectively separate and collect a sample of a specified contaminant from a gas stream, including, but not limited to, thimbles, filters, impingers, bubblers, cyclones, condensers and absorbers.

"Sampling location" means the specific position at which a sampling port is located in a stack or chimney.

"Sampling port" means an opening in a stack or chimney into which sampling or measuring devices may be inserted or through which a sample is extracted.

"Sampling rate" means the volume rate at which stack gases are drawn through a sampling train.

"Sampling train" means a combination of entrapment devices, instruments, and auxiliary apparatus arranged in a prescribed sequence to selectively separate and collect samples of specified air contaminants.

"Sampling velocity" means the linear velocity at which stack gases are drawn through the nozzle of a sampling train.

"Stack gas velocity" means the linear velocity (in the direction of gas flow) at which stack gases pass the sampling train nozzle.

"Standard conditions" means 70 degrees Fahrenheit and one atmosphere pressure (14.7 psia or 760 mm Hg).

"Traverse point" means a predetermined point at which a sample or measurement is obtained inside a stack or chimney.

7:27B–1.2 Acceptable test methods

(a) Because of size and/or inertial effects on the particles to be measured, they are to be collected under isokinetic conditions to ensure that the sample is representative. With isokinetic sampling, that portion of the gas stream from which the particles are entrapped is made to enter the sampling nozzle in the same direction and at the same velocity as the gas stream in the stack or chimney being sampled. The sample weight is determined gravimetrically after removal of uncombined water.

(b) Performance tests shall be conducted in accordance with test methods set forth hereinafter. Alternate test procedures, equipment and/or materials of construction may be used subject to prior approval and/or conditions prescribed by the Department. The Department may itself employ such alternates when warranted by test conditions or other circumstances.

12. ASTM Designation D2698–73, Standard Test Method for the Determination of the Pigment Content of Solvent Reducible Paints by High Speed Centrifuging, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103 ($4.00).

13. ASTM Designation D95–83, Standard Method for Determining Water in Petroleum and Bituminous Materials by Distillation, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103 ($4.00).

14. Method 2–1 California Air Resources Board, Test Procedures for Determining the Efficiency of Gasoline Vapor Recovery Systems at Service Stations. Available from State of California, Air Resources Board, 1102 Q Street, Sacramento, California 95812.

15. ASTM Designation D322–80, Standard Test Method for Gasoline Dilutent in Used Gasoline Engine Oils by Distillation, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103 ($4.00).

16. Code of Federal Regulations, Title 40, Part 60—Reference Methods 2A and 2B are available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

Amended by R.1992 d.102, effective March 2, 1992 (operative March 28, 1992).
See: 23 N.J.R. 1858(b), 24 N.J.R. 792(a).
Repealed and replaced (a)3 regarding vapor pressure measurement methods.

Editor's Note: In addition to the above text, Appendices A through H were filed with these rules, but not reproduced herein. Further information regarding these Appendices may be obtained by contacting:

Bureau of Technical Services
Division of Environmental Quality
Department of Environmental Protection
PO Box 411 (380 Scotch Road)
Trenton, New Jersey 08625–0411

SUBCHAPTER 4. AIR TEST METHOD 4: TESTING PROCEDURES FOR DIESEL–POWERED MOTOR VEHICLES

Authority

N.J.S.A. 13:1D–5, 13:1D–9, 26:2C–8, 26:2C–8.1, 26:2C–8.2 and 26:2C–8.5.

Source and Effective Date

R.1985 d.3, effective January 21, 1985 (operative July 1, 1985).
See: 16 N.J.R. 2894, 17 N.J.R. 184(a).

7:27B–4.1 Definitions

The following words and terms, when used in this subchapter, have the following meanings, unless the context clearly indicates otherwise.

"Alternative smoke opacity standard" means the smoke opacity standard applicable to a specific vehicle-engine-chassis combination, as determined by the procedure set forth at N.J.A.C. 7:27B-4.5.

"California Air Resources Board" or "CARB" means the agency of the State of California established and empowered to regulate sources of air contaminant emissions, including motor vehicles, pursuant to California Health and Safety Code, Sections 39500 et seq.

"Certified configuration" means a heavy-duty diesel engine design or a light-duty diesel-powered motor vehicle-engine-chassis design certified by either of the following agencies as meeting the applicable emission standards for heavy-duty diesel engines or light-duty diesel-powered motor vehicles manufactured in a given model year:

1. EPA, for model year 1971 or for a more recent model year heavy-duty diesel vehicle engine;

2. EPA, for model year 1968 or for a more recent model year light-duty diesel vehicle;

3. CARB, for model year 1973 or for a more recent model year heavy-duty diesel vehicle engine; or

4. CARB, for model year 1966 or for a more recent model year light-duty diesel vehicle.

"Chassis dynamometer" or "dynamometer" means a power absorption device utilizing a set of rollers on which a motor vehicle is driven to simulate on-road vehicle operation.

"Department" means the New Jersey Department of Environmental Protection.

"Dew point" means the temperature to which air must be cooled for saturation to occur.

"Diesel bus" means any diesel-powered autobus or motorbus of any size or configuration, whether registered in this State or elsewhere, that is designed or used for intrastate or interstate transportation of passengers for hire or otherwise on a public road, street or highway or any public or quasi-public property in this State, including, but not limited to, autobuses under the jurisdiction of the New Jersey Department of Transportation pursuant to Titles 27 or 48 of the Revised Statutes; autobuses of the New Jersey Transit Corporation and its contract carriers that are under the inspection jurisdiction of the New Jersey Department of Transportation; autobuses that are subject to Federal motor carrier safety regulations; autobuses under the authority of the Interstate Commerce Commission or its successor agen-

cy; school buses, as defined pursuant to N.J.S.A. 39:1–1; and hotel, casino, charter, and special buses.

"Diesel emissions inspection center" or "DEIC" means a facility licensed by the Division of Motor Vehicles pursuant to N.J.S.A. 39:8–69 and N.J.A.C. 13:20–47.

"Diesel engine" means a compression ignition type of internal combustion engine.

"Diesel-powered" means utilizing a diesel engine.

"Division of Motor Vehicles" or "DMV" means the Division of Motor Vehicles within the New Jersey Department of Transportation.

"Element of design" means any part or system on a motor vehicle or a motor vehicle engine pertaining to the vehicle's or engine's certified configuration.

"Emission control apparatus" means any device utilized by the vehicle manufacturer and/or the engine manufacturer to control the emission of any regulated emission, including any associated component which monitors the function and maintenance of such a device.

"Engine RPM rise time" means the time period, in seconds, during acceleration between curb idle and high idle.

"EPA" means the United States Environmental Protection Agency.

"Exhaust aftertreatment" means any element of design which affects or alters the molecular content of the exhaust emissions of a diesel engine.

"Exhaust emissions" means the emissions (including any liquid or solid particles in the gaseous stream) released into the atmosphere from any opening downstream from the exhaust ports of a motor vehicle engine.

"Exhaust leak" means any condition of the exhaust system which permits exhaust emissions to escape into the atmosphere at any point between the exhaust ports of a motor vehicle engine and the outlet of the engine exhaust pipe.

"Full-flow smokemeter" means a smokemeter which measures smoke opacity by passing a beam of light through the axis of the exhaust plume as the exhaust exits the tailpipe of a motor vehicle.

"Governor" means a mechanism installed on a diesel engine by the original equipment manufacturer for the purpose of limiting the maximum engine RPM.

"Gross combination weight rating" or "GCWR" means the GVWR of a combination (articulated) vehicle, which is defined as the GVWR of the power unit plus the GVWR of the towed unit or units.

"Gross vehicle weight rating" or "GVWR" means the value specified by the vehicle manufacturer as the maximum loaded weight of a single or combination vehicle. When used in connection with a combination or articulated vehicle, GVWR refers to the "gross combination weight rating" or "GCWR" of the combination or articulated vehicle, which is defined as the GVWR of the power unit plus the GVWR of the towed unit or units.

"Heavy-duty diesel vehicle" or "HDDV" means a diesel-powered motor vehicle other than a diesel bus that has a GVWR exceeding 8,500 pounds and is designed primarily for transporting persons or property.

"High idle" means the highest engine speed obtainable when the engine is disengaged from the transmission and is free-wheeling.

"High speed diesel engine" means any diesel engine with a maximum governed engine speed over 2,800 RPM.

"Idle" means an operating mode where the vehicle engine is not engaged in gear and where the engine operates at a speed at the revolutions per minute specified by the engine or vehicle manufacturer.

"Inspector" means any person authorized by the State of New Jersey to determine whether a vehicle complies with the requirements of N.J.A.C. 7:27–14.

"Light-duty diesel vehicle" or "LDDV" means a diesel-powered motor vehicle, other than a diesel bus, that has a GVWR of 8,500 pounds or less and is designed primarily for transporting persons or property.

"Low idle" or "curb idle" means the minimum operating speed of an engine with the accelerator pedal released and the transmission disengaged, as specified by the engine manufacturer.

"Low speed diesel engine" means any diesel engine with a maximum governed engine speed of no more than 2,200 RPM.

"Maximum governed RPM" means, for an engine which has a functioning governor, the manufacturer's recommended maximum engine speed as restricted by the governor. For an engine which does not have a functioning governor, this term means a value of 80 percent of the manufacturer's recommended maximum engine speed.

"Measurement path" means the linear path between the sending and receiving points of a full-flow smokemeter.

"Medium speed diesel engine" means any diesel engine with a maximum governed engine speed of 2,201 RPM to 2,800 RPM.

"Motor vehicle" means all vehicles propelled otherwise than by muscular power, excepting motorized bicycles and such vehicles as run only upon rails or tracks.

"Motorized bicycle" means a pedal bicycle having a helper motor characterized in that either the maximum piston displacement is less than 50 cubic centimeters, or said motor is rated at no more than 1.5 brake horsepower and said bicycle is capable of a maximum speed of no more than 25 miles per hour on a flat surface.

"MPH" means miles per hour.

"Neutral density filter" means a device used to calibrate or verify the accuracy of the raw opaque value within the measurement path of a smokemeter which consists of a lens of neutral particle density and which filters visible light to a known opacity value.

"Nominal stack size" means the exhaust pipe diameter to be used in conducting smoke opacity measurements to determine compliance with diesel smoke opacity standards, based on engine horsepower, as set forth in N.J.A.C. 7:27B–4.3 Table 1.

"Oil temperature probe" means a device integral to a smokemeter which measures the engine crankcase oil temperature.

"Opacity" means the property of a substance whereby it partially or wholly obstructs the transmission of visible light expressed as the percentage to which light is obstructed.

"Partial-flow smokemeter" means a smokemeter which samples, at frequent intervals, a representative portion of the total exhaust flow and directs it to a measurement cell, and which calculates smoke opacity based upon the sample smoke density and the diameter of the exhaust pipe.

"Particles" means any material, except uncombined water, which exists as liquid particles or solid particles at standard conditions.

"Peak smoke opacity" means the highest numerical value of smoke opacity measured during a snap acceleration smoke opacity test at N.J.A.C. 7:27B–4.3(a), a rolling acceleration smoke opacity test at N.J.A.C. 7:27B–4.3(b), or a stall smoke opacity test at N.J.A.C. 7: 27B–4.3(c).

"Regulated emission" means any solid, liquid or gaseous substance which is emitted from a motor vehicle or motor vehicle engine and which is regulated by the EPA pursuant to 40 C.F.R. Part 86.

"RPM" means revolutions per minute.

"RPM sensor" means a mechanism integral to the smokemeter which senses the engine speed in revolutions per minute.

"SAE J1667" means the recommended practice incorporated in document number J1667 published by the Society of Automotive Engineers in February 1996, entitled Snap-Acceleration Smoke Test Procedure for Heavy-Duty Diesel-Powered Vehicles, and all appendices attached thereto, incorporated herein by reference.

"Smoke" means the emissions, including airborne solid and/or liquid particles, exclusive of water vapor, released into the atmosphere from a process of combustion.

"Smokemeter" means smoke measurement equipment designed and manufactured in accordance with specifications set forth at N.J.A.C. 7:27B-4.6.

"Tailpipe" means the final downstream section of pipe in a motor vehicle's exhaust system.

"Wide open throttle" or "WOT" means, in reference to a diesel-powered motor vehicle, the positioning of the primary engine power control to deliver maximum potential power and fuel. In most cases this is the positioning of the vehicle's accelerator control at its forward-most or downward-most position.

Emergency amendment R.1995 d.409, effective June 29, 1995 (expires August 28, 1995).
See: 27 N.J.R. 2752(a).
Adopted concurrent proposal, R.1995 d.527, effective August 28, 1995 (operative October 27, 1995).
See: 27 N.J.R. 2752(a), 27 N.J.R. 3806(a).
Amended by R.1997 d.283, effective July 7, 1997 (operative August 11, 1997).
See: 29 N.J.R. 726(a), 29 N.J.R. 2826(b).
Amended "Chassis dynamometer", "Gasoline-fueled" , "Heavy-duty gasoline-fueled vehicle", "Hydrocarbons (HC)", "Idle", and "Motor vehicle emission testing equipment".
Amended by R.1997 d.393, effective September 15, 1997 (operative October 7, 1997).
See: 29 N.J.R. 971(a), 29 N.J.R. 4108(a).
Added "Alternative smoke opacity standard", "California Air Resources Board", "Certified configuration", "Dew point", "Diesel bus", "Diesel emissions inspection center", "Diesel engine", "Diesel-powered", "Division of Motor Vehicles", "Element of design", "Engine RPM hookup", "Exhaust aftertreatment", "Exhaust stack diameter", "Full-flow smokemeter", "Governor", "Light-duty diesel vehicle", "Low speed engine", "Maximum governed RPM", "Measurement path", "Neutral density filter", "Oil temperature probe", "Partial-flow smokemeter", "Particles", "Peak smoke opacity", "Regulated emission", "SAE J667", "Tailpipe" and "Wide open throttle"; deleted "Autobus", "Motor vehicle safety specialist" and "Prescribed inspection test procedure"; and amended "Department", "Emission control apparatus", "Exhaust emissions", "Gasoline-fueled", "Gross vehicle weight rating", "Heavy-duty diesel vehicle", "Idle", "Inspector", "Opacity", "Smoke", and " Smokemeter".
Amended by R.1998 d.309, effective July 6, 1998 (operative July 21, 1998).
See: 30 N.J.R. 901(a), 30 N.J.R. 2476(b).
Deleted "Engine RPM hookup", "Exhaust stack diameter" and "Operating mode"; inserted new "Gross combination weight rating" or "GCWR", "High idle", "High speed diesel engine", "Low idle" or "curb idle", "Medium speed diesel engine", "Nominal stack size" and "RPM sensor"; and rewrote "Gross vehicle weight rating" or "GCWR" and "Low speed diesel engine".
Administrative correction.
See: 31 N.J.R. 872(b).
Amended by R.1999 d.210, effective July 6, 1999 (operative August 10, 1999).

See: 31 N.J.R. 828(a), 31 N.J.R. 1803(b).
In "High speed diesel engine", "Low speed diesel engine" and "Medium speed diesel engine", substituted references to diesel engines for references to heavy-duty diesel engines; and in "Medium speed diesel engine", inserted "maximum" preceding "governed".
Amended by R.1999 d.408, effective November 15, 1999 (operative December 7. 1999).
See: 31 N.J.R. 2572(a), 31 N.J.R. 3627(a).
In "Inspector", changed N.J.A.C. reference.
Administrative change.
See: 33 N.J.R. 3550(a).

7:27B–4.2 General instructions for all tests

(a) An inspector conducting an emissions test on a diesel-powered motor vehicle pursuant to any provision of this subchapter including, but not limited to, N.J.A.C. 7:27B–4.3, 4.4(a) and 4.4(b), shall perform the test in accordance with the following general procedures:

1. Test the vehicle in as-received condition;

2. Prior to testing, verify that the smokemeter is calibrated in accordance with the manufacturer's requirements;

3. Prior to testing, ensure that the engine is at normal operating temperature by operating the vehicle on a highway or a chassis dynamometer with a road load for a minimum of 15 minutes. For testing at a DEIC, only, confirm proper engine operating temperature by inserting an oil temperature probe through the oil dipstick tube into the crankcase oil, so that the oil temperature as measured during the test will be recorded as part of the analyzer printout at the conclusion of the test. Oil temperature shall be at least 70 degrees Celsius (160 degrees Fahrenheit), and water temperature shall be at least 82 degrees Celsius (180 degrees Fahrenheit) but not overheating;

4. Examine the vehicle's exhaust system for integrity. For testing at a DEIC, only, tighten all loose pipe connections and repair all significant exhaust leaks before performing a test;

5. Prior to conducting a smoke opacity test on a diesel-powered motor vehicle equipped with multiple exhaust outlets, determine which exhaust outlet exhibits the highest opacity level by visually comparing the opacity level of each outlet during a single repetition of the snap acceleration test as set forth at N.J.A.C. 7:27B–4.3(a), if appropriate, or by liberally accelerating the engine at WOT, not to exceed maximum governed RPM. Conduct the testing using the highest-opacity exhaust outlet;

6. Ensure that the ambient temperature at the test location is between 35 degrees and 95 degrees Fahrenheit and that the temperature is above the dew point by using a thermometer and hygrometer. If the testing is conducted outdoors, do not conduct the test if there is any visible precipitation, such as rain or fog, at the test site during the time of testing. Do not conduct the test if the temperature at the test location is below 35 degrees or above 95 degrees Fahrenheit, or if the temperature is at or below the dew point;

7. Prior to testing, turn off the engine brake and all vehicle accessories, including, but not limited to, air conditioning, heating, defroster, radio and lights;

8. Determine that the engine speed governor is in proper operating condition. For DEICs only, make this determination as follows: operate the engine with the transmission in neutral and the clutch disengaged. Gradually increase the engine speed from curb idle to high idle while observing an RPM sensor connected to the engine. The engine speed should not exceed high idle as specified by the engine manufacturer with the accelerator pedal fully depressed. If the engine speed continues increasing beyond the manufacturer's rated high idle, immediately release the accelerator pedal. If the engine speed increases uncontrollably, immediately release the accelerator pedal and shut off the engine's fuel supply. Discontinue emission testing of any vehicle with dysfunctional or out-of-specification engine speed governors. Do not resume testing unless and until speed governor repairs are made;

9. If inspecting a vehicle which was either equipped by the manufacturer or was retrofitted in accordance with State or Federal law or regulation with a catalytic converter, particulate trap or trap oxidizer, or any other exhaust aftertreatment device, inspect the exhaust system for the presence of the device and for its physical integrity. Discontinue testing of any motor vehicle which exhibits any missing exhaust aftertreatment device or perforating rust, crack, hole, tear, or other such physical defect in the device. If the vehicle being tested is a heavy-duty diesel vehicle or diesel bus with an exhaust aftertreatment device, discontinue testing and fail the vehicle if the device is found not to be in proper functioning condition. Do not resume testing unless and until the defect(s) are repaired;

10. If, at any time before or during the inspection of a diesel-powered motor vehicle, continuous blue smoke is observed in the exhaust emissions for more than three seconds, discontinue the testing and determine that the vehicle has failed to pass the smoke opacity test conducted pursuant to N.J.A.C. 7:27–14.6;

11. At the conclusion of the inspection of a diesel-powered motor vehicle at a DEIC, ensure that a printed test report has been produced by the smokemeter which, at a minimum, includes (a)11i through xvii below. If the smokemeter is not capable of printing out (a)11xiv through xvii below, this information shall be manually entered in the print test report by the inspector.

i. The smoke opacity value for each snap in sequence, including preliminary cleanouts;

ii. The final test result, in percent opacity;

iii. The engine oil temperature;

(b) The testing procedures for the rolling acceleration smoke opacity test, required pursuant to N.J.A.C. 7:27-14.5, shall be performed on a straight and level road course, as follows:

1. Determine the engine horsepower from the engine identification plate or engine serial number. Refer to Table 1 below and input the nominal stack size into the smokemeter. If the engine identification plate is missing, inaccessible or illegible, measure the outside diameter of the exhaust pipe extending from the exhaust manifold with a precision caliper or equivalent gauge, rounding to the nearest inch;

2. For a DEIC, only, affix the RPM sensor to the engine and vehicle according to the smokemeter manufacturer's instructions;

3. For a DEIC, only, insert the engine oil temperature sensor into the oil dipstick tube and into the crankcase oil according to the smokemeter manufacturer's instructions;

4. For a DEIC, only, connect the engine RPM and oil temperature sensors to the smokemeter according to the smokemeter manufacturer's instructions;

5. Affix the smokemeter according to the manufacturer's instructions to the end of the vehicle's exhaust pipe. For full-flow smokemeters, ensure that the final two feet and the exit of the exhaust pipe is straight, with an internal diameter not to exceed five inches. Appropriate exhaust pipe adapters shall be used as necessary to comply with these specifications. Do not use full-flow smokemeters on vehicles with underbody exhaust pipes which direct the exhaust flow to the ground unless the exhaust gases are redirected away from the ground by the appropriate exhaust pipe adaptor mentioned above;

6. Ensure that the smokemeter is warmed up and calibrated according to N.J.A.C. 7:27B-4.2 and the manufacturer's instructions;

7. Start the engine and operate at curb idle speed;

8. Purge the exhaust system of loose soot and stabilize the smoke opacity readings. For vehicles with low speed diesel engines, conduct one rolling acceleration by rapidly depressing the accelerator pedal to the floor and holding it there for three to five seconds, or until prompted by the smokemeter to release the pedal. For vehicles with medium or high speed diesel engines, conduct three rolling accelerations by rapidly depressing the accelerator pedal to the floor and briefly holding it there until the engine speed reaches approximately 2,500 RPM, then release. The rolling acceleration portion of the test sequence shall be deemed to be complete as soon as:

i. The vehicle has reached a speed of 10 miles per hour;

ii. The engine has reached maximum governed RPM; or

iii. The engine has reached 2,500 RPM;

9. Initiate the test sequence on the smokemeter;

10. Select the appropriate smoke opacity pass/fail standards from N.J.A.C. 7:27-14.6, based upon the engine model year;

11. If using a partial-flow smokemeter, select the appropriate stack size from Table 1 below, based upon the engine horsepower. If using a full-flow smokemeter, enter the engine horsepower and nominal stack size as measured on the vehicle;

12. If using a smokemeter without horsepower input, select the appropriate stack size from Table 1 below, based upon the vehicle's engine horsepower;

13. When testing a vehicle with a manual transmission, depress the clutch and select the appropriate low gear for the degree to which the vehicle is laden to avoid overgearing or lugging. When testing a vehicle with an automatic transmission, place the transmission in "D" or "Drive" only, or the gear position immediately next to "N" or "Neutral";

14. When testing a vehicle with a manual transmission, gradually engage the clutch;

15. Accelerate until the vehicle is rolling forward at a speed equivalent to the engine curb idle, then increase the engine speed by 200 RPM, +/-50 RPM;

16. When testing a vehicle with a low speed diesel engine, rapidly depress the accelerator pedal to the floor and hold for approximately three to five seconds or until prompted by the smokemeter to release the accelerator. When testing a vehicle with a medium or high speed diesel engine, rapidly depress the accelerator pedal to the floor and hold it there until an engine RPM of approximately 2,500 RPM is achieved, then release the accelerator pedal. When testing a vehicle with a manual transmission, do not shift to the next gear. The rolling acceleration portion of the test sequence shall be deemed to be complete as soon as:

i. The vehicle has reached a speed of 10 miles per hour;

ii. The engine has reached maximum governed rpm; or

iii. The engine has reached 2,500 rpm;

17. Release the accelerator pedal, disengage the clutch and bring the vehicle to a stop; and

18. Determine whether the vehicle has passed or failed by comparing the smoke opacity test result to the standards set forth at N.J.A.C. 7:27-14.6 appropriate for the test vehicle's engine model year.

(c) The testing procedures for the stall smoke opacity test, required pursuant to N.J.A.C. 7:27-14.5, shall be performed,

on a vehicle with a medium or high speed diesel engine and an automatic transmission only, as follows:

1. Unless the vehicle engine is of a torque-tube design, inspect the vehicle's drive shaft, U-joints and slip-joints for mechanical integrity. Discontinue testing of any vehicle exhibiting signs of appreciable looseness or wear in the U-joints or slip-joints, or any damage to the drive shaft which would adversely affect the vehicle's mechanical integrity. Do not resume testing unless and until the defects are repaired;

2. Ensure that the parking and service brakes are in good operating condition. Discontinue testing of any vehicle exhibiting inoperable or inadequate parking or service brakes. Do not resume testing unless and until the defects are repaired;

3. Determine the engine horsepower from the engine identification plate or engine serial number. Refer to Table 1 below and input the nominal stack size into the smokemeter. If the engine identification plate is missing, inaccessible or illegible, measure the outside diameter of the exhaust pipe extending from the exhaust manifold with a precision caliper or equivalent gauge, rounding to the nearest inch;

4. For a DEIC, only, affix the RPM sensor to the engine and vehicle according to the smokemeter manufacturer's instructions;

5. For a DEIC, only, insert the engine oil temperature sensor into the oil dipstick tube and into the crankcase oil according to the smokemeter manufacturer's instructions;

6. For a DEIC, only, connect the engine RPM and oil temperature sensors to the smokemeter according to the smokemeter manufacturer's instructions;

7. Affix the smokemeter according to the manufacturer's instructions to the end of the vehicle's exhaust pipe. For full-flow smokemeters, ensure that the final two feet and the exit of the exhaust pipe is straight, with an internal diameter not to exceed five inches. Appropriate exhaust pipe adapters shall be used as necessary to comply with these specifications. Do not use full-flow smokemeters on vehicles with underbody exhaust pipes which direct the exhaust flow to the ground unless the exhaust gases are redirected away from the ground by the appropriate exhaust pipe adaptor mentioned above;

8. Ensure that the smokemeter is warmed up and calibrated according to N.J.A.C. 7:27B-4.2 and the manufacturer's instructions;

9. Chock the drive-wheels;

10. Set the vehicle's parking brake;

11. Start the engine and operate at curb idle speed;

12. Purge the exhaust system of loose soot and stabilize the smoke opacity readings. Conduct at least three snap accelerations by rapidly depressing the accelerator pedal to the floor and holding until the engine speed reaches high idle or 2,500 RPM, whichever is lower before releasing, with five to 45 seconds between accelerations;

13. Initiate the test sequence on the smokemeter. Some smokemeters may not have a testing sequence entitled "stall acceleration test." For these smokemeters, the snap acceleration test sequence may be used;

14. Select the appropriate smoke opacity pass/fail standard set forth at N.J.A.C. 7:27-14.6, based upon the engine model year;

15. If using a partial-flow smokemeter, select the appropriate stack size from Table 1 below, based upon the engine horsepower. If using a full-flow smokemeter, enter the engine horsepower and the actual stack diameter as measured upon the vehicle exhaust stack outlet;

16. If using a smokemeter without horsepower input, select the appropriate stack size from Table 1 below, based upon the vehicle's engine horsepower;

17. Apply the service brakes with the left foot;

18. Place the transmission in "D" or "Drive" or the gear position immediately next to "N" or "Neutral." Do not use the "LO" or "1" gear positions;

19. Rapidly depress the accelerator pedal to the floor and hold it there for approximately three seconds or until prompted to release it by the smokemeter;

20. Repeat (c)19 above at least two more times for a minimum total of three accelerations, with a pause of between five and 10 seconds between accelerations or until prompted by the smokemeter;

21. Three valid stall accelerations shall constitute a successful test procedure and terminates the test;

22. Determine whether the vehicle has passed or failed based upon three valid smoke opacity test results averaged arithmetically and compared to the standards set forth at N.J.A.C. 7:27-14.6 appropriate for the test vehicle's engine model year; and

23. If the tests results are invalid and testing must be repeated, allow a minimum of three minutes but no more than five minutes of idling to cool the transmission before repeating the test.

(d) The testing procedures for the visible black smoke screening test, required pursuant to N.J.A.C. 7:27-14.5, shall be performed as follows:

1. Determine whether the vehicle's governor and automatic transmission, as applicable, are functioning properly. Do not proceed with the testing of a vehicle which is determined to have a disabled or an improperly functioning governor or automatic transmission until the governor or automatic transmission is repaired or a properly functioning governor or automatic transmission is installed;

2. If the vehicle is equipped with a manual transmission, place the transmission in neutral and release the clutch. If the vehicle is equipped with an automatic transmission and a low speed engine, place the gear selector in the park or neutral position. If the vehicle is equipped with an automatic transmission, but is not equipped with a low speed engine, place the gear selector in drive or low gear. For both manual and automatic transmission vehicles, depress the brakes firmly throughout the remainder of the test;

3. Observe all exhaust ports of the vehicle for the presence of visible black smoke in the exhaust emissions throughout the duration of the test;

4. Beginning with the accelerator pedal in the low idle position, rapidly accelerate the engine at wide open throttle and hold the accelerator pedal at wide open throttle for one to three seconds after the engine has achieved maximum governed RPM or, for vehicles with an automatic transmission, only, until the engine speed stabilizes while operating in a forward gear. Release the accelerator pedal and allow the engine to idle for 15 seconds while continuing to observe the exhaust emissions for visible black smoke. If black smoke is observed, the vehicle shall be deemed to have failed to pass the visible black smoke screening test.

(e) (Reserved)

TABLE 1

Engine Horsepower Rating vs. Nominal Stack Size

Manufacturer's Rated Horsepower	Nominal Stack Size in Inches†
Less than 101	2
101-200	3
201-300	4
301 and over	5

†Note: Nominal stack size shall always be used when measuring engine smoke opacity, irrespective of the stack size equipped on the vehicle being tested. For example, a vehicle equipped with an engine rated at 301 horsepower or above which has an exhaust stack measuring seven inches in diameter shall, for purposes of an official test, have a nominal stack size of five inches input to the smokemeter. If, for example, a vehicle has no engine identification plate and is equipped with an exhaust stack measuring six or seven inches in diameter—but the exhaust pipe from the manifold is five inches in diameter—then the nominal stack size shall be five inches.

Amended by R.1997 d.393, effective September 15, 1997 (operative October 7, 1997).
See: 29 N.J.R. 971(a), 29 N.J.R. 4108(a).
Rewrote section.
Amended by R.1998 d.309, effective July 6, 1998 (operative July 21, 1998).
See: 30 N.J.R. 901(a), 30 N.J.R. 2476(b).
Rewrote the section.
Amended by R.1999 d.210, effective July 6, 1999 (operative August 10, 1999).
See: 31 N.J.R. 828(a), 31 N.J.R. 1803(b).
In (a), deleted a reference to manual transmissions in the introductory paragraph.
Administrative correction.
See: 38 N.J.R. 5155(b).

7:27B-4.4 Emission control apparatus examination procedure

(a) The procedure for examination of the emission control apparatus of a diesel-powered motor vehicle, required at N.J.A.C. 7:27-14.5(e), shall, if the motor vehicle had any exhaust aftertreatment incorporated within the vehicle's or engine's certified configuration by the vehicle or engine original equipment manufacturer, consist of a visual check to determine whether such exhaust aftertreatment is present on the motor vehicle.

(b) The absence of any exhaust after treatment determined pursuant to (a) above to be included in a motor vehicle or diesel engine's certified configuration shall result in a determination of failure to pass the emission control apparatus compliance examination.

New Rule, R.1985 d.331, effective July 1, 1985 (operative December 2, 1985).
See: 17 N.J.R. 781(a), 17 N.J.R. 1649(a).
Old rule "Light-duty gasoline fueled motor vehicle emission control apparatus compliance examination procedure" was repealed and this new section adopted except for (a)2 which is still pending.
Public Notice: The Department has decided not to adopt the proposed Plumbtesmo test procedure.
See: 18 N.J.R. 1714(b).
Emergency recodification from 7:27B-4.6 and amendment, R.1995 d.409, effective June 29, 1995 (expires August 28, 1995).
See: 27 N.J.R. 2752(a).
Adopted concurrent proposal, R.1995 d.527, effective August 28, 1995 (operative October 27, 1995).
See: 27 N.J.R. 2752(a), 27 N.J.R. 3806(a).
Recodified from N.J.A.C. 7:27B-4.9 and amended by R.1997 d.393, effective September 15, 1997 (operative October 7, 1997).
See: 29 N.J.R. 971(a), 29 N.J.R. 4108(a).
In (a) and (c), inserted "gasoline-fueled"; in (b), inserted "in a gasoline-fueled motor vehicle"; and added (d) and (e). Former section recodified as N.J.A.C. 7:27B-4.7.
Administrative change.
See: 33 N.J.R. 3550(a).
Recodified with amendments from N.J.A.C. 7:27B-4.8.
Administrative correction.
See: 38 N.J.R. 5155(b).

7:27B-4.5 Procedures for establishing an alternative smoke opacity standard for diesel-powered motor vehicles

(a) In the event that a heavy-duty diesel vehicle, which is equipped with an engine model year 1973 or older, fails to pass an exhaust emissions inspection as part of either a periodic inspection or an inspection conducted as part of the roadside enforcement program, the owner or lessee of the heavy-duty diesel vehicle may request the Department to establish an alternative smoke opacity standard for that vehicle-engine-chassis combination, if the cause of the failure is due to the design of the vehicle, rather than to insufficient repair and maintenance. The procedures for obtaining this alternative smoke opacity standard are as follows:

1. The owner or lessee shall present to the Department the "Heavy-duty Diesel Emission Testing Report" prepared by the inspector who conducted the smoke opacity testing and determined that the vehicle failed to meet the standards set forth at N.J.A.C. 7:27-14.4 and 14.6, as applicable;

2. The owner or lessee shall submit documentation to the Department, or its designee, demonstrating that the vehicle engine and all fuel control and emissions-related components have been, within 45 calendar days of submission of said documentation:

i. Tuned to minimize the level of smoke in the exhaust emissions consistent with the design, specifications and certified configuration, as applicable, prescribed by the original equipment manufacturer; and

ii. Determined by a licensed diesel emissions inspection center, to be within the design, specifications and certified configuration, as applicable, prescribed by the original equipment manufacturer;

3. The owner or lessee shall subject the vehicle to any other examination or testing required by the Department or the Department's designee. Such examination or testing shall be performed by a person of the Department's choosing; and

4. The owner or lessee shall ensure the performance of any repairs which the Department deems likely to enable the vehicle to meet the smoke opacity standards set forth at N.J.A.C. 7:27-14.4 and 14.6, as applicable.

(b) If the Department determines that the vehicle cannot be repaired to meet the standards set forth at N.J.A.C. 7:27-14.4 and 14.6, it shall issue an alternative smoke opacity standard report to the owner or lessee which establishes an alternative smoke opacity standard for the specific vehicle-engine-chassis combination. The Department shall establish this alternative smoke opacity standard by adding 10 percentage points or the maximum points as necessary to not yield an alternative smoke opacity standard in excess of 100 percent to the highest smoke opacity percentage obtained from all testing of the vehicle performed subsequent to any tuning, repairing, or rebuilding of the engine pursuant to (a)2 above.

(c) In order to have the alternative smoke opacity standard applied when the vehicle is inspected pursuant to the requirements of N.J.A.C. 7:27-14 and this subchapter, an owner or lessee shall present the alternative smoke opacity report issued by the Department to the inspector at the time of the inspection of the vehicle. Failure by the owner or lessee to present the alternative smoke opacity report to the inspector at the time of inspection will result in the application of the smoke opacity standards set forth at N.J.A.C. 7:27-14 otherwise applicable to the vehicle.

New Rule, R.1997 d.393, effective September 15, 1997 (operative October 7, 1997).
See: 29 N.J.R. 971(a), 29 N.J.R. 4108(a).
Former section recodified as N.J.A.C. 7:27B-4.12.
Administrative change.
See: 33 N.J.R. 3550(a).

Recodified from N.J.A.C. 7:27B-4.13. Former N.J.A.C. 7:27B-4.5, Procedures for the 2,500 RPM test, was recodified as N.J.A.C. 7:27B-5.4.

7:27B-4.6 Specifications for a smokemeter for determining compliance with N.J.A.C. 7:27-14

(a) A smokemeter used to measure smoke opacity in the exhaust emissions of a diesel-powered motor vehicle in order to determine the vehicle's compliance with N.J.A.C. 7:27-14 shall conform to the following:

1. The smokemeter shall, at minimum, conform to all specifications and standards set forth in SAE J1667 and incorporated herein by reference; and

2. The smokemeter shall be capable of accepting as input the vehicle exhaust stack diameter and the engine horsepower;

(b) In addition to the requirements set forth at (a)1 and 2 above, a smokemeter, when used by a diesel emissions inspection center to measure smoke opacity in the exhaust emissions of a diesel-powered motor vehicle for determining compliance with N.J.A.C. 7:27-14, shall conform to the following:

1. The smokemeter shall have an integrated engine RPM hookup with an accuracy of +/-20 RPM, which shall actively measure engine RPM during testing;

2. The smokemeter shall have an oil temperature probe which shall measure engine oil temperature in degrees Fahrenheit during testing;

3. The smokemeter shall have the capability to produce a printed test report, in a format approved by the Department. The report shall include:

i. The date and time of testing;

ii. The final test score and, if test score averaging is required pursuant to N.J.A.C. 7:27B-4.3(a) and (c), individual test run raw scores;

iii. The identification number of the inspector performing the test and the license number of the DEIC at which the test was performed;

iv. The vehicle identification number and the model year of the vehicle tested;

v. A graphical representation, with a resolution of +/-20 RPM, of the pattern measured by the engine RPM hookup during testing; and

vi. The oil temperature when measured during testing conducted pursuant to N.J.A.C. 7:27B-4.3(a)5, (b)4 or (c)6.

New Rule, R.1997 d.393, effective September 15, 1997 (operative October 7, 1997).
See: 29 N.J.R. 971(a), 29 N.J.R. 4108(a).
Administrative change.
See: 33 N.J.R. 3550(a).