

sierra research



Report No. SR01-11-01

Status of Vehicle Inspection Programs For Light-Duty Diesel Vehicles and Heavy-Duty Gasoline and Diesel Vehicles

prepared for:

**U.S. Environmental Protection Agency
Certification and Compliance Division**

November 6, 2001

prepared by:

Sierra Research, Inc.
1801 J Street
Sacramento, California 95814
(916) 444-6666

Report No. SR01-11-01

Status of Vehicle Inspection Programs For Light-Duty Diesel Vehicles and Heavy-Duty Gasoline and Diesel Vehicles

prepared for:

U.S. Environmental Protection Agency
Certification and Compliance Division

Under Contract No. 68-C7-0051
Work Assignment No. 3-10

November 6, 2001

prepared by:

Michael J. St. Denis
H. Anthony Ashby

Sierra Research, Inc.
1801 J Street
Sacramento, CA 95814
(916) 444-6666

DISCLAIMER NO. 1

The mention of commercial products or vehicle emissions testing contractors is for informational purposes only. Mention of these products or vehicle emissions testing contractors should not be considered an endorsement by Sierra Research or the United States Environmental Protection Agency.

DISCLAIMER NO. 2

Although the information described in this report has been funded wholly or in part by the United States Environmental Protection Agency under Contract No. 68-C7-0051, it has not been subjected to the Agency's peer and administrative review and is being released for informational purposes only. It therefore may not necessarily reflect the views of the Agency and no official endorsement should be inferred.

**Status of Vehicle Inspection Programs
For Light-Duty Diesel Vehicles and
Heavy-Duty Gasoline and Diesel Vehicles**

Table of Contents

<u>Section</u>	<u>page</u>
1. Introduction	1-1
2. Design Features of I/M Programs Testing LDDVs, HDDVs, and HDGVs	2-1
3. Program Description Summaries - Domestic I/M Programs	3-1
Alaska (Municipality of Anchorage)	3-2
Alaska (Fairbanks North Star Borough)	3-4
Arizona (Phoenix area)	3-6
Arizona (Tucson area)	3-9
California (Enhanced Program Areas)	3-12
California (Basic and Change-of-Ownership Program Areas)	3-15
Colorado (Enhanced Program Area of Denver and Boulder)	3-18
Colorado (Aspen, Colorado Springs, Fort Collins, and Greeley)	3-21
Connecticut	3-24
Idaho	3-26
Illinois	3-29
Indiana	3-31
Kentucky (Louisville area)	3-32
Kentucky (Northern Counties)	3-34
Maine	3-36
Maryland	3-37
Massachusetts	3-40
Nevada (Las Vegas and Reno areas)	3-42
New Hampshire	3-44
New Jersey	3-45
New Mexico	3-48
New York (New York Metropolitan Area)	3-51
North Carolina	3-53
Ohio	3-54
Oregon (Portland area)	3-56
Oregon (Medford area)	3-58
Pennsylvania (Philadelphia area)	3-60
Pennsylvania (Pittsburgh area)	3-61
Rhode Island	3-62
Tennessee (City of Memphis)	3-63
Texas (Dallas-Ft. Worth, El Paso, and Houston-Galveston areas)	3-64
Utah (Davis County)	3-65
Utah (Salt Lake County)	3-67

Table of Contents, Continued

<u>Section</u>	<u>Page</u>
3. Program Description Summaries - U.S. I/M Programs (Continued)	
Utah (Utah County)	3-69
Utah (Weber County)	3-71
Vermont	3-72
Virginia	3-73
Washington (Puget Sound area)	3-75
Washington (Spokane area)	3-77
Washington (Vancouver area)	3-79
Wisconsin	3-81
4 Program Description Summaries - International I/M Programs	4-1
Australia (New South Wales)	4-2
Canada (Ontario)	4-3
Canada (Vancouver, British Columbia)	4-4
China (Beijing and Guangzhou)	4-6
China (Hong Kong)	4-7
Germany	4-9
Singapore	4-11
Sweden	4-13
Britain, United Kingdom	4-15

1. INTRODUCTION

This report contains descriptive information on motor vehicle inspection and maintenance (I/M) programs operating in the United States as well as abroad that are currently testing Light-Duty Diesel Vehicles (LDDVs), Heavy-Duty Diesel Vehicles (HDDVs), or Heavy-Duty Gasoline Vehicles (HDGVs).^{*} The report includes an overview discussion of such testing; a table summarizing the features of the programs; and summary descriptions for 39 I/M programs in 27 different states, plus information on 9 international inspection programs, as listed below.

United States I/M Programs

- | | | |
|------------------------|--------------------|----------------------|
| 1. Alaska (2 programs) | 10. Maryland | 19. Oregon (2) |
| 2. Arizona (2) | 11. Massachusetts | 20. Pennsylvania (2) |
| 3. California (2) | 12. Nevada | 21. Rhode Island |
| 4. Colorado (2) | 13. New Hampshire | 22. Tennessee |
| 5. Connecticut | 14. New Jersey | 23. Texas |
| 6. Idaho | 15. New Mexico | 24. Utah (4) |
| 7. Illinois | 16. New York | 25. Virginia |
| 8. Indiana | 17. North Carolina | 26. Washington (3) |
| 9. Kentucky (2) | 18. Ohio | 27. Wisconsin |

International Inspection Programs

- | | | |
|-------------------------------|----------------------------------|-------------------|
| 1. Australia -New South Wales | 4. China - Beijing and Guangzhou | 7. Singapore |
| 2. Canada - Ontario | 5. China - Hong Kong | 8. Sweden |
| 3. Canada - Vancouver | 6. Germany | 9. United Kingdom |

Background

The Clean Air Act Amendments of 1990 (CAAA) require vehicle emission I/M programs in areas where ambient levels of ozone and CO exceed the national standards. The I/M programs that have been implemented in the United States in response to the CAAA

^{*} Motor homes are not included in this report.

requirements typically are focused on light-duty gasoline-powered passenger vehicles (LDGVs). As areas strive to achieve additional air quality benefits, however, and state and local legislators respond to public pressure to test larger vehicles and Diesel-powered vehicles, many areas have implemented I/M testing of Diesel-powered and heavy-duty vehicles (HDVs). In addition, some countries outside the U.S. have been active in developing tests for vehicle inspection programs that will address emissions from Diesel vehicles.

This report is based on a survey of I/M programs operating in the U.S. and internationally to determine what testing is currently being done for Diesel-powered vehicles (of all classes) and heavy-duty gasoline-powered vehicles. In addition, information on the pollutants measured and test equipment used was collected. I/M program personnel in areas where light-duty Diesels and heavy-duty vehicles are subject to emissions testing were contacted to determine the testing program currently in place.

For the programs identified, information was requested on test procedures, standards, equipment used, and related topics. The information collected (when available) includes the following:

- Vehicles covered (type, age, weight classes);
- Inspection frequency;
- Test procedures;
- Types and cost of equipment used;
- Pollutant measurements (HC, CO, NO_x, CO₂, PM, opacity);
- Failure rates;
- Test fee;
- Applicable standards; and
- Program experience (including benefits, costs, and problems).

Information was gathered from telephone interviews, by faxing or e-mailing questionnaires to I/M program staff, and by reviewing program websites. The name of each contact and/or the source of information is provided with the program data for each program. Surveys were e-mailed to over 40 international contacts.

For the purpose of this report, vehicles with gross vehicle weight ratings (GVWR) in excess of 8,500 lbs are considered heavy-duty vehicles, following the definition in 40 CFR 86.082-2 (this definition also applies to international vehicles). For each program, however, if different vehicle weights are used to define vehicle class, that information is provided.

Status of Testing LDDVs, HDDVs, and HDGVs

Test Types - Due to a general lack of guidance on how LDDVs, HDDVs, and HDGVs should be tested and due to allowed flexibility, I/M programs in the U.S. have developed a wide range of emissions tests. There are six general categories of tests, and some of those categories have many different ways in which they are conducted. For example,

for transient tests, many different driving cycles are used, and some programs measure only opacity for Diesels while others measure all pollutants. The test procedures include the following:

1. Snap-Idle - In the U.S., this test is based on the SAE J1667 test procedure (available free from <http://www.arb.ca.gov/msprog/hdvip/saej1667.pdf>; please read the copyright information). SAE refers to the test as a “Snap-Acceleration” procedure, but it is also commonly called the “snap-idle” test, the “J1667 test,” and the “free-acceleration test.” The test consists of measuring peak opacity after quickly depressing the throttle to the wide-open position for a short period of time. The inertia of the rotating and reciprocating engine components provides the load for the test. The test is usually done in sets of three snaps; the average of the maxima measured on each snap is used for the pass/fail decisions.
2. Loaded Cruise (LC) - The vehicle is tested at a fixed speed and load on a chassis dynamometer.
3. ASM - The vehicle is tested at a fixed speed and load on a chassis dynamometer using a load that simulates an acceleration. The ASM 5015 tests a vehicle at a load simulating 50% of the maximum acceleration rate on the Federal Test Procedure (50% of 3.3 mph s⁻¹) and 15 mph. The ASM 2525 tests a vehicle at a load simulating 25% of the maximum acceleration rate on the Federal Test Procedure (25% of 3.3 mph s⁻¹) and 25 mph.
4. Transient IMxxx - The vehicle is tested on a chassis dynamometer over a transient test cycle such as the IM240, IM147, IM93, IM31, etc. The number such as “31” refers to the length of the test cycle in seconds. Some states modify this to identify their own adaptation of an I/M test cycle. They use other identifiers besides “IM,” such as “MA” (as in “MA31”).
5. Two-Speed Idle (TSI) or Curb Idle - For the two-speed idle test, emissions are tested at 2500 rpm and at curb idle. For the curb-idle test, emissions are measured only at the vehicle’s natural (“curb”) idle speed.
6. Lug-down - The vehicle is tested on a chassis dynamometer at a fixed speed while the dynamometer load is increased to the point where the vehicle is operating at wide-open throttle.

There are five types of test networks where the tests described above are performed:

1. Decentralized
2. Centralized
3. Hybrid (Centralized and Decentralized)
4. Fleet - Self-Certification
5. Roadside-Pullover

LDDVs and HDGVs are generally tested in centralized or decentralized (and hybrid) network types. Many heavy-duty test programs, however, use a combination of fleet self-certification, in which fleet operators can test their own vehicles but are required to keep certification records for a potential audit, and roadside pullovers. The roadside pullovers are used to check on the fleet self-certification programs and for enforcement.

LDDV Testing Programs - There are 20 LDDV testing programs in the U.S., and seven have been identified outside the U.S. Approximately half of all LDDVs receive a loaded test (loaded cruise, lug-down, transient, or ASM). The majority of these tests are simple steady-state loaded cruise tests and only opacity is measured. Other steady-state loaded tests include the lug-down test used in Colorado and Hong Kong, and the ASM2525 test conducted in Ohio. Use of the lug-down test in Asia started in Hong Kong and now other countries, including Korea, Singapore, and China, are considering switching to the lug-down test for testing LDDVs. For 1996 and newer LDDVs, Oregon performs an OBDII test.

The snap-idle test generally is not used with LDDVs because of concern that all vehicles may not be equipped with engine speed governors that will prevent damage to the vehicle's engine while the throttle is held wide open. In programs that use the snap-idle test for LDDVs, the operator is required to manually limit the engine speed to a fixed setting to avoid this problem. This test is used for LDDVs in Idaho, the three test programs in Washington, and half of the international programs surveyed.

There were a few programs testing LDDVs with the TSI or curb-idle tests for opacity. Because the vehicle is not under load, the ability of this test to capture vehicles with emissions problems is low; however, the test avoids the potential engine damage problems associated with using the J1667 test. In Medford, Oregon, the TSI test includes both opacity and measurement of CO.

Transient loaded tests include the BAR31 test and IM147 driving cycles. (The BAR31 test was developed originally by the California Bureau of Automotive Repair for gasoline-powered vehicles.) LDDVs in Portland are tested on the BAR31 cycle not only for opacity, but also for HC, CO, and NOx. Rhode Island is also using the BAR31 drive cycle, but is measuring only opacity. Massachusetts is currently in the process of implementing this test as well. In Victoria, B.C., opacity is measured over the IM147 test cycle.

Transient testing is an alternative for testing LDDVs that eliminates the risk of engine damage associated with the snap-idle test. An additional advantage to a transient test is that simultaneous measurement of NOx and opacity can be made, since there is concern about NOx emissions from these vehicles. The emissions sampling of Diesel vehicles in Portland, Oregon is done through an IM240-style constant volume sampling (CVS) system. The program manager reports that with the exception of the need to change the filter in the CVS system slightly more regularly, this does not create any special equipment problems (however, the number of LDDVs tested is very low). This type of test seems a good alternative if the particulate emissions do not affect the CVS system adversely.

HDDV Testing Programs - As in testing of LDDVs, there is a wide range of test procedures (variations of snap-idle, idle, and loaded tests) used with HDDVs. Approximately half of the HDDV testing programs, both domestically and those surveyed internationally, use the snap-idle test. Although opacity would not be expected to be high with an idle test, New Mexico measures opacity during the TSI test, and the northern counties of Kentucky measure opacity on the curb-idle test.

The majority of loaded tests are simple, steady-state loaded cruise tests for opacity only. Other steady-state loaded tests include the lug-down test used in Hong Kong and the ASM2525 test conducted in Ohio. No transient loaded testing programs for HDDVs were reported.

The New South Wales (NSW) Roads and Traffic Authority (RTA) in Australia used a contractor to perform a recently concluded research test program using the DT80 procedure (acceleration to 80 km/hr at maximum vehicle load, 80 km/hr cruise, then deceleration to idle, repeated three times). This test may be implemented in the next few years, but is used currently only for research purposes. The test program included evaluation of an R&P Instruments Tapered Element Oscillating Membrane (TEOM) mass balance to measure particulate matter (PM) mass, a light scattering instrument to estimate PM mass, and simultaneously measurement of NO_x using a dilution tunnel and a CVS system. Based on initial reports,* the light scattering instrument compared favorably with the standard (filter) based methods and the TEOM did not compare as well. However, the light scattering instrument was calibrated to a specific fuel and fuel changes will affect the correlation of the light scattering instrument to a filter based method. The TEOM is expected to be more accurate over all fuel types.

The California Air Resources Board (CARB) also recently conducted the first phase of a pilot study to evaluate loaded mode testing of HDDVs for compliance with the state's State Implementation Plan (SIP) Measure 17 (M17). M17 requires the state to study and implement HDDV I/M, including NO_x only; however, the state also was studying measurement of PM due to concerns about the potential health impacts of PM. The first phase of the pilot study included measurement of PM mass using an R&P Instruments TEOM PM mass balance and a Sierra Instruments "BG-1" mini-dilution system, as well as measurement of HC, CO, and NO_x using a set of California Analytical Instruments analyzers. Testing was done on a 1500 hp eddy current Clayton dynamometer with three 17" rolls for testing twin-axle vehicles. The West Virginia University 5-Peak Cycle developed in 1994 was used as the test cycle. Results of this testing have not been released.**

The second phase of the pilot study is currently being set up at a test facility in Stockton operated by Air Resource Technologies. After purchasing the analyzers, dilution system, and TEOM from the original study, CARB moved them to Stockton and integrated them with the facility's 1000 hp SuperFlow 602 hydrokinetic dynamometer. The system is

* "Testing In-Use Diesel Vehicles - Implications for I/M Programs" - draft (2000), P. Anyon, Parsons Australia Pty. Ltd., panyon@ozemail.com.au.

** The M17 pilot study contact at CARB is Don Chernich, (916) 322-7620, dchernic@arb.ca.gov.

currently undergoing acceptance testing and CARB plans to have the facility operational by October 1, 2001. The test facility will be used to conduct a 100-vehicle repair effectiveness study. Vehicles will be tested over the DT80 or a steady-state drive cycle, and engine maps for each vehicle will be developed and used to estimate engine gram per brake horsepower-hour (g/bhp-hr) emission rates. Vehicles with engine emission rates 1.5 times their certification standard will be considered failing (for the purpose of the study) and will be sent out for repair.

CARB said its potential future on road testing program could involve having pre-formed pits for a dynamometer at many locations around the state (such as roadside weight stations), and moving a hydrokinetic dynamometer and the analytical instruments to the site (in addition, a water truck will be necessary to operate the dynamometer). The analytical system manufacturers have indicated that both the size and cost of the system may be reduced in the future, and may be more amenable to this type of use. CARB estimated that at this time it believes approximately 12 of these systems would be used statewide.

HDGV Testing Programs - Of the 39 domestic I/M programs in the U.S., 37 indicated that they test HDGVs. Twenty-three of these indicated they performed the TSI test on HDGVs, with an additional six testing HDGVs with only the curb-idle test. Four programs in the U.S. perform transient tests on HDGVs: Indiana, which performs the IM93; Maryland and Wisconsin, which perform the IM240; and Massachusetts, which performs the MA31. In Maryland and Massachusetts, the transient test is performed only on vehicles up to 10,000 pounds GVWR; above this weight, the curb-idle test is performed. For 1996 and newer HDGVs, both programs in Oregon perform an OBDII test on OBDII-compliant vehicles (non-compliant vehicles receive the Idle test).

Three of the nine international programs that responded to the survey indicated they test HDGVs (Germany, Singapore, and Sweden). Singapore and Sweden perform the curb-idle test, and Germany performs the TSI test. Most international programs responded that testing of HDGVs is limited, or HDGVs are not tested at all because they are such a small fraction of their fleets.

Diesel Test Equipment and Procedures - Overall, the majority of Diesel I/M programs are using the snap-idle test. This is because the test has a low cost (opacity meters average from \$3,000 to \$6,000) and the opacity meters are simple to use. Many times, these programs are conducted only on the side of the road, and vehicles appearing to be high emitters are detained for compulsory testing. In addition, the use of opacity meters is convenient for fleets, since the meters can be carried to the trucks in a maintenance yard and the vehicles can be tested in place, rather than having to be moved into a shop for testing. There are significant issues, however, related to using the snap-idle test alone for testing HDDVs.

The largest area of complaint to vehicle pollution control agencies from the public concerns visible emissions from Diesel vehicles. The snap-idle test was originally developed to reduce both PM emissions and visible particles for public nuisance reasons. Unfortunately, opacity meters are more sensitive to measuring larger particles, while there is growing concern that smaller particles are of greater health concern. For this

reason, opacity-based programs may control the visible larger particles, but may not be effective in reducing the small particles, which are the greatest health concern.

In addition to the health concern from PM emitted by Diesel vehicles, Diesels are high emitters of NO_x. Control of opacity (particulate emissions) can be counterproductive to the reduction of NO_x emissions. For example, if a Diesel vehicle fails the snap-idle test and a repair shop attempts to reduce the opacity by advancing the timing on older (non-computer-controlled) engines, that could lead to higher NO_x emissions.

To improve HDDV I/M programs so that both PM and NO_x are equally well controlled, the IM program must measure both pollutants. For this reason, researchers such as CARB and the NSW Australia RTA as mentioned above are considering new I/M techniques for HDDVs that can simultaneously measure both pollutants. The difficulty is that systems capable of measuring both pollutants at the same time can be prohibitively expensive. In addition, they require a heavy-duty dynamometer so that the vehicle can be tested under load. These test systems will be difficult to move and set-up and will require re-calibration each time they are moved. The cost for the test system used in the CARB study was estimated by California Analytical Instruments (who integrated the system) at approximately \$325,000. (The CVS and analytical system to measure HC, CO, CO₂, and NO_x was \$100,000; the dilution system \$100,000; the PM mass analyzer \$50,000; and the dynamometer for testing trucks on short [less than five minute] drive cycles, with dual rear axles, up to 40,000 pounds test weight [half of the maximum GVWR], was approximately \$75,000.)

Two advantages of the snap-idle test are that (1) it is easy to use at the side of the road or for self-certification of fleets, and (2) it is inexpensive. Test systems that measure both PM mass and NO_x are expensive and complex. Although all of the equipment vendors who participated in the CARB study said they believed the cost of the test system could be reduced substantially, the test system would be difficult for use in decentralized I/M testing, simply due to the complexity. Even in a centralized I/M environment, operation of the test system would require highly skilled technicians.

In summary, HDDV emissions testing in current programs, both in the U.S. and internationally, are limited to measuring opacity with an opacity meter due to simplicity of use and low cost. Most programs responded that there is interest in measuring PM mass and, in some cases, NO_x as well. However, all programs noted that they view this as too expensive and too complicated for I/M testing.

HDGV Test Equipment and Procedures - In the U.S., most HDGVs are tested using the same I/M test systems (BAR90 or BAR97 type) that are used for light-duty gasoline vehicle testing. Dynamometer testing, however, is usually restricted to HDGVs below a specified weight rating, e.g., 10,000 lbs GVWR. The use of the same equipment reduces the cost of testing. In the U.S., these vehicles are not a large proportion of the fleet (0.65% of the total VMT according to MOBILE 6), and therefore usually do not contribute greatly to emissions and are not the focus of test programs. As previously mentioned, these vehicles are even less common outside the U.S. and most international areas do not test them either.

Current Best Practice

Light-duty Diesel vehicles are insignificant contributors to PM and gaseous emissions. However, if a program wants to test these vehicles, it can carefully apply the snap-idle test with the measurement of opacity to find grossly broken vehicles.

For heavy-duty Diesel vehicles, there are currently no test procedures or equipment available to cost effectively test these vehicles for the primary pollutants of concern—PM and NO_x. The best practice at this point for heavy-duty Diesel vehicles is to continue to use the SAE J1667 snap-idle test procedure. In the future, if heavy-duty dynamometers and analytical test systems to measure NO_x and PM become more cost effective, then changing these test procedures could be considered. Because of the relatively significant PM and NO_x emissions these vehicles produce, research needs to continue into alternative testing equipment and procedures that can test heavy-duty Diesel vehicles for NO_x and PM.

For heavy-duty gas vehicles, the current idle test is sufficient for HC and CO emissions testing. The small contribution of these vehicles to overall emissions does not justify more advanced testing of these vehicles.

Organization of the Report

Following this introduction, Section 2 provides a table that lists the design features of the current operating I/M programs (basic and enhanced) in each state (including the District of Columbia) and nine international programs. Sections 3 and 4 contain tables summarizing key design features of each I/M program in the U.S. (Section 3) , and in the international programs (Section 4).

As mentioned above, each I/M program summary contained in Sections 3 and 4 includes a brief general description of the current program, vehicles subject to the program, test procedures used, test equipment used, emission standards, inspection fees, and the name, address, and telephone number of at least one person at the state or local government level who can be contacted for additional information. The website address of the program, if available, is also listed.

2. DESIGN FEATURES OF U.S. I/M PROGRAMS TESTING LDDVs, HDDVs, AND HDGVs

The following table summarizes several important design features of each current LDDV, HDDV, and HDGV I/M program in the U.S. and a sampling of international programs. Following the table is a key explaining the descriptive codes for each feature.

Design Features of I/M Programs Testing LDDVs, HDDVs, and HDGVs in the United States									
State - Program Area	Program Type	Vehicle Types Tested	GVWR Range	Model Years	Test Procedure	Exhaust Constituents Measured (Pass/Fail)	Use Chassis Dyno?	Fail Rate %	Inspection Fee
Alaska - Anchorage	D	HDGV	<12,000 CW	1968+	TSI	HC, CO			\$50 max
Alaska - Fairbanks	D	HDGV	<12,000 CW	1975+	TSI	HC, CO		12.5	\$45 max
Arizona - Phoenix	C	LDDV HDDV HDGV	#8,500 >8,500 >8,500	5-1967	LC J1667 LC, I	Opacity Opacity HC, CO	YES YES	5.9 8.6 17.7	\$12.50
Arizona - Tucson	C	LDDV HDDV HDGV	#8,500 >8,500 >8,500	5-1967	LC LC LC, I	Opacity Opacity HC, CO	YES YES YES	4.1 3.5 10.8	\$9
California - Enhanced areas	R D	HDDV HDGV	>8,500 >8,500	All 4-1974	J1667 TSI	Opacity HC, CO			None \$45 ave
California - Basic and Change of Ownership areas	R D	HDDV HDGV	>8,500 >8,500	All 4-1974	J1667 TSI	Opacity HC, CO			None \$30 ave
Colorado - Denver/Boulder	C, H	LDDV HDDV HDGV	#8,500 >8,500 >8,500	2-All	LD, J1667 LD, J1667 TSI	Opacity Opacity HC, CO	YES YES		1 hour 1 hour \$15 max
Colorado - Aspen, Colorado Spgs., Ft. Collins, Greeley	D	LDDV HDDV HDGV	#8,500 >8,500 >8,500	All	LD, J1667 LD, J1667 TSI, I	Opacity Opacity HC, CO	YES YES		1 hour 1 hour \$15 max
Connecticut	C	LDDV HDDV HDGV	#8,500 #10,000 #10,000	25!	LC LC I	Opacity Opacity HC, CO	YES YES		\$20
Idaho	D	LDDV HDDV HDGV	#8,500 >8,500 >8,500	1965+	J1667 J1667 TSI	Opacity Opacity HC, CO			\$12 max
Illinois	D, R C	HDDV HDGV	>16,000 >8,500	All 4-1968	J1667 I	Opacity HC, CO			None None
Indiana	C	HDGV	#9,000	4-1976	IM93, I	HC, CO, NO _x	YES		None
Kentucky - Louisville	C	LDDV HDDV HDGV	#8,500 #18,000 #18,000	1968+	LC, I LC, I LC, I	Opacity Opacity HC, CO	YES YES YES		\$11
Kentucky - North Counties	C	LDDV HDDV HDGV	#8,500 #18,000 #18,000	1968+	I I I	Opacity Opacity HC, CO	YES YES YES		\$20
Maine	R	HDDV	>18,000	All	J1667	Opacity			None
Maryland	C, R C	HDDV HDGV	>8,500 #26,000	2-1977	J1667 IM240, I	Opacity HC, CO	YES	7.0	None 14
Massachusetts	D	HDDV HDGV	>8,500 >8,500	2-1984	J1667 MA31, I	Opacity HC, CO, NO _x	YES		\$29
Nevada - Las Vegas and Reno areas	D D, R D	LDDV HDDV HDGV	#8,500 >8,500 >8,500	2-1968	LC J1667 TSI	Opacity Opacity HC, CO	YES	0.3/0.17 7/30 6.5/5.7	\$20 None \$23 max
New Hampshire	R	HDDV	>10,000	1980+	J1667	Opacity		9	None
New Jersey	H D, R H	LDDV HDDV HDGV	#8,500 >18,000 >18,000	All	Vis J1667 I	Visible smoke Opacity HC, CO		8	None/0.5 hr 45-75 None/0.5 hr

Design Features of I/M Programs Testing LDDVs, HDDVs, and HDGVs in the United States									
State - Program Area	Program Type	Vehicle Types Tested	GVWR Range	Model Years	Test Procedure	Exhaust Constituents Measured (Pass/Fail)	Use Chassis Dyno?	Fail Rate %	Inspection Fee
New Mexico	D	LDDV HDDV HDGV	#8,500 >26,000 >26,000	1975+	TSI TSI TSI	Opacity Opacity HC, CO		3 3	\$20 max
New York - Metropolitan Area Counties	D	HDDV HDGV	>8,500 >8,500	2-25	J1667 I	Opacity HC, CO		5.5	\$35 max
North Carolina	D	HDGV	>8,500	1975+	I	HC, CO		5	\$19.40
Ohio	C	LDDV HDDV HDGV	#8,500 #10,000 >8,500	2-25	ASM2525 ASM2525 TSI	Opacity Opacity HC, CO	YES YES	5	\$19.50
Oregon - Portland	C	LDDV HDGV	#8,500 >8,500	2-1975+	BAR31, I, OBDII TSI, OBDII	HC, CO, NOx, Opacity HC, CO	YES	1.5 12.5	\$21
Oregon - Medford	C	LDDV HDGV	#8,500 >8,500	2-20	TSI, OBDII TSI, OBDII	CO, Opacity HC, CO			\$10
Pennsylvania - Philadelphia	D	HDGV	#9,000	1975+	TSI	HC, CO		6.8	\$43 ave
Pennsylvania - Pittsburgh	D	HDGV	#9,000	1975+	TSI	HC, CO		6.8	\$27 ave
Rhode Island	D	LDDV	#8,500	2-25	BAR31	Opacity	YES		\$47
Tennessee - Memphis	C	HDGV	<26,000	All	I	HC, CO			\$8
Texas - Dallas/Ft. Worth, El Paso, and Houston/Galveston	D	HDGV	>8,500	2-24	TSI	HC, CO			\$13
Utah/Davis County	D	LDDV HDDV HDGV	#8,500 >8,500 >8,500	1968+	LC LC, J1667 TSI	Opacity Opacity HC, CO	YES YES		\$24 \$24 \$20
Utah/Salt Lake County	D	LDDV HDDV HDGV	#8,500 >8,500 >8,500	1968+	LC LC, J1667 TSI	Opacity Opacity HC, CO	YES YES		\$23 \$23 \$25
Utah /Utah County	D	LDDV HDDV HDGV	#8,500 >8,500 >8,500	1968+	LC LC, J1667 TSI	Opacity Opacity HC, CO	YES YES	3.3 4.5 11.2	\$20 ave
Utah/Weber County	D	HDGV	>8,500	1968+	TSI	HC, CO			\$20 max
Vermont	D, R	HDDV	>8,500	All	J1667	Opacity			None
Virginia	D	HDGV	#10,000	2-24	TSI	HC, CO		11.2	\$20 max
Washington - Puget Sound	C	LDDV HDDV HDGV	#8,500 >8,500 >8,500	5-25	J1667 J1667 TSI	Opacity Opacity HC, CO		4 4 11	\$15
Washington - Spokane	C	LDDV HDDV HDGV	#8,500 >8,500 >8,500	5-25	J1667 J1667 TSI	Opacity Opacity HC, CO		4 4 11	\$15
Washington - Vancouver	C	LDDV HDDV HDGV	#8,500 >8,500 >8,500	5-25	J1667 J1667 TSI	Opacity Opacity HC, CO		4 4 11	\$15
Wisconsin	C	HDGV	#10,000	1968+	IM240	HC, CO, NOx	YES		None

Design Features of Some International I/M Programs Testing LDDVs, HDDVs, and HDGVs									
State - Program Area	Program Type	Vehicle Types Tested	GVWR Range	Model Years	Test Procedure	Exhaust Constituents Measured (Pass/Fail)	Use Chassis Dyno?	Fail Rate %	Inspection Fee (USD)
Australia, New South Wales	D	None							
Canada, Ontario	D, R	HDDV	>8,500	All	J1667	Opacity			None
Canada, Vancouver, BC	C R	LDDV HDDV	#11,000 >11,000	All	IM147 J1667	Opacity Opacity	Yes	7.3 48	15.60 / yr None
China, Beijing and Guangzhou City	D	LDDV HDDV		1980+	J1667 J1667	Opacity, HC, CO, NO _x Opacity, HC, CO, NO _x		15 - 20 15 - 20	150 - 200 150 - 200
China, Hong Kong (HDDV program starts early 2002)	D	LDDV HDDV	#11,000 >11,000	All	LD LD	Opacity Opacity	Yes Yes	60	40 40
Germany	D	LDDV HDGV	#7,700	1977+ 1970+	J1667 TSI	Opacity CO		18	35
Singapore	D	LDDV HDDV HDGV		All	J1667 J1667 I	Opacity Opacity CO			30/15 38/19 38/19
Sweden	C	LDDV HDDV HDGV		All	J1667 J1667 I	Opacity Opacity HC, CO			25/15 25/15 25/15
United Kingdom	D	LDDV HDDV	#7,700 >7,700	1979+	J1667 J1667	Opacity Opacity		1.5 1.3	52 55 or 61

----- Key to Symbols -----

Type	C	Centralized	Test Procedure	IM _{xx}	Transient modes (e.g., IM240, IM147, BAR31)
	D	Decentralized		ASM	Acceleration Simulation Mode (ASM2525, 5015)
	H	Hybrid (Centralized and motorist's choice)		ASM2	Both ASM tests
	R	Roadside (HDDV only)		LC	Loaded cruise mode.
				TSI	Two-speed Idle (2500 rpm and curb idle)
				I	Curb Idle
Vehicle Types Tested	LDDV	Light-Duty Diesel Vehicles		J1667	SAE J1667 Snap Idle test*
	HDDV	Heavy-Duty Diesel Vehicles		R	Roadside pullover inspection.
	HDGV	Heavy-Duty Gasoline Vehicles		LD	Lugdown Test
GVWR Range	#8,500 7,000 CW	If no note, weight is GVWR Curb Weight	Use Chassis Dyno?	YES blank	Dynos used in emissions test. Dynos not used.
Model Years	1968+	1968 and newer model years (some newer models may also be exempted)	Fees	xx/yy 1 hour xx/yr	initial test cost / retest cost, some include safety One hour of labor at posted shop rates If annual and biennial in same program, annual
	5-25	Vehicles 5 to 25 model years old			
	5-1975	First 5 model years exempted, vehicles to 1975 tested			Many programs were unable to supply a failure rate for thier programs. Some programs responded that this is not closely tracked.

3. PROGRAM DESCRIPTION SUMMARIES DOMESTIC I/M PROGRAMS

This section contains summaries of each of the U.S. I/M programs that are currently testing LDDVs, HDDVs, or HDGVs.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - ALASKA (Municipality of Anchorage)

Vehicles Tested - HDGV

Program Description - Biennial emissions tests and visual inspections at licensed private repair facilities. Approximately 90 facilities are participating in the program. BAR97 analyzers. Inspection also required on transfer of title if vehicle is 1987 model year or older and more than 12 months have elapsed since last test. Contractor-operated referee facility. Fleet operators can inspect their own vehicles.

HDGV

Vehicles Included - HDGVs of 1968 and later model years (1968+) up to 12,000 pounds curb weight. Two most recent model years exempted. "Seasonal Waivers" are available for vehicles not driven during winter months. "Commuter" vehicles subject to inspection.

Test Procedures - HC and CO emissions measured on Two-Speed Idle (TSI) test (2500 rpm and curb idle). No visual or functional inspection required for 1968-74 models. Visual/functional inspection of 1975 and later (1975+) models covers catalyst, EGR, PCV, air injection, evaporative emission control components, thermostatic air intake system (TAC), and fuel metering. No evaporative control system functional test, as program is focused only on CO.

Exhaust Components Measured - HC, CO, CO₂, O₂

Emissions Standards - Emissions standards are based on model year.

	Emissions Standards for HDGVs			
	<u>1968-73</u>	<u>1974-78</u>	<u>1979-93</u>	<u>1994+</u>
Idle CO (%)	5.0	4.0	4.0	1.0
2500 rpm CO (%)	5.0	4.0	4.0	1.0
HC (ppm)	1000	1000	1000	220

Fail Rate - Not available.

Test Equipment - All analyzers used in the program are 4-gas Emission Inspection Systems from Worldwide Environmental Products, Inc. As configured for the Alaska I/M programs, they measure HC, CO, CO₂, and O₂.

Estimated Test Equipment Costs - Approximately \$18,000 per unit.

Inspection Fees - Inspection fee is market-driven to a maximum of \$50; Certificate of Inspection for passing vehicles is \$18.

Problems - None reported.

Contact Persons - Program Manager: Keith Beeson, I/M Program Administrator, Vehicle Inspection Program, Municipality of Anchorage, Department of Health and Human Services, 825 L Street, P.O. Box 196650, Anchorage, Alaska 99519-6650; (907)343-4796. Air Agency Contact: Cindy Heil, Alaska Department of Environmental Conservation, 555 Cordova Street, Anchorage, Alaska 99501; (907)269-7579. Also Mary Parker, same location; (907)269-7695.

Website - None given.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - ALASKA (Fairbanks North Star Borough)

Vehicles Tested - HDGV

Program Description - Biennial emissions tests and visual inspections at licensed private repair facilities. Currently 28 facilities (including fleets) are participating in the program. BAR97-equivalent analyzers. Inspection also required on transfer of title if vehicle is 1987 model year or older and more than 12 months have elapsed since last test. Borough-operated referee facility. Fleet operators can inspect their own vehicles.

HDGV

Vehicles Included - 1975+ HDGVs up to 12,000 pounds curb weight. New vehicles are exempt for two years after initial registration. "Seasonal Waivers" are available for vehicles not driven during winter months.

Test Procedures - HC and CO emissions measured on TSI. Visual/functional inspection of emission control systems covers catalyst, EGR, PCV, air injection, evaporative emission control components, thermostatic air intake system (TAC), and fuel metering. No evaporative control system functional test (as program is focused only on CO).

Exhaust Components Measured - HC, CO, CO₂, O₂

Emissions Standards - Emissions standards are based on model year.

	Emissions Standards for HDGVs			
	<u>1968-73</u>	<u>1974-78</u>	<u>1979-93</u>	<u>1994+</u>
Idle CO (%)	5.0	4.0	4.0	1.0
2500 rpm CO (%)	5.0	4.0	4.0	1.0
HC (ppm)	1000	1000	1000	220

Fail Rate - 12.5%.

Test Equipment - Analyzers are 4-gas Emission Inspection Systems from Worldwide Environmental Products, Inc. As configured for the Alaska I/M programs, they measure HC, CO, CO₂, and O₂.

Estimated Test Equipment Costs - Approximately \$18,000 per unit.

Inspection Fees - Inspection fee market-driven, no maximum; average cost \$45. Certificate of Inspection for passing vehicles is \$20.

Problems - None reported.

Contact Persons - Program Manager: Glenn Miller, Fairbanks North Star Borough I/M Program, 3175 Peger Road, Fairbanks, Alaska 99701; (907)459-1005. Also David Anderson, same location; (907)459-1007. Air Agency Contact: Cindy Heil, Alaska Department of Environmental Conservation, 555

Cordova Street, Anchorage, Alaska 99501; (907)269-7579. Also Mary Parker, same location; (907)269-7695.

Website - None given.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - ARIZONA (Phoenix area)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Emissions tests and visual inspections at centralized, contractor-operated (Gordon-Darby) inspection centers. Inspection network consists of 11 centers housing 48 inspection lanes. Inspection frequency depends on vehicle age; see below. Fleet operators (of at least 25 vehicles) can inspect their own vehicles, but few do, as test and repair equipment requirements are strict.

LDDV

Vehicles Included - 1967+ LDDVs tested annually for opacity. The current and four most recent model years are exempt from the program (e.g., during calendar year 2001, 1997 and newer models are exempt). Inspection is also required for vehicles used regularly to commute from outside the program area.

Test Procedures - Exhaust opacity measured during loaded-cruise operation. Dyno loads for the loaded cruise test range from 6.4 hp @ 30 mph for the LDDVs # 4,000 lbs GVWR to 32 hp @ 50 mph for LDDVs 4,001-8,500 lbs GVWR. LDDVs incapable of dynamometer operation receive “technical difficulty” certificate, exempting them from testing for current year.

Exhaust Components Measured - Opacity

Emissions Standards - For all LDDVs, maximum allowable opacity is 20% for 10 seconds.

Fail Rate - 5.9% (opacity only).

Test Equipment - Opacity meters: Wager Model 650, Red Mountain Smoke Check 1667. Chassis dynamometers custom built by I/M contractor.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$12.50, with one free retest within 60 days of initial test.

Problems - None reported.

HDDV

Vehicles Included - 1967+ HDDVs tested annually for opacity. Current and 4 most recent model years are exempt (e.g., during calendar year 2001, 1997 model year and newer vehicles are exempt).

Test Procedures - SAE J1667 Snap-Acceleration Smoke Test Procedure.

Exhaust Components Measured - Opacity

Emissions Standards - Maximum smoke opacity standards on the J1667 snap-acceleration test are 55% for 1990 model year and older HDDVs, 40% for 1991+ HDDVs.

Fail Rate - 8.6% (J1667).

Test Equipment - Opacity meters: Wager Model 650, Red Mountain Smoke Check 1667.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee of \$12.50 includes one free retest within 60 days of initial test.

Problems - Ford HDDVs with 6.9-liter and 7.3-liter engines, and GM HDDVs with 6.2-liter and 6.5-liter engines, if equipped with Stanadyne non-electronic governors, exhibit surging when run up against governor, making them incapable of testing per J1667. These HDDVs currently are being exempted from testing for technical difficulty.

HDGV

Vehicles Included - 1967+ HDGVs are tested annually. Current and 4 most recent model years are exempt (e.g., during calendar year 2001, 1997 model year and newer vehicles are exempt).

Test Procedures - All HDGVs tested for HC and CO emissions at curb idle and on loaded cruise test. Dyno loads range from 2.8 hp @ 22 mph for 4-cylinder HDGVs to 10.8 hp @ 35 mph for HDGVs with 8-cylinder (or more) engines. HDGVs with full-time 4-wheel drive or non-defeatable traction control, or that otherwise are not capable of dynamometer testing, are tested at curb idle.

Visual/functional inspection on 1975+ HDGVs. Visual inspection covers catalyst, air injection system, PCV system, and presence of gas caps on all vehicles. Gas caps tested on all 1971+ vehicles with “sealed” systems.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - HDGV emissions standards are based on vehicle model year.

Emissions Standards for HDGVs					
		Curb Idle		Loaded Cruise	
	Cylinders	HC ppm	CO %	HC ppm	CO %
1967-71	#4	500	5.50	500	4.20
	>4	450	5.00	450	3.75
1972-74	#4	400	5.50	400	4.20
	>4	400	5.00	400	3.75
1975-78	All	350	4.00	350	3.00
1979-80	All	300	4.00	300	3.00
1981+	All	300	4.00	300	3.00

Fail Rate - 17.7% (emissions only).

Test Equipment - Gas analyzers are provided by California Analytical; gas analysis benches and chassis dynamometers custom-built by I/M contractor.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$12.50 for all vehicles discussed here. One free retest within 60 days of initial test.

Problems - None reported.

Contact Persons - Program Manager: Dan Grubbe, Manager, Arizona Vehicle Emissions Inspection Program, Arizona Department of Environmental Quality, 600 North 40th Street, Phoenix, Arizona 85008; (602)207-7017.

Website - <http://www.adeq.state.as.us/environ/air/vei/>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - ARIZONA (Tucson area)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Annual emissions tests and visual inspections at centralized, contractor-operated (Gordon-Darby) inspection centers. Inspection network consists of 3 centers housing 11 inspection lanes. Equipment is BAR97-equivalent but without dilution correction. Fleet operators (of at least 25 vehicles) can inspect their own vehicles.

LDDV

Vehicles Included - 1967+ LDDVs. Current and four most recent model years are exempt from the program (e.g., during calendar year 2001, 1997 and newer models will be exempt).

Test Procedures - Exhaust opacity measured during loaded-cruise operation. Dyno loads for the loaded cruise test range from 6.4 hp @ 30 mph for the LDDVs # 4,000 lbs GVWR to 31 hp @ 50 mph for LDDVs 4,001-8,500 lbs GVWR. LDDVs incapable of dynamometer operation receive “technical difficulty” certificate, exempting them from testing for current year.

Exhaust Components Measured - Opacity

Emissions Standards - For all LDDVs, maximum allowable opacity is 30% for 10 seconds.

Fail Rate - 4.1% (opacity only).

Test Equipment - Opacity meters: Wager Model 650, Red Mountain Smoke Check 1667. Chassis dynamometers custom built by I/M contractor.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$9, with one free retest within 60 days of initial test.

Problems - None reported.

HDDV

Vehicles Included - 1967+ HDDVs. The current and 4 most recent model years are exempt from the program (e.g., during calendar year 2001, 1997 and newer models will be exempt).

Test Procedures - HDDVs with GVWR of 8,501-10,500 lbs are tested for opacity on loaded cruise operation (31 hp @50 mph). HDDVs heavier than 10,500 lbs GVWR are tested during lug-down operation on dynamometer.

Exhaust Components Measured - Opacity

Emissions Standards - For all HDDVs, maximum allowable opacity is 30% for 10 seconds.

Fail Rate - 3.5% (opacity only).

Test Equipment - Opacity meters: Wager Model 650, Red Mountain Smoke Check 1667. Chassis dynamometers custom built by I/M contractor.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$9, with one free retest within 60 days of initial test.

Problems - None reported.

HDGV

Vehicles Included - 1967+ LDDVs. The current and four most recent model years are exempt from the program (e.g., during calendar year 2001, 1997 and newer models will be exempt).

Test Procedures - HC and CO emissions measured; 1967 to 1980 vehicles (and all motorcycles, and vehicles with full-time four-wheel drive or non-defeatable traction control) receive curb-idle test; 1981+ models get steady-state loaded-mode (cruise) test, which includes curb idle. Dynamometer loads and speeds on the steady-state test range from 2.8 hp @ 22 mph for 4-cylinder vehicles to 15.8 hp @ 40 mph for all heavy-duty vehicles.

Visual/functional inspection limited to catalyst and air injection system. Functional evap test limited to gas-cap pressure test on 1971 and later vehicles.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - HDGV emissions standards are based on model year, number of cylinders, and test type.

Emissions Standards for HDGVs					
		Curb Idle		Loaded Cruise	
	Cylinders	HC ppm	CO %	HC ppm	CO %
1967-71	#4	500	5.50		
	>4	450	5.00		
1972-74	#4	400	5.50		
	>4	400	5.00		
1975-78	All	350	4.00		
1979-80	All	300	4.00		
1981+	All	300	4.00	300	3.00

Fail Rate - 10.8%.

Test Equipment - Gas analyzers are provided by California Analytical; constant volume sampling system and dynamometers custom-built by I/M contractor.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$9, with one free retest within 60 days of initial test.

Problems - None reported.

Contact Persons - Program Manager: Dan Grubbe, Manager, Arizona Vehicle Emissions Inspection Program, Arizona Department of Environmental Quality, 600 North 40th Street, Phoenix, Arizona 85008; (602)207-7017.

Website - <http://www.adeq.state.az.us/environ/air/vei/>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - CALIFORNIA (Enhanced Program Areas)

Vehicles Tested - HDDV, HDGV

Program Description - For HDDVs, truck and bus fleet operators are required to perform their own testing on their fleets annually. The test is also performed for enforcement at random roadside locations and at fleet facilities (fleets are required to self-certify). For HDGVs biennial emissions tests and visual/functional inspections at licensed private test-and-repair or test-only facilities. Vehicles undergoing change of ownership and out-of-state vehicles being registered in California for the first time are also subject to inspection. Fleet operators can inspect their own vehicles.

HDDV

Vehicles Included - All HDDVs.

Test Procedures - SAE J1667.

Exhaust Components Measured - Opacity

Emissions Standards - Pre 1991 - 55%, 1991 and newer - 40%.

For pre-1991 vehicles that have smoke opacities greater than 55 percent but less than 70 percent and have not received a citation in the past 12 months, a Notice of Violation is issued. Similar to a “fix it ticket,” the Notice of Violation has no penalty if repairs are made to the engine and a Demonstration of Correction form is submitted to the ARB with 45 days.

If repairs are not made and a Demonstration of Correction form is not submitted within the 45-day period, a citation will be issued. Only one Notice of Violation may be issued in a 12-month period.

First Level Citation: For pre-1991 engines with 70 percent or greater smoke opacity and 1991 and newer engines with greater than 40 percent opacity that have not received any citations in the past 12 months, a First Level Citation is issued.

The penalty is \$300 if engine repairs are made and a Demonstration of Correction form is submitted to the ARB within 45 days. The penalty is increased to \$800 if repairs are not made and a Demonstration of Correction form is not submitted to the ARB within 45 days.

Second Level Citation: The penalty for any further violations within a 12-month period is \$1800. In addition, a Demonstration of Correction form must be submitted in order to clear the citation.

In extreme cases, the California Highway Patrol may take a vehicle out of service for an outstanding citation if the penalty has not been paid or if the vehicle has not been repaired.

Fail Rate - Unknown.

Test Equipment - Opacity meters, various manufacturers (see the website <http://www.arb.ca.gov/msprog/hdvp/smokemtr.htm> for a list of manufacturers CARB has identified).

Estimated Test Equipment Costs - \$3,000 to \$8,000.

Inspection Fees - None. However, for the fleet self-certification program, fleet operators have to either purchase their own opacity meter or contract with a service to test their vehicles. Roadside (enforcement) inspections are free.

Problems - None reported.

HDGV

Vehicles Included - 1974+ HDGVs, excluding the four most recent model years. Model-year exemption does not apply for re-registration upon change of ownership or first registration in California.

Test Procedures - HC and CO emissions measured on TSI, plus gas cap pressure test, comprehensive visual inspection of emission control system, including MIL, and functional check of EGR.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - HDGV emissions standards categories are based on model year and GVWR.

Emissions Standards for HDGVs					
		Curb Idle		2500 rpm	
	GVWR lbs	HC ppm	CO %	HC ppm	CO %
1966-69	>8,500	700	5.5	750	5.0
1970-73	>8,500	550	5.0	600	4.5
1974-78	>8,500	300	3.0	350	3.5
1979-83	>8,500	250	2.2	250	3.0
1984-86	>8,500	250	1.5	200	1.6
1987-90	8,501-14,000	220	1.5	200	1.6
1991+	8,501-14,000	150	1.2	150	1.5
1987-90	\$14,001	250	2.5	200	1.6
1991+	\$14,001	150	1.5	150	1.5

Fail Rate - Not available.

Test Equipment - Gas analyzer (includes gas cap tester): BAR-97 Emissions Inspection System (EIS) provided by SPX, ESP, Snap-On, Worldwide.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee not regulated; range is \$35-\$80, average about \$45. Fee of \$7.75 for Certificate of Inspection pays for program administration and enforcement.

Problems - None reported.

Contact Persons - HDDV - Marilyn Hazewood, Mobile Source Enforcement Branch, Heavy-Duty Diesel Section, (916) 322-2659, mhazewoo@arb.ca.gov. HDGV - Program Manager: Douglas Laue, Chief, Bureau of Automotive Repair, 10240 Systems Parkway, Sacramento, California 95827; (916)255-4355. Also Gary Hunter, Deputy Chief of Staff for Smog Check Operations; (916)255-4397. Air Agency Contact for both programs: Thomas Cackette, Deputy Executive Officer, California Air Resources Board, 1001 "I" Street, P.O. Box 2815, Sacramento, CA 95812; (916)322-2892.

Website - HDGV testing - <http://www.smogcheck.ca.gov/smogweb/>,
HDDV testing - <http://www.arb.ca.gov/msprog/hdvp/hdvp.htm>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - CALIFORNIA (Basic and Change-of-Ownership Program Areas)

Vehicles Tested - HDDV, HDGV

Program Description - For HDDVs, truck and bus fleet operators are required to perform their own testing on their fleets annually. The test is also performed for enforcement at random roadside locations and at fleet facilities (fleets are required to self-certify). For HDGVs, biennial emissions tests and visual/functional inspections at licensed private test-and-repair or test-only facilities. Vehicles undergoing change of ownership and out-of-state vehicles being registered in California for the first time are also subject to inspection. Fleet operators can inspect their own vehicles.

HDDV

Vehicles Included - All HDDVs.

Test Procedures - SAE J1667.

Exhaust Components Measured - Opacity

Emissions Standards - Pre 1991 - 55%, 1991 and newer - 40%.

For pre-1991 vehicles that have smoke opacities greater than 55 percent but less than 70 percent and have not received a citation in the past 12 months, a Notice of Violation is issued. Similar to a “fix it ticket,” the Notice of Violation has no penalty if repairs are made to the engine and a Demonstration of Correction form is submitted to the ARB within 45 days.

If repairs are not made and a Demonstration of Correction form is not submitted within the 45-day period, a citation will be issued. Only one Notice of Violation may be issued in a 12-month period.

First Level Citation: For pre-1991 engines with 70 percent or greater smoke opacity and 1991 and newer engines with greater than 40 percent opacity that have not received any citations in the past 12 months, a First Level Citation is issued.

The penalty is \$300 if engine repairs are made and a Demonstration of Correction form is submitted to the ARB within 45 days. The penalty is increased to \$800 if repairs are not made and a Demonstration of Correction form is not submitted to the ARB within 45 days.

Second Level Citation: The penalty for any further violations within a 12-month period is \$1,800. In addition, a Demonstration of Correction form must be submitted in order to clear the citation.

In extreme cases, the California Highway Patrol may take a vehicle out of service for an outstanding citation if the penalty has not been paid or if the vehicle has not been repaired.

Fail Rate - Unknown.

Test Equipment - Opacity meters, various manufacturers (see the website <http://www.arb.ca.gov/msprog/hdvp/smokemtr.htm> for a list of manufacturers CARB has identified).

Estimated Test Equipment Costs - \$3,000 to \$8,000.

Inspection Fees - None. However, for the fleet self-certification program, fleet operators have to either purchase their own opacity meter or contract with a service to test their vehicles. Roadside (enforcement) inspections are free.

Problems - None reported.

HDGV

Vehicles Included - 1974+ HDGVs, excluding the four most recent model years. The last four model year exemption does not apply for change-of-ownership or first registration in California.

Test Procedures - HC and CO emissions measured on TSI, plus gas cap pressure test; comprehensive visual inspection of emission control system, including MIL; and functional check of EGR.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - HDGV emissions standards categories are based on model year and GVWR.

Emissions Standards for HDGVs

	GVWR lbs	Curb Idle		2500 rpm	
		HC ppm	CO %	HC ppm	CO %
1966-69	>8,500	700	5.5	750	5.0
1970-73	>8,500	550	5.0	600	4.5
1974-78	>8,500	300	3.0	350	3.5
1979-83	>8,500	250	2.2	250	3.0
1984-86	>8,500	250	1.5	200	1.6
1987-90	8,501-14,000	220	1.5	200	1.6
1991+	8,501-14,000	150	1.2	150	1.5
1987-90	\$14,001	250	2.5	200	1.6
1991+	\$14,001	150	1.5	150	1.5

Fail Rate - Not available.

Test Equipment - BAR-90ET test analyzer systems provided by ESP, Snap-On, SPX, ESP.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee not regulated; range is about \$15-\$40, average about \$30. Fee of \$7.75 for Certificate of Inspection pays for program administration and enforcement.

Problems - None reported.

Contact Persons - HDDV - Marilyn Hazewood, Mobile Source Enforcement Branch, Heavy-Duty Diesel Section, (916) 322-2659, mhazewoo@arb.ca.gov. HDGV - Program Manager: Douglas Laue, Chief, Bureau of Automotive Repair, 10240 Systems Parkway, Sacramento, California 95827; (916)255-4355. Also Gary Hunter, Deputy Chief of Staff for Smog Check Operations; (916)255-4397.

Air Agency Contact for both programs: Thomas Cackette, Deputy Executive Officer, California Air Resources Board, 1001 "I" Street, P.O. Box 2815, Sacramento, CA 95812; (916)322-2892.

Website - HDGV testing - <http://www.smogcheck.ca.gov/smogweb/>
HDDV testing - <http://www.arb.ca.gov/msprog/hdvip/hdvip.htm>.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - COLORADO (Enhanced Program Area of Denver and Boulder)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Emissions inspection of all cars and trucks. Biennially, 1982+ gasoline-powered vehicles are inspected at centralized, contractor-operated (ESP) inspection centers; 1981 and older vehicles may be inspected in the centralized program or at licensed private facilities, at the owner's option. Centralized network consists of 77 inspection lanes in 15 centers. Inspection also required on change of ownership, for vehicles new to the program area, and for commuter vehicles. Diesel-powered vehicles are inspected annually at specially licensed private facilities, 28 in number. Fleet operators (20 or more gasoline vehicles, 9 or more Diesels > 7,500 lbs empty weight) can inspect their own vehicles annually.

LDDV

Vehicles Included - All LDDVs; the two most recent model years are exempted (except for change of ownership or new-to-area vehicles).

Test Procedures - Three-mode opacity tests on chassis dynamometers. For LDDVs #7,500 lbs empty weight, test modes are wide-open throttle (WOT) at 60, 50, and 40 mph (dyno loaded so as to require WOT operation to maintain those speeds). For heavier LDDVs (to 8,500 lbs GVWR), test modes are WOT operation at 90%, 80%, and 70% of maximum rated engine speed. Fleet inspections employ the snap-acceleration test.

Test Equipment - Chassis dynamometers, opacity meters.

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity standards depend on vehicle weight and method of aspiration (naturally aspirated or turbo charged).

LDDV Maximum Opacity		
Empty Weight		% Opacity
#7,500	Naturally Aspirated	40
	Turbo charged	35
>7,500	Naturally Aspirated	35
	Turbo charged	20

Fail Rate - Not available.

Test Equipment - Chassis dynamometers, opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Maximum inspection fee is one hour of labor at the inspection shop's posted rate.

Problems - None reported.

HDDV

Vehicles Included - All HDDVs except farm-plated vehicles. The two most recent model years are exempted (except for change of ownership or new-to-area vehicles).

Test Procedures - Three-mode opacity tests on chassis dynamometers. For HDDVs vehicles greater than 8,500 pounds and >7,500 lbs empty weight, test modes are WOT operation at 90%, 80%, and 70% of maximum rated engine speed. Fleet inspections employ the snap-acceleration test.

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity standards depend on vehicle weight and method of aspiration (naturally aspirated or turbo charged).

HDDV Maximum Opacity		
Empty Weight		% Opacity
#7,500	Naturally Aspirated	40
	Turbo charged	35
>7,500	Naturally Aspirated	35
	Turbo charged	20

Fail Rate - Not available.

Test Equipment - Chassis dynamometers, opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Maximum inspection fee is one hour of labor at the inspection shop's posted rate.

Problems - None reported.

HDGV

Vehicles Included - All HDGVs. The two most recent model years of Diesel vehicles are exempted (except for change of ownership or new-to-area vehicles).

Test Procedures - HC and CO measured on TSI. Visual inspection of 1975+ models covers air injection system, catalyst, fuel inlet restrictor, check-engine light, oxygen sensor, and fuel cap. Gas cap pressure test.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - Emissions standards are based on model year.

TSI Emissions Standards for HDGVs

	HC ppm	CO %
pre-1968	1500	7.0
1968-69	1200	6.5
1970-78	1000	5.5
1979	800	4.0
1980	800	3.5
1981-85	600	3.0
1986+	300	2.0

Fail Rate - Not available.

Test Equipment - BAR-90 test analyzer systems.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Maximum inspection fee is \$15.

Problems - None reported.

Contact Persons - Program Manager: R. J. Hicks, Colorado Dept. of Revenue, Motor Vehicle Division, Air Emissions Program, 1881 Pierce Street, Lakewood, Colorado 80261; (303)205-5935. Also John Schoen; (303)205-5669. Air Agency Contact: Michael O'Toole, Colorado Dept. of Public Health and Environment, Air Pollution Control Division, 4300 Cherry Creek Drive So., Denver, Colorado 80276-1530; (303)692-3139.

Website: <http://www.cdphe.state.co.us/ap/mobile.asp>

Other Websites -

Air Care Colorado: <http://aircarecolorado.com/>

Pitkin County: <http://www.aspengov.com/EH/county/emissions.html>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - COLORADO (Aspen, Colorado Springs, Fort Collins, and Greeley)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Biennial emissions tests for 1982+ vehicles and annual emissions inspection for 1981 and older vehicles at licensed private repair facilities. Inspection is also required upon change of ownership and for vehicles of new-to-area residents. Fleet operators (20 or more gasoline vehicles, 9 or more Diesel vehicles >7500 lbs. empty weight) can inspect their own vehicles, but this must be done annually. Diesel-powered vehicles are inspected annually at specially licensed private facilities. Approximately 243 facilities are participating in the program in the four areas, including fleet repair facilities.

LDDV

Vehicles Included - All LDDVs; the two most recent model years are exempted (except for change of ownership or new-to-area vehicles).

Test Procedures - Three-mode opacity tests on chassis dynamometers. For LDDVs #7,500 lbs empty weight, test modes are wide-open throttle (WOT) at 60, 50, and 40 mph (dyno loaded so as to require WOT operation to maintain those speeds). For heavier LDDVs (to 8,500 lbs GVWR), test modes are WOT operation at 90%, 80%, and 70% of maximum rated engine speed. Fleet inspections employ the snap-acceleration test.

Test Equipment - Chassis dynamometers, opacity meters.

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity standards depend on vehicle weight and method of aspiration (naturally aspirated or turbo charged).

LDDV Maximum Opacity		
Empty Weight		% Opacity
#7,500	Naturally Aspirated	40
	Turbo charged	35
>7,500	Naturally Aspirated	35
	Turbo charged	20

Fail Rate - Not available.

Test Equipment - Chassis dynamometers, opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Maximum inspection fee is one hour of labor at the inspection shop's posted rate.

HDDV

Vehicles Included - All HDDVs except farm-plated vehicles. The two most recent model years are exempted (except for change of ownership or new-to-area vehicles).

Test Procedures - Three-mode opacity tests on chassis dynamometers. For HDDVs greater than 8,500 pounds and >7,500 lbs empty weight, test modes are WOT operation at 90%, 80%, and 70% of maximum rated engine speed. Fleet inspections employ the snap-acceleration test.

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity standards depend on vehicle weight and method of aspiration (naturally aspirated or turbo charged).

HDDV Maximum Opacity		
Empty Weight		% Opacity
#7,500	Naturally Aspirated	40
	Turbo charged	35
>7,500	Naturally Aspirated	35
	Turbo charged	20

Fail Rate - Not available.

Test Equipment - Chassis dynamometers, opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Maximum inspection fee is one hour of labor at the inspection shop's posted rate.

Problems - None reported.

HDDGV

Vehicles Included - All HDGVs except farm-plated vehicles. The two most recent model years are exempted (except for change of ownership or new-to-area vehicles).

Test Procedures - HC and CO emissions measured on TSI (1981+ models) or at curb idle only (1980 and older models). Visual inspection of 1975+ models includes air injection system, catalyst, fuel inlet restrictor, check-engine light, oxygen sensor, and fuel cap. Gas cap pressure test.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - Emissions standards are based on model year.

Emissions Standards for HDGVs		
	HC ppm	CO %
pre-1968	1500	7.0
1968-69	1200	6.5
1970-78	1000	5.5

1979	800	4.0
1980	800	3.5
1981-85	600	3.0
1986+	300	2.0

Fail Rate - Not available.

Test Equipment - BAR-90 test analyzer systems.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Maximum inspection fee is \$15.

Problems - None reported.

Contact Persons - Program Manager: R. J. Hicks, Colorado Dept. of Revenue, Motor Vehicle Emissions Division, 1881 Pierce Street, Lakewood, Colorado 80261; (303)205-5935. Also John Schoen; (303)205-5669. Air Agency Contact: Michael O'Toole, Colorado Dept. of Public Health and Environment, Air Pollution Control Division, 4300 Cherry Creek Drive So., Denver, Colorado 80246-1530; (303)692-3139.

Website: <http://www.cdphe.state.co.us/ap/mobile.asp>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - CONNECTICUT

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Emissions inspections (biennial for 1981+ vehicles, and annual for 1980 and older vehicles) at centralized, contractor-operated (ESP) inspection centers (25 inspection facilities with 92 lanes). Separate roadside or weigh-station safety and exhaust opacity inspections on commercial vehicles >26,000 lbs GVWR. In all vehicle categories, only the 25 most recent model years are subject to the program. For instance, in calendar year 2001, 1977 is the oldest model year inspected. New vehicles are exempt from inspection for 12 months from date of initial registration.

LDDV

Vehicles Included - LDDVs of 25 most recent model years.

Test Procedures - Opacity measured under loaded cruise operation: 30 mph, ~7.5 hp.

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity for all LDDVs is 20%.

Fail Rate - Not available.

Test Equipment - Chassis dynamometers, opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee (\$20 for biennial test, \$10 for annual) includes windshield sticker and one retest for vehicles that fail the initial test.

Problems - None reported.

HDDV

Vehicles Included - HDDVs # 10,000 lbs GVWR, 25 most recent model years.

Test Procedures - Opacity measured under loaded cruise operation: 30 mph, ~7.5 hp. Roadside and weigh-station safety inspections and opacity tests are conducted on commercial HDDVs >26,000 lbs GVWR.)

Exhaust Components Measured - Opacity

Emissions Standards - For HDDVs with GVWR #10,000 lbs, maximum opacity is 20%. For commercial vehicles with GVWR >26,000 lbs, maximum opacity depends on vehicle model year: 1990 model year and older vehicles: 55%; 1991+ vehicles: 40%.

Fail Rate - Not available.

Test Equipment - Chassis dynamometers, opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee (\$20 for biennial test, \$10 for annual) includes windshield sticker and one retest for vehicles that fail the initial test. Safety inspection costs \$15.

Problems - None reported.

HDGV

Vehicles Included - HDGVs with GVWR #10,000 lbs. (Separate roadside and weigh-station safety inspections and opacity tests are conducted on commercial HDGVs >26,000 lbs GVWR.)

Test Procedures - HC and CO measured at curb idle. Visual inspection of catalyst and gas cap. Gas cap pressure test.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - Emissions standards are based on vehicle model year.

Emissions Standards for HDGVs		
	HC ppm	CO %
1977	300	2.70
1978	275	2.40
1979	250	2.10
1980	225	2.00
1981-82	200	1.20
1983	175	1.00
1984-87	150	1.00
1988+	125	1.00

Fail Rate - Not available.

Test Equipment - BAR-90 test analyzer systems.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee (\$20 for biennial test, \$10 for annual) includes windshield sticker and one retest for vehicles that fail the initial test.

Problems - None reported.

Contact Persons - Program Manager: Robert Waz, Director, Emissions Division, Dept. of Motor Vehicles, Rowland Government Center, 55 West Main St., Waterbury, Connecticut 06702; (203)805-6224. Air Agency Contact: William Menz, Program Manager; Bureau of Air Management; Air Management, Planning, and Standards Division; Dept. of Environmental Protection; 79 Elm Street, Hartford, Connecticut 06106-5127; (860)424-3409.

Website - <http://dmvct.org/emipage.htm>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - IDAHO (Boise area)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Annual emissions inspection at private test-only facilities; 40 facilities are participating in the program. Three privately owned mobile emissions test vans provide on-site inspections of fleets. BAR90 analyzers.

LDDV

Vehicles Included - 1965 and newer LDDVs. The most recent model year is exempted if driven fewer than 5,000 miles.

Test Procedures - Modified snap-acceleration test. Throttle pedal is depressed to floor and held for three seconds, then released.

Exhaust Components Measured - Opacity

Emissions Standards - LDDV opacity standards categories are based on vehicle model year. May become more stringent in 2002.

Opacity Standards for LDDVs			
	<u>65-74</u>	<u>75-91</u>	<u>92+</u>
Maximum Opacity, %	70	55	40

Fail Rate - Not available.

Test Equipment - Opacity meters: ProTech Opax 2000, Red Mountain.

Estimated Test Equipment Costs - ProTech Opax 2000: \$3,000; Red Mountain: \$5,700.

Inspection Fees - Maximum allowable fee for emissions inspection is \$12; \$2 goes to the Air Quality Board to cover administrative costs. One free retest is included in the fee.

Problems - Strict snap-acceleration procedure drove engine speed past tachometer redline, which worried owners. Procedure modified to ensure that engine speed does not exceed redline. Adapters for opacity meters had to be fabricated (locally, then by manufacturers) to accommodate small-diameter exhausts on smaller LDDVs.

HDDV

Vehicles Included - 1965+ HDDVs (except motor homes). The most recent model year is exempted if driven fewer than 5,000 miles.

Test Procedures - Snap acceleration test.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are based on vehicle model year. May become more stringent in 2002.

Opacity Standards for HDDVs			
	<u>65-74</u>	<u>75-91</u>	<u>92+</u>
Maximum Opacity, %	70	55	40

Fail Rate - Not available.

Test Equipment - Opacity meters: Opax 2000, Red Mountain.

Estimated Test Equipment Costs - Opax 2000: \$3,000; Red Mountain: \$5,700.

Inspection Fees - Maximum allowable fee for emissions inspection is \$12; \$2 goes to the Air Quality Board to cover administrative costs. One free retest is included in the fee.

Problems - On some HDDVs, strict snap-acceleration procedure drove engine speed past tachometer redline, which worried owners. Procedure was modified to ensure that engine speed does not meet redline. Throttle depressed onto governor; held for 5 seconds; feathered, if necessary, to avoid redline.

HDGV

Vehicles Included - 1965+ HDGVs (except motor homes). The most recent model year is exempted if driven fewer than 5,000 miles.

Test Procedures - HC and CO measured on TSI. Visual inspection (1984+ vehicles only) is limited to catalyst and air injection system.

Exhaust Components Measured - HC, CO, CO₂, O₂

Emissions Standards - Standards categories are based on vehicle model year.

Emissions Standards for HDGVs			
	<u>65-74</u>	<u>75-80</u>	<u>81+</u>
HC ppm	900	700	500
CO %	6.0	5.0	3.0

Fail Rate - Not available.

Test Equipment - BAR90 gas analyzers.

Estimated Test Equipment Costs - Gas analyzers: \$8,000.

Inspection Fees - Maximum allowable emission inspection fee of \$12 includes one free retest.

Problems - None reported.

Contact Persons - Dennis D. Turner, Executive Director, Air Quality Board, 1755 Westgate Drive, Suite 120, Boise, ID 83704; (208)377-9191. Also, Roger Jensen, Quality Assurance, same location.

Website - <http://www.emissiontest.org>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - ILLINOIS (Metropolitan Chicago and northern Illinois & East St. Louis areas)

Vehicles Tested - HDDV, HDGV

Program Description - For HDDVs, annual inspection at decentralized facilities or fleet self-certification allowed (for fleets of over 25 vehicles) with the snap-idle test, and random roadside testing conducted by DOT with the state police (coincident with random roadside safety inspections). For HDGVs, biennial emissions inspection at centralized, contractor-operated (ESP) inspection centers (35 inspection facilities with 139 test lanes). Fleet operators can inspect their own vehicles.

HDDV

Vehicles Included - For the annual inspection program, all intrastate HDDVs >16,000, all interstate busses, and Recreational vehicles over 16,000 in the 11-county program area. All smoking vehicles on road are subject to the roadside inspections.

Test Procedures - Snap acceleration test.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are based on vehicle model year. May become more stringent in 2002.

Opacity Standards for HDDVs			
	<u>65-74</u>	<u>75-91</u>	<u>92+</u>
Maximum Opacity, %	70	55	40

Fail Rate - Not available.

Test Equipment - Opacity meters: Two approved – Red Mountain and ProTech.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Initial test \$30, retest \$25 if retested at the same station as the initial test.

Problems - A problem with the smoke meters is program start up, which required firmware upgrades. Weather is a significant issue for the roadside program.

HDGV

Vehicles Included - 1968+ HDGV. The four newest model years are exempt, i.e., in calendar year 2001, 1997 models will be tested for the first time.

Test Procedures - Curb-idle test only. Vehicles failing initial idle inspection are tested again after preconditioning at high-idle operation. During idle test, the sum of CO + CO₂ concentrations must exceed 6%. Functional evap test limited to gas cap. No visual inspection required as part of test, but waiver inspection includes visual checks of catalyst, fuel inlet restrictor, and fuel filler cap, and a functional gas-cap pressure test. Catalyst must be replaced if fuel inlet shows signs of tampering.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - Standards are based on vehicle model year.

	Idle Emissions Standards, All HDGVs			
	<u>1968-71</u>	<u>1972-78</u>	<u>1979-84</u>	<u>1985+</u>
HC ppm	1550	900	700	300
CO %	9.5	9.0	7.0	3.0

Fail Rate - Not available.

Test Equipment - BAR97-equivalent test analyzer systems.

Estimated Test Equipment Costs - Not available.

Inspection Fees - No direct cost to motorists for inspection. Three inspections per year per vehicle are allowed.

Problems - None reported.

Contact Persons - For HDDV testing - Tony Klasing, Illinois Department of Transportation, Manager Commercial Vehicle Section, Diesel Vehicle Testing, Springfield Illinois, (217) 762-1606. For HDGV testing - Program Manager: Elizabeth Tracy, Vehicle Inspection & Maintenance, Illinois EPA, 1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276; (217)782-0408. Also Jim Matheny, Technical Services Manager (217)785-5153.

Website - HDGV <http://www.epa.state.il.us/air/vim>.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - INDIANA (Chicago, IL suburbs and Louisville, KY suburbs)

Vehicles Tested - HDGV

Program Description - Biennial emissions inspection at centralized, contractor-operated (ESP) inspection centers (9 inspection stations with 27 test lanes). Inspection also required on change of ownership and first registration in program area.

HDGV

Vehicles Included - 1976+ HDGVs with GVWR #9,000 lbs. The four newest model years are exempt.

Test Procedures - For 1981+ models, HC, CO, and NO_x are measured on IM93 (first hill of IM240) transient test cycle. (Pass/fail based on HC and CO only.) The test cycle is repeated once for failing vehicles. For 1976-80 models and vehicles incapable of dynamometer testing, HC and CO are measured on idle test. Gas cap pressure test and visual inspection for presence of catalyst conducted on all vehicles.

Exhaust Components Measured - HC, CO, NO_x, CO₂

Emissions Standards - IM93 emissions test standards for HDGVs are based on vehicle model year.

	IM93 Emissions Standards for HDGVs					
	<u>1981-82</u>	<u>1983-84</u>	<u>1985-86</u>	<u>1987-90</u>	<u>1991-97</u>	<u>1998+</u>
HC g/mi	7.50	6.00	5.00	3.00	2.40	2.00
CO g/mi	100.0	100.0	75.0	60.0	40.0	30.0

Fail Rate - Not available.

Test Equipment - Chassis dynamometers, CVS systems, gas analysis systems.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspections are free of charge.

Problems - None reported.

Contact Persons - Program Manager: Michael L. Worrell, Dept. of Environmental Management, 100 N. Senate Avenue, Room 1001, P.O. Box 6015, Indianapolis, Indiana 46206-6015; (317)232-8218. Also Phil Doyle, (317)232-8420.

Website - http://www.state.in.us/idem/oam/programs/imsite_new/

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - KENTUCKY (Louisville area)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Annual emissions tests and visual inspections at centralized, contractor-operated (Gordon-Darby) inspection centers. Five inspection centers provide 22 inspection lanes. Fleet operators are allowed to inspect their own vehicles upon meeting all hardware and software requirements, with data submission to the contractor.

LDDV

Vehicles Included - 1968+ LDDVs.

Test Procedures - LDDVs are tested for opacity; dyno-capable LDDVs on loaded cruise, non-dyno capable at curb idle. Load and speed for the loaded cruise test depend on number of engine cylinders; approximate values for a vehicle with an 8-cylinder engine are 9 hp at 32-35 mph.

Exhaust Components Measured - Opacity

Emissions Standards - Idle test opacity standard is 5%; loaded cruise standard is 20%.

Fail Rate - Not available.

Test Equipment - Chassis dynamometers, opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$11, with one free retest.

Problems - None reported.

HDDV

Vehicles Included - 1968+ HDDVs #18,000 lbs GVWR .

Test Procedures - HDDVs with GVWRs of 8,501-9,999 lbs that are dyno-capable tested for opacity on loaded cruise. Heavier GVWRs and those not dyno-capable, are tested at curb idle. Loaded cruise conditions depend on number of engine cylinders.

Exhaust Components Measured - Opacity

Emissions Standards - Idle test opacity standard is 5%; loaded cruise standard is 20%.

Fail Rate - Not available.

Test Equipment - Chassis dynamometers, opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$11, with one free retest.

Problems - None reported.

HDGV

Vehicles Included - 1968+ HDGVs with GVWR #18,000 lbs.

Test Procedures - HDGVs #10,000 lbs GVWR tested for HC and CO during loaded-mode (cruise) operation and at curb idle. Load and speed depend on number of engine cylinders. Heavier HDGVs are tested only at curb idle. 1984+ vehicles get visual inspection of catalyst, air injection, and evaporative system; and fillpipe pressure test and separate gas-cap pressure test.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - HC and CO standards, based on model year and GVWR, are too numerous to list. The range is from 220 ppm HC and 1.2% CO for 1985+ models to 1300 ppm HC, 8.0% CO for pre-1968 models.

Fail Rate - Not available.

Test Equipment - Gas analysis systems.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$11, with one free retest.

Problems - None reported.

Contact Persons - Program Manager: Diane Hazellief, Air Pollution Control District of Jefferson County, Vehicle Emissions Testing Headquarters, 1821 Taylor Avenue, Louisville, Kentucky 40213; (502)458-1018, ext 132. Air Agency Contact: David Gore, Kentucky Natural Resources and Environmental Protection Cabinet, Division for Air Quality, Special Programs Branch, 803 Schenkel Lane, Frankfort, Kentucky 40601; (502)573-3382.

Website - <http://www.apcd.org/vet/index.html>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - KENTUCKY (Northern Counties of Boone, Campbell, and Kenton)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Biennial emissions tests and anti-tampering inspections at contractor-operated (ESP) inspection centers. Three inspection centers, one in each county, provide a total of 11 inspection lanes.

LDDV

Vehicles Included - 1968+ LDDVs.

Test Procedures - LDDVs are tested for opacity at curb idle.

Exhaust Components Measured - Opacity

Emissions Standards - Idle test opacity standard is 5%.

Fail Rate - Not available.

Test Equipment - Opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$20, with one free retest.

Problems - None reported.

HDDV

Vehicles Included - 1968+ HDDVs #18,000 lbs GVWR .

Test Procedures - HDDVs are tested for opacity at curb idle.

Exhaust Components Measured - Opacity

Emissions Standards - Idle test opacity standard is 5%.

Fail Rate - Not available.

Test Equipment - Opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$20, with one free retest.

Problems - None reported.

HDGV

Vehicles Included - 1968+ HDGVs with GVWR #18,000 lbs.

Test Procedures - HC and CO measured at curb idle. Antitampering inspection is appropriate to the model year, and 1981+ models get fillpipe pressure test and separate gas-cap pressure test.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - HC and CO standards, based on model year and GVWR, are too numerous to list. The range is from 220 ppm HC and 1.2% CO for 1982+ models to 1500 ppm HC, 9.0% CO for 1968 models.

Fail Rate - Not available.

Test Equipment - Gas analysis systems.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$20, with one free retest.

Problems - None reported.

Contact Persons - Program Manager: Parker Moore, Branch Manager, Special Programs Branch, Kentucky Natural Resources and Environmental Protection Cabinet, Division for Air Quality, 803 Schenkel Lane, Frankfort, Kentucky 40601; (502)573-3382 ext. 421. Air Agency Contact: David Gore, Kentucky Natural Resources and Environmental Protection Cabinet, Division for Air Quality, Special Programs Branch, 803 Schenkel Lane, Frankfort, Kentucky 40601; (502)573-3382.

Website - www.nr.state.ky.us/nrepc/dep/daq/pubinfo/NKyemissions.htm.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - MAINE

Vehicles Tested - HDDV

Program Description - HDDVs are tested for exhaust opacity in a roadside pull-over program conducted by the DEP in conjunction with the State Police roadside safety inspection program.

HDDV

Vehicles Included - All HDDVs recruited at roadside over 18,000 GVWR.

Test Procedures - SAE J1667.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are based on vehicle model year.

	Opacity Standards for HDDVs		
	<u>Pre-1974</u>	<u>1974-90</u>	<u>1991+</u>
Maximum Opacity, %	70	55	40

Fail Rate - Not available.

Test Equipment - Opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - None.

Problems - None reported.

Contact Persons - Air Agency Contact: Ron Severance, Dept. of Environmental Protection, Bureau of Air Quality Control, State House, Station 17, Augusta, Maine 04333; (207)287-2437. Also Scott Wilson (207)287-8442.

Website - <http://www.state.me.us/dep/air/mobile/mainedep1.htm>.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - MARYLAND (Baltimore area & D.C. suburbs)

Vehicles Tested - HDDV, HDGV

Program Description - Biennial emissions tests at centralized, contractor-operated (ESP) inspection centers. Inspection network includes 87 inspection lanes in 19 inspection centers. Each facility has one 4-wheel drive dynamometer. Exemptions available if all registered owners are aged 70 years or older and vehicle is driven 5,000 miles or less annually, and for vehicles with Disabled license plates that are driven 5,000 miles or less annually. HDDVs are tested for exhaust opacity in a separate, roadside pull-over program conducted by the State Police.

HDDV

Vehicles Included - All HDDVs.

Test Procedures - SAE J1667.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are based on vehicle model year.

	Opacity Standards for HDDVs		
	<u>Pre-1974</u>	<u>1974-90</u>	<u>1991+</u>
Maximum Opacity, %	70	55	40

Fail Rate - Not available.

Test Equipment - Opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - None.

Problems - None reported.

HDGV

Vehicles Included - 1977+ HDGVs #26,000 lbs GVWR. First inspection not required until two years after vehicle's initial titling.

Test Procedures - 1984+ HDGVs with GVWR 8,501-9,999 lbs get IM240 test for HC, CO, and NOx. Older and heavier HDGVs and those that cannot be dyno tested, are tested at idle for HC and CO. Vehicles that are not dyno tested also get anti-tampering inspection.

Exhaust Components Measured - HC, CO, NOx, CO₂

Emissions Standards - Emissions standards for both categories of HDGVs are based on model year.

IM240 Emissions Standards for HDGVs
GVWR 8,501-9,999 lbs

	HC g/mi	CO g/mi	NOx g/mi
1984-87	3.20	80.0	7.0
1988-90	3.20	80.0	5.0
1991-95	2.40	60.0	4.5
1996+	2.40	60.0	4.0

Idle Emissions Standards for HDGVs with GVWR 8,501-9,999 lbs
That Cannot be Tested on Dynamometer

	HC ppm	CO %
1977	580	7.0
1978	550	6.7
1979	470	5.0
1980	350	5.0
1981	250	3.0
1982	220	2.5
1983	220	1.5
1984+	220	1.2

Idle Emissions Standards for HDGVs with GVWR \$10,000 lbs

	HC ppm	CO %
1977-78	650	7.0
1979	650	6.5
1980-82	500	6.0
1983	500	3.5
1984-85	440	3.0
1986	280	2.5
1987+	220	1.2

Fail Rate - Overall HDGV fail rate: 7.0%.

Test Equipment - Constant volume samplers and Gas analyzers: California Analytical Instruments.
Chassis dynamometers: Real Time Model 20N.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Initial inspection \$14, first re-inspection free, additional re-inspections \$14.

Problems - None reported.

Contact Persons - Program Director: Joseph W. Colden, Vehicle Inspections Program Manager, Motor Vehicle Administration, Dept. of Transportation, 6601 Ritchie Highway, N.E., Glen Burnie, Maryland 21062; (410)787-2927. Manager: Frances Loudenslager, Vehicle Emissions Inspection Program, same location; (410)768-7286. Air Agency Contact: Peggy Lord, Dept. of the Environment, Air and Radiation Management Administration, 2500 Broening Highway, Baltimore, Maryland 21224; (410)631-3270; also David Filbert, same location.

Website - <http://www.mva.state.md.us>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - MASSACHUSETTS

Vehicles Tested - HDDV, HDGV

Program Description - Biennial emissions inspections at licensed private repair facilities managed by a state contractor (Keating Technologies). Inspection also required on change of ownership and first-time registration in program area (new cars excepted). Approximately 1,500 facilities are participating in the program. Fleet operators inspect their own vehicles.

HDDV

Vehicles Included - 1984+ HDDVs. Two most recent model years are exempt.

Test Procedures - SAE J1667.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards depend on GVWR, vehicle type, and model year.

	Maximum Opacity Standards for HDDVs				
	<u>1984+</u>	<u>1984-90</u>	<u>1991+</u>	<u>1984-93</u>	<u>1994+</u>
8,501 - 10,000 lbs	40%				
Trucks >10,000 lbs		55%	40%		
Buses > 10,000 lbs				40%	30%

Fail Rate - Not available.

Test Equipment - Opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Fee is \$29 for the biennial safety plus emissions test, one free retest.

Future Program - Beginning approximately January 2002, Diesel vehicles with GVWR of 8,500 lbs or less will be tested for opacity on MA31 drive cycle. Diesel vehicles in GVWR range of 8,501 to 10,000 lbs will get motorist's choice of MA31 or snap-acceleration test procedure.

Problems - None reported.

HDGV

Vehicles Included - 1984+ HDGVs. Two most recent model years are exempt.

Test Procedures - HDGVs with GVWR of 8,501-10,000 lbs are tested on the Massachusetts Short Transient Test Trace (MA31) for HC, CO, and NOx. HDGVs rated over 10,000 lbs GVWR, and lighter HDGVs not compatible with dynamometer testing, get TSI for HC and CO. Gas cap pressure test on all HDGVs; visual inspection of catalyst, EGR, PCV, and fuel filler cap for vehicles getting TSI.

Exhaust Components Measured - HC, CO, NO_x, CO₂

Emissions Standards - Emissions standards and idle standards depend on vehicle model year.

MA31 Transient Test Standards (on an IM240 Basis)
HDGVs 8,501-10,000 lbs GVWR

	<u>1984-87</u>	<u>1988-90</u>	<u>1991-95</u>	<u>96+</u>
HC g/mi	3.2	3.2	2.4	2.4
CO g/mi	80	80	60	60
NO _x g/mi	7.0	5.0	4.5	4.0

Two-Speed Idle Emissions Standards
HDGVs

	<u>1984-86</u>	<u>1987+</u>
HC ppm	220	100
CO %	0.8	0.6

Fail Rate - Not available.

Test Equipment - Chassis dynamometers, BAR-97 gas analyzer systems, VMAS flow measurement system.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Fee is \$29 for the biennial safety plus emissions test or the safety-only test.

Problems - None reported.

Contact Persons - Program Manager: Frederick Civian, Massachusetts Dept. of Environmental Protection, Division of Enhanced Vehicle Inspection and Maintenance, 1 Winter St., 10th Floor, Boston, Mass. 02108; (617)292-5821. Also Mark Wert, same location; (617)292-5598.
RMV Contact: Steve Sebestyen, Massachusetts Registry of Motor Vehicles, 100 Nashua St., Boston, Mass. 02114; (617)351-9045.

Website - <http://vehicletest.state.ma.us/home.html>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - NEVADA (Las Vegas and Reno areas)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Annual emissions tests and visual inspections at private repair facilities. BAR90 analyzers upgraded to accommodate networking. Fleet operators (>3 vehicles) can inspect their own vehicles. Statewide, there are approximately 430 facilities participating in the program.

LDDV

Vehicles Included - All 1968+ LDDVs except the last two model years.

Test Procedures - LDDVs tested for opacity at 40 mph on dynamometer. Dynamometer load applied according to the number of cylinders: 4 cyl., 7 hp; 6 cyl., 15 hp; and 8 cyl., 30 hp.

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity standards: Washoe County – 40%. Clark County – 30%.

Fail Rate - Washoe County – 0.30%; Clark County – 0.17%.

Test Equipment - Mustang dynamometers used in both counties. Opacity meters differ. Washoe County uses Bosch, Clark County uses Wager.

Estimated Test Equipment Costs - Dynamometers: \$15,000 plus installation. Opacity meters: For both brands, estimated cost is \$6,000 per unit.

Inspection Fees - Maximum fee for LDDV opacity test in both Washoe County (Reno area) and Clark County (Las Vegas area) is \$20. Compliance certificates cost an additional \$5 in both program areas.

Problems - None reported.

HDDV

Vehicles Included - All 1968+ HDDVs except the last two model years.

Test Procedures - HDDVs tested for exhaust opacity during random roadside pull-overs, in fleet yards, and at weigh stations, using the SAE J1667 snap-acceleration test.

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity standard is 70% for all HDDVs.

Fail Rate - Washoe County: 7.3%. Clark County: 29.5%.

Test Equipment - Washoe County: Bosch Opacity Meters. Clark County: Wager Opacity Meters.

Estimated Test Equipment Costs - For both brands, estimated cost is \$6,000 per unit.

Inspection Fees - No fee is assessed for HDDV opacity tests.

Problems - None reported.

HDGV

Vehicles Included - All 1968+ HDGVs except last two model years.

Test Procedures - HC and CO measured at 2500 rpm and idle. CO₂ also measured as a check for exhaust dilution. Visual inspection for pre-1981 vehicles includes only fuel cap. For 1981+ models, visual inspection includes gas cap, fuel inlet restrictor, air injection system, catalyst, and EGR. Illuminated MIL will fail vehicle. No evap functional test.

Exhaust Components Measured - HC, CO, CO₂, O₂

Emissions Standards - Standards categories are based on vehicle model year.

Emissions Standards for HDGVs

	<u>1968-69</u>	<u>1970-78</u>	<u>1979</u>	<u>1980</u>	<u>1981+</u>
HC ppm	1400	1400	1000	1000	1000
CO %	7.0	6.0	5.0	4.0	3.5

Fail Rate - For first half of 2001, Washoe County: 6.5%; Clark County: 5.7%.

Test Equipment - Gas analysis benches: Worldwide Environmental.

Estimated Test Equipment Costs - Gas analysis bench: \$14,000 each.

Inspection Fees - Maximum inspection fee for HDGVs in Washoe County (Reno area) is \$21.50; in Clark County (Las Vegas area), \$23.50. Compliance certificates cost an additional \$5 in both program areas.

Problems - None reported.

Contact Persons - Program Manager: Lloyd Nelson, Dept. of Motor Vehicles and Public Safety, 555 Wright Way, Carson City, Nevada 89711-0700; (775)684-4682. Air Agency Contact: Adele Malone, Division of Environmental Protection, Bureau of Air Quality, 123 W. Nye Lane, Carson City, Nevada 89710; (775)687-4670, ext 3076.

Website - http://www.state.nv.us/dmv_ps/emission.htm#General

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - NEW HAMPSHIRE

Vehicles Tested - HDDV

Program Description - HDDVs >10,000 lbs GVWR and Diesel buses \$25 passengers are subject to snap-acceleration opacity testing at tolls and scales, and in random roadside pullovers. Vehicles failing age-determined opacity standards are subject to administrative fine and must document corrective repairs.

HDDV

Vehicles Included - All HDDVs >10,000 lbs GVWR, and all Diesel buses with capacity \$25 passengers.

Test Procedures - SAE J1667 snap acceleration.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are a function of vehicle model year.

	<u>Pre-1974</u>	<u>1974-90</u>	<u>1991+</u>
Opacity %	70	55	40

Fail Rate - Approximately 9%.

Test Equipment - Bosch RTT 100 opacity meters.

Estimated Test Equipment Costs - \$8,500 per unit.

Inspection Fees - None.

Problems - Unspecified problems with opacity meters, and a small fraction of non-repeatable readings, are attributed to truck drivers' feathering the throttle during the test.

Contact Persons - Program Manager: Tom Hettinger, Office of Emissions and Special Projects, Dept. of Safety, James H. Hayes Safety Building, 10 Hazen Drive, Concord, New Hampshire 03305; (603)271- 0351. Air Agency Contact: Kent Finemore, Administrator, Department of Environmental Services, Air Resources Division, 64 North Main Street, Caller Box 2033, Concord, New Hampshire 03302-2033; (603)271-1382. Also Mike Fitzgerald, Mobile Source Unit; (603)271-6390.

Website - <http://www.des.state.nh.us/ard/>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - NEW JERSEY

Vehicles Tested - HDDV, HDGV

Program Description - For HDDVs over 18,000 GVWR, annual inspection is required at one of more than 300 decentralized Diesel Emissions Inspection Centers. Roadside enforcement is conducted by ten joint teams from the DMV and state police using the snap-idle test. For HDGVs, hybrid program; biennial emissions and safety inspections at (1) contractor-operated (Parsons Advanced Technologies) centralized inspection stations, and (2) decentralized licensed private inspection facilities (motorist choice). New-to-area vehicles are subject to inspection. ASM-equivalent analyzers in centralized test lanes; BAR97 analyzers at private facilities. Reinspection at licensed emissions repair facilities (ERFs) is allowed. Fleet operators can self-inspect.

LDDV

Vehicles Included - All model years #8,500 GVWR and privately registered Diesel vehicles up to 18,000.

Test Procedures - LDDVs are tested for visual observation of smoke.

Exhaust Components Measured - Visual observation for smoke.

Emissions Standards - Vehicle fails if smoke observed while vehicle drives through test lane.

Fail Rate - Not available.

Test Equipment - None.

Estimated Test Equipment Costs - None.

Inspection Fees - Inspections at contractor-operated lanes are free (covered in registration fee). At private facilities, fee is half the posted hourly labor rate of \$50-\$75. Reinspection fee is based on individual failing items, and is calculated by multiplying the state-assigned time to inspect each component by the shop's hourly labor rate.

Problems - None reported.

HDDV

Vehicles Included - All >18,000 GVWR.

Test Procedures - SAEJ1667 and rolling snap-idle.

Exhaust Components Measured - Opacity

Emissions Standards - For pre-1974 vehicles - 70%, for 1974 to 1991 vehicles - 55%, for 1991 and newer vehicles - 40%. Upon first failure of the roadside emissions test, vehicle owners are fined \$700, with the fine reduced to \$150 upon proof that the vehicle has been repaired. The second offense fine is \$1,300, reduced to \$500 upon proof that the vehicle has been repaired.

Fail Rate - For roadside inspections, 16% of vehicles recruited fail a visual screening test, half of these (8% of those recruited) fail the snap-idle test.

Test Equipment - Opacity meters.

Estimated Test Equipment Costs - \$3,000 - \$8,000

Inspection Fees - Annual inspection cost is 1 hour shop labor (\$45 to \$75). Roadside inspections are free.

Problems - None reported.

HDGV

Vehicles Included - All HDGVs. New vehicles are inspected by dealer prior to delivery and receive a two-year sticker, effectively exempting new vehicles from inspection for their first 24 months of ownership.

Test Procedures - HC and CO emissions measured at curb idle.

Exhaust Components Measured - HC, CO, CO₂, O₂

Emissions Standards - Idle emissions standards are based on model year.

	HDGV Emissions Standards				
	<u>Pre-1968</u>	<u>1968-70</u>	<u>1971-74</u>	<u>1975-78</u>	<u>1979+</u>
HC ppm	1400	1200	700	500	300
CO %	8.5	8.5	6.0	4.0	3.0

Fail Rate - Not available.

Test Equipment - BAR97 analyzers.

Estimated Test Equipment Costs - \$15,000 - \$20,000

Inspection Fees - Inspections at contractor-operated lanes are free (covered in registration fee). At private facilities, fee is half the posted hourly labor rate of \$50-\$75. Reinspection fee is based on individual failing items, and is calculated by multiplying the state-assigned time to inspect each component by the shop's hourly labor rate.

Problems - None reported.

Contact Persons - Program Manager: Al Ari, Deputy Commissioner, Dept. of Transportation, 1035 Parkway Ave., P.O. Box 600, Trenton, NJ 08625; (609)530-3536. Air Agency Contact: David West, Chief, Bureau of Transportation Control, Dept. of Environmental Protection, 380 Scotch Road, CN437, Trenton, New Jersey 08625; (609)530-4035. Also, for decentralized program issues: Rob Schell, same location, (609)530-4038; for centralized and Diesel emissions issues: Tony Iavarone (609)530-4064.

Website - <http://www.cleanairnj.org/test/index.html>, also
<http://www.state.nj.us/mvs/vehicleinspection.htm>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - NEW MEXICO (Albuquerque)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Biennial decentralized emissions tests and visual inspections at private test and repair facilities, and at city-operated referee stations. Approximately 140 facilities are participating in the program. Inspections also required on vehicle title transfers. BAR90 analyzers. Fleet operators can self-inspect.

LDDV

Vehicles Included - All 1975+ LDDVs.

Test Procedures - LDDVs are tested upon change of ownership or title transfer for smoke opacity on TSI at city-operated referee stations. Opacity determination is made by EPA Method 9 (visible determination by qualified observer).

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity for LDDVs is 25%.

Fail Rate - Vehicles 15 or more years old: >20%. Newer vehicle fail rate declines to < 3% at 2 years old.

Test Equipment - None.

Estimated Test Equipment Costs - None.

Inspection Fees - Fee for emissions inspection is not regulated; average price in market is slightly under \$20. One free retest available at City retest facility.

Problems - Program manager stated that the state Motor Vehicles Division is selecting for testing mostly new Diesels at the end of their first registration cycle (one or two years). The result of this is that over 95% of the Diesels tested are less than 2 years old, so the fail rate is <3%.

HDDV

Vehicles Included - All 1975+ HDDVs under 26,000 lbs GVWR.

Test Procedures - HDDVs are tested at change of ownership or title transfer for smoke opacity on TSI at city-operated referee stations. Opacity determination is made by EPA Method 9 (visible determination by qualified observer).

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are based on vehicle weight rating: GVWR #10,000 lbs: 25%; GVWR >10,000 lbs: 30%.

Fail Rate - Vehicles 15 or more years old: >20%. Newer vehicle fail rate declines to < 3% at 2 years old.

Test Equipment - None.

Estimated Test Equipment Costs - None.

Inspection Fees - Fee for emissions inspection is not regulated; average price in market is slightly under \$20. One free retest available at City retest facility.

Problems - Apparently the state Motor Vehicles Division selects the vehicles to be tested, and the Albuquerque city program manager stated that MVD is selecting mostly new Diesels at the end of their first registration cycle (one or two years). The result of this is that over 95% of the Diesels tested are less than 2 years old, so the fail rate is <3%.

HDGV

Vehicles Included - All 1975+ HDGVs under 26,000 lbs GVWR.

Test Procedures - HC and CO measured on TSI.

Exhaust Components Measured - HC, CO, CO₂, O₂

Emissions Standards - Emissions standards based on vehicle weight, model year, and test mode.

Emissions Standards for HDGVs						
GVWR	Model Year	Idle		2500 rpm		
		HC ppm	CO %	HC ppm	CO %	
8,501 - 10,000	1975-80	950	6.5	950	6.5	
	1981-83	800	5.4	450	3.5	
	1984+	630	4.0	400	3.0	
10,001 - 25,999	1975-80	950	6.5	950	6.5	
	1981-86	800	5.5	500	3.5	
	1987+	440	2.0	400	3.0	

Fail Rate - Not available.

Test Equipment - BAR90 analyzers, various manufacturers.

Estimated Test Equipment Costs - \$16,000 - \$19,000 each.

Inspection Fees - Fee for emissions inspection is not regulated; average price in market is slightly under \$20. One free retest available at City retest facility.

Problems - None reported.

Contact Persons - Program Manager: Glen L. Dennis, Manager, Vehicle Pollution Management Division, City of Albuquerque Environmental Health Dept., 1500 Broadway N.E., Albuquerque, New Mexico 87102; (505)764-1110. Also Mike Baca, same location. Air Agency Contact: Angel Martinez,

Air Pollution Control Division, City of Albuquerque Environmental Health Dept., One Civic Plaza
(P.O. Box 1293), Albuquerque, New Mexico 87103; (505)768-2600.

Website - None given.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - NEW YORK (The nine-county New York Metropolitan Area (NYMA) comprised of Nassau, Suffolk, Rockland, and Westchester counties, and the 5 boroughs of New York City)

Vehicles Tested - HDDV, HDGV

Program Description - Annual emissions and safety inspections at licensed private repair facilities. Vehicles undergoing change of ownership and new-to-state are subject to inspection. About 3,800 facilities in the NYMA are participating in the program. Of those, about 240 fleet operators (25 or more vehicles) are licensed to inspect their own vehicles (must meet the same requirements as other inspection facilities, except being subject to covert audits).

HDDV

Vehicles Included - HDDVs 25 model years old and newer (e.g., in year 2001, the oldest model year inspected is 1976), excluding emergency vehicles and farm vehicles. The two most recent model years are exempt from emissions inspection.

Test Procedures - SAE J1667 performed at specially licensed facilities called Official Diesel Emission Inspection Stations (ODEIS).

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are based on vehicle model year.

	<u>1976-90</u>	<u>1991+</u>
Maximum Opacity, %	55	40

Fail Rate - Not available.

Test Equipment - Opacity meters approved by New York DEC include the following brands: Wager Model 7500, CalTest 1000-WIN-TR, Red Mountain Engineering Smoke Check 1667, Bosch RTT 100, ESP Diesel-sense 1667, and SPX Dieseltune Smokemeter DX-240.

Estimated Test Equipment Costs - Per-unit costs vary; range is \$5,000 to \$10,000.

Inspection Fees - Maximum fee (emission and safety inspection together) is \$35. Vehicles remaining at inspection facility for repairs following a failing test receive free retest; otherwise vehicles are charged regular inspection fee for retests.

Problems - Some HDDV owners expressed concern about possible damage when their engines go to a high speed when tested on J1667 procedure. Engine manufacturers, however, have assured NY DEC that their engines can be tested safely and are operating within design parameters. Some ODEIS have had problems with malfunctioning opacity meters that are not repaired within a reasonable time. NY DEC personnel feel that some of these problems may result from stations' not having service contracts with their opacity meter vendors.

HDGV

Vehicles Included - HDDVs 25 model years old and newer (e.g., in year 2001, the oldest model year inspected is 1976), excluding farm vehicles. The two most recent model years are exempt from emissions inspection.

Test Procedures - HDGVs are tested at curb idle.

Exhaust Components Measured - HC, CO, NO_x, CO₂

Emissions Standards - Emissions standards are based on vehicle model year.

Idle Emissions Standards for HDGVs		
	<u>1976-78</u>	<u>1979+</u>
HC ppm	600	300
CO %	4.5	3.0

Fail Rate - 5.48%

Test Equipment - Gas analyzers provided by SPX, ESP, and Sun/Snap-on.

Estimated Test Equipment Costs - Approximately \$18,000.

Inspection Fees - Maximum fee (emission and safety inspection together) is \$35. Vehicles remaining at inspection facility for repairs following a failing test receive free retest; otherwise vehicles are charged regular inspection fee for retests.

Problems - None reported.

Contact Persons - Program Manager: Mike Maher, Director, Technical Services Bureau, New York State Department of Motor Vehicles, 6 Empire State Plaza, Room 418, Albany, New York 12228; (518)474-0616; also Phil Risley, same location; (518)474-4279. Air Agency Contact: Joe Tuttle, Bureau of Mobile Sources, Dept. of Environmental Conservation, 50 Wolf Road, Albany, New York 12233-3259; (518)457-8894.

Websites - <http://www.nydmv.state.ny.us/vehsafe.htm>, and <http://www.dec.state.ny.us/website/dar/beim/index.html>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - NORTH CAROLINA (Nine-County Area Encompassing Charlotte, Raleigh-Durham, and Greensboro – Winston-Salem areas)

Vehicles Tested - HDGV

Program Description - Annual emissions tests and visual inspections at licensed private repair facilities. Fleet operators can inspect their own vehicles. About 1,400 facilities are in the program.

HDGV

Vehicles Included - HDGVs manufactured after 1974.

Test Procedures - HC and CO measured at idle, after 30 seconds of preconditioning at 2500 rpm. Failing vehicles get second-chance test after conditioning at 2500 rpm for 180 seconds. Visual inspection includes (as applicable) catalyst, air injection system, fuel inlet restrictor and cap, evaporative emissions control system, PCV, EGR, TAC, and oxygen sensor.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - Standards are based on vehicle model year.

HDGV Emissions Standards		
	<u>1975-78</u>	<u>1979+</u>
HC ppm	500	400
CO %	5.0	4.0

Fail Rate - Estimated at 5%, based on 1998 annual report.

Test Equipment - Test analyzer systems provided by Allen, Bear, ESP, SPX, Sun/Snap-on.

Estimated Test Equipment Costs - \$12,000-\$15,000 per unit.

Inspection Fees - Statutory inspection fee is \$19.40; includes \$2.40 for sticker and one free retest.

Problems - State regulations require all vehicles subject to the program to be inspected in enclosed, level facilities and lifted for inspection of exhaust systems and tires. Owners of privately owned large motor homes find it difficult to locate facilities large enough to accommodate their vehicles.

Contact Persons - Program Manager: Major John Robinson, Jr., Division of Motor Vehicles, 1100 New Bern Ave., Raleigh, North Carolina 27604; (919)733-7872. Air Agency Contact: Donnie Redmond, Dept. of Environment and Natural Resources, Division of Air Quality, 2728 Capital Boulevard, 1641 Mail Service Center, Raleigh, North Carolina 27699-1641; (919)733-1481. Also Paul Gordey, (919)715-7220, and Laura Cole (919)733-1482.

Website - www.dmv.dot.state.nc.us/enforcement/emissionsinspections.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - OHIO (Cleveland-Akron, Dayton-Springfield, Cincinnati)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Biennial emissions tests and tampering inspections at centralized, contractor-operated facilities (ESP). Testing also required on change of ownership. I/M repair facilities are licensed by the state on a voluntary basis. Statewide, the inspection contractor provides 177 inspection lanes in 44 facilities.

LDDV

Vehicles Included - LDDVs up to 25 years old. New vehicles are exempted from testing for the first 2 model years. Thus, in calendar year 2001, vehicles of model years 1977-99 must be tested (odd model year vehicles tested in odd years, even model year vehicles in even years).

Test Procedures - Exhaust opacity measurements during ASM2525 test. Vehicles that cannot be dyno-tested get the snap-acceleration test.

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity is 20% for all LDDVs.

Fail Rate - Not available.

Test Equipment - Dynamometers: Mustang 5100 IM240 2wd, Realtime 20N. Opacity meters: Telonic/Berkeley Model 200, Wager Model 650.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$19.50, paid upon passing test or from the third test on.

Problems - Problems are minimal, and related to the low volume of LDDV testing. For example, vehicle inspector may not conduct snap-acceleration test properly because of lack of practice.

HDDV

Vehicles Included - HDDVs up to 25 years old, with GVWR #10,000. New vehicles are exempted from testing for the first 2 model years.

Test Procedures - Exhaust opacity measurements during ASM2525 test. Vehicles that cannot be dyno-tested get the snap-acceleration test.

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity is 20% for all HDDVs.

Fail Rate - Not available.

Test Equipment - Dynamometers: Mustang 5100 IM240 2wd, Realtime 20N. Opacity meters: Telonic/Berkeley Model 200, Wager Model 650.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$19.50, paid upon passing test or from the third test on.

Problems - Problems are minimal, and related to the low volume of HDDV testing. For example, vehicle inspector may not conduct snap-acceleration test properly because of lack of practice.

HDGV

Vehicles Included - HDGVs up to 25 years old. New vehicles are exempted from testing for the first 2 model years.

Test Procedures - HC and CO measured during TSI.

Exhaust Components Measured -HC, CO, CO₂

Emissions Standards - Emissions standards depend on vehicle model year.

Two-Speed Idle Emissions Standards for HDGVs

	HC ppm	CO %
<u>1975-77</u>	450	5.0
<u>1978</u>	350	4.0
<u>1979</u>	275	3.0
<u>1980</u>	230	2.0
<u>1981+</u>	220	1.2

Fail Rate - Approximately 4% - 5%.

Test Equipment - Gas analyzers: Horiba. Gas cap testers: ESP

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$19.50, paid upon passing test or from the third test on.

Problems - None reported.

Contact Persons - Program Manager: Rick Carleski, Acting Manager, Mobile Sources Section, Ohio EPA, P.O. Box 1049, Columbus, Ohio 43215-1049; (614)644-3059. Also David Youngerman, Frederick Jones, same location.

Website - <http://www.epa.state.oh.us/dapc/mobile.html>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - OREGON (Portland metropolitan area)

Vehicles Tested - LDDV, HDGV

Program Description - Biennial emissions tests and visual inspections at centralized, state-operated inspection centers. State operates 19 enhanced test lanes and 22 basic test lanes housed in 8 inspection facilities. Fleet operators (public agencies with more than 50 vehicles, or private sector with more than 100 vehicles) can inspect their own vehicles.

LDDV

Vehicles Included - 1975+ LDDVs. New vehicles are exempt for the first 2 model years.

Test Procedures - 1975-80 model year LDDVs are tested for CO at curb idle; standard is 1.5%. 1981-95 models get BAR31 transient loaded test for HC, CO, and NOx; standards are same as for gasoline LDVs. If, during either test, smoke is observed at levels >20% opacity, then exhaust opacity is measured at curb idle and at "one-third throttle." Program personnel acknowledge that both smoke observation and the one-third throttle setting are subjective. 1996+ LDDVs get OBDII check only; same pass/fail criteria as for gasoline vehicles.

Exhaust Components Measured - HC, CO, NOx, Opacity

Emissions Standards - 1975-80 LDDVs meet 1.5% CO standard at idle, and 20% opacity standard when tested. BAR31 standards are presented in the table below. All standards are stringent. Diesel standards for light-duty vehicles are 1.5% CO (HC not measured) and 20% opacity at idle.

	BAR31 Test Emissions Standards for LDDVs		
	<u>1981-82</u>	<u>1983-89</u>	<u>1990-95</u>
HC g/mi	2.0	2.0	1.2
CO g/mi	64	32	30
NOx g/mi	3.70	3.70	3.00

Fail Rate - Approximately 1.5%.

Test Equipment - Idle test: ESP gas analyzers. BAR31 test: Realtime dynamometers, Horiba IM240 gas analyzers. Opacity test: Sensors opacity meters.

Estimated Test Equipment Costs - ESP analyzers: \$15,000 per unit. Dynamometers and IM240 analyzers were purchased at auction from defunct I/M programs (Michigan, Texas). Oregon paid approximately \$10,000 per unit, original costs reported to be \$50,000-\$60,000. Opacity meter costs not available.

Inspection Fees - Inspection fee is \$21 upon passing. No fee if vehicle fails.

Problems - Idle test: difficulty in finding engine speed signal. BAR31 test: vehicles too low for safe dynamometer operation, AWD, ABS brakes, traction-control vehicles.

HDGV

Vehicles Included - 1975+ HDGVs. New vehicles are exempt for the first 2 model years.

Test Procedures - HC and CO measured on TSI.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - Six standards categories are based on model year, type of fuel delivery, and presence or absence of catalytic converter.

		Emissions Standards for HDGVs			
		Curb Idle		2500 rpm	
		HC ppm	CO %	HC ppm	CO %
1975-78	Carburetor	500	4.0	--	3.0
1975-78	Fuel Injection	500	4.0	--	--
1979-84	Carburetor	350	3.0	--	3.0
1979-84	Fuel Injection	350	3.0	--	--
1985+	No Catalyst	350	3.0	--	3.0
1985+	Catalyst	220	1.0	220	1.0

Fail Rate - Approximately 12.5%

Test Equipment - Gas analyzers supplied by ESP.

Estimated Test Equipment Costs - Approximately \$15,000 per unit.

Inspection Fees - Inspection fee is \$21 upon passing. No fee if vehicle fails.

Problems - On many late-model HDGVs, it is difficult to get an engine speed signal.

Contact Persons - Program Manager: Ted Kotsakis, Manager, Vehicle Inspection Program, Air Quality Division, Department of Environmental Quality, 1240 S.E. 12th Avenue, Portland, Oregon 97214; (503)731-3050 ext 231. Also Jerry Coffer, (503)731-3050 ext 229.

Website - http://www.deq.state.or.us/aq/vip/vip_frame_page_htm

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - OREGON (“Rogue Valley I/M Program” covers Medford, Ashland, Eagle Point, and surrounding areas)

Vehicles Tested - LDDV, HDGV

Program Description - Biennial emissions tests and visual inspections at centralized, state-operated inspection center. (One facility, three inspection lanes.) Fleet operators can inspect their own vehicles.

LDDV

Vehicles Included - LDDVs 20 years old and newer. New vehicles are exempt for the first 2 model years.

Test Procedures - 1981-95 vehicles tested for CO emissions on two-speed idle; standard is 1.5%. If smoke is observed during TSI, then exhaust opacity is measured with an opacity meter. Standard is 20%. 1996+ models get OBDII check only; same pass/fail criteria as for gasoline vehicles.

Exhaust Components Measured - CO, Opacity

Emissions Standards - For all model years, CO standard is 1.5%, opacity standard is 20%.

Fail Rate - Not available.

Test Equipment - ESP gas analyzers, Sensors opacity meters.

Estimated Test Equipment Costs - ESP analyzers: \$15,000 per unit. Opacity meter cost not available.

Inspection Fees - Inspection fee is \$10.

Problems - None reported.

HDGV

Vehicles Included - HDGVs 20 years old and newer. New vehicles are exempt for the first 2 model years.

Test Procedures - 1981-95 HDGVs tested for HC and CO emissions on two-speed idle. 1996+ models get OBDII check only.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - Six standards categories are based on model year, type of fuel delivery, and presence or absence of catalytic converter.

Emissions Standards for HDGVs					
		Curb Idle		2500 rpm	
		HC ppm	CO %	HC ppm	CO %
1975-78	Carburetor	500	4.0	--	3.0

1975-78	Fuel Injection	500	4.0	--	--
1979-84	Carburetor	350	3.0	--	3.0
1979-84	Fuel Injection	350	3.0	--	--
1985+	No Catalyst	350	3.0	--	3.0
1985+	Catalyst	220	1.0	220	1.0

Fail Rate - Not available.

Test Equipment - ESP gas analyzers, Sensors opacity meters.

Estimated Test Equipment Costs - ESP analyzers: \$15,000 per unit. Opacity meter cost not available.

Inspection Fees - Inspection fee is \$10.

Problems - None reported.

Contact Persons - Program Manager: Ted Kotsakis, Manager, Vehicle Inspection Program, Air Quality Division, Department of Environmental Quality, 1240 S.E. 12th Avenue, Portland, Oregon 97214; (503)731-3050 ext. 231. Also Jerry Coffey, (503)731-3050 ext 229. Medford contact: Ted Wacker, DEQ, Rogue Valley I/M Program, 3030 Biddle Road, Medford, Oregon 97504; (541)776-6140.

Website - None given.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - PENNSYLVANIA (Five counties in Philadelphia area)

Vehicles Tested - HDGV

Program Description - Annual emissions tests and safety inspections at licensed private repair facilities. Approximately 1,800 facilities are participating in the program. BAR97 analyzers. Sticker enforcement. Fleet operators can inspect their own vehicles

HDGV

Vehicles Included - 1975+ HDGVs #9,000 lbs GVWR. Vehicles driven fewer than 5,000 miles in the year prior to inspection are eligible for an exempt sticker.

Test Procedures - HC and CO measured on TSI. Gas-cap pressure test and visual inspection conducted on all vehicles; visual inspection covers catalyst, fuel inlet restrictor, PCV, EGR, air injection system, and evaporative emission control system.

Exhaust Components Measured - HC, CO, NO_x, CO₂

Emissions Standards - All HDGVs must meet the same standards: 650 ppm HC, 6.0% CO.

Fail Rate - 6.8%.

Test Equipment - BAR-97 gas analyzer systems supplied by ESP, Sun, Snap-On, SPX.

Estimated Test Equipment Costs - \$13,000 - \$22,000.

Inspection Fees - Emission inspection fee (includes one free retest within 30 days at station that performed first inspection) is not regulated; average fee is \$43.

Problems - None reported.

Contact Persons - Program Manager: John Munafo, Manager, Vehicle Inspection Division, Bureau of Motor Vehicles, Pennsylvania Dept. of Transportation, P.O. Box 8697, Harrisburg, Pennsylvania 17105; (717)787-3184. Also Peter Gertz, (717)783-7016, same location.

Website - <http://www.drivecleanpa.state.pa.us/>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - PENNSYLVANIA (Four counties in Pittsburgh area)

Vehicles Tested - HDGV

Program Description - Annual emissions tests and safety inspections at licensed private repair facilities. Approximately 1,100 facilities are participating in the program. Fleet operators can inspect their own vehicles.

HDGV

Vehicles Included - 1975+ HDGVs #9,000 lbs GVWR. Vehicles driven fewer than 5,000 miles in the year prior to inspection are eligible for an exempt sticker.

Test Procedures - HC and CO measured on TSI. Gas-cap pressure test and visual inspection conducted on all vehicles; visual inspection covers catalyst, fuel inlet restrictor, PCV, EGR, air injection system, and evaporative emission control system.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - All HDGVs must meet the same standards: 650 ppm HC, 6.0% CO.

Fail Rate - 6.8%.

Test Equipment - BAR-97 gas analyzer systems supplied by ESP, Sun, Snap-On, SPX.

Estimated Test Equipment Costs - \$13,000 - \$22,000.

Inspection Fees - Emission inspection fee (includes one free retest within 30 days at station that performed first inspection) is not regulated; average fee is \$27.

Problems - None reported.

Contact Persons - Program Manager: John Munafo, Manager, Vehicle Inspection Division, Bureau of Motor Vehicles, Pennsylvania Dept. of Transportation, P.O. Box 8697, Harrisburg, Pennsylvania 17105; (717)787-3184. Also Peter Gertz, (717)783-7016, same location.

Website - www.drivecleanpa.state.pa.us.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - RHODE ISLAND

Vehicles Tested - LDDV

Program Description - Biennial emissions tests at private repair facilities. Approximately 300 facilities are participating in the program. Fleet operators can inspect their own vehicles if they become Authorized Inspection and Repair Stations (AIRS).

LDDV

Vehicles Included - LDDVs 25 model years old and newer. New vehicles are exempt for first 2 calendar years from purchase date or 24,000 miles.

Test Procedures - LDDVs tested for opacity on RI2000 procedure, a BAR31 transient cycle. Vehicles that cannot be dyno tested get TSI.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are 20% on BAR31 test, 5% on TSI.

Fail Rate - Not reported.

Test Equipment - Chassis dynamometers, opacity meters.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is set at \$47; includes safety inspection and sticker, which shop buys from State, and one free reinspection within 30 days at the station that did the original test.

Problems - None reported.

Contact Persons - Program Manager: Robert J. Connors, Vehicle Inspection Division, Department of Transportation, 286 Main Street, Providence, Rhode Island 02860; (401)222-3017. Air Agency Contact: Steve Majkut, Dept. of Environmental Management, Division of Air Resources, 235 Promenade St., Providence, Rhode Island 02908; (401)222-2808. Also Tom Barry, same location; ext. 7021.

Website - <http://www.riinspection.com/>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - TENNESSEE (City of Memphis)

Vehicles Tested - HDGV

Program Description - Annual emissions tests and safety inspections at centralized inspection centers operated by the local government. Three inspection centers provide a total of 10 inspection lanes. Fleet operators (10 or more vehicles) can inspect their own vehicles.

HDGV

Vehicles Included - HDGVs with GVWR <26,000 lbs.

Test Procedures - HC and CO emissions measured at idle.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - Standards categories are based on model year and GVWR.

Emissions Standards for Passenger Cars and Light Trucks						
		<u>pre-1972</u>	<u>1972- 74</u>	<u>1975- 79</u>	<u>1980</u>	<u>1981+</u>
GVWR						
<9,000	HC ppm	900	700	600	400	220
	CO %	8.9	8.2	7.5	4.7	1.2
9,000-25,999	HC ppm	1000	1000	1000	800	400
	CO %	8.9	8.2	8.0	6.0	4.0

Fail Rate - Not available.

Test Equipment - BAR-97 gas analysis systems.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$8.

Problems - None reported.

Contact Person - Program Manager: Terence McBride, Manager, Motor Vehicle Inspection Bureau, 590 Washington Street, Memphis, Tennessee 38105; (901)528-2905.

Website - None given.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - TEXAS (Dallas-Ft. Worth, El Paso, and Houston-Galveston areas)

Vehicles Tested - HDGV

Program Description - Annual emissions tests and visual inspections at licensed private test-and-repair facilities. Approximately 2,300 facilities participate in the program statewide. Fleet operators can inspect their own vehicles.

HDGV

Vehicles Included - HDGVs 24 years old and newer. New vehicles are exempt for the first two years; testing begins with the vehicle's second anniversary of initial registration.

Test Procedures - HC and CO emissions measured on TSI. Second-chance test automatically conducted for vehicles that fail initial test. Gas-cap pressure test. Visual inspection covers air injection system, PCV, evap control system, TAC system, EGR, and catalyst (on 1984+ models).

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - Emissions standards are based on model year.

	HDGV Emissions Standards			
	<u>1972-78</u>	<u>1979-81</u>	<u>1982-84</u>	<u>1985+</u>
HC ppm	900	700	500	300
CO %	9.0	7.0	5.0	3.0

Fail Rate - Not reported.

Test Equipment - Gas analyzer systems.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Emission inspection fee is regulated at \$13.

Problems - None reported.

Contact Persons - Program Manager: Jimmy Guckian, Program Administrator, Texas Department of Public Safety, P.O. Box 4087, MSC 0543, Austin, Texas 78773-0001. jimmy.guckian@txdps.state.tx.us Also Judith Sherman, (512)424-2776. Air Agency Contact: Hazel Barbour, Section Manager, Mobile Source Section, Texas Natural Resource Conservation Commission, P.O. Box 13087, Austin, Texas 78711-3087; (512)239-1440. Also Bob Wierzowiecki; (512)239-1769.

Website - <http://www.tnrcc.state.tx.us/air/ms/motoristchoice.html>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - UTAH (Davis County)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Annual emissions tests and visual inspections at private facilities and at Davis County technical center. Fleet operators may inspect their own vehicles. Approximately 100 private repair facilities, of which about 25 are test-only and 35 are county-certified test-and-repair, are participating in the program. The county operates one centralized test-only facility.

LDDV

Vehicles Included - 1968+ LDDVs.

Test Procedures - LDDVs are tested at county inspection center for opacity on steady-state loaded-mode tests: 30% of rated engine power at 50 mph, and wide-open throttle (WOT) at 50 mph.

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity for turbo charged LDDVs is 30%. For naturally aspirated LDDVs the standard is 35%.

Fail Rate - Not available.

Test Equipment - Chassis dynamometer: Mustang MD250. Opacity meter: Bosch RTT 100.

Estimated Test Equipment Costs - Chassis dynamometer: \$27,000. Opacity meter: \$8,000.

Inspection Fees - LDDV test fee is \$24.

Problems - None reported.

HDDV

Vehicles Included - 1968+ HDDVs.

Test Procedures - HDDVs are tested for opacity. HDDVs with GVWR 8,501-16,000 lbs get steady-state loaded tests (50 mph, 30% of rated engine power, and 50 mph, WOT). Vehicles with GVWR >16,000 lbs get snap-acceleration test per SAE J1667.

Exhaust Components Measured - Opacity

Emissions Standards - For HDDVs with GVWR 8,501-16,000 lbs, maximum opacity standards are: turbo charged: 30%; naturally aspirated: 35%. HDDVs with GVWR > 16,000 lbs: 70%.

Fail Rate - Not available.

Test Equipment - Chassis dynamometer: Mustang MD250. Opacity meter: Bosch RTT 100.

Estimated Test Equipment Costs - Chassis dynamometer: \$27,000. Opacity meter: \$8,000.

Inspection Fees - HDDV test fee is \$24; all inspections are conducted at the technical center.

Problems - None reported.

HDGV

Vehicles Included - 1968+ HDGVs.

Test Procedures - HC and CO measured on TSI test.

Exhaust Components Measured - HC, CO, CO₂, O₂

Emissions Standards - Standards categories are based on model year.

	Emissions Standards for HDGVs			
	<u>1968-69</u>	<u>1970-78</u>	<u>1979-80</u>	<u>1981+</u>
HC ppm	1500	1200	1000	800
CO %	7.0	5.0	4.0	3.5

Fail Rate - Not available.

Test Equipment - Gas analyzer systems: ESP Model Utah2000.

Estimated Test Equipment Costs - Gas analyzers: \$12,500.

Inspection Fees - Maximum fee for emissions inspection is \$20.

Problems - None reported.

Contact Persons - Program Manager: Delane McGarvey, Environmental Health Dept., Davis County Courthouse, 28 E. State St. (P.O. Box 618) Farmington, Utah 84025; (801)451-3296. Also Mike Egginton at County Technical Center (801)546-8860. Air Agency Contact: Bill Colbert, State of Utah, Department of Environmental Quality, Division of Air Quality, 150 North 1950 West Temple (P.O. Box 144820), Salt Lake City, Utah 84114-4820; (801)536-4423.

Website - None given.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - UTAH (Salt Lake County)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Annual emissions tests, visual inspections, and safety inspections at private repair facilities. Approximately 340 facilities are participating in the program. Fleet operators inspect their own vehicles.

LDDV

Vehicles Included - 1968+ LDDVs.

Test Procedures - LDDVs are tested for opacity on steady-state loaded-mode tests: 30% of rated engine power at 50 mph, and wide-open throttle (WOT) at 50 mph.

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity for turbo charged LDDVs is 30%. For naturally aspirated LDDVs the standard is 35%.

Fail Rate - Not available.

Test Equipment - Chassis dynamometer: Mustang MD250. Opacity meter: Bosch RTT 100.

Estimated Test Equipment Costs - Chassis dynamometer: \$27,000. Opacity meter: \$8,000.

Inspection Fees - LDDV test fee is \$23.

Problems - None reported.

HDDV

Vehicles Included - 1968+ HDDVs.

Test Procedures - HDDVs are tested for opacity. HDDVs with GVWR 8,501-16,000 lbs get steady-state loaded tests (50 mph, 30% of rated engine power, and 50 mph, WOT). Vehicles with GVWR > 16,000 get snap acceleration test per SAE J1667.

Exhaust Components Measured - Opacity

Emissions Standards - For HDDVs with GVWR 8,501-16,000 lbs, maximum opacity standards are: turbo charged: 30%; naturally aspirated: 35%. HDDVs with GVWR > 16,000 lbs: 70%.

Fail Rate - Not reported.

Test Equipment - Chassis dynamometer: Mustang MD250. Opacity meter: Bosch RTT 100.

Estimated Test Equipment Costs - Chassis dynamometer: \$27,000. Opacity meter: \$8,000.

Inspection Fees - HDDV test fee is \$23.

Problems - None reported.

HDGV

Vehicles Included - 1968+ HDGVs.

Test Procedures - HC and CO measured on TSI.

Exhaust Components Measured - HC, CO, CO₂, O₂

Emissions Standards - Standards categories are based on model year.

	Emissions Standards for HDGVs			
	<u>1968-69</u>	<u>1970-78</u>	<u>1979-80</u>	<u>1981+</u>
HC ppm	1500	1200	1000	800
CO %	7.0	5.0	4.0	3.5

Fail Rate - Not reported.

Test Equipment - Gas analyzer systems: ESP Model Utah2000.

Estimated Test Equipment Costs - \$12,500.

Inspection Fees - Maximum fee for emissions inspection is \$25.

Problems - None reported.

Contact Persons - Program Manager: Jim Brande, Bureau of Air Pollution Control, Salt Lake City/County Health Dept., 788 East Woodoak Lane, Room 150, Salt Lake City, Utah 84107-6379; (801)313-6677. Also Richard Valentine, same location. Air Agency Contact: Bill Colbert, State of Utah, Department of Environmental Quality, Division of Air Quality, 150 North 1950 West Temple (P.O. Box 144820), Salt Lake City, Utah 84114-4820; (801)536-4423.

Website - <http://www.slvhealth.org/html/eh/html/im.html>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - UTAH (Utah County)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Annual emissions tests and visual inspections for tampering at private repair facilities. Approximately 140 repair facilities and 8 fleets are participating in the program. Fleet operators can inspect their own vehicles.

LDDV

Vehicles Included - 1968+ LDDVs.

Test Procedures - LDDVs are tested for opacity on steady-state loaded-mode tests: 30% of rated engine power at 50 mph, and wide-open throttle (WOT) at 50 mph.

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity for turbo charged LDDVs is 30%. For naturally aspirated LDDVs the standard is 35%.

Fail Rate - 3.3%.

Test Equipment - Chassis dynamometer: Mustang MD250. Opacity meter: Bosch RTT 100.

Estimated Test Equipment Costs - Chassis dynamometer: \$27,000. Opacity meter: \$8,000.

Inspection Fees - Emission inspection fee is market-based; typical prices are in the range of \$15-25.

Problems - None reported.

HDDV

Vehicles Included - 1968+ HDDVs.

Test Procedures - HDDVs are tested for opacity. Vehicles with GVWR 8,501-16,000 lbs get steady-state loaded test (50 mph, 30% of rated engine power, 50 mph, WOT). Vehicles with GVWR > 16,000 get snap acceleration test per SAE J1667.

Exhaust Components Measured - Opacity

Emissions Standards - For HDDVs with GVWR 8,501-16,000 lbs, maximum opacity standards are turbo charged: 30%; naturally aspirated: 35%. HDDVs with GVWR > 16,000: 70%.

Fail Rate - 4.5%.

Test Equipment - Chassis dynamometer: Mustang MD250. Opacity meter: Bosch RTT 100.

Estimated Test Equipment Costs - Chassis dynamometer: \$27,000. Opacity meter: \$8,000.

Inspection Fees - Emission inspection fee is market-based; typical prices are in the range of \$15-25.

Problems - None reported.

HDGV

Vehicles Included - 1968+ HDGVs.

Test Procedures - HC and CO measured on TSI.

Exhaust Components Measured - HC, CO, CO₂, O₂

Emissions Standards - Standards categories based on model year.

	Emissions Standards for HDGVs			
	<u>1968-69</u>	<u>1970-78</u>	<u>1979-80</u>	<u>1981+</u>
HC ppm	1500	1200	1000	800
CO %	7.0	5.0	4.0	3.5

Fail Rate - 11.2%

Test Equipment - BAR-97 gas analyzer systems: ESP Model Utah2000

Estimated Test Equipment Costs - Gas analyzer systems: \$12,500

Inspection Fees - Emission inspection fee is market-based; typical prices are in the range of \$15-25.

Problems - None reported.

Contact Persons - Program Managers: R. Dana Cundiff, Utah County Health Dept., 3255 North Main St., Spanish Fork, Utah 84660; (801)343-4601. Air Agency Contact: Bill Colbert, State of Utah, Department of Environmental Quality, Division of Air Quality, 150 North 1950 West Temple (P.O. Box 144820), Salt Lake City, Utah 84114-4820; (801)536-4423.

Website - <http://www.co.utah.ut.us/dept/health/Air.htm#I/M>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - UTAH (Weber County)

Vehicles Tested - HDGVs

Program Description - Annual emissions tests, visual inspections, and safety inspections at private repair facilities. Approximately 100 facilities participate in the program. Fleet operators inspect their own vehicles.

HDGV

Vehicles Included - 1968+ HDGVs.

Test Procedures - HC and CO measured on TSI. Dual-fuel vehicles tested on both fuels. Visual inspection is performed on all models, but pass/fail applies to 1991 and newer models only; covers catalyst, air injection system, PCV, EGR, and evaporative emissions control system. OBDII checks not required, are performed at motorists' option. If repairs are indicated by OBD, motorists are referred to new-vehicle dealerships (if vehicle is under warranty) or to the I/M station if it is able to do the repairs.

Exhaust Components Measured - HC, CO, CO₂, O₂

Emissions Standards - Standards are based on model year.

	Emissions Standards for HDGVs			
	<u>1968-69</u>	<u>1970-78</u>	<u>1979-80</u>	<u>1981+</u>
HC ppm	1500	1200	1000	800
CO %	7.0	5.0	4.0	3.5

Fail Rate - No data available.

Test Equipment - Test analyzer systems provided by ESP.

Estimated Test Equipment Costs - \$15,500 per unit.

Inspection Fees - Maximum fee for emissions inspection is \$20.

Problems - None reported.

Contact Persons - Program Managers: Barre Draper, Environmental Health Dept., 2570 Grant Avenue, Ogden, Utah 84401; (801)399-8329. Air Agency Contact: Bill Colbert, State of Utah, Department of Environmental Quality, Division of Air Quality, 150 North 1950 West Temple (P.O. Box 144820), Salt Lake City, Utah 84114-4820; (801)536-4423.

Website - <http://www.co.weber.ut.us/>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - VERMONT

Vehicles Tested - HDDV

Program Description - Testing is only conducted as random roadside inspections or random fleet inspections by the Department of Environmental Conservation and the Department of Motor Vehicles (in conjunction with random safety inspections).

HDDV

Vehicles Included - All HDDVs, randomly selected.

Test Procedures - Opacity is measured using SAE J1667 snap-acceleration procedure.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are based on model year.

Opacity Standards for HDDVs		
	<u>Pre 1991</u>	<u>1992+</u>
Opacity %	55	40

Fail Rate - Unknown.

Test Equipment - Opacity meters.

Estimated Test Equipment Costs - Unknown.

Inspection Fees - None.

Problems - None reported.

Contact Person - Program Manager: Thomas Moye, Chief, Mobile Sources Section, Vermont Dept. of Environmental Conservation, Air Pollution Control Division, Building 3 South, 103 So. Main St., Waterbury, Vermont 05671; (802)241-3840.

Website - <http://www.anr.state.vt.us/dec/air/docs/hduty.pdf>.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - VIRGINIA (Northern counties of Arlington, Fairfax, Loudon, Prince William, and Stafford, and cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park)

Vehicles Tested - HDGV

Program Description - Biennial emissions tests and visual inspections at licensed private repair facilities. Fleet operators can inspect their own vehicles. Over 370 facilities are participating in the emissions program.

HDGV

Vehicles Included - HDGVs #10,000 lbs GVWR, 24 years old and newer. New models are not inspected until they are two years old.

Test Procedures - HC and CO measured on TSI. Visual inspection covering catalyst, air injection system, EGR, evaporative canister, and thermostatic air cleaner (TAC) is conducted on 1973+ models, in addition to gas cap pressure test.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - Two-speed idle standards are a function of vehicle model year.

Two-Speed Idle Emissions Standards for HDGVs					
	<u>68-69</u>	<u>70-74</u>	<u>75-79</u>	<u>80</u>	<u>81+</u>
HC ppm	1000	600	400	220	220
CO %	8.0	6.5	4.0	2.0	1.2

Fail Rate - In 1999, HDGV Initial Test fail rate was 13.9%; in 2000, it was 11.2%.

Test Equipment - Gas analysis benches are built to BAR97 specifications and supplied by ESP, SPX, Sun/Snap-On, Worldwide Environmental, and Maxwell.

Estimated Test Equipment Costs - Cost of benches estimated to be in the range \$15,000 to \$20,000 per unit.

Inspection Fees - Maximum fee is \$20 for emission inspection, with one free reinspection included within 14 days at the facility performing the original inspection.

Problems - Determining correct GVWR is most prevalent problem. Some vehicles with GVWR > 8,500 lbs are tested incorrectly as light-duty vehicles on ASM2 test; others with GVWR < 8,500 lbs get two-speed idle. GVWR data in DMV records are problematic, since GVWR is entered by owners upon registration. I/M inspectors are required to visually verify GVWR from vehicles' door plates (or other valid source), but DEQ finds much variance in GVWR for identical make/model combinations. DEQ management recommends that GVWR be accessible from vehicle lookup table.

Contact Persons - Program Manager: J. Michael Thompson, Director, Northern Virginia Office, Mobile Source Operations, Virginia Dept. of Environmental Quality, 13901 Crown Court, Woodbridge, Virginia 22193; (703)583-3866. Planning and Standards: Rich Olin, Chief Engineer, Mobile Sources,

Virginia Dept. of Environmental Quality, P.O. Box 10009, Richmond, Virginia 23240; (804)698-4425.
rdolin@deq.state.va.us

Website - <http://www.deq.state.va.us/mobile/>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - WASHINGTON (Puget Sound area)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Biennial emissions tests at centralized, contractor-operated (ESP) inspection centers. There are 16 test stations with 68 inspection lanes (45 active, 23 spare). Fleet operators can inspect their own vehicles. All vehicles at least 5 years old and up to 25 years old are subject to inspection. In odd-numbered years, odd-numbered model year vehicles between 6 and 25 years old, plus the 5th oldest model year vehicles, are tested (e.g., in 2001, odd model years from 1977 to 1995, plus 1996 are tested). In even-numbered years, even-numbered model year vehicles between 6 and 25 years old, plus the 5th oldest model year vehicles, are tested (e.g., in 2002, even model years from 1978 to 1994, plus 1997 are tested). Vehicles undergoing change of ownership, and vehicles being registered in program area the first time are also subject to inspection.

LDDV

Vehicles Included - All LDDVs.

Test Procedures - Opacity is measured using SAE J1667 snap-acceleration procedure.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are based on model year.

	Opacity Standards for LDDVs		
	<u>1968-73</u>	<u>1974-91</u>	<u>1992+</u>
Opacity %	70	60	40

Fail Rate - Approximately 4%.

Test Equipment - Sun and Red Mountain opacity meters are used.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$15.

Problems - Some motorists are concerned about high engine speeds seen during test.

HDDV

Vehicles Included - All HDDVs.

Test Procedures - Opacity is measured using SAE J1667 snap-acceleration procedure.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are based on model year.

Opacity Standards for HDDVs

	<u>1968-73</u>	<u>1974-91</u>	<u>1992+</u>
Opacity %	70	60	40

Fail Rate - Approximately 4%.

Test Equipment - Sun and Red Mountain opacity meters are used.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$15.

Problems - Vehicle owners/drivers express concern about apparently high engine speeds during test.

HDGV

Vehicles Included - All HDGVs.

Test Procedures - HC and CO measured on TSI.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - Emissions standards are based on model year.

Emissions Standards for HDGVs

	<u>1977-80</u>	<u>1981+</u>
HC ppm	600	400
CO %	3.0	3.0

Fail Rate - Approximately 11%.

Test Equipment - Gas analyzers provided by I/M contractor, ESP.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$15.

Problems - None reported.

Contact Person - John C. Raymond, Dept. of Ecology, P.O. Box 47600, Olympia, Washington 98504-7600, (360)407-6856. E-mail address: jray461@ecy.wa.gov.

Website - http://www.ecy.wa.gov/programs/air/Automotive_Pages.htm.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - WASHINGTON (Spokane area)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Biennial emissions tests at centralized, contractor-operated (ESP) inspection centers. There are 2 test stations with 8 inspection lanes. Fleet operators can inspect their own vehicles. All vehicles at least 5 years old and up to 25 years old are subject to inspection. In odd-numbered years, odd-numbered model year vehicles between 6 and 25 years old, plus the 5th oldest model year vehicles, are tested (e.g., in 2001, odd model years from 1977 to 1995, plus 1996 are tested). In even-numbered years, even-numbered model year vehicles between 6 and 25 years old, plus the 5th oldest model year vehicles, are tested (e.g., in 2002, even model years from 1978 to 1994, plus 1997 are tested). Vehicles undergoing change of ownership, and vehicles being registered in program area the first time are also subject to inspection.

LDDV

Vehicles Tested - All LDDVs.

Test Procedures - Opacity is measured using SAE J1667 snap-acceleration procedure.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are based on model year.

	Opacity Standards for LDDVs		
	<u>1968-73</u>	<u>1974-91</u>	<u>1992+</u>
Opacity %	70	60	40

Fail Rate - Approximately 4%.

Test Equipment - Sun and Red Mountain opacity meters are used.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$15.

Problems - Motorists sometimes express concern about high engine speeds during test.

HDDV

Vehicles Included - All HDDVs.

Test Procedures - Opacity is measured using SAE J1667 snap-acceleration procedure.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are based on model year.

Opacity Standards for HDDVs

	<u>1968-73</u>	<u>1974-91</u>	<u>1992+</u>
Opacity %	70	60	40

Fail Rate - Approximately 4%.

Test Equipment - Sun and Red Mountain opacity meters are used.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$15.

Problems - Motorist concern about high engine speeds on test.

HDGV

Vehicles Included - All HDGVs.

Test Procedures - HC and CO measured on TSI.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - HDGV standards are based on model year.

Emissions Standards for HDGVs

	<u>1977-80</u>	<u>1981+</u>
HC ppm	600	400
CO %	3.0	3.0

Fail Rate - Approximately 11%.

Test Equipment - Gas analyzers provided by ESP (I/M contractor).

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$15.

Problems - None reported.

Contact Person - John C. Raymond, Dept. of Ecology, P.O. Box 47600, Olympia, Washington 98504-7600, (360)407-6856. E-mail address: jray461@ecy.wa.gov. In Spokane: Grant Pfeifer, Dept. of Ecology, (509)456-3284.

Website - http://www.ecy.wa.gov/programs/air/Automotive_Pages.htm

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - WASHINGTON (Vancouver area)

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Biennial emissions tests at centralized, contractor-operated (ESP) inspection centers (2 inspection centers, 10 lanes). Fleet operators can inspect their own vehicles. All vehicles at least 5 years old and up to 25 years old are subject to inspection. In odd-numbered years, odd-numbered model year vehicles between 6 and 25 years old, plus the 5th oldest model year vehicles, are tested (e.g., in 2001, odd model years from 1977 to 1995, plus 1996 are tested). In even-numbered years, even-numbered model year vehicles between 6 and 25 years old, plus the 5th oldest model year vehicles, are tested (e.g., in 2002, even model years from 1978 to 1994, plus 1997 are tested). Vehicles undergoing change of ownership, and vehicles being registered in program area the first time are also subject to inspection.

LDDV

Vehicles Tested - All LDDVs.

Test Procedures - Opacity is measured using SAE J1667 snap-acceleration procedure.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are based on model year.

	Opacity Standards for LDDVs		
	<u>1968-73</u>	<u>1974-91</u>	<u>1992+</u>
Opacity %	70	60	40

Fail Rate - Approximately 4%.

Test Equipment - Sun and Red Mountain opacity meters are used.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$15.

Problems - Some concern among motorists over apparently high engine speeds during test.

HDDV

Vehicles Included - All HDDVs.

Test Procedures - Opacity is measured using SAE J1667 snap-acceleration procedure.

Exhaust Components Measured - Opacity

Emissions Standards - Opacity standards are based on model year.

Opacity Standards for HDDVs

	<u>1968-73</u>	<u>1974-91</u>	<u>1992+</u>
Opacity %	70	60	40

Fail Rate - Approximately 4%.

Test Equipment - Sun and Red Mountain opacity meters are used.

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$15.

Problems - Concern about high engine speeds during test.

HDGV

Vehicles Included - All HDGVs.

Test Procedures - HC and CO measured at idle.

Exhaust Components Measured - HC, CO, CO₂

Emissions Standards - HDGV standards are based on model year.

Emissions Standards for HDGVs

	<u>1977-80</u>	<u>1981+</u>
HC ppm	600	400
CO %	3.0	3.0

Fail Rate - Not available.

Test Equipment - Gas analyzers provided by ESP (I/M contractor).

Estimated Test Equipment Costs - Not available.

Inspection Fees - Inspection fee is \$15.

Problems - None reported.

Contact Person - John C. Raymond, Dept. of Ecology, P.O. Box 47600, Olympia, Washington 98504-7600, (360)407-6856. E-mail address: jray461@ecy.wa.gov. In Vancouver: Kevin Hancock, Dept. of Ecology, (360)690-7165.

Website - http://www.ecy.wa.gov/programs/air/Automotive_Pages.htm

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - WISCONSIN (Seven counties in SE Wisconsin)

Vehicles Tested - HDGV

Program Description - Biennial emissions tests at centralized, contractor-operated (ESP) inspection centers (12 inspection centers, 44 inspection lanes). Vehicles with odd-numbered model years are tested in even calendar years. New vehicles are exempt from testing in the calendar year matching their model year, e.g., a 2001 model year vehicle will not be tested in 2001. Inspection also required on change of ownership for vehicles more than five years old.

HDGV

Vehicles Included - 1968+ HDGVs #10,000 lbs GVWR.

Test Procedures - HC, CO, NOx measured on IM240 test. Gas-cap pressure test. No underhood inspection, except as follows: All-wheel drive, full-time four-wheel drive, and traction control-equipped vehicles that for any reason cannot be dynamometer tested are subject to TSI plus 9-point inspection covering catalytic converter, fuel filler restrictor, fuel cap, PCV system, air injection system, evaporative control canister, EGR system, oxygen sensor, and TAC. For the TSI, vehicle exhaust is collected and analyzed as in the IM240 test but the concentrations are multiplied by the IM240 system dilution factor for comparison with cutpoints. Fuel inlet tampering requires catalyst replacement.

OBDII Inspections - On 1996+ models, OBDII checks are conducted in place of emissions test. Indicated repairs are mandatory.

Exhaust Components Measured - HC, CO, NOx, CO₂, O₂

Emissions Standards - IM240 standards presented below are for HDGVs with GVWR between 8,501 and 10,000 lbs. Fast-pass standards apply to 1991 and later vehicles.

	IM240 Emissions Standards, grams/mile HDGVs 8,501-10,000 lbs GVWR							
	<u>68-69</u>	<u>70-73</u>	<u>74-78</u>	<u>79-84</u>	<u>85-86</u>	<u>87-90</u>	<u>91-95</u>	<u>96+</u>
HC	20.0	10.0	10.0	7.5	5.0	2.0	2.0	na
CO	200.0	175.0	150.0	100.0	80.0	40.0	40.0	na
NOx	15.0	10.0	10.0	8.0	8.0	6.0	5.0	na

Fail Rate - Not available.

Test Equipment - SuperFlow electric dynamometers, Horiba gas analyzers (model FCA-240 measures HC and NOx, AIA-240 measures CO and CO₂), Horiba CVS systems.

Estimated Test Equipment Costs - Not available.

Inspection Fees - No charge for inspection.

Problems - None reported.

Contact Persons - Program Manager: Barbara Wehrle, Chief, Motor Vehicle Inspection Section, Division of Motor Vehicles, 4802 Sheboygan Avenue, Madison, Wisconsin 53702; (608)266-0992. Chuck Rhodes, Supervisor I/M Group, 1150 N. Alois St., Milwaukee, WI 53208; (414)266-1084. Air Agency Contact: Mohammad Islam, Dept. of Natural Resources, Bureau of Air Management (AM-10), P.O. Box 7921, 101 South Webster, Madison, Wisconsin 53707; (608)264-9219. Also Chris Boveé; (608)266-5542.

Website - <http://www.dot.state.wi.us/dmv/im.html>

4. PROGRAM DESCRIPTION SUMMARIES INTERNATIONAL I/M PROGRAMS

This section contains summaries of inspections in foreign countries that are currently testing LDDVs, HDDVs, or HDGVs.

Test fees and equipment costs are presented in U.S. dollars, and should be considered approximate, as they are derived from exchange rates which vary over time.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - AUSTRALIA (New South Wales)

Vehicles Tested - None currently, DT80 proposed.

Program Description - The Australian state of New South Wales proposed testing light (under 4,500 kg GVWR) petrol (i.e., gasoline-powered) vehicles based in the Sydney region. This proposal is unlikely to proceed largely because adoption of Euro standards and cleaner fuel standards is predicted to result in emission reductions from metropolitan fleets of around 70% over the next 15 years, despite increases in the number of vehicles and distance traveled. The Roads and Traffic Authority (RTA) will continue to operate two IM240 test stations for modified vehicles, voluntary testing, and research into the performance of alternative fuels.

Although particulates are predicted to fall about 35% in the coming years, interest is still increasing about Diesel testing programs due to health concerns. There has been some development of a Diesel in-service test in Australia, the DT80. This test and accompanying test standards are about to be included into national legislation so that any state can adopt them into its legislation if the state plans to implement a test program. Also recently agreed to is the Diesel National Environment Protection Measure, which requires the states to assess the need for a program to reduce the impact of Diesel emissions and which includes guidelines for a number of program alternatives. Details can be found at www.nepc.gov.au and www.nrtc.gov.au.

NSW is about to commence a program to test all of the Sydney government Diesel bus fleet (1,700 vehicles) and any other fleets that wish to volunteer. The test results will be compared with the results of an assessment of their maintenance regimes to establish best practice in maintenance. The funding for this program is being provided by the Commonwealth government. (The person managing the funding of the pilot test programs at Environment Australia is Emma Campbell emma.campbell@ea.gov.au. Marc Thomson mthompson@nepc.gov.au at the National Environment Protection Council managed the development of the Diesel test.). Decisions will then be made about the need for a Diesel testing program. It is estimated that some form of audited maintenance program will be developed. At this stage, no other states have started any form of petrol or Diesel test program, but several are collecting information and talking to NSW about their program development.

Contact Person - Bruce Dowdell, Manager, Vehicle Emissions management Program, Roads and Traffic Authority, 36 Ennis Road Milsons Point NSW 2061, (61) 02 9935 7383.
Bruce_Dowdell@RTA.NSW.gov.au.

Website - www.rta.nsw.gov.au.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - CANADA (Ontario)

Vehicles Tested - HDDV

Program Description - Annual HDDV testing is conducted at decentralized facilities; fleets can self-certify using the snap-idle test. Roadside snap-idle testing is performed for enforcement.

HDDV

Vehicles Included - All HDDVs are tested annually. Vehicles identified at roadside as potentially exceeding the standards are recruited for the roadside test.

Test Procedures - SAE J1667 (Snap-Idle).

Exhaust Components Measured - Opacity

Emissions Standards - 55% opacity for 1990 and older vehicles, 40% opacity for 1991 and newer vehicles.

Fail Rate - Unknown.

Test Equipment - Opacity meter.

Estimated Test Equipment Costs - Unknown.

Inspection Fee - Unknown.

Problems / Remarks - None reported.

Contact Person - John Richie, Ontario Ministry of the Environment, Drive Clean Ontario Office, (416) 314-7853.

Website - None given.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - CANADA (Greater Vancouver Regional District and Fraser Valley Regional Districts)

Vehicles Tested - LDDV, HDDV

Program Description - Diesel vehicles having GVWRs of 5,000 kg or less are tested as part of the AirCare program using IM147 opacity measurements performed by contractor-operated centralized facilities. Diesel vehicles heavier than 5,000 kg GVWR are tested as part of the AirCare ON-ROAD program using J1667 performed by crown corporation staff.

LDDV

Vehicles Included - 5,000 kg (11,000 pounds) GVWR and less, all model years.

Test Procedures - Loaded transient (IM147).

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity for LDDVs is 30% opacity.

Fail Rate - 7.3%.

Test Equipment - Wager opacity meter, Real-Time dynamometer, exhaust evacuation system.

Estimated Test Equipment Costs - \$75,000 per lane.

Inspection Fees - \$15.60 for 1991 and older (annual test), \$31.20 for 1992 and newer (biennial).

HDDV

Vehicles Included - Vehicles identified at roadside as potentially exceeding the standards greater than 5,000 kg (11,000 pounds) GVWR.

Test Procedures - SAE J1667 (Snap-Idle).

Exhaust Components Measured - Opacity

Emissions Standards - 55% opacity for 1990 and older vehicles, 40% opacity for 1991 and newer vehicles.

Fail Rate - 48% (only those vehicles suspected of non-compliance are tested).

Test Equipment - Opacity meter.

Estimated Test Equipment Costs - US\$60,000 per complete patrol van (includes vehicle and all test equipment, data communications equipment, and tools).

Inspection Fee - None.

Problems / Remarks - Inspectors must have reasonable and probable grounds to stop a vehicle for testing. To that end, visual pre-screening (EPA Method 9) is used but many drivers will back off the throttle when they see an AirCare ON-ROAD patrol van.

Contact Person - Dave Gourley, Pacific Vehicle Testing Technology, AirCare Administration, 102-4705 Wayburn Drive, Burnaby, B.C. V5G 3L1, (604) 453-5170. Dave_Gourley@translink.bc.ca.

Website - <http://www.aircare.ca/>

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - CHINA (Beijing City and Guangzhou City)

Vehicles Tested - LDDV, HDDV

Program Description - Annual decentralized emissions test at institutes and government test centers.

LDDV

Vehicles Included - 1980+, weight range not provided.

Test Procedures - Snap-Idle.

Exhaust Components Measured - Opacity, HC, CO, NOx

Emissions Standards - Unknown.

Fail Rate - 15 -20 %.

Test Equipment - Opacity meter, CVS, dilution tunnel.

Estimated Test Equipment Costs - Unknown.

Inspection Fees - \$150 - \$200.

Problems / Remarks - None reported.

HDDV

Vehicles Included - 1980+, weight range not provided.

Test Procedures - Snap-Idle.

Exhaust Components Measured - Opacity, HC, CO, NOx

Emissions Standards - Unknown.

Fail Rate - 15 -20 %.

Test Equipment - Opacity meter, CVS, dilution tunnel.

Estimated Test Equipment Costs - Unknown.

Inspection Fees - \$150 - \$200.

Problems / Remarks - None reported.

Contact Person -Boguang Wang, Guangzhou Research Institute of Environmental Protection, (86) 020-87502687, wangboguang@ihw.com.cn.

Website - None given.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - CHINA (Hong Kong)

Vehicles Tested - LDDV, HDDV

Program Description - Annual decentralized emissions test at private test and repair facilities (three operators run a total of 13 test centers licensed by the government).

LDDV

Vehicles Included - Vehicles under 5,000 kg (11,000 pounds) GVWR.

Test Procedures - Lug-down test with opacity measured at three engine power levels: maximum power, 90%, and 80% of maximum power. Described in "Code of Practice for Designated Vehicle Emission Testing Centres, Applicable to Testing Diesel Vehicles of Gross Vehicle Weight up to 5.5 Tonnes - Volume 1," June 28, 2000.

Exhaust Components Measured - Opacity

Emissions Standards - The smoke level at rated engine speed, and 50% of rated engine power, measured at the wheel shall not exceed 50 Hartridge Smoke Unit (HSU). Measured engine speed at maximum power must be within 10% of rated speed or vehicle is rejected from testing due to suspicion of detuning.

Fail Rate - 60%. Only vehicles observed as dirty on road are recruited.

Test Equipment - Dieseltune (SPX) partial flow opacity meter, light-duty dynamometer.

Estimated Test Equipment Costs - \$60,000.

Inspection Fees - Approximately \$40, set by the government.

Problems / Remarks - None reported.

HDDV

Vehicles Included - Vehicles from 5,000 kg (11,000 pounds) to 38,000 kg (38,000 pounds) GVWR.

Test Procedures - Lug-down test with opacity measured at maximum power, 90%, and 80% of maximum power. Described in "Code of Practice for Designated Vehicle Emission Testing Centres, Applicable to Testing Diesel Vehicles of Gross Vehicle Weight over 5.5 Tonnes - Volume 1," June 28, 2000.

Exhaust Components Measured - Opacity

Emissions Standards - The smoke level at rated engine speed, and 50% of rated engine power, measured at the wheel shall not exceed 50 Hartridge Smoke Unit (HSU). Measured engine speed at maximum power must be within 10% of rated speed or vehicle is rejected from testing due to suspicion of detuning.

Fail Rate - No data yet; program is set to begin testing in 2002.

Test Equipment - Dieseltune (SPX) partial flow opacity meter, heavy-duty dynamometer.

Estimated Test Equipment Costs - \$120,000.

Inspection Fees - Approximately \$40 , set by the government.

Problems / Remarks - None reported.

Contact Person - Y. S. Yam, Hong Kong Environmental Protection Department, 45/F, Revenue Tower, 5 Gloucester Road, Wan Chai, Hong Kong, China, (852) 2594 6424, Y_S_Yamkha@epd.gov.hk,

Website - <http://www.info.gov.hk/epd/>

Additional Information -EPD is currently studying the addition of NO measurement.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - GERMANY

Vehicles Tested - LDDV, HDGV

Program Description - Decentralized emissions tests at government-approved private test and repair facilities.

LDDV

Vehicles Included - All vehicles built since 1977 up to 3,500 kg max gross weight.

Test Procedures - Snap-idle test and visual check of emission control components.

Exhaust Components Measured - Opacity

Emissions Standards - Naturally aspirated 2.5 m⁻¹, turbo charged 3.5 m⁻¹.

Fail Rate - Approximately 18%.

Test Equipment - Bosch opacity meter.

Estimated Test Equipment Costs - Approximately \$5,000.

Inspection Fees - Emissions test is part of full roadworthiness test, total cost is \$35.

Problems / Remarks - None reported.

HDGV

Vehicles Included - Vehicles greater than 3,500 kg (7,700 pounds) max gross weight built since 1970.

Test Procedures - TSI.

Exhaust Components Measured - CO

Emissions Standards - Unknown.

Fail Rate - Unknown.

Test Equipment - Unknown.

Estimated Test Equipment Costs - Unknown.

Inspection Fees - Unknown.

Problems / Remarks - None reported.

Contact Persons - Mr. Helge Schmidt, RWTÜV Fahrzeug GmbH, Stuben Straße 53, D-45138 Essen, Germany, (49) 201-825-2533, he.schmidt@rwtuev-fz.de.

Website - None given.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - SINGAPORE

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Annual decentralized emissions tests at private test and repair facilities. Three operators run a total of nine centers, VICOM, with five centers, being the largest.

LDDV

Vehicles Included - Specific models (Nissan pickups, Cabster, Toyota Dyna 150, Hiace, Isuzu NHR and NKR, Mitsubishi Canter L300, Mazda E2200.

Test Procedures - Free acceleration test (Snap-Idle).

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity for LDDVs is 50 HSU (Hartridge Smoke Units).

Fail Rate - 7.7%.

Test Equipment - Opacity meter.

Estimated Test Equipment Costs - \$4,500 to \$6,000 for free standing opacity meter.

Inspection Fees - Approximately \$30 for initial inspection, \$15 for retest.

Problems / Remarks - A trial project is underway testing LDDVs on a chassis dynamometer using the lug-down test. This is being used for vehicles caught by the Ministry of the Environment, but is only for research purposes. For mandatory vehicle inspection, the free acceleration test applies.

HDDV

Vehicles Included - Nissan U41, Toyota Coaster, Dyna 200, Isuzu CXZ, Mitsubishi Fuso, Mazda T3500, Leyland, Scania buses.

Test Procedures - Free acceleration test (Snap-Idle).

Exhaust Components Measured - Opacity

Emissions Standards - Maximum opacity for LDDVs is 50 HSU (Hartridge Smoke Units).

Fail Rate - 5.8%.

Test Equipment - Opacity meter.

Estimated Test Equipment Costs - \$4,500 to \$6,000 for free-standing opacity meter.

Inspection Fees - Approximately \$38 for initial inspection, \$19 for retest.

Problems / Remarks - A trial project is underway testing HDDVs on a chassis dynamometer using the lug-down test. This is being used for vehicles caught by the Ministry of the Environment but is only for research purposes. For mandatory vehicle inspection, the free acceleration test applies.

HDGV

Vehicles Included - All gasoline-powered vehicles (light- and heavy-duty).

Test Procedures - CO measured on curb idle test.

Exhaust Components Measured - HC, CO, CO₂, O₂, although only CO is regulated.

Emissions Standards - Emissions standards are a function of year of initial registration.

Emissions Standards for HDGVs	
Model Year	CO %
Registered on or after July 1, 1992	3.5
Registered October 1, 1986 to June 30, 1992	4.5
Registered before October 1, 1986	6.0

Fail Rate - 3.0%.

Test Equipment - Four-gas analyzers.

Estimated Test Equipment Costs - \$4,500 to \$6,000 for free-standing gas analyzer.

Inspection Fees - Same as for Diesel vehicles: approximately \$38 for initial inspection and \$19 for retest of heavy-duty vehicles.

Contact Persons - Edwin Low, Head of Automotive Mechanics Department, Institute of Technical Education, Ang Mo Kio 4300 Ang Mo Kio Avenue 5, Singapore 569869, 552 9305, lowhc@ite.edu.sg.
Tan Quee Hong, Senior Engineer, Pollution Control Department, Ministry of the Environment, Tan_Quee_Hong@env.gov.sg, Tel: (65) 731 9782, Fax: (65) 731 9651.

Website - <http://www.gov.sg/env/>,
http://www.onemotoring.com.sg/vehMaintain/maintain_insp.asp.

Additional Information - The Ministry of the Environment (“ENV”) has taken over responsibility for vehicle pollution control from the Land Transport Authority (formerly the Registry of Vehicles). ENV has initiated the formation of the Motor Industry Certification Board, whose first task was to set standards for workshops servicing Diesel vehicles. These workshops can request an “audit” and if they meet the ENV requirements, will be certified as official service shops. Presently, this is not mandatory. In the future, the program will be extended to garages servicing gasoline-driven vehicles.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - SWEDEN

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Annual emissions tests at centralized test stations (175 test stations, 600 test lanes and a staff of over 2,000 people) operated under contract by Bilprovningen.

LDDV

Vehicles Included - All LDDVs.

Test Procedures - Free acceleration test (Snap-Idle).

Exhaust Components Measured - Opacity

Emissions Standards - Unknown.

Fail Rate - 4.5%.

Test Equipment - Unknown.

Estimated Test Equipment Costs - Unknown.

Inspection Fees - \$25 for initial inspection, \$15 for a retest. Set by the government.

Problems / Remarks - None reported.

HDDV

Vehicles Included - All HDDVs.

Test Procedures - Free acceleration test (Snap-Idle).

Exhaust Components Measured - Opacity

Emissions Standards - Unknown.

Fail Rate - Unknown.

Test Equipment - Unknown.

Estimated Test Equipment Costs - Unknown.

Inspection Fees - \$25 for initial inspection, \$15 for a retest. Set by the government.

Problems / Remarks - None reported.

HDGV

Vehicles Included - Unknown.

Test Procedures - Idle test for HC and CO, functional visual inspection for EGR.

Exhaust Components Measured - HC, CO

Emissions Standards - Unknown.

Fail Rate - Unknown.

Test Equipment - Unknown.

Estimated Test Equipment Costs - Unknown.

Inspection Fees - \$25 for initial inspection, \$15 for a retest. Set by the government.

Problems / Remarks - None reported.

Contact Persons - Larsolov Olsson, Principal Technical Officer, Transportation Section, Swedish EPA - larsolov.olsson@environ.se. Testing contractor: Bilprovningen, Box 508, 162 15 Vällingby, Sweden, (46) 8 759 21 00.

Website -

www2.bilprovningen.se/Extern/Bilprovningen/www/DynMenuBilprovEng.nsf?OpenDatabase

Additional Information - Test includes safety and averages in the range of 13 to 17 minutes to complete. Inspectors use wireless handheld computers for entering data that are connected to the "Vehicle Register" via the National Road Administration, which is also connected to the "Road Police" for enforcement purposes.

Program Summary
LDDV, HDDV, and HDGV Inspection

Program Location - BRITAIN, UNITED KINGDOM

Vehicles Tested - LDDV, HDDV, HDGV

Program Description - Decentralized emissions tests; for vehicles #3,500 kg (7,700 pounds) max gross weight, testing may be conducted at either private test-and-repair facilities or government-run facilities. For vehicles over 3,500 kg (7,700 pounds) max gross weight, testing is conducted at government-run facilities.

LDDV

Vehicles Included - LDDVs with design gross weights #3,500 kg (7,700 pounds) .

Test Procedures - Snap-idle for all vehicles first used August 1, 1979, or later; visual check on vehicles first used before this date.

Exhaust Components Measured - Opacity

Emissions Standards - Naturally aspirated 2.5 m⁻¹, turbo charged 3.0 m⁻¹.

Fail Rate - Approximately 1.5%.

Test Equipment - Opacity meter.

Estimated Test Equipment Costs - Approximately \$2,200.

Inspection Fees - Emissions test is part of full roadworthiness test, total cost is \$53.

Problems / Remarks - None reported.

HDDV

Vehicles Included - Over 3,500 kg (7,700 pounds) design gross weight.

Test Procedures - Snap-idle.

Exhaust Components Measured - Opacity

Emissions Standards - Naturally aspirated 2.5 m⁻¹, turbo charged 3.0 m⁻¹.

Fail Rate - Approximately 1.3%.

Test Equipment - Opacity meter.

Estimated Test Equipment Costs - Approximately \$2,900.

Inspection Fees - Emissions test is part of full roadworthiness test; test fee is \$56 for 2-axle vehicles, \$62 for 4-axle vehicles.

Problems /Remarks - Currently researching addition of NOx and PM to testing.

HDGV

Vehicles Included - Large passenger-carrying vehicles.

Test Procedures - Idle.

Exhaust Components Measured - HC, CO.

Emissions Standards - Unknown.

Fail Rate - Not known.

Test Equipment - Gas analyzer.

Estimated Test Equipment Costs - \$4,400 - \$14,700.

Inspection Fees - Emissions test is part of full roadworthiness test. Test fees are \$68 for vehicles with 9 to 16 seats, and \$124 for vehicles with 17 or more seats.

Problems /Remarks - There are very few vehicles of this class.

Contact Person - Stephen Biddulph, Dept. of Environment & Transport in England,
Stephen.Biddulph@dtlr.gsi.gov.uk. Telephone (44)0117-954-3200.

Additional Information - Testing is governed by the Vehicle Inspectorate (an executive agency of the Department for Transport, Local Government and the Regions), Roadworthiness Scheme, c/o 15 Masfield Close, Bilton, Harrogate, North Yorkshire, HG1 3LU, 423 530809. General inquiries can be made to the inspectorate at enquiries@via.gov.uk.

Website - <http://www.via.gov.uk>