

DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Air Quality Control Commission

REGULATION NUMBER 12 REDUCTION OF DIESEL VEHICLE EMISSIONS

5 CCR 1001-15

[Editor's Notes follow the text of the rules at the end of this CCR Document.]

PART A DIESEL FLEET SELF-CERTIFICATION PROGRAM

I. General Provisions

I.A. Statement of Purpose

The purpose of Part A of this regulation is to reduce air pollution resulting from emissions from diesel-powered motor vehicles in the AIR Program area through opacity inspections or exemplary maintenance, by all diesel fleets registered, required to be registered or routinely operated in the program area or principally operated from a terminal, maintenance facility, branch, or division located within the program area as defined in 42-4-401 (8) C.R.S. with nine (9) or more vehicles over 14,000 pounds Gross Vehicle Weight Rating. Regulation Number 12 is a State-Only program and is not part of any state implementation plan with the US EPA.

I.B. Definitions

The following terms shall have the following meanings when used in this regulation:

- I.B.1. "Commission" means The Colorado Air Quality Control Commission
- I.B.2. "Compliance Plan" means a written plan of action completed by applicable diesel vehicle fleets conforming with the requirements of this regulation.
- I.B.3. "Certification of Emissions Control" (CEC), means the official certificate issued by a private (non-government) fleet opacity inspector to a fleet vehicle which has been inspected and tested according to the procedures in Part A, Section IV, and is in compliance with the opacity standards.
- I.B.4. "Diesel Fleet Self-Certification Program" (DFSCP) means the Opacity Inspection Program for Diesel Powered Fleet Vehicles Established by Section 42-4-414 C.R.S., as amended, and the Air Quality Control Commission, as AQCC Regulation Number 12, Part A.
- I.B.5. "Diesel Powered Motor Vehicle" or "Diesel Vehicle" as applicable to opacity inspections, includes only a motor vehicle with four wheels or more on the ground, powered by an internal combustion, compression ignition, diesel fueled engine, and also includes any motor vehicle having a personal property classification of A, B, or C, pursuant to Section 42-3-106, C.R.S., as specified on its vehicle registration, and for which registration in this state is required for operation on the public roads and highways. "Diesel Vehicle" does not include the following: vehicles registered pursuant to Section 42-12-304 (20), or 42-3-306 (4), C.R.S.: off-the-road powered vehicles or heavy construction equipment.
- I.B.6. "Division" means the Air Pollution Control Division of the Colorado Department of Public Health and Environment.

- I.B.7. "Excessive Violation" means non-compliance with the provisions of II.A.2.b., c., d., or i. of this Part A., or falsely making a certification that a vehicle is "physically based and principally operated outside the program area" pursuant to 42-4-414 (2.5) or the provisions of I.E. of this Part A.
- I.B.8. "Exemplary Maintenance" means an alternative method for fleet operators to demonstrate compliance with opacity standards on vehicles ten years old or newer by electronically submitting proof of periodic maintenance performed on vehicles, subject to the qualifying criteria and requirements for fleets and vehicles contained in this Part A.I.F and I.G. Exemplary maintenance is an optional alternative to opacity testing which may be chosen at the fleet's own discretion.
- I.B.9. "Fleet" means a diesel vehicle fleet consisting of nine (9) or more diesel vehicles of greater than 14,000 pounds Gross Vehicle Weight Rating, registered or required to be registered, or routinely operated in the program area or principally operated from a terminal, maintenance facility, branch, or division located within the program area.
- I.B.10. "GVWR" (gross vehicle weight rating) means the weight specified by the vehicle manufacturer as the maximum allowable loaded weight (vehicle empty weight plus the driver, passengers and payload) of a single vehicle.
- I.B.11. "Highest opacity reading" is that greatest stable opacity value for other than the snap/free acceleration procedures.
- I.B.12. "Opacity Compliance Coordinator" means designated person from each vehicle fleet to be the contact person between the fleet and the Division for carrying out this regulation.
- I.B.13. "Opacity Determination Certification" means a valid, non-expired, certification to be maintained by an opacity compliance coordinator and/or other fleet personnel charged with determining opacity levels. Opacity training and certification are to be conducted by the Division.
- I.B.14. "Opacity" means the degree to which an air pollutant obscures the view of an observer expressed in percentage of obscurity, or the degree, expressed in percent, to which transmittance of light is reduced by the air pollutant.
- I.B.15. "Opacity Inspection Form" (OIF) means the official form issued by the Division to diesel self-certification fleets for recording opacity test results.
- I.B.16. "Opacity meter" means an optical instrument which is designed to measure the opacity of diesel exhaust. Opacity meters must meet the requirements of Part B II.C. of this Regulation. Opacity meters to be utilized for the SAE J1667 test procedures (Part A.V.C.5) must meet SAE J1667 specifications.
- I.B.17. "Physically Based" means the business location, including either the origination or destination of a vehicle, where a vehicle is maintained or legally parked when not in use on the road.
- I.B.18. "Principally Operated" means used to transport goods or passengers, or to operate mounted equipment within the program area for ninety or more cumulative days in a 12 month period.
- I.B.19. "Rated RPM" means a specific rpm which the manufacturer states that the engine's maximum/rated brake horsepower is attained. Rated horsepower and rpm information is usually found on a label affixed to the engine itself or other under-the-hood location.

I.B.20. "Routinely Operated" means operated for 90 days or more in any 12 month period.

I.B.21. "SAE J1667 specifications" and "SAE J1667 test procedures" mean the specifications and test procedures set out in *J1667 Recommended Practice, Snap Acceleration Smoke Test Procedure for Heavy-Duty Diesel Powered Motor Vehicles*, © 1996 Society of Automotive Engineers Inc. (SAE), which document is hereby incorporated into this regulation by reference. The incorporation of the *J1667 Recommended Practice* into this rule by reference does not include later amendments to or editions of the material. The *J1667 Recommended Practice* may be examined at any state publications depository library. To find out how to obtain a copy of the *J1667 Recommended Practices* contact Manager, Mobile Source Section, Air Pollution Control Division, Colorado Department of Public Health and Environment, 4300 Cherry Creek Drive South, Denver, Colorado 80246-1530, or visit the Society of Automotive Engineers, Inc. website at www.sae.org.

I.B.22. "Terminal, Division, or Maintenance Facility" means improved real property owned, leased or otherwise lawfully held by a controlling commercial interest by the fleet and meeting applicable local zoning requirements for commercial trucking, motor coach, or truck/coach maintenance operations.

I.B.23. "WOT" means wide open throttle.

I.C. Applicability

I.C.1. Geographic Area of Applicability

This regulation shall apply to the program areas as defined in Section 42-4-401 (8) C.R.S.

I.C.2. Vehicles eligible for diesel fleet self-certification program.

Heavy-duty diesel vehicles of greater than 14,000 pounds Gross Vehicle Weight Rating, identified as a fleet (nine (9) or more vehicles) and registered or required to be registered or routinely operated in the program area or principally operated from a terminal, maintenance facility, branch, or division located within the program area are required to participate in the diesel fleet self-certification program.

I.D. Opacity Compliance Test Cycle – New Vehicle Exemption

I.D.1. Opacity compliance tests conducted on heavy-duty diesel vehicles equal to or less than ten model years old are valid for twenty-four months.

I.D.2. Opacity compliance tests conducted on heavy-duty diesel vehicles that are more than ten model years old are valid for twelve months.

I.D.3. Exemplary maintenance reports submitted as an alternative to opacity testing are valid for twelve months

I.D.4. Any new heavy-duty diesel vehicle sold on or after August 6, 2003 shall be exempt from testing until such vehicle has reached its fourth model year, or until the date of the transfer of ownership prior to the expiration of such exemption, if such transfer is within twelve months before such exemption ends.

I.E. Opacity Testing Exemption for Vehicles Certified as Physically Based and Principally Operated Outside the Program Area

Heavy-duty diesel vehicles of greater than 14,000 pounds gross vehicle weight rating, owned by a fleet subject to the provisions of I.C.1. and 2. of this Part A and registered or required to be registered in the program area that are certified by the fleet owner to be physically based and principally operated from a terminal, division, or maintenance facility outside the program area, are exempt from the opacity testing requirements of this Part A. This exemption is valid for a period of 12 months from the date the certification is approved by the executive director of the department of revenue and may be renewed annually.

A vehicle exempted from opacity testing requirements that later becomes physically based and principally operated within the program area must be opacity tested within 90 days of the date its exemption expires, or within ninety days of a change to the location at which the vehicle is physically based, whichever is earlier.

I.F. Exemplary Maintenance - Fleet Enrollment Qualifying Criteria

A fleet may submit an exemplary maintenance report as an alternative to an opacity inspection for individual vehicles. In order to qualify for the exemplary maintenance alternative, a fleet must meet the following requirements:

- I.F.1. Maintain their vehicles to manufacturer's specified maintenance procedures and intervals at a minimum
- I.F.2. Utilize a computer based electronic maintenance management program to schedule, track and report on maintenance performed on vehicles owned/controlled by the fleet
- I.F.3. Provide an electronic exemplary maintenance report for each exemplary maintenance eligible vehicle in a format prescribed by the Air Pollution Control Division (Division) on a reporting schedule as prescribed in this Part A I.D.3
- I.F.4. Maintain maintenance compliance timeliness rating with their own maintenance plan as submitted.
- I.F.5. Have maintained a standing in good status with the Diesel Fleet Self Certification Program for the past three calendar years
- I.F.6. Submit a Division approved exemplary maintenance Compliance Plan each year, as part of the annual Compliance Plan submittal pursuant to II.A.2.

I.G. Exemplary Maintenance -Vehicle Qualifying Criteria

For individual vehicles that will utilize the exemplary maintenance alternative to opacity testing, the following qualifying criteria apply:

- I.G.1. The vehicle must be owned/controlled by a fleet that qualifies to perform, and is enrolled in Exemplary Maintenance, pursuant to Part A I.F
- I.G.2. The vehicle must be no more than ten model years old
- I.G.3. The vehicle is to be maintained to manufacturer's specified maintenance procedures and intervals, at a minimum
- I.G.4. The exemplary maintenance status must be reported to the Division in an Electronic Maintenance Report in a format approved by the Division, annually pursuant to Part A II.A.2.i.

II. Requirements to File Compliance Plan

II.A. Compliance Plan Requirements and Contents

- II.A.1. Every fleet shall prepare, adopt, and submit to the Division within the time period hereinafter provided a complete Compliance Plan form signed by an authorized agent and containing a commitment to implement and maintain a program which meets the requirements of this regulation.

Each participating fleet shall provide the Division with an updated/revised compliance plan and fleet vehicle inventory on an annual basis. Such plan and fleet vehicle inventory shall be submitted to the Division by December 31 of each year, to be effective for the following calendar year. Should fleet size or compliance coordinator change, the Division shall be notified within thirty (30) days of a change.

- II.A.2. Each Compliance Plan shall set forth with reasonable detail a plan which shall include provisions for at least the following:

II.A.2.a. Dissemination of written information to all employees who maintain and/or operate diesel vehicles subject to these regulations, regarding Colorado opacity laws, penalties for non-compliance, and health and environmental impacts of diesel emissions, as provided by the Division.

II.A.2.b. Establishment of test procedures to be used for determining and certifying compliance with State opacity standards as given in Section VII of this Part A of this regulation.

II.A.2.c. Establishment of maintenance practices and schedules to be followed for maintaining low-smoke levels. Maintenance schedules at a minimum will follow manufacturer's recommended procedures and intervals.

II.A.2.d. Performance of biennial opacity compliance tests for vehicles ten years old and newer, and annual opacity compliance tests for vehicles greater than ten years old, or older than model year 1995, as described in Section IV of this Part A of this regulation prior to the vehicle's annual registration on each vehicle subject to these regulations, repair of any vehicle found to be exceeding the State opacity standard (found in Section VII of Part A of this regulation) and bring it into compliance with State opacity standards before being returned to service, maintaining records of such testing, including the opacity inspection form and any other forms provided by the Division and submit the white copies of the opacity inspection form to the Division annually by December 31, of each year. Subsequent year forms and documents may not be dispensed to fleets which fail to submit the prior year opacity inspection forms to the Division as required.

II.A.2.e. Establishment of an Opacity Compliance Coordinator from each fleet to oversee the carrying out of this regulation.

II.A.2.f. Determination of vehicle smoke opacity by a fleet compliance coordinator and/or other trained observer employed by the fleet having possession of a valid, non-expired, opacity determination certificate issued by the Division. Such persons shall determine vehicle smoke opacity levels by either the visual method or by use of a continuous-reading, light extinction opacity meter with peak hold feature or interfaced chart recorder. Such test shall use an opacity meter for vehicles that are greater than ten model years old.

II.A.2.g. Participating fleets shall submit fleet vehicle inventory information to include but not necessarily limited to make, VIN, unit ID, and license plate type, number and state.

II.A.2.h. Notwithstanding the provisions of Part A, Section II.A.2.D., new Heavy-duty diesel vehicles shall be issued a certification of emissions compliance without inspection or testing. Such certificate shall expire on the anniversary of the day of the issuance of such certification when such vehicle has reached its fourth model year or on the date of the transfer of ownership if such date is within twelve months before such certificate would expire, pursuant to Section I.D.4., or unless such transfer of ownership is a transfer from the lessor to the lessee. Prior to the expiration of such certification, such vehicle shall be inspected pursuant to Section IV of this Part A.

II.A.2.i. A fleet qualifying to utilize the exemplary maintenance alternative must electronically submit an Exemplary Maintenance Plan, as part of the Compliance Plan, for those eligible vehicles that will not be opacity tested. The Exemplary Maintenance Plan must contain vehicle maintenance profiles and a commitment by the fleet to adhere to those maintenance profiles. Maintenance profiles are to be based on the fleet's determination of maintenance needs for their own vehicles, but must be no less stringent than those prescribed by the engine manufacturer for that engine in that application. The Exemplary Maintenance Plan must contain other vehicle specific information as prescribed by the Division.

II.B. Additional requirement

Each Opacity Compliance Coordinator shall provide to all new employees or newly reassigned employees who work in the maintenance or operation of diesel vehicles, the most current information regarding this regulation and the Fleet's Compliance Plan within thirty (30) days of the employees commencing work. Each Opacity Compliance Coordinator shall provide updated information to all employees regarding this regulation within thirty (30) days of any substantial change to this regulation and/or the Fleet's Compliance Plan.

III. Compliance Plan Filing – Time, Approval

III.A. Filing of Plans

Fleets which meet the applicability criteria of this Regulation Number 12 are required to participate in the DFSCP of this Regulation Number 12, and such fleets bear the responsibility of contacting and notifying the Division of their fleet status and intent to participate in the DFSCP. Affected fleets shall complete and submit a compliance plan and a vehicle inventory to the Division for approval within 30 days of initial contact with the Division.

III.B. Approval and Disapproval

The Division shall review and evaluate each Compliance Plan (and exemplary maintenance plan, if submitted) filed with it within thirty (30) days of its receipt by the Division. Upon approval of a Compliance Plan (and exemplary maintenance plan, if submitted), the Division shall return a copy of the plan marked "approved" to the Fleet who shall post the plan in a conspicuous place in the Business location. If a Compliance Plan (or exemplary maintenance plan, if submitted) as filed is disapproved by the Division, the Division shall issue a letter of disapproval, and the Fleet shall have thirty (30) days within which to revise the plan and resubmit it to the Division. The Division shall have thirty (30) days to approve or disapprove the resubmitted plan.

III.C.

Heavy-duty diesel-fueled motor vehicles owned by the United States government, State of Colorado, and local governments within the AIR Program area, subject to the provisions of Part A of this regulation (Diesel Fleet Self-Certification Program), shall be inspected once every other year, (for vehicles ten years old, and newer), or every year (for vehicles greater than ten years old), and shall comply with the inspection provisions and obtain a Certification of Emissions Control. Inspection results will be reported to the Department of Revenue by submission of the Certification of Emissions Control not later than December 31, of each year.

IV. Heavy-duty Diesel Vehicle Self-Certification Opacity Test Procedures

IV.A. Opacity Evaluation Methods

Fleets shall utilize one of the following two methods of evaluating smoke opacity.

- IV.A.1. A visual evaluation by means of a smoke observer trained and certified by the Colorado Department of Health. The observer is to be positioned in a location perpendicular to the exhaust plume and at a distance which will provide a clear view of the exhaust plume. Visual observation shall not be used on vehicle that is older than ten model years.
- IV.A.2. Opacity meter evaluation of the exhaust stream by means of a portable light extinction opacity meter as specified in Part B, Section II.C.1. of this regulation. The meter is to be attached to the exhaust piping and calibrated as specified by the manufacturer. Opacity meters to be utilized for the Snap acceleration J1667 test procedures (Part A.IV.C.5.) must meet SAE J1667 specifications.

IV.B. Test Site and Vehicle Parameters

- IV.B.1. On-Road test procedures will require a testing site approximately 300 yards in length that is suitable for vehicle full-power runs to be conducted in complete safety.
- IV.B.2. An ambient temperature of 35°F (1.7°C) or above is required during any given vehicle test.
- IV.B.3. Vehicles scheduled for opacity testing shall be in safe operating condition.
- IV.B.4. Vehicles shall be at normal operating temperatures.
- IV.B.5. If the vehicle to be tested is equipped with multiple exhaust outlets, and if it is determined that they emit different exhaust smoke levels, the outlet emitting the heavier smoke level shall be opacity evaluated.
- IV.B.6. Vehicles undergoing opacity testing are to use fuel obtained from the fleet's normal fuel supply. No special fuels, fuel additives, or devices are to be utilized for the sole purpose of obtaining opacity readings during testing that are lower than those typically observed when the vehicle is operating on the fleet's usual fuel supply.

IV.C. Self-Certification Program Opacity Test Procedures

Fleets shall inspect their vehicles for compliance with opacity standards as defined in Part A, Section VII by utilizing one of the following test procedures, 1 through 5. Fleets that utilize the SAE J1667 test procedures shall use such procedures on all its vehicles.

IV.C.1. On- Road acceleration Test Procedure

IV.C.1.a. Select a gear which will permit the vehicle to accelerate under wide open throttle (WOT) from a moving position (approximately 900 to 1000 engine rpm) up to maximum engine rpm in no less than seven (7) seconds. This step is vital in order to ensure that the engine will be operated in an rpm range and timeframe which will allow sufficient time and engine loading in order to accurately monitor the vehicle's smoke opacity levels. Bring vehicle to a stop.

IV.C.1.b. If an opacity meter is being utilized, shutdown the engine and verify the zero setting of the opacity meter. Clean the monitoring unit as necessary.

IV.C.1.c. Restart engine and with the transmission in the selected gear as described in step a, accelerate the vehicle under WOT from a road speed equivalent of 900 to 1000 engine rpm up to maximum engine rpm.

If a visual opacity observation is being used, alert the certified observer by means of a horn or other communication that the test is completed and to record on the opacity inspection worksheet the highest opacity which was observed in an engine rpm range which encompasses 70% of rated rpm up to maximum governed rpm. If an opacity meter was utilized, note and record the highest opacity reading displayed during the aforementioned rpm range.

IV.C.1.d. Bring the vehicle to a safe controlled stop and shutdown the engine. Examine opacity meter reading, if applicable, and if there is more than a five percent (5%) shift (deviation) in the zero position and the highest opacity reading observed during the test exceeds the standard as defined in Part A, VII, clean the meter lenses, zero the meter and repeat the procedure beginning at step c.

IV.C.1.e. If the highest opacity observed during Step c exceeds the opacity standard and the opacity meter zero shift, if applicable, is less than five percent (5%), the vehicle fails the inspection.

IV.C.1.f. If neither the highest opacity observed during step c nor the opacity meter zero shift, if applicable, exceeds the opacity standard, the vehicle passes the inspection.

IV.C.1.g. The opacity inspector shall then record on the self-certification fleet opacity inspection form (OIF), the highest opacity reading the opacity meter zero shift (if applicable), the pass/fail determination and sign the (OIF). Vehicles which comply with the inspection procedures and applicable opacity standards shall be issued a complete CEC. The Inspector shall write the vehicle's GVWR on the CEC.

IV.C.2. On-Road Brake Lug-Down Test Procedure

IV.C.2.a. Select a gear which will permit the vehicle to attain a road speed of 15 to 25 mph with the engine at maximum rpm, wide open throttle (WOT). Due to the many variables, this gear selection is basically a trial and error effort. Upon completing the gear selection, bring vehicle to a stop.

IV.C.2.b. If an opacity meter is being utilized, shutdown the engine and verify the zero setting of the opacity meter. Clean the monitoring unit as necessary.

IV.C.2.c. Restart engine and with the vehicle operating at WOT in the selected gear as described in Step a, maintain WOT and slowly begin loading the engine by means of the vehicle's service brakes. The loading is to be applied linearly throughout an engine rpm range which extends from maximum engine rpm down to seventy percent (70%) of the engine's rated rpm in a time span which encompasses no less than seven (7) seconds.

IV.C.2.d. Momentarily maintain the seventy percent (70%) rated rpm/WOT relationship and if a visual opacity observation is being used, alert the certified observer by means of a horn or other communication that the test is completed and to record on the opacity inspection worksheet the highest opacity which was observed during the brake lugdown procedure.

If an opacity meter was utilized, note and record the highest opacity reading displayed during the brake lugdown procedure.

IV.C.2.e. Bring the vehicle to a safe controlled stop and shutdown the engine. Examine opacity meter reading, if applicable, and if there is more than a five percent (5%) shift (deviation) in the zero position, and the highest opacity reading observed during the test exceeds the standard as defined in Part A, VII, clean the meter lenses, zero the meter, and repeat the procedure beginning at Step c.

IV.C.2.f. If the highest opacity observed during Step c exceeds the opacity standard and the opacity meter zero shift, if applicable, is less than five percent (5%), the vehicle fails the inspection.

IV.C.2.g. If neither the highest opacity observed during Step c nor the opacity meter zero shift, if applicable, exceeds the opacity standard, the vehicle passes the inspection.

IV.C.2.h. The opacity inspector shall then record on the self-certification fleet opacity inspection form (OIF), the highest opacity reading, the opacity meter zero shift (if applicable), the pass/fail determination and sign the OIF. Vehicles which comply with the inspection procedures and applicable opacity standards shall be issued a completed CEC. The inspector shall write the vehicle's GVWR on the CEC.

IV.C.3. Stall Test Procedure (Vehicles with Automatic Transmissions)

This is a full-load stationary test designed for vehicles equipped with automatic transmissions.

IV.C.3.a. Transmission/torque converter oil is to be at normal operating temperature (160 to 200° F).

IV.C.3.b. If an opacity meter is being utilized, verify the zero setting of the opacity meter. Clean the monitoring unit if necessary.

IV.C.3.c. Start engine and operate at idle rpm. Apply vehicle's parking brake and securely block the vehicle. Apply the service brakes and shift the transmission gear selector to a forward range.

IV.C.3.d. Accelerate the engine by means of wide open throttle (WOT) until the transmission's stall speed rpm is attained. Maintain stall speed rpm for approximately five seconds in order to allow for stabilization.

IV.C.3.e. Momentarily maintain stall speed rpm and if a visual opacity observation is being used, alert the certified observer by means of a horn or other communication that the test is completed and to record on the opacity inspection worksheet the opacity attained at this time (stall speed rpm).

If an opacity meter is utilized, note and record the opacity meter reading at this time (stall speed rpm).

IV.C.3.f. Return the engine to idle rpm and shut down the engine.

Examine opacity meter reading, if applicable, and if there is more than a five percent (5%) shift (deviation) in the zero position, and the highest opacity reading observed during the test exceeds the standard as stated in Part A, VII, clean the meter lenses, zero the meter and repeat the procedure beginning at Step c.

Allow approximately two minutes of neutral operation between stall tests in order to prevent overheating of the transmission. During the two-minute period, maintain 1000 to 1400 engine rpm.

IV.C.3.g. If the highest opacity observed during Step e exceeds the opacity standard and the opacity meter zero shift, if applicable, is less than five percent (5%), the vehicle fails the inspection.

IV.C.3.h. If neither the highest opacity observed during Step e nor the opacity meter zero shift, if applicable, exceeds the opacity standard, the vehicle passes the inspection.

IV.C.3.i. The opacity inspector shall then record on the self-certification fleet opacity inspection form (OIF), the highest opacity reading, the opacity meter zero shift (if applicable), the pass/fail determination and sign the OIF. Vehicles which comply with the inspection procedures and applicable opacity standards shall be issued a completed CEC. The Inspector shall write the vehicle's GVWR on the CEC.

IV.C.4. Dynamometer Test Procedure

IV.C.4.a. If a smoke opacity meter is being used, verify the meter is set at zero. Start engine and with the dynamometer in an unloaded mode/condition, select a gear which will allow the vehicle to attain and maintain a no-load vehicle speed of 60 to 70 miles per hour (mph) at wide open throttle (WOT). It is preferred and recommended that vehicles be operated at the lower end of this mph range whenever possible. If vehicle has a maximum road speed that is less than 60 mph, operate vehicle at the highest mph possible. Upon stabilization, maintain speed for ten (plus or minus four) seconds and record engine rpm and mph on opacity worksheet.

IV.C.4.b. While maintaining full throttle (WOT), slowly increase the dynamometer loading until engine rated rpm (plus or minus 15 rpm) is obtained. Maintain this speed/load for ten (plus or minus four) seconds and record data on opacity worksheet; engine rpm, smoke opacity, and horsepower (hp).

IV.C.4.c. Maintain full throttle (WOT) and slowly increase dynamometer loading until engine is at 90 percent of rated rpm (plus or minus 15 rpm). Maintain this speed/load for ten (plus or minus four) seconds and record data on opacity worksheet; engine rpm, smoke opacity, and hp.

IV.C.4.d. Maintain full throttle (WOT) and slowly increase dynamometer loading until engine is at 80 percent of rated rpm (plus or minus 15 rpm). Maintain this speed/load for at least ten (plus or minus four) seconds and record data on opacity worksheet; engine rpm, smoke opacity, and hp.

- IV.C.4.e. Maintain full throttle (WOT) and slowly increase dynamometer loading until engine is at 70 percent of rated rpm (plus or minus 15 rpm). Maintain this speed/load for ten (plus or minus four) seconds and record data on opacity worksheet; engine rpm, smoke opacity, and hp. This step concludes the engine loading procedure; do not apply additional loading under any circumstances.
- IV.C.4.f. Vehicles with automatic transmissions are allowed two downshifts to the next lower gear at any point during the dynamometer lugdown test. If a downshift occurs, continue with the test.
- IV.C.4.g. Remove dynamometer loading and shutdown engine after observing engine cool down procedure.
- IV.C.4.h. Examine opacity meter reading, if applicable, and if there is more than a five percent (5%) shift (deviation) in the zero position and the highest opacity reading observed during the test exceeds the standard as defined in Part A, VIII, clean the meter lenses, zero the meter and repeat the procedure beginning at Step a.
- IV.C.4.i. If the highest opacity observed during Steps b through e exceeds the opacity standard and the opacity meter zero shift, if applicable, is less than five percent (5%) the vehicle fails the inspection.
- IV.C.4.j. If neither the highest opacity observed during Step b through e nor the opacity meter zero shift, if applicable, exceeds the opacity standard, the vehicle passes the inspection.
- IV.C.4.k. The opacity inspector shall then record on the self-certification fleet opacity inspection form (OIF), the highest opacity reading, the opacity meter zero shift (if applicable), the pass/fail determination and sign the report OIF. Vehicles which comply with the inspection procedures and applicable opacity standards shall be issued a complete CEC. The Inspector shall write the vehicle's GVWR on the CEC.

IV.C.5. SAE J1667 Test Procedures.

If the SAE J1667 test procedures are used, the inspector shall comply with the procedures and specifications set out in SAE J1667 Recommended Practice, Snap Acceleration Smoke Test Procedure for Heavy-Duty Diesel Powered Motor Vehicles, © 1996 Society of Automotive Engineers Inc. (SAE), which document is incorporated herein by reference as provided in Section I.B.18.

The opacity inspector shall then record on the self-certification fleet opacity inspection form (OIF), the average opacity reading, and the pass/fail determination and signs the report OIF. Vehicles which comply with the inspection procedures and applicable opacity standards shall be issued a completed CEC. The Inspector shall write the vehicle's GVWR on the CEC.

IV.D.

Optional No-Load Opacity Test (the opacity results of these tests (Section IV.D.1 and IV.D.2) are for data collection and engine diagnosis information only and will not be used in determining a vehicle's compliance with Regulation 12, Part A, VII, opacity standards).

IV.D.1. High Idle Opacity Test Procedure

- IV.D.1.a. If an opacity meter is being utilized, verify the zero setting of the meter. Start engine and operate at idle rpm.

IV.D.1.b. With the transmission in neutral, slowly increase the engine speed to high idle (maximum governed no-load rpm) and allow engine rpm to stabilize.

IV.D.1.c. Momentarily maintain high idle rpm and if a visual observation is being used, alert the certified observer by means of a horn or other communication that the test procedure has reached completion and the observer is to record on the opacity inspection worksheet the opacity observed at this time (high idle rpm).

If an opacity meter is utilized, note and record the meter reading/value at this time (high idle rpm).

IV.D.1.d. Return the engine to idle rpm and shutdown the engine. Enter the highest opacity reading observed and record in step (1.c.) on the self-certification opacity inspection form.

IV.D.2. Snap/Free Acceleration Test Procedure. This procedure requires a rapid wide open throttle (WOT) no-load acceleration of the engine from low idle rpm to maximum governed no-load engine rpm with the transmission in neutral.

IV.D.2.a. If an opacity meter is being utilized, verify the zero setting of the meter. Start engine and operate at idle rpm.

IV.D.2.b. With the transmission in neutral and the engine at idle rpm, slowly accelerate the engine, allowing the engine to reach its maximum stabilized, no-load governed speed/rpm. Allow the engine to return to idle.

IV.D.2.c. If an opacity meter is being utilized, place the meter in "Peak Hold" position. If a visual observation is being used, the certified observer shall note and record the highest opacity observed during the following (Step 2.d) rapid acceleration procedure.

IV.D.2.d. Perform the acceleration procedure as described in step (2.b) but accelerate the engine as rapidly as possible. Allow engine to return to idle and shut down engine.

IV.D.2.e. Enter on the opacity inspection form the highest opacity observed and recorded by the certified observer or captured by the opacity meter's peak hold feature, whichever is applicable.

V. Determination of Compliance

V.A. On-Site Fleet Inspection

The Division shall have the authority to determine a Fleet's compliance with this regulation or the Fleet's Compliance Plan (or exemplary maintenance plan, if submitted) by personal inspection of a Fleet's Business Location. The Division shall notify each inspected fleet of any violations of this regulation or the Fleet's Compliance Plan (or exemplary maintenance plan, if submitted) immediately upon completion of the inspections and shall be supplied with a written report of the results of the inspection within thirty (30) days of the inspection date. Such inspections by the Division may not be made more frequently than twice in any twelve (12) month period unless complaints of violation of this regulation have been received by the Division or the Division otherwise has cause to believe that the Fleet is not in compliance with the requirements of this regulation or the Fleet's Compliance Plan (or exemplary maintenance plan, if submitted). Such inspections may be made by the Division only during the normal working hours of a Fleet. The time of inspection will be determined by the Division, but must be at times reasonably convenient to the fleet. Individual vehicles of the fleet requested by the Division should be available at the time of inspection, as reasonably convenient to the fleet operators, with advance notice by the Division of such inspection.

V.B. Record Keeping Requirements

Opacity test results from the annual inspections shall be kept by the Fleets and shall be available to the Division at inspections as described in Section V.A. Copies of test data shall be submitted to the Division annually by December 31 of each year. Fleets which fail to submit the test data to the Division as required may not be dispensed forms and documents for the following year. Standardized test forms shall be developed and provided by the Division.

- V.B.1. Exemplary maintenance annual Electronic Maintenance Reports shall be kept by the fleets and shall be available to the Division at inspections as described in section V.A. Copies of Electronic Maintenance Reports shall be submitted to the Division by December 31 of each year. Exemplary maintenance fleets which fail to submit Electronic Maintenance Reports, or fail to submit Electronic Maintenance Reports that demonstrate compliance with the elements of that fleet's exemplary maintenance plan as required, may be denied the opportunity to participate in the exemplary maintenance alternative for up to three years, at the discretion of the Division Director.

V.C. Testing Exemption Certification Records

Certification made by the fleet owner and approved by the Executive Director of the Department of Revenue that a vehicle is physically based and principally operated from a terminal, division, or maintenance facility outside the program area as described in I.E. shall be kept by the Fleet Compliance Coordinator and shall be made immediately available to the Division at inspections as described in V.A.

VI. Penalties for Non-Compliance

- VI.A. Excessive violations, two or more within a 12 month period, as defined in Part A, Section I.B.7 of this regulation shall result in the fleet being removed from the self-certification program (Regulation 12, Part A) and being placed under the diesel opacity inspection program (Regulation 12, Part B) for a minimum of one year (twelve months).
- VI.B. Exemplary maintenance fleets may be discontinued from enrollment for excessive violations. Exemplary maintenance fleets which fail to submit Electronic Maintenance Reports, or fail to submit Electronic Maintenance Reports that demonstrate compliance with the elements of that fleet's Exemplary Maintenance Plan as required, or that falsify maintenance records or Electronic Maintenance Reports, may be discontinued from enrollment in the exemplary maintenance program.
- VI.C. Excessive violators shall be reported to the Executive Director of the Department of Revenue for enforcement action at the Executive Director's discretion and authority, which may include a hold to be placed on the violating vehicle's registration. Demonstration of compliance shall be made by the fleet to the Division. The Division shall report to the executive director of the Department of Revenue that compliance has been demonstrated.

VII. Opacity Standards for Diesel-Powered Motor Vehicles Subject to Part A of This Regulation.

Subject to the provisions of Section 42-4-413, C.R.S., as amended, and Section 42-4-414, C.R.S., as amended vehicles inspected following the procedures established in the Part A of this regulation shall meet the following opacity standards. The smoke opacity standard for all diesel vehicles subject to loaded mode opacity test, under Part A IV.C.1 through IV.C.4 of this regulation shall be thirty-five percent (35%) and twenty percent (20%) for naturally aspirated and turbocharged diesel vehicles respectively for five (5) seconds. The smoke opacity standard for all diesel vehicles of model year 1991 and newer subject to snap acceleration J1667 opacity tests, under Part A IV.C.5 of this regulation shall be 40% opacity. The smoke opacity standard for all diesel vehicles of model year 1990 and older subject to snap acceleration J1667 opacity tests, under Part A IV.C.5 of this regulation shall be 55% opacity.

PART B DIESEL OPACITY INSPECTION PROGRAM

I. General Provisions

I.A. Statement of Purpose

The purpose of PART B of this regulation is to reduce air pollution resulting from emissions from diesel powered motor vehicles, as defined in Part B of this regulation, registered or required to be registered, routinely operated in the program area, or principally operated from a terminal, maintenance facility, branch, or division located within the AIR Program area, and not subject to Part A of this regulation.

I.B. Definitions

- I.B.1. "AIR Account" is a special fund set aside in the Highway Users Tax Fund for the operation of the "AIR Program" and the "Diesel Opacity Inspection Program".
- I.B.2. "Air Environmental Systems Technician" mean those persons employed by the Department of Revenue for licensing and enforcement of the AIR Program and the Diesel Opacity Inspection Program.
- I.B.3. "AIR Program" is the Automobile Inspection and Readjustment (AIR) Program established pursuant to Sections 42-4-301 to 42-4-316.5 C.R.S. as amended.
- I.B.4. "AQCC" means Air Quality Control Commission.
- I.B.5. "Basic Engine Systems" are those parts or assemblies which provide for the efficient conversion of diesel fuel into useful power to include, but not limited to valve train mechanisms, cylinder heads, block, piston-ring-cylinder sealing integrity and post-combustion emissions control devices.
- I.B.6. "Certificate of Qualification" means official certificate issued by the Division to candidates who have successfully passed the qualification test, required in order to become licensed as a diesel opacity inspector in the Diesel Opacity Inspection Program.
- I.B.7. "Certification of Diesel Smoke Opacity Compliance" is the document which indicates that the smoke emissions from the vehicle comply with applicable smoke opacity limits at the time of inspection or after needed adjustments or repairs and re-inspection.
- I.B.8. "Certification of Diesel Smoke Opacity Waiver" is the document which indicates that the smoke emissions from the vehicle do not comply with the applicable smoke opacity limits after inspection, adjustment and smoke-related repairs.
- I.B.9. "Certification" or "Certification of Emissions Control" means either a "Certification of Diesel Smoke Opacity Compliance" or "Certification of Diesel Smoke Opacity Waiver" issued to the owner of a diesel vehicle which is subject to the diesel emissions inspection program in order to indicate the status of inspection requirement compliance of such a vehicle.
- I.B.10. "Certification of Emissions Exemption" means the official document issued by the Department of Revenue, in lieu of the Certification of Emissions Control.
- I.B.11. "Certified Neutral Density Filter" means an optical quality filter which reduces the amount of transmitted light, an amount which is dependent upon the filter's optical density rating, uniformly across the visible light spectrum for the purpose of verifying the accuracy of the opacity meters.

- I.B.12. "Certified Thermometer" means a laboratory grade ambient temperature measuring device with a range of at least 20°F through 120°F and an attested accuracy of at least plus or minus 1°F with increments of 1°, with protective shielding, and approved by the Department.
- I.B.13. "Chassis Dynamometer" means a vehicle power absorption device which has the ability to approximate or simulate actual on-road operation of motor vehicles through the application of variable loading.
- I.B.14. "Commission" means Colorado Air Quality Control Commission.
- I.B.15. "Department" means Department of Revenue.
- I.B.16. "Diesel Opacity Inspection" means an inspection of a diesel powered vehicle performed by a licensed inspector, employed by a licensed station, pursuant to 42-4-406 C.R.S., using the procedures and provisions set forth in Part B of AQCC Regulation Number 12 and Department rules.
- I.B.17. "Diesel Opacity Inspection Program" means the opacity inspection program for diesel powered vehicles established by 42-4-401 to 42-4-412 C.R.S., as amended and Regulation Number 12, Part B.
- I.B.18. "Diesel Opacity Inspection Program Station" is a station that qualifies and is licensed to operate as an emissions inspection station for light or heavy-duty diesel vehicles, or both in accordance with requirements set forth in 42-4-407 C.R.S., as amended, AQCC Regulation Number 12, Part B, and Department Rules required under 42-4-405 C.R.S.
- I.B.19. "Diesel Opacity Inspector" means an individual licensed to perform opacity inspections on vehicles required under 42-4-406 C.R.S. who is employed at a licensed diesel opacity inspection station and is qualified in accordance with AQCC Regulation Number 12, Part B and the Department of Revenue.
- I.B.20. "Diesel Powered Motor Vehicle" or "Diesel Vehicle" as applicable to opacity inspections, includes only a motor vehicle with four wheels or more on the ground, powered by an internal combustion, compression ignition, diesel fueled engine, and also includes any motor vehicle having a personal property classification of A, B, or C pursuant to Section 42-3-106, C.R.S., as specified on its vehicle registration, and for which registration in this state is required for operation on the public roads and highways. "Diesel Vehicle" does not include the following: vehicles registered pursuant to Section 42-12-301, or 42-3-306 (4) C.R.S.: off-the-road diesel powered vehicles or heavy construction equipment.
- I.B.21. "Diesel Vehicle Inspection Report (DVIR)" means official form issued by the Colorado Department of Revenue to licensed diesel opacity inspection stations, which contains a Certification of Emissions Control.
- I.B.22. "Division" is the Air Pollution Control Division of the Colorado Department of Public Health and Environment.
- I.B.23. "Emissions Control Systems" are those parts, assemblies or systems originally installed by the manufacturer in or on a vehicle for the specific purpose of reducing emissions.
- I.B.24. "Engine Rated RPM" means a specific rpm at which the manufacturer states that the engine's maximum/rated brake horsepower is attained. Above this rpm, the engine's governor will typically begin limiting full load fuel quantity and thus prevent the engine from developing full power beyond this rpm. Rated engine power and speed information is usually found on a label affixed to the engine itself or other under-the-hood location.

- I.B.25. "GVWR" (gross vehicle weight rating) means the weight specified by the vehicle manufacturer as the maximum allowable loaded weight (vehicle empty weight plus the driver, passengers and payload) of a single vehicle.
- I.B.26. "Heavy-duty Diesel Vehicle" as applicable to the Diesel Opacity Inspection Program refers to diesel vehicles of greater than 14,000 pounds GVWR.
- I.B.27. "Heavy-duty Diesel Opacity Inspection Station" means a facility licensed to inspect heavy-duty diesel vehicles only.
- I.B.28. "Heavy-duty Dynamometer" means a chassis dynamometer meeting the requirements for accurately and safely testing heavy-duty vehicles.
- I.B.29. "Highest Opacity Reading" is that greatest stable opacity value for other than the snap/free acceleration procedure.
- I.B.30. "ISO" means International Standards Organization.
- I.B.31. "Light-duty Diesel Opacity Inspection Station" means a facility licensed to inspect light-duty diesel vehicles only (14,000 pounds GVWR and less).
- I.B.32. "Light-duty Diesel Vehicle" as applicable to the Diesel Opacity Inspection Program refers to diesel vehicles of 14,000 pounds and less GVWR/
- I.B.33. "Light-duty Dynamometer" means a chassis dynamometer meeting the requirements for testing light- duty vehicles. These dynamometers may have a limited heavy- duty capability.
- I.B.34. "Maximum No-Load RPM or HIGH Idle RPM" means the maximum rpm that the engine's governor will allow the engine to attain under no-load, wide open throttle (WOT) conditions.
- I.B.35. "MPH" means miles per hour.
- I.B.36. "On-Road Test Procedures" means the heavy-duty diesel test procedures described in Part B, Section III.D. of this regulation.
- I.B.37. "Opacity" means the degree to which an air pollutant obscures the view of an observer expressed in percentage of obscuration, or the degree, expressed in percent, to which transmittance of light is reduced by the air pollutant.
- I.B.38. "Opacity Meter" means an optical instrument which is designed to measure the opacity of diesel exhaust.
- I.B.39. "Opacity Meter Calibration Form" means official form provided by the Division for recording weekly opacity meter calibration procedures, to be kept on file at the inspection station.
- I.B.40. "Opacity Testing" means the testing of motor vehicles using procedures prescribed in this regulation in order to determine the magnitude (expressed as a percentage) of obscured light (opacity) due to exhaust constituents, mainly fine particles.
- I.B.41. "Opacity Worksheet" means worksheet provided by the Division for recording measured opacity levels during dynamometer testing for determining opacity compliance, to be maintained with station's DVIR for auditing purposes.

- I.B.42. "Phototachometer" means a non-contact rotational speed measuring instrument which processes data received from a reflected light beam and remotely displays the results as revolutions per minute (rpm).
- I.B.43. "RPM" means revolutions per minute as pertaining to engine crankshaft speed.
- I.B.44. "Routinely Operated" or "Principally Operated" means operated for 90 days or more in any 12 month period.
- I.B.45. "SAE" means Society of Automotive Engineers.
- I.B.46. "State Emissions Technical Centers" are those facilities, operated by the Department of Public Health and Environment for technical or administrative support of the AIR Program and the Diesel Opacity Inspection Program.
- I.B.47. "Stripchart Recorder" means an instrument which receives and records data from one or more electrical inputs and displays that information in the form of real-time, continuous (non-impact) tracings on paper.
- I.B.48. "Training Program" means instruction developed by the Division for training diesel opacity inspectors.
- I.B.49. "WOT" means wide open throttle.

I.C. Applicability

I.C.1. Geographic Area of Applicability

This regulation shall apply to the AIR Program area as defined in Section 42-4-401 (8) C.R.S.

I.C.2. Vehicles Eligible for Diesel Opacity Inspection Program

Part B of this regulation shall apply to all diesel-fueled motor vehicles as defined in Section 42-4-401 (5) C.R.S., except those diesel-powered vehicles subject to the provisions for Part A of this regulation (Diesel Fleet Self-Certification Program), pursuant to Section 42-4-414, C.R.S.

I.C.2.a. The burden of proof in establishing an exemption from all or any part of the diesel opacity inspection requirements is on the vehicle owner. Any applications for exemptions must be submitted to the Colorado Department of Revenue for approval.

I.D. Conditions for Issuance of Certification of Emissions Control

I.D.1. A diesel vehicle which is registered or required to be registered in the program area, routinely operates in the program area or is principally operated from a terminal, maintenance facility, branch or Division located within the program area shall not be sold, registered for the first time in the program area or reregistered, unless such vehicle has a Certification of Emissions Control.

I.D.2. For new diesel motor vehicles being registered for the first time, a Certification of Emissions Control shall be issued without testing for diesel opacity compliance. Prior to the expiration of such certification, such vehicle shall be inspected and a Certification of Emissions Control shall be obtained for diesel smoke opacity compliance.

I.D.2.a. For light duty diesel vehicles sold on or after July 1, 2007, such certificate shall expire on the earliest to occur:

- I.D.2.a.i. The anniversary of the day of the issuance of such certification when such vehicle has reached its fourth model year.
- I.D.2.a.ii. The date of the transfer of ownership if such date is within twelve months before such certification would expire, Pursuant to Section I.D.2.a.i., unless such transfer of ownership is a transfer from the lessor to the lessee.
- I.D.2.b. For heavy-duty vehicles, such certification shall expire on the earliest to occur:
 - I.D.2.b.i. The anniversary of the day of the issuance of such certification when such vehicle has reached its fourth model year, or
 - I.D.2.b.ii. The date of the transfer of ownership if such date is within twelve months before such certification would expire, Pursuant to Section I.D.2.a.i. unless such transfer of ownership is a transfer from the lessor to the lessee.
- I.D.2.c. For heavy- duty diesel vehicles ten years old and newer the Certificate of Emissions Control will be valid for two years from the date of issuance.
- I.D.2.d. For light-duty diesel vehicles ten years old and newer and model year 2004 or newer the certificate of emissions control will be valid for two years from the date of issuance.
- I.D.2.e. For heavy- duty diesel vehicles greater than ten years old the Certificate of Emissions Control will be valid for one year from the date of issuance.
- 1.D.2.f For light-duty diesel vehicles greater than ten years old or model year 2003 or older the certificate of emissions control will be valid for one year from the date of issuance.
- I.D.3. For used diesel vehicle retail sales transactions by a licensed dealer conducted within the AIR Program area, a Certification of Diesel Smoke Opacity Compliance will be required at the time of sale. The responsibility of complying with the inspection provisions is that of the selling dealer.
- I.D.4. A "Certification of Diesel Smoke Opacity Compliance" shall be issued by a licensed diesel inspection station to any diesel vehicle which has been inspected and tested according to the procedures in Part B, Section III of this regulation and found to be within applicable smoke opacity limits and equipment requirements as stated in Sections IV and V, Part B of this regulation.
- I.D.5. No Certification of Diesel Emissions Control may be issued to a diesel vehicle of model year 1991 and newer if there is evidence of diesel emissions control system tampering, as determined by the procedures described in Section III. A.4. of Part B of this regulation.
- I.D.6. A temporary Certification of Emissions Control may be issued by a Department of Revenue AIR Program Air Environmental Systems Technician to those vehicles which fail the initial opacity inspection and continue to exceed applicable opacity standards, and for which needed parts are not presently available in order to make corrective repairs to that specific vehicle.
- I.D.7. A "Certification of Diesel Smoke Opacity Waiver" shall be issued by a Department of Revenue AIR Program Air Environmental Systems Technician to any diesel vehicle which has been reinspected after failing the initial opacity inspection procedure as prescribed in Part B, Section III of this regulation, and exceed the applicable smoke opacity limits as stated in Section V of this Part B of this regulation, and for which proper presentation of documented evidence, of expenditures for smoke emissions related adjustments and repairs have been made which equal or exceed minimum dollar expenditures as follows:

- I.D.7.a. For light-duty diesel vehicles (less than or equal to 14,000 pound GVWR) a minimum expenditure of seven hundred and fifty dollars (\$750) must be made in an attempt to comply with smoke opacity standards.
- I.D.7.b. For heavy-duty diesel vehicles (greater than 14,000 pounds GVWR), a minimum expenditure of fifteen hundred dollars (\$1500) must be made in an attempt to comply with smoke opacity standards.
- I.D.7.c. Confirmation of documented evidence that minimum expenditures for smoke emissions related repairs have been made and issuance of a "Certification of Diesel Smoke Opacity Waiver" shall be made only by a Department of Revenue AIR Program Air Environmental Systems Technician.
- I.D.7.d. Documented proof of smoke emissions repair costs for the specific failing vehicle shall be in the form of an itemized bill, invoice, work order, manifest, or statement, for the following types of work and/or parts:
 - I.D.7.d.i. Replacements, adjustments and repairs to the diesel vehicle which are directly related to the reduction of exhaust smoke, necessary to comply with the applicable opacity standards.
 - I.D.7.d.ii. Replacements, repairs and adjustments to the following systems shall qualify as emissions related repairs for the purpose of reducing exhaust smoke opacity:
 - I.D.7.d.ii.A. Air intake systems
 - I.D.7.d.ii.B. Fuel system components, including fuel injection pumps, injectors and related components.
 - I.D.7.d.ii.C. Exhaust systems
 - I.D.7.d.ii.D. Turbochargers and superchargers
 - I.D.7.d.ii.E. Air scavenging pumps (blower) for two-stroke cycle engines
 - I.D.7.d.ii.F. Fuel control systems, such as governors, aneroids, puff limiters and fuel modulators, utilized to control the air/fuel ratio, including microprocessor/electronic control systems, mechanical systems, hydraulic systems or pneumatic systems.
 - I.D.7.d.ii.G. Basic Engine Systems
 - I.D.7.d.iii. The expenditure for smoke reduction activities does not include the opacity inspection or reinspection fee(s) as specified in C.R.S. Section 42-4-408(3), nor does the expenditure include the costs of replacement, adjustment, or repair of air pollution control equipment due to instances of neglect, maladjustment, abuse, tampering or disconnection.
 - I.D.7.d.iv. Air pollution control equipment is any part, assembly or system originally installed by the manufacturer for the sole or primary purpose of reducing emissions. Such equipment shall include, but is not limited to, catalytic converters, exhaust gas treatment devices, particulate filters or traps, and exhaust gas recirculating (EGR) systems.

I.E. Fees for Diesel Opacity Inspections

I.E.1. Initial Opacity Inspection Fees

A licensed Diesel Opacity Inspection station shall charge a fee not to exceed the hourly shop rate for one hour as posted by the station pursuant to Section IV.A.4 of this regulation, for the inspection of any diesel-fueled motor vehicle required to be inspected pursuant to this regulation.

I.E.2. Reinspection Fees for Vehicles Failing Initial Opacity Inspection

If the vehicle fails the initial opacity inspection, the vehicle owner has 30 days in which to have repairs or adjustments made and return the vehicle to the licensed diesel inspection station which performed the initial inspection for one reinspection at a cost not exceeding the posted hourly shop rate for one hour.

I.E.3. Certificate of Emissions Control Fee

In order to encompass cost incurred by the Department of Revenue and the Department of Health in the administration, operation and evaluation of the diesel Opacity Inspection Program, the Certificate of Emissions Control (CEC) shall be sold to licensed diesel vehicle inspection stations for a cost of five dollars (\$5) each. Certificates of emissions control must be purchased from the agency designated by the Commission (AQCC).

I.E.4. Home Rule Inclusion in the Diesel Opacity Inspection Program.

Any home rule city, town, or county shall, upon request by the governing body of such local government to the Department of Health and the Department of Revenue, be included in the Diesel Opacity Inspection Program. When such a request is made, said departments and governing body shall agree to a start-up date for the Diesel Opacity Inspection Program in such areas. On or after such dates, all diesel-fueled motor vehicles which are registered in the area shall be inspected and required to comply with the provisions of this regulation, as if such area was in the AIR Program area.

II. Test Equipment Requirements

Standards and procedures for the operation, adjustment, calibration and certification of the Division approved smoke opacity meters, chassis dynamometers, and other required equipment in the performance of diesel opacity inspections for the Diesel Opacity Inspection Program.

II.A. Approval of Required Test Equipment

Diesel opacity inspection required by the Diesel Opacity Inspection Program shall not be performed unless the equipment used meets the specifications of the Colorado Diesel Opacity Inspection Program as defined in this regulation and as approved by the Division. Opacity meters, chassis dynamometers, photo tachometers and strip chart recorders must be approved by the Division. A manufacturer requesting the approval of an instrument for use in Colorado's Diesel Opacity Inspection Program shall make application thereof on forms provided thereby, and sources of vendors for the qualifying instruments may be obtained from the Program Administrator, Mobile Sources Section, Air Pollution Control Division, Colorado Department of Public Health and Environment, 4300 South Cherry Creek Drive, Denver, CO, 80246.

II.B. Running Changes and Equipment Updates

Any changes to design or performance characteristics of components specifications which may affect equipment or instrument performance must be approved by the Commission. It will be the instrument manufacturer's responsibility to confirm that such changes have no detrimental effect on opacity meter or other equipment or instrument performance. All equipment and instruments used in Colorado's Diesel Opacity Inspection Program will be updated as needed and specified in revisions to Commission Regulation Number 12.

II.C. Opacity Meter

Every licensed station shall have on the premises an approved portable opacity meter meeting specifications to conduct opacity tests for the Diesel Opacity Inspection Program. Only opacity meters approved by the Division shall be used for opacity inspections in the Diesel Opacity Inspection program.

The opacity meter is to be portable in design and function with an emphasis on compactness and light weight. The instrument will consist of two major, separate components connected by an interconnecting cable. The major components are the stack monitor/sensor and the control/indicator unit.

II.C.1. Opacity Meter Specifications

II.C.1.a. Stack Monitor/Sensor

II.C.1.a.i. Must be adaptable by means of a quick connect device, to exhaust piping and outlets having outside diameters from two to six inches.

II.C.1.a.ii. Light Source: Light emitting diode (LED), pulsed green light.

II.C.1.a.iii. Light Detector: Silicon photo detector.

II.C.1.a.iv. Provide for in line continuous measurement of exhaust opacity.

II.C.1.b. Control/Indicator Unit

II.C.1.b.i. Meter Display

II.C.1.b.i.A. Range: 0-100 percent opacity

II.C.1.b.i.B. Accuracy

II.C.1.b.i.C. Digital read-out; Plus or minus two percent of full scale

II.C.1.b.i.D. Drift: Less than 2.5% per hour

II.C.1.b.i.E. Response time: Less than two seconds from 0-90% of scale

II.C.1.b.i.F. Peak Hold Feature

II.C.1.b.ii. Warm-up time: Not to exceed ten minutes

II.C.1.b.iii. Operating temperature range: 32°-120°F.

II.C.1.b.iv. Integrated with a chart recorder and/or provide for a linear 0-1 VDC OR 0-10 VDC output signal.

II.C.1.b.v. Power Requirements

II.C.1.b.v.A. 115 Volts AC input

II.C.1.b.v.B. Internal replaceable or rechargeable batteries allowing for operation independent of AC input.

II.C.1.b.vi. Connecting Cable

II.C.1.b.vi.A. Heat and abrasion resistant

II.C.1.b.vii. Calibration: Opacity meters must be calibration checked weekly. Calibration results must be recorded on a calibration form provided by the Department or Division and kept on file at the inspection station.

II.C.2. Opacity meters meeting all SAE J1667 specifications shall be considered equivalent to the above Division specification.

II.D. Dynamometer Specifications and Criteria

II.D.1. Light-duty Dynamometers

II.D.1.a. Capacity: A minimum requirement is the capacity to absorb up to 180 horsepower at speeds between 50 and 80 miles per hour (mph), capable of accommodating vehicles with individual axle loads up to 5,000 lbs.

II.D.1.b. Rolls: Minimum roll diameter: 8.5 inches.

II.D.1.c. Load and Speed Control

II.D.1.c.i. Infinitely variable throughout the load and speed range from no-load to full-load. Reference the dynamometer's "performance envelope" or power absorption capacity curve.

II.D.1.c.ii. Ability to set a load or speed and until deactivated, maintain that preset setting without additional input from the load controller.

II.D.1.d. Instrumentation: Interfaced, calibrated horsepower and road speed indicators located in such a manner to be readily visible and discernable by the operator of the vehicle under test.

II.D.1.e. Calibration:

II.D.1.e.i. Provision for field checking the accuracy of the dynamometer's calibration including the electrical output signal, interface and attendant instrumentation.

II.D.1.e.ii. Availability of manufacturer's recommended/ specified equipment, tools and procedures for the field calibration and adjustment of the dynamometer.

II.D.2. Heavy-duty Dynamometers

II.D.2.a. Capacity: A minimum requirement is the capability to absorb a minimum of 400 horsepower at speeds between 50 and 80 mph. Capable of accommodating vehicles with individual axle loads up to 22,000 lbs.

II.D.2.b. Rolls:

II.D.2.b.i. Minimum roll diameter: 8.5 in.

II.D.2.b.ii. Tandem axle capability to accommodate, at a minimum, vehicle interaxle spacing of 48 to 58 inches.

II.D.2.c. Load and Speed Control:

II.D.2.c.i. Infinitely variable throughout the load and speed range from no-load to full-load. Reference the dynamometer's "performance envelope" or power absorption capacity curve.

II.D.2.c.ii. Ability to set a load or speed and until deactivated, maintain that preset setting without additional input from the load controller.

II.D.2.d. Instrumentation: Interfaced, calibrated horsepower and road speed indicators located in such a manner to be readily readable and discernable by the operator of the vehicle under test.

II.D.2.e. Calibration:

II.D.2.e.i. Provision for field checking the accuracy of the dynamometer's calibration including the electrical output signal, interface and attendant instrumentation.

II.D.2.e.ii. Availability of manufacturer's recommended/ specified equipment, tools, and procedures for the field calibration and adjustment of dynamometer.

II.E. Other Required Equipment for Diesel Opacity Inspection Stations.

II.E.1. Photo Tachometer (Heavy-Duty Vehicle Inspection Stations Only)

Every heavy-duty diesel vehicle inspection station shall have a photo tachometer capable of sensing a vehicle's engine rpm and digitally displaying that rpm in the vehicle operator's compartment. This tachometer must be capable of measuring rpm from 0-6000 rpm with an accuracy of plus or minus five rpm or better. For heavy-duty on-road testing stations this unit must be of portable design with the readout capable of being read from the vehicle's cab, and must be easily interfaced with the strip chart recorder.

II.E.2. Strip Chart Recorders (Heavy-duty On-Road Inspection Stations Only)

In those instances where on-road opacity testing will be utilized, strip chart recorders shall be used in order to accurately monitor and analyze the test sequence.

Description of an approved strip chart recorder is as follows:

II.E.2.a. Recorder capable of accurately recording data in a moving heavy-duty vehicle.

II.E.2.b. Unit is to be powered by internal batteries (rechargeable or non-rechargeable) or 12 VDC external source. A 115 VAC, 60 Hz, unit powered by means of a DC/AC inverter is also acceptable.

II.E.2.c. A minimum of two channels for recording 1) exhaust opacity and, 2) engine speed (rpm).

II.E.2.d. A recorder chart speed of approximately four to eight inches/min. (10 to 20 cm/min).

II.E.2.e. A minimum chart paper width of three inches.

II.E.3. Certified Neutral Density Filter.

A neutral density filter, certified and calibrated by the Division, must be kept by each diesel testing station for weekly calibration checks of the opacity meter. The results of the calibration checks of each approved opacity meter must be recorded on a calibration log provided by the Division and made available to Department of Revenue, Air Environmental Systems Technicians upon request during station inspections.

II.E.4. Certified Thermometer

For use in the Diesel Opacity Inspection Program, the thermometer must be a laboratory grade ambient temperature measuring device with a range of at least 20°F (twenty degrees) through 120°F (one-hundred-twenty degrees) and an attested accuracy of at least plus or minus 1° (one degree) Fahrenheit with increments of one degree, with protective shielding, and approved by the Department of Revenue.

II.E.5. Safety Restraint Equipment

Adequate safety restraint equipment for all dynamometer test stations is required. Restraint equipment must be capable of restraining the type of vehicles tested at that station. Equipment may be chains, fabric tie-down straps, wheel chocks, as appropriate and as approved upon licensing.

II.E.6. Hearing ear protectors, as needed.

II.E.7. Auxiliary engine cooling fan.

Light-duty inspection stations are required to have available on premises and for use during opacity inspections, an auxiliary engine cooling fan which meets the following minimum specifications:

Guarded fan complying with OSHA regulations.

CFM free air delivery of 3200 CFM

Fan diameter of 24 inches.

1/4 H.P. motor.

II.E.8. Exhaust gas removal equipment.

If a closed exhaust system is utilized, the pressure within the system shall be maintained between 4 inches H₂O positive pressure and 2 inches H₂O negative pressure at all times when any given vehicle is undergoing opacity testing.

II.E.9. Required reference materials.

II.E.10. Basic hand tools necessary to perform inspection.

III. Procedures and Practices to Ensure the Proper Performance of Opacity Inspections

III.A. General Inspection Requirements

- III.A.1. All aspects of the inspection must be performed by a licensed diesel emissions inspector. It is the responsibility of the inspector to notify the Department of Revenue of his/her current place of employment.
- III.A.2. The inspection shall take place at the address of the station license.
- III.A.3. The temperature of the inspection area (or ambient temperature for on-road tests) shall be between 35°F and 110°F (2°C and 43°C) during the inspection. Temperatures during the inspection must be accurately recorded and monitored in a well-ventilated location, away from vehicle engine and exhaust heat sources and out of direct sunlight.
- III.A.4. For 1991 and later model year diesel vehicles, the diesel emissions inspector shall perform an inspection for the integrity of the emissions control systems and/or devices as listed on the vehicle's emissions control label or in an emissions control systems application guide. The following system/devices if original must be installed, intact and apparently operational:
 - III.A.4.a. Any fuel injection pumps seals and covers.
 - III.A.4.b. Any seals and/or covers protecting the aneroid, throttle delay, boost compensation device, or other air/fuel ratio adjustments.
 - III.A.4.c. The particulate matter trap system or catalytic converter system, including pipes and valves.
 - III.A.4.d. Engine computer controls, related sensors, actuators, malfunction indicator, or service maintenance reminder lights.
 - III.A.4.e. Positive crankcase ventilation, crankcase depression and air box drain equipment, including their hoses, pipes, valves and connectors.
 - III.A.4.f. The exhaust gas recirculation valve.
 - III.A.4.g. Related hoses, connectors, brackets, and hardware for these components.
 - III.A.4.h. Any other emissions-related components for a particular vehicle/engine as listed on a vehicle evaluation form (DR2365) issued by Emissions Technical Center staff.
 - III.A.4.i. The vehicle shall fail the inspection if the emission control components are found to be tampered, defective, or otherwise rendered partially or completely inoperative. When determining original equipment emissions control systems/devices, the vehicle's under-the-hood emissions control label takes precedence over any other sources of information.

III.B. Inspection Procedure for Light-Duty Diesel Vehicles (14,000 GVWR and less)

- III.B.1. Preliminary Check of Vehicle
 - III.B.1.a. Safety check vehicle (tires, drive-line, etc.)
 - III.B.1.b. Ensure engine lube oil and coolant levels are at proper levels.
 - III.B.1.c. For vehicles with multiple exhaust outlet, operate engine, observe and determine which emits the heavier exhaust smoke. During testing, monitor the exhaust outlet which emits the heavier smoke, if there is a difference in smoke levels.
- III.B.2. Diesel Vehicle Inspection Report Forms (DVIR)

III.B.2.a. The opacity inspector shall accurately identify and enter vehicle and owner information from vehicle to be tested as required on the DVIR.

III.B.3. Prepare Vehicle for Opacity Testing

III.B.3.a. Locate vehicle on dynamometer.

III.B.3.b. Secure vehicle with adequate safety restraints such as chains, nylon straps, wheel chocks or tie downs.

III.B.3.c. Locate auxiliary engine cooling fan in front of vehicle radiator or engine cooling inlet, whichever is applicable.

III.B.3.d. Vehicle is to be at a stabilized normal operating temperature. This shall be determined by feeling the top radiator hose, by checking the temperature gauge, and/or operating the vehicle prior to performing the inspection.

III.B.3.e. Zero/span opacity meter following manufacturer's specifications. Clean and recalibrate as necessary before conducting test.

III.B.3.f. Attach pre-calibrated opacity meter to vehicle's exhaust outlet and calibrate meter according to the manufacturer's instructions.

III.B.4. Opacity Testing

Opacity testing of light-duty diesel vehicles involves a dynamometer loaded-mode lug-down test procedure.

Engine temperature and oil pressure are to be closely monitored during all testing. Testing is to be discontinued if engine and vehicle operating parameters are not within acceptable limits.

III.B.4.a. Dynamometer Test Procedure

III.B.4.a.i. Verify smoke opacity meter is set at zero. Start and operate engine at idle rpm. With the dynamometer in an unloaded mode/condition and the vehicle in direct or drive gear (do not use overdrive), slowly increase vehicle speed to 60 mph (plus or minus two mph). Continue to maintain (by manual or automatic control) 60 mph while slowly increasing dynamometer loading until maximum horsepower (hp) is developed at 60 mph. Maintain this full throttle speed/load condition for a minimum of 10 seconds (plus or minus four seconds) and record mph, opacity, and hp on Opacity Worksheet. Proceed directly to Step iii.

III.B.4.a.ii. NOTE: Vehicles with automatic transmissions are allowed two downshifts to the next lower gear at any point during the dynamometer lugdown test. If a downshift occurs, continue with the test.

III.B.4.a.iii. While maintaining full throttle, slowly increase the dynamometer loading until a vehicle speed of 50 mph (plus or minus two mph) is achieved. Maintain this full throttle speed/load condition for a minimum of 10 seconds (plus or minus four seconds) and record mph, opacity, and hp on Opacity Worksheet. Proceed directly to Step (iv).

III.B.4.a.iv. While maintaining full throttle, slowly increase the dynamometer loading until a vehicle speed of 40 mph (plus or minus two mph) is achieved. Maintain this full throttle speed/load condition for a minimum of ten seconds (plus or minus four seconds) and record mph, opacity, and hp on Opacity Worksheet.

III.B.4.a.v. Slowly remove dynamometer loading while returning engine to idle. Shut down engine after observing cool down procedure. Note, and record residual opacity meter reading on Opacity Worksheet.

III.B.4.a.vi. The inspector shall refer to the opacity standards in Section V of Part B of this regulation.

III.B.4.a.vi.A. If the highest opacity reading taken from steps (i) through (iv) exceeds the opacity standard and the opacity meter shift exceeds five percent (5%), clean the lenses, zero meter and repeat the dynamometer test procedure starting at step (i). At least one additional test will be conducted at no cost to the motorist.

III.B.4.a.vi.B. If the highest opacity reading taken from steps (i) through (iv) exceeds the opacity standard and the opacity meter zero shift is less than five percent (5%), the vehicle fails the inspection.

III.B.4.a.vii. The inspector shall then enter the highest opacity reading, the opacity meter zero shift, the pass/fail determination, inspector signature and other required information on the DVIR form. Vehicles which comply with the inspection procedures and applicable opacity standards shall be issued a completed CEC. The Inspector shall write the vehicle's GVWR on the CEC.

III.B.5. Vehicle Removal From Dynamometer

III.B.5.a. Detach all test equipment, restraints and remove them from the vehicle.

III.B.5.b. Remove vehicle from dynamometer

III.C. Dynamometer Inspection Procedures for Heavy-Duty Diesel Vehicles (Greater than 14,000 pounds GVWR.)

III.C.1. Preliminary Check of Vehicle

III.C.1.a. Safety check vehicle (tires, drive-line, etc.)

III.C.1.b. Ensure engine lube oil and coolant levels are at proper levels.

III.C.1.c. Verify proper operation of vehicle tachometer, or mount and connect approved photo tachometer.

III.C.1.d. For vehicles with multiple exhaust outlets, operate engine, observe and determine which outlet emits the heavier exhaust smoke, if there is a difference. During testing, monitor the exhaust outlet which emits the heavier smoke.

III.C.2. Diesel Vehicle Inspection Report Forms

III.C.2.a. The opacity inspector shall accurately identify and enter vehicle and owner information from vehicle being tested as required on the DVIR.

III.C.2.b. Determine the engine's rated horsepower and attendant rpm and enter on DVIR form and also on the opacity worksheet

III.C.3. Prepare Vehicle for Opacity Testing

III.C.3.a. Locate vehicle on dynamometer.

III.C.3.b. Secure vehicle with adequate safety restraints such as chains, nylon straps, wheel chocks or tie downs.

III.C.3.c. Vehicle is to be at a stabilized operating temperature. This shall be determined by feeling the top radiator hose, by checking the temperature gauge, and/or by operating the vehicle prior to performing the inspection.

III.C.3.d. Zero/span opacity meter, following manufacturer's specifications. Clean and recalibrate, as necessary, before conducting test.

III.C.3.e. Attach pre-calibrated opacity meter to vehicle's exhaust outlet and calibrate meter according to the manufacturer's instructions.

III.C.4. Opacity Testing

Dynamometer opacity testing of heavy-duty diesel vehicles involves two separate and distinct test procedures. The two tests are 1) a snap/free no-load acceleration test and 2) a dynamometer loaded-mode lug-down test procedure.

Engine temperature and oil pressure are to be closely monitored during all testing. Testing is to be discontinued if engine and vehicle operating parameters are not within acceptable limits.

NOTE: If the vehicle is equipped with a temperature regulated radiator shutter or modulating fan and its operation is erratic, unstable or questionable, secure the shutter in the open position for the duration of the opacity test.

III.C.4.a. Snap/Free Acceleration Test Procedure

This procedure requires a rapid Wide Open Throttle (WOT) no-load acceleration of the engine from low idle to maximum governed no-load rpm with the transmission in neutral

III.C.4.a.i. Verify the zero setting of the opacity meter. Start and operate the engine at idle rpm.

III.C.4.a.ii. With the transmission in neutral and the engine at idle rpm, slowly accelerate the engine allowing the engine to reach its maximum stabilized governed speed. Allow the engine to return to idle.

III.C.4.a.iii. Place the opacity meter in the peak hold position.

III.C.4.a.iv. Perform the acceleration procedure as in Step (ii), but rapidly accelerate the engine. Record on the opacity worksheet the highest or peak smoke opacity reading attained during the procedure.

III.C.4.a.v. Return the engine to idle rpm and shut down engine.

III.C.4.a.vi. Return opacity meter to normal mode (peak hold off) and note zero shift (deviation) reading. Record the peak opacity value obtained in step (iv) and the meter zero shift on the DVIR form, and proceed to the dynamometer test procedure.

III.C.4.b. Dynamometer Test Procedure

III.C.4.b.i. Verify smoke opacity meter is set at zero. Start and operate engine at idle rpm. With the dynamometer in an unloaded mode/condition, select a gear which will allow the vehicle to attain and maintain a no-load vehicle speed of 60 to 70 miles per hour (mph) at wide open throttle (WOT). It is preferred and recommended that vehicle be operated at the lower end of this mph range whenever possible. If vehicle has a maximum road speed that is less than 60 mph, operate vehicle at the highest mph possible. Upon stabilization, maintain speed for at least ten seconds (plus or minus four seconds) and record engine rpm and mph on opacity worksheet.

III.C.4.b.ii. While maintaining full throttle (WOT), slowly increase the dynamometer loading until engine rated rpm (plus or minus 15 rpm) is obtained. Maintain this speed/load for at least ten seconds (plus or minus four seconds) and record data on opacity worksheet; engine rpm, smoke opacity, and horsepower (hp).

III.C.4.b.iii. Maintain full throttle (WOT) and slowly increase dynamometer loading until engine is at 90% of rated rpm (plus or minus 15 rpm). Maintain this speed/load for at least ten seconds (plus or minus four seconds) and record data on opacity worksheet; engine rpm, smoke opacity, and hp.

III.C.4.b.iv. Maintain full throttle (WOT) and slowly increase dynamometer loading until engine is at 80% of rated rpm (plus or minus 15 rpm). Maintain this speed/load for at least ten seconds (plus or minus four seconds) and record data on opacity worksheet; engine rpm, smoke opacity, and hp.

III.C.4.b.v. Maintain full throttle (WOT) and slowly increase dynamometer loading until engine is at 70% of rated rpm (plus or minus 15 rpm). Maintain this speed/load for at least ten seconds (plus or minus four seconds) and record data on opacity worksheet; engine rpm, smoke opacity, and hp. This step concludes the engine loading procedure; do not apply additional loading under any circumstances.

III C.4.b.vi. Note: Vehicles with automatic transmissions are allowed two downshifts to the next lower gear at any point during the dynamometer lugdown test. If a downshift occurs, continue with the test.

III.C.4.b.vii. Slowly remove dynamometer loading while returning engine to idle. Shutdown engine after observing cool down procedure. Note and record residual opacity meter reading on Opacity Worksheet.

III.C.4.b.viii. The inspector shall refer to the opacity standards in Section V of Part B of this regulation.

III.C.4.b.viii.A. If the highest opacity reading taken from steps (ii) through (v) exceeds the opacity standard and the opacity meter zero shift exceeds five percent (5%), clean the lenses, zero meter and repeat the dynamometer test procedure starting at step (i). At least one additional test will be conducted at no cost to the motorist.

III.C.4.b.viii.B. If the highest opacity reading taken from steps (ii) through (v) exceeds the opacity standard and the opacity meter zero shift is less than five percent (5%), the vehicle fails the inspection.

III.C.4.b.viii.C. If neither the highest opacity meter reading taken in steps (ii) through (v) nor the opacity meter zero shift exceeds the opacity standard, the vehicle passes the inspection.

III.C.4.b.ix. The inspector shall then enter the highest opacity reading, the opacity meter zero shift, the pass/fail determination, inspector signature, and other required information on the DVIR form. Vehicles which comply with the inspection procedures and applicable opacity standards shall be issued a completed CEC. The Inspector shall write the vehicle's GVWR on the CEC.

III.C.4.c. Vehicle Removal From Dynamometer

III.C.4.c.i. Detach all test equipment, restraints and remove them from the vehicle.

III.C.4.c.ii. If the vehicle is equipped with a radiator shutter or modulating fan which has been secured in the open position prior to testing, restore unit to normal operation.

III.C.4.c.iii. Remove vehicle from dynamometer.

III.D. On-Road Inspection Procedures for Heavy-Duty Diesel Vehicles (Greater than 14, 000 pounds GVWR)

III.D.1. Test Site Requirements and Conditions

In addition to the prescribed test equipment and other requirements, as set forth by this regulation, a test site will only be considered adequate for on-road opacity testing when there is:

III.D.1.a. Approximately three-hundred (300) yards of sound, smooth, paved test lane in a safe, uncongested area on private property (non-public roads).

III.D.1.b. An ambient temperature between 35°F and 110°F (2°C and 43°C) during any given vehicle test procedure.

III.D.1.c. An opacity inspector licensed by the Department of Revenue and in possession of a valid opacity inspector license.

III.D.1.d. A driver, knowledgeable in the operation of the vehicle to be tested and in possession of a valid operator's license relative to that vehicle. (Refer to IV.B.3)

III.D.2. Vehicle Preparation

Prior to proceeding with the actual opacity testing of the vehicle, the following guidelines must be followed:

III.D.2.a. Verify that the vehicle to be tested meets the program definition of a heavy-duty vehicle (Greater than 14,000 pounds GVWR).

III.D.2.b. Vehicle is to be equipped with a speedometer in good working order.

- III.D.2.c. Perform a safety inspection of the vehicle's brakes, tires and driveline for defects or unsafe conditions.
- III.D.2.d. Enter the requested vehicle/owner information on the Diesel Vehicle Inspection Report (DVIR) form.
- III.D.2.e. Determine the engine's rated horsepower and attendant rpm and enter on DVIR form and also on the opacity worksheet.
- III.D.2.f. Securely mount the test/reference tachometer and interface it with the approved strip chart recorder which is to be located in the vehicle's cab. Ensure that all wires and cables do not pose any potential safety hazards.
- III.D.2.g. Securely attach the approved/registered opacity meter to the vehicle's exhaust piping. If a full-flow opacity meter is to be used, ensure that the optical pickup head is attached in such a manner that the opacity meter's emitter and detector light path is perpendicular to the vehicle's direction of travel and is centered approximately 5" plus or minus 1" from the exhaust outlet. Interface the meter with the strip chart recorder. Follow the calibration procedures prescribed by the equipment manufacturers.

III.D.3. Test Procedures

The on-road opacity testing of heavy-duty diesel vehicles involves two separate and distinct test procedures. The two tests are 1) a snap/free no-load-mode acceleration test and, 2) either an on-road load-mode acceleration test or an on-road loaded-mode brake lug-down test.

III.D.3.a. Snap/Free Acceleration Test Procedure

This procedure requires a rapid Wide Open Throttle (WOT) no-load acceleration of the engine from low idle to maximum governed no-load rpm with the transmissions in neutral.

- III.D.3.a.i. Verify the zero settings of the opacity meter and chart recorder. Start and operate the engine at idle rpm.
- III.D.3.a.ii. With the transmission in neutral and the engine at idle rpm, slowly accelerate the engine allowing the engine to reach its maximum stabilized no-load governed speed. Allow the engine to return to idle.
- III.D.3.a.iii. Place the opacity meter in the peak hold position.
- III.D.3.a.iv. Perform the acceleration procedure as in Step (ii), but rapidly accelerate the engine. Record on the opacity worksheet the highest or peak smoke opacity reading attained during the procedure.
- III.D.3.a.v. Return the engine to idle rpm and shutdown engine.
- III.D.3.a.vi. Return opacity meter to normal mode (peak hold off) and note zero shift (deviation) reading. Record the peak opacity value obtained in step (iv) and the meter zero shift on the DVIR form, and proceed to the on-road test; either acceleration or lugdown procedure, as applicable.

III.D.3.b. On-Road Acceleration Opacity Test Procedure

- III.D.3.b.i. Verify smoke opacity meter and chart recorder are set at zero. Start and operate engine at idle rpm.

Select a gear which will permit the vehicle to accelerate under WOT from a moving position (approximately 900 to 1000 engine rpm) up to maximum engine rpm in no less than seven seconds. This step is vital in order to ensure that the engine will be operated in an rpm range and time frame which will allow sufficient time and engine loading in order to accurately monitor the vehicle's smoke opacity levels.

III.D.3.b.ii. Bring the vehicle to a stop and shutdown the engine. Verify the zero settings of the opacity meter and the strip chart recorder. Clean the monitoring unit as necessary.

III.D.3.b.iii. With the transmission in the selected gear (as described in Step (i) and the strip chart recorder in record mode, accelerate the vehicle under WOT from a road speed equivalent of 900 to 1000 engine rpm up to maximum engine rpm. Maintain maximum rpm for a few seconds in order to allow for stabilized conditions.

III.D.3.b.iv. Bring the vehicle to a safe controlled stop, shut down engine and discontinue the recording. Note and record on the opacity worksheet, 1) the highest opacity reading observed between maximum engine rpm and 70 percent (70%) rated rpm and, 2) the opacity meter/chart recorder zero shift (deviation) reading.

III.D.3.b.v. The inspector shall refer to the opacity standards in Section V of Part B of this regulation.

III.D.3.b.vi. If the highest recorded opacity taken from step (iii) through (iv) exceeds the opacity standard and the opacity meter/chart recorder zero shift (deviation) exceeds five percent (5%), clean the lenses, zero meter and repeat the acceleration test procedure starting at step (iii). At least one additional test will be conducted at no cost to the motorist.

III.D.3.b.vi.A. If the highest opacity reading taken from steps (iii) through (iv) exceeds the opacity standard over the required time period, with five percent (5%) or less zero shift, the vehicle fails the inspection.

III.D.3.b.vi.B. If neither the highest opacity meter reading taken in steps (iii) through (vi) nor the zero shift exceeds the opacity standard, the vehicle passes the inspection and the inspector shall proceed directly to step (xi).

III.D.3.b.vi.C. If the highest opacity meter reading exceeds the opacity standard with five percent (5%) or less zero shift, but for less than the required time period, the vehicle will require additional testing as follows.

III.D.3.b.vii. Verify the zero settings of the opacity meter and strip chart recorder. Clean the monitoring unit as necessary.

III.D.3.b.viii. Accelerate the vehicle as in step (iii), however, the vehicle's acceleration must be temporarily restrained (10 ± 4 seconds) at that rpm point in the procedure where the highest opacity reading was observed. Decreased throttle is not to be used to slow the vehicle's rate of acceleration. The vehicle's service brakes should be utilized for that purpose. Opacity and rpm must be accurately recorded at this time.

III.D.3.b.ix. Bring the vehicle to a safe controlled stop, shut down engine, and discontinue the recording. Note the highest opacity meter reading and the opacity meter/chart recorder zero shift.

III.D.3.b.x. If the highest opacity meter reading taken from steps (viii) and (ix) exceeds the opacity standard and the opacity meter/chart recorder zero shift (deviation) exceeds five percent (5%), clean the lenses, zero meter and repeat the acceleration test procedure starting at step (viii).

III.D.3.b.x.A. If the highest opacity reading taken from steps (viii) through (ix) exceeds the opacity standard over the required time period, with five percent (5%) or less zero shift, the vehicle fails the inspection.

III.D.3.b.x.B. If neither the highest opacity meter reading taken in steps (viii) through (ix) nor the opacity meter zero shift exceeds the opacity standard, the vehicle passes the inspection.

III.D.3.b.xi. The inspector shall then enter the highest opacity reading, the opacity meter/chart recorder zero shift, the pass/fail determination, inspector signature, and other required information on the DVIR form. Vehicles which comply with the inspection procedures and applicable opacity standards shall be issued a completed CEC. The Inspector shall write the vehicle's GVWR on the CEC.

III.D.3.c. On-Road Brake Lug-Down Test Procedure

III.D.3.c.i. Verify smoke opacity meter and chart recorder are set at zero. Start and operate engine at idle rpm.

III.D.3.c.ii. Select a gear which will permit the vehicle to attain a road speed of 15 to 25 mph with the engine at maximum rpm, wide open throttle (WOT). Due to the many variables, this gear selection process is basically a trial and error effort. Bring the vehicle to a stop and shut-down the engine.

III.D.3.c.iii. Verify the zero settings of the opacity meter and strip chart recorder. Clean the monitoring unit as necessary.

III.D.3.c.iv. With the vehicle operating at WOT in the selected gear as described in Step (ii) and the chart recorder in record mode, maintain WOT and slowly begin loading the engine by means of the vehicle's service brakes. The loading is to be applied linearly throughout an engine rpm range which extends from maximum engine rpm down to 70 percent of the engine's rated rpm in a time span which encompasses no less than ten seconds.

III.D.3.c.v. Note: Vehicles with automatic transmissions are allowed two downshifts to the next lower gear at any point during the brake lug-down test. If a downshift occurs, continue with the test.

III.D.3.c.vi. Bring the vehicle to a safe controlled stop, shut down engine and discontinue the recording. Note and record on the Opacity Worksheet, 1) the highest opacity reading observed between maximum engine rpm and 70% rated rpm and, 2) the opacity meter/chart recording zero shift (deviation) reading.

III.D.3.c.vii. The inspector shall refer to the Opacity Standards in Section V of Part B of this regulation.

- III.D.3.c.viii. If the highest opacity meter reading taken from steps (iv) through (vi) exceeds the opacity standard and the opacity meter/chart recorder zero shift exceeds five percent (5%), clean the lenses, zero meter and repeat the brake lugdown test procedure starting at step (iv). At least one additional test will be conducted at no cost to the motorist.
- III.D.3.c.viii.A. If the highest opacity meter reading taken from steps (iv) through (vi) exceeds the opacity standard over the required time period with five percent (5%) or less zero shift, the vehicle fails the inspection.
- III.D.3.c.viii.B. If neither the highest opacity meter reading taken in steps (iv) through (vi) nor the opacity meter zero shift exceeds the opacity standard, the vehicle passes the inspection and the inspector shall proceed directly to step (xiii).
- III.D.3.c.viii.C. If the highest opacity meter reading exceeds the opacity standard with five percent (5%) or less zero shift but for less than the required time period, the vehicle will require additional testing as follows.
- III.D.3.c.ix. Verify the zero settings of the opacity meter and chart recorder, clean the monitoring unit as necessary.
- III.D.3.c.x. Again, operate the vehicle as in Step (iv), however restrain the vehicle for ten, plus or minus four, seconds (10 ± 4 seconds) by means of the vehicle's service brakes at the rpm point in the procedure where the highest opacity reading was observed.
- III.D.3.c.xi. Bring the vehicle to a safe controlled stop, shut down engine and discontinue the recording. Note the highest opacity meter reading and the opacity meter/chart recorder zero shift.
- III.D.3.c.xii. If the highest opacity meter reading taken from steps (x) and (xi) exceeds the opacity standard and the opacity meter/chart recorder zero shift exceeds five percent (5%), clean the lenses, zero meter and repeat the brake lugdown test procedure starting at step (x).
- III.D.3.c.xii.A. If the highest opacity meter reading taken from steps (x) and (xi) exceeds the opacity standard over the required time period with five percent (5%) or less zero shift, the vehicle fails the inspection.
- III.D.3.c.xii.B. If neither the highest opacity meter reading taken in steps (x) through (xi) nor the zero shift exceeds the opacity standard, the vehicle passes the inspection.
- III.D.3.c.xiii. The inspector shall then enter the highest opacity reading, the opacity meter/chart recorder zero shift, the pass/fail determination, inspector signature, and other required information on the DVIR form. Vehicles which comply with the inspection procedures and applicable opacity standards shall be issued a completed CEC. The Inspector shall write the vehicle's GVWR on the CEC.

IV. Qualification of Inspection Stations and Testing and Licensing of Diesel Opacity Inspectors

IV.A. Requirements for Licensing of a Diesel Opacity Inspection Station

IV.A.1. The following equipment and tools shall be available at Diesel Opacity Inspection Stations for performance of diesel opacity inspections:

IV.A.1.a. Smoke opacity meter (see Section II.C) in proper calibration according to the manufacturer's guidelines.

IV.A.1.b. Chassis dynamometer (see Section II.D). Not required for Heavy-Duty On-Road Test Stations.

IV.A.1.c. Photo tachometer (See Section II.E.1).

IV.A.1.d. Strip Chart Recorder (See Section II.E.2). Heavy-duty on-road test stations only.

IV.A.1.e. Neutral density filter for calibration check of opacity meter. (See Section II.E.3).

IV.A.1.f. Manufacturer's operation, maintenance and calibration manuals for opacity meters and dynamometers must be retained in the inspection area.

IV.A.1.g. Certified thermometer, as described in Section II.E.4.

IV.A.1.h. Safety restraint equipment, as described in Section II.E.5.

IV.A.1.i. Hearing ear protectors.

IV. A.1.j. Engine cooling fan. Required for light-duty inspection stations only.

IV.A.1.k. Exhaust removal equipment.

IV.A.1.l. Reference materials as required by licensing.

IV.A.1.m. Basic hand tools necessary to perform inspection.

IV.A.2. The station must be a permanent location which meets all applicable zoning requirements to provide for the inspection of diesel vehicles, as licensed, and as defined in this regulation.

IV.A.3. A licensed diesel emissions inspector is employed and is available to make a proper inspection during all hours the station is open for business.

IV.A.4. All Diesel Opacity Inspection stations are required to post in a conspicuous location in a clearly legible fashion a sign indicating the fees charged for the initial inspection and first reinspection. Such fees shall not exceed the posted hourly shop rate for one hour. Inspection personnel shall notify diesel vehicle owners of the fee prior to performing any test procedure.

IV.A.5. Additional requirements for Heavy-duty On-Road Testing Stations

IV.A.5.a. Approximately three-hundred (300) yard of sound, smooth paved test lane in a safe, uncongested area, on private property (non-public roads).

IV.A.5.b. A driver knowledgeable in the operation of the vehicle to be tested and in possession of a valid operator's license relative to that vehicle.

IV.B. Testing and Licensing of Applicants for Diesel Opacity Inspectors

IV.B.1. Certificates of Qualification for Diesel Opacity Inspectors

- IV.B.1.a. Applications for Certificates of Qualification for diesel opacity inspectors shall be filed with the Air Pollution Control Division, Colorado Department of Public Health and Environment, 4300 South Cherry Creek Drive, Denver, CO 80246, and the issuance of Certificates of Qualification shall be administered by the Division. Applications for such Certificates of Qualification shall be completed on forms provided by the Division. Before an applicant may be given a Certificate of Qualification, he must comply with the requirements of this section. The Division will notify applicants of the evaluation requirements prior to testing.
- IV.B.2. An applicant must demonstrate knowledge, skill, and competence concerning the conduct of diesel opacity inspections. Such knowledge, skill and competence will be shown by passing a qualification test including, but not limited to, knowledge of the following:
- IV.B.2.a. Knowledge of rules and regulations of Diesel Opacity Inspection Program procedures.
- IV.B.2.b. Visual inspection procedures of the required emissions control equipment for 1991 and newer vehicles.
- IV.B.2.c. Operation of and proper use, care, maintenance and calibration of the Commission – approved opacity meters, chassis dynamometers, photo tachometers and strip chart recorders.
- IV.B.2.d. Proper use of and distribution of DVIR forms, Certificates of Emissions Control, opacity worksheets and supplemental documents.
- IV.B.2.e. Waiver requirements for all diesel vehicles failing the initial emissions inspection.
- IV.B.3. For on-road heavy-duty diesel inspector licenses only, the applicant must possess a valid Colorado Class A operator's license.
- IV.B.4. The Division shall issue a Certificate of Qualification to an applicant upon successful completion of the requirements of this section.
- IV.B.5. **Requalification Requirements for all Diesel Opacity Inspectors**
- IV.B.5.a. Upon the determination by the Commission of the necessity of technically updating the qualifications for diesel opacity inspectors and, upon development or approval of retraining courses and retesting requirements for diesel opacity inspectors to demonstrate said qualifications, diesel opacity inspectors, or holders of certificates of qualification, shall be required to requalify.
- IV.B.5.b. Diesel Opacity Inspectors shall be required to requalify within ninety (90) days from the date of written notification by the Division. Said notice shall be mailed to the address of record in the office of the Department of Revenue (Department) charged with licensing of diesel opacity inspectors which notice shall inform the person of the necessity of requalification and the nature of such skills, systems, and procedures requiring the retraining for the continued performance of the opacity inspection. The notice shall give the name and location of training sources approved or accredited for purposes of retraining, the necessity of requalification by a certain date, and the nature and evidence of documentation to be filed with the Division evidencing such requalification, and state that failure to requalify within said period of time shall result in suspension or revocation of the diesel opacity inspector's license or certification as described in the Department's rules and regulations.

IV.B.5.c. The Division shall issue a Certificate of Requalification to any person who has requalified to the satisfaction of the Division and according to the requalification regulation of the Department.

IV.B.6. Transmittal of Certificates and Issuance of Diesel Opacity Inspector's Licenses

The Division shall provide a duplicate copy of any Certificate of Qualification to the opacity inspector authority of the Department of Revenue, and, upon application by any person so certified or recertified, the Department shall issue a diesel opacity inspectors license in accord with the regulations of that department.

IV.B.7. Lapse of Certificate of Qualification for Diesel Opacity Inspector

A person to whom the Division has issued a Certificate of Qualification, or Certificate of Requalification, who has not been issued a Diesel Opacity Inspector's license within six (6) months from the date of issuance of the most recently issued certificate shall be deemed to have forfeited the said certificate and shall be required to reapply if a new Certificate of Qualification is requested.

V. Opacity Standards for Diesel-Powered Motor Vehicles Subject to Part B of This Regulation

V.A. In order for a vehicle (owner) to obtain a valid Certification of Emissions Compliance, the exhaust opacity from the diesel-powered motor vehicle subject to the annual Diesel Opacity Inspection Program may not exceed the following maximum opacity level.

V.B. The smoke opacity standard for all naturally aspirated Light-duty diesel vehicles subject to opacity test under Part B of this regulation shall be forty percent (40%) opacity for (5) five seconds. The smoke opacity standard for turbocharged Light-duty vehicles shall be thirty-five percent (35%) for five (5) seconds.

For all Heavy-duty vehicles subject to opacity tests under Part B of this regulation, the opacity standards shall be thirty-five percent (35%) and twenty percent (20%) for naturally aspirated and turbocharged diesel vehicles respectively for five (5) seconds.

V.C. Peak opacity (snap/free acceleration) tests shall be a component of the Heavy-duty diesel vehicle tests and conducted following the procedures specified in Section III, Part B of this regulation, and recorded on the Opacity Inspection form, but no peak opacity standard shall apply.

V.D. Opacity Standards for Diesel Vehicles with Non-Original Engines (Engine Changes)

For those vehicles in which the original engine has been replaced, the opacity standards and applicable emissions control equipment for the year and model of the vehicle body/chassis, shall apply.

Those diesel-powered vehicles titled/registered as model year 1991 and newer, that were assembled by other than a licensed manufacturer such as a kit-car, and registered/titled according to Section(s) 42-1-102 (45.5) and/or 42-12-203, the applicable emissions control equipment will be based upon a determination by technical center personnel of the vintage of the vehicle engine. An affidavit may be issued by the technical center personnel and the year of the engine shall be presumed to be that stated by the vehicle owner unless it is determined by center personnel, after physical inspection of the vehicle engine, that the year of the engine is other than stated by the owner. The emissions standards for a vehicle of this classification will be determined by the model year of the vehicle as registered/titled.

PART C STANDARDS FOR VISIBLE POLLUTANTS FROM DIESEL ENGINE POWERED VEHICLES (Operating on Roads, Streets and Highways)

- I. No person shall emit or cause to be emitted into the atmosphere from any diesel-powered motor vehicle of 14,000 pounds Gross Vehicle Weight Rating or less, any air contaminant, for a period greater than five (5) consecutive seconds, which is of such a shade or density as to obscure an observer's vision to a degree in excess of 40% opacity.
- II. No person shall emit or cause to be emitted into the atmosphere from any diesel-powered motor vehicle of more than 14,000 pounds Gross Vehicle Weight Rating/any air contaminant, for a period greater than five (5) consecutive seconds, which is of such a shade or density as to obscure an observer's vision to a degree in excess of 35% opacity, with the exception of Subpart III or Subpart IV.
- III. No person shall emit or cause to be emitted into the atmosphere from any naturally aspirated (non-turbocharged) diesel-powered motor vehicle of more than 14,000 pounds Gross Vehicle Weight Rating/Gross Combination Weight, operated above 7,000 feet (mean sea level) any air contaminant for a period greater than five (5) consecutive seconds, which is of such a shade or density as to obscure an observer's vision to a degree in excess of 40% opacity.
- IV. No person shall emit or cause to be emitted into the atmosphere from any diesel-powered motor vehicle of more than 14,000 pounds Gross Vehicle Weight Rating any air contaminant which is of such a shade or density as to obscure an observer's vision to a degree in excess of 40% opacity when tested using an SAE J1667 Snap acceleration test procedure.
- V. Any diesel-powered motor vehicle exceeding these requirements shall be exempt for a period of 10 minutes, if the emissions are a direct result of a cold engine start-up and provided the vehicle is in a stationary position.

These standards shall apply to motor vehicles intended, designed, and manufactured primarily for travel or use in transporting person, property, auxiliary equipment, and/or cargo over roads, streets, and highways.

Enforcement of these emission standards shall be by peace officers and environmental officers pursuant to the authority of 42-4-412, or 42-4-413 C.R.S., within program boundaries.

PART D STATEMENT OF BASIS, SPECIFIC STATUTORY AUTHORITY AND PURPOSE

I. Amendment to Parts A and B, and Creation of this Part D

Adopted January 15, 1998

Basis and Purpose

Regulation Number12 establishes programs for Diesel Opacity Inspections and for Diesel Fleet Self-Certification. Both programs require annual emissions inspections for diesel vehicles covered by such programs. In 1997, the General Assembly revised §42-4-406 (1) (b) (II), C.R.S., to provide that new diesel vehicles do not need to be inspected until such vehicles are two years old, or upon a transfer of ownership. The revisions adopted on January 15, 1998 create such an exemption from inspection requirements for new diesel vehicles.

Federal Requirements

The Diesel Inspection Programs established in Regulation Number 12 are federally required because the State took emission reduction credit for such programs in the Denver element of the State Implementation Plan for particulate matter (Denver PM10 SIP). However, federal law does not expressly require the State to have opacity or emissions inspection programs for diesel vehicles and such programs are not required for areas outside of the Denver PM10 non-attainment area.

Federal law is entirely silent on the question of whether the creation of a two-year exemption from inspection requirements for new diesel vehicles will change the emissions reduction credit associated with such programs. Since federal law is silent on this issue, the Commission cannot determine whether federal law permits the State to create an exemption for such vehicles for more than the two years established by § 42-4-406 (1) (b) (II), C.R.S., or whether such exemption is not required by provisions of the Federal Act or is otherwise more stringent than requirements of the Federal Act. Nevertheless, the January 15, 1998 revisions should be submitted to EPA as a revisions to the Denver PM10 SIP. The submission of this revision to EPA is required in order to give effect to § 42-4-406 (1) (b) (II) in federal law. Failure to include the January 15, 1998 revisions in the SIP would result in more stringent SIP provisions.

The Division intends to propose a revision to Regulation Number12 to remove the Diesel Inspection Programs for Colorado Springs, Greeley, and Fort Collins from the SIP.

Statutory Authority

Specific statutory authority for the amendments is provided in § § 42-4-403(1) and 42-4-406 (1) (b) (II).

Findings Pursuant to § 25-7-110.8

The January 15, 1998 rule revisions relax existing inspection requirements for diesel vehicles and are not intended to increase the effectiveness of the relevant programs in reducing air pollution. Furthermore, the Commission has no discretion under state law not to create such an exemption for new diesel vehicles. For these reasons the determinations enumerated in § 25-7-110.8 (1), C.R.S., do not apply.

II. Amendments To Parts B and D

Adopted January 11, 2001

Basis and Purpose

Regulation Number12 establishes as a control strategy, the Diesel Opacity Inspection and the Diesel Fleet Self-Certification Programs. Both programs require periodic inspection of both light-duty and heavy-duty diesel powered vehicles. Emissions related repairs are required of those vehicles that do not comply with inspection requirements. The intended purpose of Regulation Number 12 is to reduce diesel vehicle emissions. The diesel inspection and maintenance (diesel I/M) program is one of the control measures relied on to demonstrate attainment of federal requirements in the Denver PM State Implementation Plan (SIP).

The rule revision implements the provisions of Section 42-4-408 (3), C.R.S. as amended pursuant to H.B. '00-1381. H.B. '00-1381 amends the inspection fee for diesel powered motor vehicles from a maximum of \$45 to a fee no greater than the posted hourly shop rate for one hour. The amendments to Section 42-4-408 (3) require inspection station personnel to notify diesel vehicle owner/operators of the fee, prior to conducting any element of the inspection.

The revisions to Regulation Number12 corrects a statutory reference which established inspection fees that resulted when Title 42 of the Colorado Revised Statues was recodified.

Federal Requirements

The federal act and EPA requirements are silent to the issue of inspections fees, how fees may be structured and the posting of fees. The setting of a vehicle inspection fee or fees and the required posting of same are the prerogative of individual states. The fees specified and the manor in which fees shall be posted, shall not be incorporated into the State Implementation Plan.

Statutory Authority

Specific statutory authority for amendments to Regulation Number 12 is Section 42-4-403, C.R.S.

Findings Pursuant to Section 25-7-110.8, C.R.S

The January 11, 2001 rule revisions do not increase or decrease the effectiveness of the Diesel Opacity Inspection Program in reducing diesel emissions. The rule revision results in Regulation Number 12 being consistent with Section 42-4-408 (3), C.R.S. as amended. For these reasons, the determinations enumerated in Section 25-7-110.8 (1), C.R.S. do not apply.

III. Amendments to Parts A, B, C, and, D

Adopted September 18, 2003

Basis and Purpose

Regulation Number 12 establishes as a control strategy, the Diesel Opacity Inspection and the Diesel Fleet Self-Certification Programs. Both programs require periodic inspection of both light-duty and heavy-duty diesel powered vehicles. Emissions related repairs are required of those vehicles that do not comply with inspection requirements. The intended purpose of Regulation Number 12 is to reduce diesel vehicle emissions. The diesel inspection and maintenance (diesel I/M) program is no longer an element of the State Implementation Plan, with the April 19, 2001 changes to the PM SIP, all elements of regulation 12 were removed from the SIP. The US EPA approved this SIP revision on September 16, 2002 and it became effective October 16, 2002.

The rule revision implements various provisions of Section 42-4-401 through 414 and 25-7-122 C.R.S. as amended pursuant to H.B. '03-1053, as follows:

- The distinction between light and Heavy-duty diesel vehicles is redefined,
- New Heavy-duty diesel vehicles become exempt from emissions testing for four years,
- The Heavy-duty diesel test cycle is extended to two years,
- Vehicles routinely operated in the program area are required to be tested,
- Allows the use of an automated snap-acceleration test procedure for fleets and for roadside enforcement,
- Eliminates visual opacity testing for fleets older than ten years,
- Allows the use of newer technology opacity meters,
- Obsolescent an conforming changes are made, which changes are not substantive

The revised rule identifies the *J1667 Recommended Practice, Snap Acceleration Smoke Test Procedure for Heavy-duty Powered Motor Vehicles*, © 1996 Society of Automotive Engineers Inc. (SAE) as the automated snap-acceleration test procedure that may be used for fleet inspections. The Commission adopted the SAE J1667 test procedures based on the authority set out in Section 42-4-414 (2) (b), C.R.S., as revised by HB03-1053 allowing the use of an automated opacity metering protocol. The SAE J1667 test procedure is such an automated opacity metering protocol.

One participant stated that small operators tend to own older vehicles than large operators. Therefore, he noted that the mandatory use of an opacity meter for older fleet vehicles, but not for newer fleet vehicles, imposes a somewhat more onerous requirement on small operators. However, the requirement to use an opacity meter when testing older vehicles is set out in statute and the Commission does not have the authority to change that requirement. Section 42-4-414 (2) (b). Furthermore, the requirement for the use of an opacity meter on older, but not newer vehicles is justified because newer vehicles tend to be cleaner than older vehicles.

The Commission also readopted the rule in its entirety. Prior to HB03-1053, Section 42-4-414, C.R.S., vested rulemaking authority over the Diesel Fleet Self-Certification Program with the executive director of the department of public health and environment. The previous version of Part A, of Regulation Number 12 was adopted by the Commission pursuant to a delegation of authority from the executive director. HB03-1053 revised Section 42-4-414 to delegate such rulemaking authority to the Commission directly from the General Assembly. The Commission hereby readopts Regulation Number 12 in its entirety pursuant to the authority granted it by the General Assembly in Sections 42-4-403 and 42-4-414.

Federal Requirements

There are no federal laws or rules requiring the Diesel Fleet Self-Certification Program or the Diesel Opacity Inspection Program. Both programs have been removed from the state implementation plan. Both programs are established by state statute and exceed the minimum federal requirements.

Statutory Authority

Specific statutory authority for amendments to Regulation Number 12 is set out in Sections 42-4-403 and 42-4-414, C.R.S.

Findings Pursuant To § 25-7-110.8

The selection of the SAE J1667 test procedures as the automated opacity metering protocol approved by the Commission is based on reasonably available, validated, reviewed, and sound scientific methodologies. All validated, reviewed, and sound scientific methodologies and information made available by interested parties concerning the selection of an automated opacity metering protocol was considered. In fact, the J1667 test procedure was adopted, in part, due to suggestions from the diesel engine manufacturing sector over the years. The primary purpose of the adoption of the SAE J667 test procedure is to make diesel emissions test more convenient; it was not adopted to result in a demonstrable reduction in air pollution. To further enhance convenience and flexibility, the test is made optional for fleets. Fleets have the choice of continuing to use the lug-down tests already set out in the rule. For fleets, the test is optional. Thus, the adoption of the J1667 test procedures is administrative in nature. The optional nature of the J1667 test procedures makes the rule the most cost-effective alternative and will maximize the air quality benefits of Regulation Number 12 in the most cost-effective manner by giving the fleet's additional flexibility.

Most of the remaining rule revisions are exempt from the determinations required by § 25-7-110.8 C.R.S., because the changes were adopted to implement statutory provisions, rather than reduce air pollution. For the most part, the regulatory revisions relax existing inspections for diesel vehicles and the Commission has no discretion but to adopt them under state law. One area in which the Commission exercised discretion in a manner that may result in a reduction in air pollution concerns the definitions of the terms "principally operated" and "routinely operated". However, such definitions are administrative in nature and are also exempt from the requirements of Section 25-7-110.8, C.R.S. HB03-1053 expanded the scope of the programs to include vehicles "routinely operated in the program area or principally operated from a terminal, maintenance facility, branch, or division located within the program area", but did not define these terms. The statutory requirement to include such vehicles in the programs cannot reasonably be administered without defining the terms. For guidance in defining the terms, the Commission turned to the 90-day rule established in Section 42-4-310 (1) (c), C.R.S., for motorists commuting into the AIR Program. Thus, such definitions are administrative, rather than scientific, in nature. The 90-day rule was chosen to implement the overall legislative intent, rather than to achieve a specific reduction in air pollution. For these reasons the determinations enumerated in § 25-7-110.8 (1), C.R.S., do not apply.

IV. Amendments to Parts A, B, and D

Adopted October 21, 2004

Basis and Purpose

The rule revision implements provisions of Section 42-4-406 (1)(b)(II) and 42-4-414 (2)(c) as amended pursuant to H.B. '04-1025, to remove the requirement of an emissions inspection upon change of ownership while the vehicle is still within its model year exemption, unless there is less than twelve months left on that exemption. The model year exemption for new light duty diesel vehicles is two years; and for new heavy-duty diesels the exemption period is four years.

Statutory Authority

Specific statutory authority for amendments to Regulation Number 12 is set out in Sections 42-4-403 and 42-4-414, C.R.S.

Findings pursuant to § 25-7-110.8

The rule revisions are exempt from the determinations required by § 25-7-110.8 C.R.S. because the changes were adopted to implement statutory provisions, rather than reduce air pollution. The regulatory revisions relax existing inspections for diesel vehicles and the Commission has no discretion but to adopt them under state law.

V. Amendments to Parts A, B, and D

Adopted March 18, 2005

Basis and Purpose

The Colorado Department of Public Health and Environment, Air Pollution Control Division proposes amendments to Air Quality Regulation Number 12: Reduction of Diesel Vehicle Emissions. The proposed amendments delete obsolete provisions and correct typographical and grammatical errors. The proposed revisions will have no regulatory impact on any person, facility, or activity.

The proposed amendments remove transitional provisions of the diesel emissions inspection programs within the Front Range. The transition process will be complete by December 31, 2004, rendering the transition provisions in the Regulation obsolete. Legislative Legal Services requested that the transition language be removed from the rule in order to avoid confusion and potential conflict with statute. In addition, date references that are in the past have been removed from the proposed rule.

Statutory Authority

Specific statutory authority for amendments to Regulation Number 12 is set out in Sections 42-4-403 and 42-4-414, C.R.S.

Findings pursuant to § 25-7-110.8

The rule revisions are exempt from the determinations required by § 25-7-110.8 C.R.S. because the changes were adopted to clarify and conform to existing statutory provisions, rather than reduce air pollution. The regulatory revisions remove references to obsolete provisions for diesel vehicles. The proposed revisions will have no regulatory impact on any person, facility, or activity.

VI. Amendments to Parts B and D

Adopted November 16, 2006

Basis and Purpose

Regulation Number 12 establishes as a control strategy, the Diesel Opacity Inspection and the Diesel Fleet Self-Certification Programs. Both programs require periodic inspection of both light-duty and heavy-duty diesel powered vehicles. Emissions related repairs are required of those vehicles that do not comply with inspection requirements. The intended purpose of Regulation Number 12 is to reduce diesel vehicle emissions.

The rule revision implements provisions of Section 42-4-406 C.R.S. as amended pursuant to S.B. 06-058, as follows:

- Light-duty diesel test cycles are extended to two years for models 10 years old or newer and model year 2004 and newer,
- Extend the light-duty model year exemption from two years to four years,
- Remove obsolescent language which changes are not substantive.

The changes were adopted to implement statutory changes and the Commission has no discretion but to adopt the provisions of S.B. 06-058. The rule provides regulatory relief and is not intended to reduce air pollution.

Statutory Authority

Specific statutory authority for amendments to Regulation Number 12 is set out in Sections 42-4-403 and 42-4-414, C.R.S.

Findings pursuant to § 25-7-110.8

The rule revisions are exempt from the determinations required by § 25-7-110.8 C.R.S. because the changes were adopted to implement statutory provisions and remove an obsolete provision rather than reduce air pollution. The regulatory revisions relax existing inspections for diesel vehicles and the Commission has no discretion but to adopt them under state law.

Further, these revisions will include any typographical and grammatical errors throughout the regulation.

VII. Amendments to Parts A, B, C and D

Adopted October 20, 2011

Basis and Purpose

The purpose of this rulemaking is to revise Regulation Number 12 to conform to provisions of House Bill 11-1157. House Bill 11-1157 permits heavy-duty vehicles that are registered in the Fleet Self-Certification Opacity Inspection Program area, but are physically based and principally operated outside of the program area to forgo the periodic opacity testing requirements contained in Air Quality Control Commission Regulation Number 12 Part A.

It is projected by Air Pollution Control Division staff that the mandated changes to Regulation Number 12 will affect less than 100 vehicles and result in no additional cost to the program, or air quality benefits. As such, there is no cost/benefit to be derived from the mandated changes.

Federal Requirements

There are currently no federal requirements. Regulation No 12 regulates both the Fleet Self-Certification Opacity Testing Program (Regulation No 12, Part A), and the non fleet Diesel Opacity Inspection Program (Regulation Number 12, Part B). Both programs are aimed at improving air quality through reducing diesel opacity (smoke) from identified high opacity producing diesel vehicles.

Specific Statutory Authority

Specific Statutory Authority for the revisions to Regulation Number 12, are contained in Sections 42-4-401 through 42-4-414, C.R.S., and specifically 42-4-414, C.R.S., for the Fleet Self-Certification Opacity Inspection Program.

Scientific/Technical Rationale

This rule is based on reasonably available validated, reviewed, and sound scientific methodologies.

Findings pursuant to Section 25-7-110.8

The rule revisions are exempt from the determinations required by Section 25-7-110.8 C.R.S. because the changes were adopted to implement statutory provisions rather than reduce air pollution. The regulatory revisions relax existing inspections for diesel vehicles and the Commission has no discretion but to adopt them under state law.

Further, these revisions will include any typographical, grammatical and formatting errors throughout the regulation.

VIII. Amendments to Part A

Adopted August 15, 2013

Basis and Purpose

The purpose of this rulemaking is to revise Regulation Number 12 to adopt provisions contained in House Bill 13-1091. These revisions will permit qualified fleets to use "exemplary maintenance" as an alternative method to demonstrate compliance with opacity standards on vehicles ten years old or newer. Exemplary maintenance would be an optional choice, at the fleet's own discretion.

Air Pollution Control Division staff project that exemplary maintenance practices that continuously monitor, maintain, and repair modern fleet diesel vehicles, will result in at least the same level of air quality improvement as the existing periodic opacity testing. Well maintained late model heavy-duty diesel vehicles are equipped with extensive exhaust aftertreatment equipment and sophisticated engine controls. Late model heavy trucks when properly maintained, simply do not smoke.

Federal Requirements

There are currently no federal requirements. Regulation No 12 regulates both the Fleet Self-Certification Opacity Testing Program (Regulation No 12, Part A), and the non fleet Diesel Opacity Inspection Program (Regulation No. 12, Part B). Both programs are aimed at improving air quality though reducing diesel opacity (smoke) from identified high opacity producing diesel vehicles or for the self-certification fleets, through the proposed exemplary maintenance practices.

Specific Statutory Authority

Specific Statutory Authority for the revisions to Regulation No. 12, are contained in Sections 42-4-401 through 42-4-414), C.R.S., and specifically 42-4(414), C.R.S., for the Fleet Self-Certification Opacity Inspection Program. The exemplary maintenance option is specifically permitted under C.R.S. 42-4-414(2)(a)(IV)(b.5), as amended by HB 13-1091.

Scientific/Technical Rational

This rule is based on reasonably available validated, reviewed, and sound scientific methodologies.

Findings pursuant to Section 25-7-110.8

Since fleets may use exemplary maintenance as an option to periodic opacity testing, and is voluntary on the fleet's part, there is no measureable economic impact from this proposed rule change. Fleets are able to either participate in this program or conduct their traditional opacity testing at their choice, depending on whichever is less expensive and/or that meets their fleet's requirements. Many fleets currently conduct their own exemplary maintenance practices that mirror the proposed requirements.

Editor's Notes

History

Entire rule eff. 12/15/2011.

Part A I.A, I.B.8 – I.B.23, I.D, I.F – I.G, II.A.2.i, III.B, V.A, V.B.1, VI; Part D VIII eff. 09/30/2013.