ILLINOIS POLLUTION CONTROL BOARD
January 18, 2001

IN THE MATTER OF:	)	
	)	
DIESEL OPACITY RULES:	)	R01-8
AMENDMENTS TO	)	(Rulemaking – Air)
35 ILL. ADM. CODE 240.	)	

Adopted Rule. Final Order.

OPINION AND ORDER OF THE BOARD (by S.T. Lawton, Jr.):

The Board today adopts amendments to its regulations on controlling air emissions from motor vehicles. Specifically, the Board adopts amendments to the smoke opacity standards and test procedures for diesel-powered heavy duty vehicles. These changes are mandated by the Illinois General Assembly.

In this final opinion, the Board: (1) summarizes the adopted amendments; (2) discusses procedural matters in this rulemaking; (3) sets forth background information on smoke opacity standards and test procedures, and the legislation requiring this rulemaking; (4) provides an overview of each of the amendments; and (5) discusses their economic reasonableness and technical feasibility. This opinion is followed by the Board's final order, which sets forth the amendments.

The Board today adopts this rulemaking pursuant to Section 5-40(d) of the Illinois Administrative Procedure Act (IAPA) (5 ILCS 100-5-40(d) (1998)). The adopted rules are the same as those adopted at second notice, except that the definition of "affected areas" was deleted at the request of the Joint Committee on Administrative Rules (JCAR).

SUMMARY

Opacity is the measurement of light that cannot pass through emissions and reach a light detector. The Illinois General Assembly directed the Board to amend its smoke opacity standards and test procedures for diesel-powered heavy duty vehicles, commonly referred to as heavy-duty diesel powered vehicles (HDDVs), as set forth in 35 Ill. Adm. Code 240. The General Assembly specifically requires the Board to amend its smoke opacity standards to be consistent with guidance of the United States Environmental Protection Agency (USEPA), with one exception. USEPA guidance calls for 1990 or earlier model HDDVs to meet a 55% peak smoke opacity standard. See USEPA "Guidance to States on Smoke Opacity Cutpoints to be Used with the SAE J1667 In-Use Smoke Test Procedure," (1999 USEPA Guidance) EPA420-F-99-024 at 1, February 25, 1999. The General Assembly, however, mandated that 1973 and earlier models of HDDVs must only meet a 70% smoke opacity standard until January 1, 2003. See 625 ILCS 5/13-109.1(b) (1999).

The General Assembly also requires the Board to amend its smoke opacity test procedures to be consistent with the Society of Automotive Engineers (SAE) recommended practice. The Board's adopts amendments to 35 Ill. Adm. Code 240 are consistent with these legislative directives.

PROCEDURAL MATTERS

The Illinois General Assembly adopted legislation in 1999 that amends the diesel smoke opacity tests and procedures under the Illinois Vehicle Code. See Pub. Act 91-254, eff. July 1, 2000. The law requires the Board to amend its existing diesel smoke opacity rules of 35 Ill. Adm. Code 240 within eight months of the legislation's effective date of July 1, 2000, by February 28, 2001.

On September 7, 2000, the Board adopted its first-notice opinion and order for amendments to its diesel smoke opacity standards. The proposed amendments were published in the *Illinois Register* on September 22, 2000. See 24 Ill. Reg. 39. The 45-day IAPA public comment period began on that date and ended on November 6, 2000.

The Board held two hearings in this matter during the first-notice period. The first hearing was held in Springfield on October 4, 2000, and the second hearing was held in Chicago on October 24, 2000. The second hearing was reserved in part for the purpose of receiving comments or questions regarding the Board's request of the Department of Commerce and Community Affairs (DCCA) to conduct an economic impact study, and DCCA's declining to perform one.

No one presented testimony in either of the two hearings. No one appeared at the second hearing. The hearing officer admitted four exhibits into the record at the October 4, 2000 hearing, including the Society of Automotive Engineering (SAE) Report – "Snap Acceleration Smoke Test Procedure for Heavy-Duty Diesel Powered Vehicles" (February, 1996) and supporting documentation. The Board did not receive any public comments in this matter. The public comment period expired on November 9, 2000.

The Board adopted a second-notice opinion and order on November 16, 2000, which added definitions for "snap acceleration test" as well as "affected area" and "vehicle curb weight," as requested by JCAR. JCAR considered the rules at its December 12, 2000 meeting, and issued a certificate of no objection.

The Board received a letter from JCAR during the second-notice period, requesting the removal of the definition for "affected area" from the rulemaking. The Board has removed the definition to avoid confusion to the regulated community. With the exception of this one change, the Board adopts the amendments to the diesel opacity regulations as found in its second-notice opinion and order.

BACKGROUND

Existing Standards

On April 7, 1992, the Board adopted new HDDV smoke opacity standards and test procedures to replace regulations that applied only to pre-1970 diesel engines. See Diesel Vehicle Exhaust Opacity Limits (February 27, 1992), R90-20. The 1992 regulations established smoke opacity standards and test procedures for HDDVs at 35 Ill. Adm. Code 240.141. The existing smoke opacity standards are the same as the limits currently recommended by the USEPA. See 1999 USEPA Guidance at 1. The Board's existing peak smoke opacity standards for HDDVs are as follows:

40% or less for 1991 or later model years
55% or less for 1990 or earlier models

The most current USEPA recommendations concerning the above limits or "cutpoints" are based upon the results of a 1998 SAE study of state-operated smoke testing programs. The study found that most states support the 40/55% limits, which are intended to identify excessive smoke emitters. SAE report, "Establishment of Smoke Opacity Cutpoints for SAE J1667 Test Procedure" (1998 SAE Report) at 6 (November 1998). According to the report, states also agreed that the 40/55% limit yields good results at screening out "gross polluters." 1998 SAE Report at 7.

The Board's existing smoke opacity test procedure is set forth at 35 Ill. Adm. Code Sections 240.141(b) and (c). The test procedure uses a smokemeter that measures the amount of light that passes through exhaust smoke during a "snap-idle" test. In the snap-idle test, the HDDV is placed in neutral and the engine is run from idle to its maximum no-load RPM. The peak opacity readings of the smoke plume generated from repetitive snap-idle accelerations of the engine are then compared to the smoke opacity standards listed above.

Illinois Vehicle Code Amendments – Pub. Act 91-254 and Pub. Act 91-865

The Illinois General Assembly specifically directs the Board in Pub. Act 91-254 to revise its diesel emissions standards and procedures to be consistent with: (1) the SAE recommended practice J1667 "Snap-Acceleration Smoke Test Procedure for Heavy-Duty Diesel Powered Vehicles;" and (2) the USEPA's "Guidance to States on Smoke Opacity Cutpoints to be used with SAE J1667 In-Smoke Test Procedure." See 625 ILCS 5/13-109.2 (1999).

The legislation also states the Board must add a new diesel smoke opacity standard of 70% for 1973 and earlier model HDDVs until January 1, 2003. Beginning January 1, 2003, these older vehicles will be subject to the generally applicable smoke opacity standard of 55%. See 625 ILCS 5/13-109.1(b) (1999). This 70% limitation is less stringent than the 55% limit recommended by the USEPA for the same model year HDDVs. See 1999 USEPA Guidance at 1.

The 1999 amendments to the Illinois Vehicle Code also authorize a new diesel emission inspection program and create the Diesel Emissions Testing Fund. See Pub. Act 91-254 (1999), eff. July 1, 2000. The legislation requires all two-year and older HDDV models with a gross vehicle weight rating (GVWR) over 16,000 pounds to undergo diesel emissions tests during the currently required annual safety test inspections. 625 ILCS 5/13-109.1(a) (1999).

The annual emissions testing only applies to trucks registered within the ozone non-attainment areas located in the Chicago metropolitan area, the collar counties, and the Bi-State Metro East areas of the State, all of which include the following counties: Cook, DuPage, Kane, Lake, Madison, McHenry, Monroe, St. Clair, and Will. The law also extends to applicable HDDVs that are registered in the townships of Aux Sable and Goose Lake of Grundy County and Oswego in Kendall County. See 625 ILCS 5/13-100.1 (1999). Finally, the 1999 legislation preempts home rule and exempts farm vehicles from the annual emissions testing requirements.

If a truck fails the diesel emissions test, the owner or operator of the truck must repair and retest the vehicle within 30 days. If the HDDV fails the test a second time, and is not an emergency vehicle, the testing station or Illinois Department of Transportation (IDOT) will place it out of service. See 625 ILCS 5/13-109.1(c) (1999). The Illinois State Police may issue a waiver after re-inspection if given documented proof of at least a total of $3,000 spent in an attempt to repair the noncompliant vehicle *Id.*

The General Assembly also recently passed Pub. Act 91-865 in April 2000, which authorizes the Illinois State Police to perform non-scheduled "spot testing" of certain HDDVs which emit excessive black smoke within ozone non-attainment areas of the State. Pub. Act 91-865, eff. July 1, 2000. Spot testing applies to both interstate and intrastate vehicles. The Board notes that the General Assembly directed the Board solely to adopt a revised test procedure and temporary smoke opacity standard, and gave IDOT and the Illinois State Police the responsibility to implement the rule in non-attainment areas through the diesel inspection program.

USEPA Guidance / Recommendations for HDDV Inspection and Maintenance Programs

The USEPA established emissions control regulations for new motor vehicles under Title II of the Clean Air Act (CAA). See 40 C.F.R. § 86 (2000). While the CAA requires in-use inspection and maintenance for passenger cars and light-duty vehicles, it does not require states to implement any inspection and maintenance programs for in-use HDDVs. However, many states including Illinois are in various stages of independently implementing in-use smoke testing programs as a means to address concerns about emissions from HDDVs.

The USEPA has raised concern that some states are not adopting the same test procedures for smoke measurement. The USEPA published two guidance documents that are designed to promote consistency among state programs and help to establish consistent test procedures and opacity standards. The USEPA warns that inconsistent testing procedures subject the trucking industry to different protocols whenever trucks engage in interstate travel. In addition, different testing protocols hinder states from accurately comparing their diesel opacity test results. The USEPA concludes a uniform test would allow states to more easily compare results and quantify any environmental benefits.

The USEPA recommends the uniform use of the SAE J1667 "Snap-Acceleration Smoke Test Procedure for HDDVs." See USEPA Guidance EPA420-F-97-053, April 3, 1997. The SAE J1667 snap-acceleration smoke test procedure is similar to the snap-idle test procedure that is currently utilized in Illinois. Both procedures measure smoke opacity by averaging peak readings from three cycles of revving the engine from idle to full throttle and back to idle again.

However, the SAE J1667 test procedure contains more detail than the existing procedure, in that it addresses at greater length the time duration per test run, operating parameters for measurement equipment, sampling of multiple exhaust ports, and variations in ambient air conditions. See SAE report "Snap-Acceleration Smoke Test Procedure for Heavy-Duty Diesel Powered Vehicles," (SAE J1667 report) (February 1996). The SAE J1667 procedure spans 42 pages, whereas the existing procedure under 35 Ill. Adm. Code 240 only covers two pages. Moreover, the Illinois procedure refers to an outdated document, SAE J225a "Diesel Engine Smoke Measurement" from August 1978, which was updated to a more recent edition in February 1995.

OVERVIEW OF AMENDMENTS

Discussion of the Suggested Changes to Part 240 Diesel Opacity Regulations

The proposed changes to the Board's existing diesel opacity rules are contained in the Board's order. Additions are shown by underline and deletions by strike-through font. The proposed changes are explained below.

Opacity Standards – 35 Ill. Adm. Code 240.141(a)

The Board's current 40/55 percent peak smoke opacity standards are consistent with the 1999 USEPA guidance. However, the Board here adds a provision under Section 240.141(a) that incorporates the 70% standard for 1973 and older model HDDVs until December 31, 2002, as mandated in Section 13-109.1(b) of the Illinois Vehicle Code.

The Board also deletes the reference to the federal peak smoke engine certification at Section 240.141(a) to be consistent with USEPA guidance. The USEPA guidance does not make any distinctions in its recommended standards that are based on the certification requirements. Deleting the reference to federal certification does not appear to broaden the scope of the regulations because the certification is required for all newly manufactured engines of model years 1977 and newer. See 40 C.F.R. § 86 (2000). Although the Board solicited comments about whether deleting the federal certification reference poses any potential problems, the Board did not receive any public comments on the issue.

SAE J1667 Smoke Test Procedure – Section 240.141(b)

Summary of the SAE J1667 Smoke Test Procedure. The regulations incorporate the SAE J1667 test procedure in accordance with the legislative directive in Pub. Act 91-254. 625

ILCS 5/13-109.1(b) (1999). Although the new procedure is similar to Illinois' existing snap-idle cycle, it does include a few differences, and a much more extensive protocol. The Board describes the procedure below. However, the following summary in no way should be considered a substitute for meticulous compliance with the SAE J1667 test procedure. It is imperative to follow the specific details of the 1998 SAE report. A complete version of the SAE J1667 test procedure is available at: http://www.sae.org for a $59 fee.

Test Equipment. The SAE 1667 report sets forth specific details concerning test equipment, which essentially involves three main components. The smoke measurement equipment used in the J1667 test utilizes a full-flow end-of-line or sampling type smokemeter. The smokemeter data processing unit must be compatible with the test equipment. A supplemental chart recorder or other collection media may be used to record test results, provided that the device(s) does not affect the smoke measurement.

Vehicle Preparation and Safety Check. The SAE J1667 report identifies how to prepare a vehicle and perform a safety check prior to conducting the smoke test. In part, the procedure involves placing the vehicle in neutral for manual transmissions or park for automatic transmissions, if available, and deactivating any devices installed on the engine to ensure normal acceleration characteristics of the engine and representative snap-acceleration test results. The procedure also requires persons performing the test to verify the speed-limiting capability of the engine governor by gradually revving the engine once, being cautious of signs that the engine may be of questionable soundness. If the test administrator observed unsafe conditions, he or she would abort the test. The vehicle preparation step further instructs test administrators to inspect the vehicle for exhaust leaks, and note blue or white smoke, which could indicate oil burning or leaking internal coolant.

Test Preparation and Equipment Set-Up. When setting up equipment prior to the smoke test, the SAE J1667 report requires the installation of the smokemeter and data processing unit per manufacturers' specifications. In addition, if the test results are to be reported in units of smoke opacity, the rated power of the engine must be determined. For full-flow end-of-line type smokemeters, the procedure includes details on aligning the axis of the light beam perpendicular to the axis of the exhaust flow and determining the effective optical path length used to make smoke measurements per SAE J1667 Appendix D. For sampling type smokemeters, the report discusses how to insert the probe into the exhaust tailpipe with the open end facing upstream into the exhaust flow. For multiple exhaust outlets, the SAE 1667 report directs people to use the most convenient exhaust outlet if there is no discernible difference between emissions from the other outlets.

To ensure repeatability between test cycles, the SAE advises that the test administrator may install a tachometer to measure engine speed and provide data regarding the idle RPM, maximum RPM, and time to accelerate from idle to maximum RPM.

Ambient air conditions can affect snap-acceleration smoke test results. To ensure reliable results, the procedure also instructs the test administrator to record ambient conditions at the time of the test, including: altitude, air temperature, wind, dry air density, and humidity. Correcting factors are then applied during the final result calculations.

As the SAE notes, regulating agencies adopting this procedure should make some allowances for the fact that certain vehicles may be more sensitive than others to the adjustment equations used for air density in the final calculations. In light of this, the adjustment equations can only be considered approximate when it is applied to specific engines of unknown air density sensitivity.

Driver Familiarization and Vehicle Preconditioning. The sections involving driver familiarization and vehicle preconditioning can be summarized in the following steps. The 1998 SAE report first discusses how to warm up the vehicle by operating it for at least 15 minutes or by checking water and oil temperature gages to verify that the engine is within normal operating temperature range.

The procedure then instructs the test administrator to execute a preliminary snap-acceleration test. When the vehicle is warmed-up and at low idle speed, the procedure states the throttle should be moved to the fully open position as rapidly as possible and held in the position until the engine reaches maximum governed speed. The throttle must be held for an additional 1-4 seconds before releasing to allow the engine to return to idle. Then, the engine must be allowed to idle from 5 to 45 seconds before initiating the next snap-acceleration test cycle.

According to the SAE J1667 report, the test administrator should repeat the preliminary snap-acceleration test at least twice. The preliminary cycles allow the test administrator to remove any loose soot in the vehicle exhaust system and ensure that the smoke measurement system is operating properly.

Execution of the Snap Acceleration Test. The SAE J1667 report contains specific details regarding performance of the snap-acceleration test. The test procedure generally involves the following steps. The report specifies how test administrators must set up a smokemeter data processing unit and verify the zero and full scale readings of the smokemeter. Then, the report instructs test administrators to conduct three snap-acceleration test cycles within two minutes of the preliminary snap-acceleration cycles.

Finally, the SAE J1667 report discusses how to analyze and ensure the accuracy of the results from the snap-acceleration test. The process includes determining the corrected maximum 0.5 second average smoke values for each of the 3 cycles and applying algorithms and corrections in SAE J1667 Appendices A, B, C, and D. The degree of the post-test smokemeter zero shift must also be determined. The report includes how test administrators must validate that none of the test procedures or criteria were compromised. To be considered valid, the difference between the highest and lowest 0.5 second average smoke values shall not exceed 5.0% opacity, and the smokemeter zero shift values shall not exceed 2% opacity . If a test is deemed invalid, the SAE procedure directs persons to troubleshoot the possible causes and repeat the above steps.

Calculation and Reporting of Final Results. After completing the snap-acceleration test, the SAE J1667 test procedure directs the test administrator to report the average of the 3 corrected maximum 0.5 second average smoke values as the final result.

Adopted Amendments. Pub. Act 91-254 requires the Board to update its existing diesel smoke test to be consistent with the SAE J1667 procedure. While the current smoke test procedure, which utilizes a snap-idle cycle, is similar to SAE J1667, it does not provide the level of detail set forth in the new SAE smoke test procedure. In Section 240.141(b), the Board replaces the existing test procedure at 35 Ill. Adm. Code 240.141(b) and (c) with the SAE J1667 smoke test procedure.

The Board also incorporates by reference the SAE J1667 test procedure. The Board further adds a note to 35 Ill. Adm. Code 240.141(b), to indicate that the Department of Transportation regulations at 92 Ill. Adm. Code 460 also address diesel smoke test procedures.

Adjusted Standard – Section 240.141(d)

In the Board's original diesel opacity rulemaking, R90-20, Detroit Diesel Corporation (DDC) commented that 1987-1990 Series 60 engines could not reasonably meet the 55% opacity standard using the Board's snap-idle test and that the engines emit very low levels of smoke under most other operating conditions. See Diesel Vehicle Exhaust Opacity Limits (February 27, 1992), R90-20, slip op. at 10-11. The Board therefore adopted Section 240.141(d) to set forth the level of justification required for such engines to qualify for an adjusted standard from the 55% opacity standard of subsection (a)(2):

> d) Pursuant to Section 28.1(b) of the Act and 35 Ill. Adm. Code 106. Subpart G, any person petitioning for an adjusted standard from the 55% peak smoke opacity standard in subsection (a)(2) for DDC 1987-1990 Series 60 engines shall establish its justifications by providing the following information at a minimum:
>
> 1) The specific characteristics common only to all the 1987-1990 Series 60 engines that result in noncompliance with the 55% opacity standard.
>
> 2) All USEPA certification and snap/idle test data.
>
> 3) Economic and technical data related to the logistical or other perceived difficulties encountered or that may be encountered if the existing 1987-1990 Series 60 engine software were to be reprogrammed so as to come into compliance.
>
> 4) The alternative opacity standard proposed and supporting data.
>
> 5) Supporting data showing that the requested standard will not result in environmental or health effects substantially and significantly

> more adverse than the effects considered by the Board in adopting the rule of general applicability. (Section 28.1(c)(3) of the Act). 35 Ill. Adm. Code 240.141(a).

DDC in turn petitioned for an adjusted standard pursuant to subsection (d). DDC demonstrated that complying with the 55% opacity standard using the snap idle test on the DDC 1987-1990 Series 60 engines was unreasonable. On May 20, 1993, in AS 92-4, the Board granted the adjusted standard, relaxing the 55% opacity standard to 85% for all of the engines in question. See *In re* Joint Petition of Detroit Diesel Corporation and the Engine Manufacturers Association for Adjusted Standards from 35 Ill. Adm. Code 240.141 (May 20, 1993), AS 92-4. The 85% opacity standard was premised on studies of the engines when evaluated using the snap-idle test.

Since the Board based subsection (d) on potential difficulties for these engines with a test that is now being replaced, the Board deletes the subsection. Although the old snap-idle test and the new snap-acceleration test are similar, the procedures do contain some differences. In its first-notice opinion, the Board solicited comments on whether the DDC engines would have the same problems with the snap-acceleration test, and, if so, whether 85% would be the appropriate smoke opacity standard for these engines using the new test. The Board did not receive any comments regarding the deletion of subsection (d) or the appropriate smoke opacity standard achievable by the DDC 1987-1990 Series 60 engines under the new snap acceleration test procedure.

Definitions – Section 240.102

The Board alters five definitions and in the regulations to reflect the incorporation of the SAE J1667 procedure. The Board defines "opacity" because it is used in Part 240 of the diesel smoke opacity regulations. The Board bases the new term on the definition set forth in the SAE J1667 smoke test procedure, which defines opacity as "the percentage of light transmitted from a source that is prevented from reaching a light detector."

To ensure the regulatory definitions are consistent with the new SAE J1667 procedures, the Board replaces the definition for the existing snap idle cycle with the new snap acceleration test, and strikes the terms of "smokemeter" and "opacimeter" as definitions that are no longer necessary. The Board also adopts a definition for "vehicle curb weight" as provided by the Agency in accordance with a request by JCAR for the addition.

Incorporations by Reference - Section 240.107

The Board incorporates by reference the new SAE J1667 test procedure document. The Board also deletes older references to the SAE J255a procedure and the International Standards Organization (ISO) Publication 393, and incorporates by reference the SAE J1667 test procedure. The Board does not incorporate by reference the USEPA Guidance document on smoke opacity standards because the Board has set forth the applicable standards in 35 Ill. Adm. Code 240.141(a).

Other Changes - Sections 240.104, 240.105 & 240.106

The remainder of the changes update sections concerning inspection, penalty and determination of violation. Diesel powered vehicles that are subject to inspection under Section 13-109.1 of the Act must comply with smoke opacity standards in Section 240.141(a). See 35 Ill. Adm. Code 240.104(c). Any violations of Section 240.141(a) would be subject to penalties under Section 13.109.1 of the Act. See 35 Ill. Adm. Code 240.105(a). Violations of Section 240.141(a) could be determined in accordance with test procedures in Section 240.141(b). See 35 Ill. Adm. Code 240.106(c).

ECONOMIC REASONABLENESS AND TECHNICAL FEASIBILITY

The Illinois General Assembly mandated in Pub. Act 91-254 that the Board adopt both the more lax temporary smoke diesel opacity standard for older model HDDVs and the snap acceleration test procedure. The record before the Board indicates that the proposed rules will provide an economic benefit to sources with heavy-duty diesel powered vehicles that are 1973 and earlier models, which will be held to a more lenient 70% smoke diesel opacity standard until January 1, 2003. Further, the new snap-acceleration test, which is similar to the existing snap-idle test, is economically reasonable and based on existing technology. Thus, the Board finds that the adoption of this rule is economically reasonable and technically feasible based on the record before it.

ORDER

The Board hereby adopts the following amendments to 35 Ill. Adm. Code 240. The Board directs the Clerk to cause the submission of the following adopted rules to the Secretary of State for filing and publication in the *Illinois Register*.

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE B: AIR POLLUTION
CHAPTER I: POLLUTION CONTROL BOARD
SUBCHAPTER K: EMISSION STANDARDS AND LIMITATIONS FOR MOBILE SOURCES

PART 240
MOBILE SOURCES

SUBPART A: DEFINITIONS AND GENERAL PROVISIONS

Section
240.101 Preamble
240.102 Definitions
240.103 Prohibitions
240.104 Inspection

SUBPART B: EMISSIONS

SUBPART C: ~~HEAVY DUTY DIESEL~~ SMOKE OPACITY STANDARDS AND TEST PROCEDURES FOR DIESEL-POWERED HEAVY DUTY VEHICLES

SUBPART D: STEADY-STATE IDLE MODE TEST EMISSION STANDARDS

SUBPART E: TRANSIENT LOADED MODE TEST EMISSION STANDARDS

SUBPART F: EVAPORATIVE TEST STANDARDS

SUBPART G: ON-ROAD REMOTE SENSING TEST EMISSION STANDARDS

SUBPART H: ON-BOARD DIAGNOSTIC TEST STANDARDS

AUTHORITY: Implementing Sections 9, 10 and 13 and authorized by Sections 27 and 28.5 of the Environmental Protection Act [415 ILCS 5/9, 10, 13, 27, and 28.5] and Section 13B-20 of the Vehicle Emissions Inspection Law of 1995 [625 ILCS 5/13B-20]; implementing Section 13-109.2 of the Illinois Vehicle Code [625 ILCS 5/13-109.2] ~~and authorized by Sections 27 and 28.5 of the Environmental Protection Act [415 ILCS 5/27 and 28.5]~~.

SOURCE: Adopted as Chapter 2: Air Pollution, Part VII: Mobile Sources, filed and effective April 14, 1972; codified at 7 Ill. Reg. 13628; amended in R85-25, at 10 Ill. Reg. 11277, effective June 16, 1986; amended in R90-20 at 16 Ill. Reg. 6184, effective April 7, 1992; amended in R94-20 at 18 Ill. Reg. 18013, effective December 12, 1994; amended in R94-19 at 18 Ill. Reg. 18228, effective December 20, 1994; amended in R98-24 at 22 Ill. Reg. 13723, effective July 13, 1998; expedited correction at 22 Ill. Reg. 21120, effective July 13, 1998; amended at R01-12 at 24 Ill. Reg. 19188, effective December 18, 2000; amended in R01-8 at 25 Ill. Reg. _____, effective _____.

~~BOARD NOTE: This part implements the Environmental Protection Act as of July 1, 1994.~~

NOTE: Capitalization denotes statutory language.

SUBPART A: DEFINTIONS AND GENERAL PROVISIONS

Section 240.102 Definitions

All terms which appear in this Part have the definitions specified in this Part and 35 Ill. Adm. Code 201 and 211. Where conflicting definitions occur, the definitions of this Section apply in this Part.

"Adjusted loaded vehicle weight ("ALVW")" means the value of the vehicle curb weight plus gross vehicle weight rating divided by two.

"Agency" means the Illinois Environmental Protection Agency.

"Diesel engine" means all types of internal-combustion engines in which air is compressed to a temperature sufficiently high to ignite fuel injected directly into the cylinder area.

"Diesel locomotive" means a diesel engine vehicle designed to move cars on a railway.

"Evaporative system integrity test" means a test of a vehicle's evaporative system. The test shall either consist of a leak check of a vehicle's fuel cap with a fuel cap pressure decay tester (fuel cap pressure decay test), a fuel cap leak flow tester (fuel cap leak flow test), or a visual functional check, as applicable.

"Fuel cap" means a device used to seal a vehicle's fuel inlet.

"Fuel cap leak flow test" means a test which may be performed in accordance with this Part on a vehicle's fuel cap using a fuel cap leak flow tester to determine whether the vehicle complies with the evaporative system emission standards of this Part.

"Fuel cap leak flow tester" means a device used to determine the leak flow integrity of a vehicle's fuel cap by comparing the measured leak flow of the fuel cap with an established fuel cap leak flow standard.

"Fuel cap pressure decay test" means the test performed in accordance with this Part on a vehicle's fuel cap using a fuel cap pressure decay tester to determine whether the vehicle complies with the evaporative system emission standards of this Part.

"Fuel cap pressure decay tester" means a device used to determine the pressure decay integrity of a vehicle's fuel cap by monitoring the pressure behind the fuel cap for a ten second period and comparing the measured pressure decay of the fuel cap to an established fuel cap pressure decay standard.

"Fuel cap visual functional test" means the test performed in accordance with this Part on a vehicle's fuel cap using visual analysis to determine whether the vehicle complies with the evaporative system emission

standards of this Part.

"Full power position" means the throttle position at which the engine fuel delivery is at maximum flow.

"Gross vehicle weight rating (GVWR)" means the value specified by the manufacturer as the maximum design loaded weight of a single vehicle.

"Heavy duty vehicle" means any motor vehicle rated at more than 8500 pounds GVWR or that has a vehicle curb weight of more than 6000 pounds or that has a basic vehicle frontal area in excess of 45 square feet.

"High idle" means a vehicle operating condition with engine disconnected from an external load (placed in either neutral or park) and operating at speed of 2500 $\pm$ 300 RPM.

"IM240" means the transient mass emissions inspection procedure that the USEPA developed and has been implemented for the use in the Illinois Enhanced Vehicle Inspection and Maintenance Program. 240 refers to the 240 second maximum duration of the driving cycle that the vehicle undergoes as it is positioned on the dynamometer and essentially driven for the purpose of measuring the mass amount of emissions coming out of the tail pipe.

"Idle mode" means that portion of a vehicle emission test procedure conducted with the engine disconnected from an external load and operating at minimum throttle.

"Initial idle mode" means the first of up to two idle mode sampling periods during a steady-state idle mode test, during which exhaust emission measurements are made with the vehicle in "as-received" condition.

"Light duty truck 1" means a motor vehicle rated at 6000 pounds maximum GVWR or less and which has a vehicle frontal area of 45 square feet or less, and which is designed primarily for purposes of transportation of property or is a derivation of such a vehicle, or is designed primarily for transportation of persons and has a capacity of more than 12 persons, or is available with special features enabling off-street or off-highway operation and use.

"Light duty truck 2" means a motor vehicle rated between 6001 and 8500 pounds maximum GVWR and which has a vehicle frontal area of

45 square feet or less, and which is designed primarily for purposes of transportation of property or is a derivation of such a vehicle, or is designed primarily for transportation of persons and has a capacity of more than 12 persons, or is available with special features enabling off-street or off-highway operation and use.

"Light duty vehicle" means a passenger car or passenger car derivative capable of seating 12 passengers or fewer.

"Loaded mode" means that portion of a vehicle emission test procedure conducted with the vehicle positioned and operating under load on a chassis dynamometer.

"Loaded vehicle weight (LVW)" means the vehicle curb weight plus 300 pounds.

"Measured values" means five-second running averages of exhaust emission concentrations sampled at a minimum rate of twice per second.

"Model year" means the year of manufacture of a motor vehicle based upon the annual production period as designated by the manufacturer and indicated on the title and registration of the vehicle. If the manufacturer does not designate a production period for the vehicle, then "model year" means the calendar year of manufacture.

"Motor vehicle" as used in this Part, shall have the same meaning as in Section 1-146 of the Illinois Vehicle Code [625 ILCS 5/1-146].

<u>"Opacity" means the percentage of light transmitted from a source that is prevented from reaching a light detector.</u>

"Preconditioning mode" means a period of steady-state loaded mode or high-idle operation conducted to ensure that the engine and emissions control system components are operating at normal operating temperatures, thus minimizing false failures caused by improper or insufficient warm-up.

"Second-chance idle mode" means the second of two idle mode sampling periods during a steady-state idle mode test, preceded by a preconditioning mode and utilized as a second chance to pass idle exhaust emission standards immediately following an initial idle mode failure.

~~"Smokemeter or opacimeter" means an optical instrument designed to measure the opacity of smoke or diesel exhaust gases using the light extinction method.~~

~~"Snap-idle cycle" means rapidly depressing the accelerator pedal from normal idle to the full power position while the vehicle is in neutral, holding the pedal in the position for no longer than ten seconds or until the engine reaches maximum RPM, and fully releasing the pedal so that the engine decelerates to normal idle.~~

"Snap-acceleration test" means a test to measure exhaust smoke opacity from heavy-duty diesel powered vehicles in accordance with the SAE J1667 procedure, incorporated by reference at Section 240.107 of this Subpart.

"Steady-state idle test" means a vehicle emission test procedure consisting of an initial idle mode measurement of exhaust emissions followed, if necessary, by a loaded or high idle preconditioning mode and a second-chance idle mode.

"Transient loaded mode test" or "IM240 testing" or "transient IM240 loaded mode exhaust emission test procedure" or "transient IM240 test procedure" means a vehicle emissions test run on an inertial and power absorbing dynamometer using USEPA's IM240 driving cycle consisting of accelerations and decelerations simulating on-road driving conditions.

"Vehicle curb weight" means the actual vehicle weight plus standard equipment and a full fuel tank.

(Source: Amended at 25 Ill. Reg.___ , effective ____)

Section 240.104 Inspection

a) All motor vehicles subject to inspection pursuant to Section 13B-15 of the Vehicle Emissions Inspection Law [625 ILCS 5/13B-15] shall comply with applicable vehicle emission standards contained in Sections 240.152, 240.162, 240.163, 240.172, 240.182, and 240.192 of this Part.

b) All diesel-powered vehicles subject to inspection pursuant to Section 13-109.1 of the Illinois Vehicle Code [625 ILCS 5/13-109.1] must comply with applicable smoke opacity standards set forth in Section 240.141(a) of this Part.

(Source: Amended at 25 Ill. Reg.___ , effective ____)

Section 240.105 Penalties

a) Any violations of Section~~s~~ 240.103, 240.121, 240.122, and 240.123 of this Part shall be subject to the penalties as set forth in Section 42 of the Act [415 ILCS

5/42].

b) Any violations of Sections 240.104(b), 240.152, 240.162, 240.163, 240.172, 240.182, and 240.192 of this Part shall be subject to the penalties as set forth in Sections 13B-55 and 13B-60 of the Vehicle Emissions Inspection Law [625 ILCS 5/13B-55 and 13B-60].

c) Any violation of Section 240.141(a) of this Part will be subject to penalties as set forth in Section 13-109.1 of the Illinois Vehicle Code [625 ILCS 5/13-109.1].

(Source: Amended at 25 Ill. Reg.___ , effective ____)

Section 240.106 Determination of Violation

a) Any violations of Sections 240.103, 240.121, 240.122, and 240.123 of this Part shall be determined by visual observation or by a test procedure employing an opacity measurement system as qualified by 35 Ill. Adm. Code 201, Subpart J.

b) Any violations of Sections240.152, 240.162, 240.163, 240.172, 240.182, or 240.192 of this Part shall be determined in accordance with test procedures adopted by the Agency in 35 Ill. Adm. Code 276.

c) Any violation of Section 240.141(a) of this Part will be determined in accordance with test procedures set forth in Section 240.141(b) of this Part.

(Source: Amended at 25 Ill. Reg.___ , effective ____)

Section 240.107 Incorporations by Reference

The following materials are incorporated by reference and include no later editions or amendments:

a) Society of Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001, www.sae.org: Report J1667 Snap-Acceleration Smoke Test Procedure for Heavy-Duty Diesel Powered Vehicles (February 1996) 255a Diesel Engine Smoke Measurement (August 1978).

b) International Standards Organization (ISO), Case Postale 56, 1211 Geneve 20, Switzerland: ISO 393 (Working Draft, January 1991). Also available from American National Standards Institute (ANSI), 11 West 42nd Street, New York, NY 10036.

b~~c~~) United States Environmental Protection Agency (USEPA), "High-Tech I/M Test Procedures, Emission Standards, Quality Control Requirements, and Equipment Specifications: IM240 and Functional Evaporative System Tests, Revised Technical Guidance," Report EPA-AA-RSPD-IM-96-1 (June 1996), 2565 Plymouth Road, Ann Arbor, MI 48105.

(Source: Amended at 25 Ill. Reg.___ , effective ____)

SUBPART C: ~~HEAVY-DUTY DIESEL~~ SMOKE OPACITY STANDARDS AND TEST PROCEDURES FOR DIESEL-POWERED HEAVY DUTY VEHICLES

Section 240.140 Applicability

This Subpart applies to all on-road, diesel-powered heavy duty vehicles ~~with a 8,000 pounds or greater manufacturer's maximum gross vehicle weight rating (GVWR)~~ operating in the State of Illinois.

(Source: Amended at 25 Ill. Reg.___ , effective ____)

Section 240.141 ~~Heavy Duty Diesel Vehicle~~ Smoke Opacity Standards and Test Procedures for Diesel-Powered Heavy Duty Vehicles

a) Diesel-powered heavy duty vehicles described in Section 240.140 of this Subpart are subject to the following ~~The standard for heavy-duty diesel vehicle~~ smoke opacity standards ~~is as follows~~:

1) Diesel-powered heavy duty vehicles that are model year ~~No~~ 1991 or newer ~~later model year heavy-duty diesel-powered vehicle with a federal peak smoke engine certification operating on the roadways within the State of Illinois shall~~ must not exceed forty percent peak smoke opacity when tested in accordance with ~~subsections~~ subsection (b) of this Section ~~and (c)~~.

2) Except as set forth in subsection (a)(3) of this Section, ~~for subsection (a)(1), no heavy-duty~~ diesel-powered heavy duty ~~vehicle~~ vehicles that are model year 1990 or older ~~operating on the roadways within the State of Illinois shall~~ must not exceed fifty-five percent peak smoke opacity when tested in accordance with subsection ~~subsections~~ (b) of this Section ~~and (c)~~.

3) Until December 31, 2002, diesel-powered heavy duty vehicles that are model year 1973 or older must not exceed seventy percent peak smoke opacity when tested in accordance with subsection (b) of this Section. Beginning on January 1, 2003, diesel-powered heavy duty vehicles that are model year 1973 or older must not exceed fifty-five percent peak

smoke opacity when tested in accordance with subsection (b) of this Section.

b) Test procedures and equipment for measuring peak smoke opacity from diesel-powered heavy duty vehicles must be in accordance with the Society of Automotive Engineer's (SAE) Recommended Practice J1667, "Snap-Acceleration Smoke Test Procedure for Heavy-Duty Diesel Powered Vehicles," (February 1996), incorporated by reference in Section 240.107 of this Part. BOARD NOTE: The Illinois Department of Transportation also addresses the use of diesel smoke test procedures in 92 Ill. Adm. Code 460.

~~The smoke opacity measurement shall be carried out using a light-extinction type opacimeter capable of measuring and recording opacity continuously during the snap idle testing cycle. A strip chart recorder or an equivalent or better recording device shall be used in concert with the opacimeter to record opacity continuously, including peak values. The opacimeter shall be capable of providing opacity readings with sufficient resolution to obtain 0.5 second-averaged values. The peak 0.5 second-averaged value shall be used for showing compliance with the standard in subsection (a). Where the response time of the instrument is such that opacity is being measured at smaller than 0.5 second intervals, the meter shall have the capability of providing or allowing the calculation of 0.5 second-averaged values.~~

~~1) The opacimeter shall be either an in-line full-flow opacimeter; end-of-line or plume type full-flow opacimeter; or a sampling type partial flow opacimeter. The opacimeter and recording devices shall be calibrated according to manufacturer's specifications. Corrections for the effect of exhaust stack diameter shall apply to opacity measurements made using an end-of-line full-flow opacimeter; and~~

~~2) The opacimeter and recorder shall comply with specifications in the International Standards Organization ISO 393 and in Society of Automotive Engineers (SAE) report number J255a entitled "Diesel Engine Smoke Measurement", incorporated by reference in Section 240.107.~~

~~c) The test procedure using the snap idle cycle shall occur when the engine is at normal operating temperature. The test shall consist of preparation, preconditioning, and testing phases.~~

~~1) In the preparation phase, the vehicle shall be placed at rest, the transmission shall be placed in neutral, and the vehicle wheels shall be properly restrained to prevent any rolling motion. In the event of a roadside test, it shall be acceptable under this Section for the driver to apply the brakes during the test.~~

2) In the preconditioning phase, the vehicle shall be put through a snap idle cycle three or more times until successive measured smoke opacity readings are within ten percent (10%) of each other. The opacimeter shall be rechecked prior to the preconditioning sequence to determine that its zero and span setting are adjusted to manufacturer's specifications.

3) In the testing phase, the vehicle shall be put through the snap idle cycle three times.

A) The smoke opacity shall be measured during the preconditioning and testing phases with an opacimeter meeting the requirements of subsection (b) and shall be recorded continuously on the recorder during each snap idle cycle. The maximum 0.5 second averaged value recorded during each snap idle cycle shall be the smoke opacity reading.

B) The average of the three smoke opacity readings shall be used to determine compliance with the opacity standard in subsection (a).

d) Pursuant to Section 28.1(b) of the Act and 35 Ill. Adm. Code 106. Subpart G, any person petitioning for an adjusted standard from the 55% peak smoke opacity standard in subsection (a)(2) for DDC 1987-1990 Series 60 engines shall establish its justifications by providing the following information at a minimum:

1) The specific characteristics common only to all the 1987-1990 Series 60 engines that result in noncompliance with the 55% opacity standard.

2) All USEPA certification and snap/idle test data.

3) Economic and technical data related to the logistical or other perceived difficulties encountered or that may be encountered if the existing 1987-1990 Series 60 engine software were to be reprogrammed so as to come into compliance.

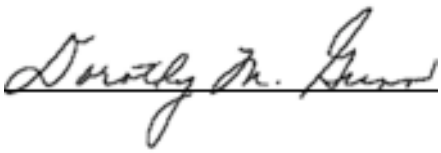
4) The alternative opacity standard proposed and supporting data.

5) Supporting data showing that THE REQUESTED STANDARD WILL NOT RESULT IN ENVIRONMENTAL OR HEALTH EFFECTS SUBSTANTIALLY AND SIGNIFICANTLY MORE ADVERSE THAN THE EFFECTS CONSIDERED BY THE BOARD IN ADOPTING THE RULE OF GENERAL APPLICABILITY. (Section 28.1(c)(3) of the Act).

(Source: Amended at 25 Ill. Reg.___ , effective ____)

IT IS SO ORDERED.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, do hereby certify that the above opinion and order was adopted on the 18th day of January 2001 by a vote of 7-0.



Dorothy M. Gunn, Clerk
Illinois Pollution Control Board