



**Environmental
Protection Agency**

2011 Annual Report

Ohio Vehicle Inspection and Maintenance Program

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ATTACHMENTS

Attachment A: Index of Report Pages Relevant to EPA Regulation Sections

Attachment B: Detailed 2011 Emission Reduction Test Data

1 Executive Summary

This document is the 2011 Annual Report for the United States Environmental Protection Agency (U.S. EPA) on the Ohio Enhanced Inspection and Maintenance Program (I/M Program) known as E-Check. This report covers January 1 to December 31, 2011.

This annual report is required by U.S. EPA under 40 CFR 51.366. U.S. EPA requires this report to cover four categories of information:

- emissions test data;
- quality assurance information;
- quality control information; and
- compliance and enforcement actions.

1.1 Major Findings

Emissions Tests Conducted

In 2011, there were approximately 1,982,936 vehicles registered in northeastern Ohio. A biennial vehicle emission test is required for the majority of the fleet; exemptions exist for vehicles four years old and newer and pre-1985 model year vehicles. In 2011, 898,009 vehicle emission tests were performed, including initial tests, retests, and off-cycle tests due to change of ownership/registration. Only 1,661 of the emission tests performed were opacity tests on diesel-fueled vehicles.

Compliance and Enforcement

If a vehicle fails a retest and has had repair work performed on the emission control system, the vehicle may be eligible for a waiver. In 2011, 13,496 vehicles, or 1.5 percent of the vehicles that were emission tested, received a waiver. Some of the vehicles that initially failed E-Check did not obtain a passing test or waiver. While it is difficult to track what happened to these vehicles, some are taken out of service entirely and some are sold to new owners residing in non-E-Check counties where ground-level ozone has been less of a problem.

Some owners may attempt to illegally register a failing vehicle in a non-E-Check county, but Ohio EPA and Ohio Bureau of Motor Vehicles (BMV) work together to stop these illegal registrations. In 2011, 65 investigations by Ohio BMV's Special Investigations Unit were initiated for E-Check-related vehicle registration violations. In 45 of the 65 cases, Ohio BMV determined motorists were attempting to bypass the vehicle emission testing requirement in the county of residence. In all 45 cases motorists either corrected the registration and had the vehicle tested or the registration was cancelled on the vehicle.

Emissions Reductions from Tailpipe Tested Vehicles

U.S. EPA requires states to calculate emission reductions from vehicles that are repaired after failing a "tailpipe" emissions test. In 2011 there were 16,652 vehicles that initially failed the tailpipe test. The number of vehicles that failed the initial tailpipe test

and passed at a later date following repairs was 8,334. The repaired vehicles had an average emission improvement of 68.7 percent for hydrocarbon, 86.1 percent for carbon monoxide, and 57.2 percent for oxides of nitrogen.

Quality Assurance

In 2011, Ohio EPA performed 3,570 site audits to determine if stations are correctly performing all emissions tests and if the station's physical conditions meet all state requirements. All 23 stations operating throughout the year received a minimum of 17 on-site performance audits. As a result of these audits, there were no performance issues identified that warranted shutting down a station. Ohio EPA, however, found 7 instances that could be considered a violation of the technical aspects of the contract. As a result of these items being identified, Envirotest Systems took actions with its employees that ranged from retraining to disciplinary reporting.

2 The Ohio I/M Program

2.1 Purpose and Statistics of the Ohio E-Check Program?

The northeast Ohio area has been officially designated as attaining the 1997 ozone standard of 0.08 ppm. However, there are measured violations of the 2008 ozone standard of 0.075ppm. In 2012, the U.S. EPA designated the Cleveland-Akron area as marginal nonattainment. The nonattainment designation means that Ohio EPA will need to find additional emission reductions of volatile organic compounds (VOC) and nitrogen oxides (NOx) in order to attain the 0.075 ppm standard. Although designated as marginal nonattainment, as a practical matter, Ohio EPA will need to maintain the current program in the Cleveland area to maintain the emission reductions from the program.

Ohio EPA administers the vehicle emissions testing program, or E-Check, as authorized by Ohio Revised Code (ORC) 3704.14. The goals of the E-Check program are to identify gross-polluting vehicles for repair, and provide a fair and accurate test with minimum inconvenience to Ohio's motorists. In 1996, Ohio contracted with Envirotest Systems to operate the Ohio I/M Program in the Dayton-Springfield, Cincinnati, and Akron-Cleveland areas. In 2005, the contract was extended for an additional two years in northeast Ohio with Envirotest Systems. In 2007, the contract was extended for an additional six months in northeast Ohio. Envirotest Systems was awarded a one-year contract in early 2008 to continue providing motor vehicle emission tests to motorists through June 2009. A six month extension was granted in June 2009. The contract was renewed in October 2009 with Envirotest Systems until the end of June 2011. Beginning July 1, 2011, the contract was extended for one year until June 30, 2012. In the summer of 2011, the Ohio legislature passed legislation for Ohio to implement a decentralized program by June 30, 2012. In January 2012, Envirotest won a three year contract to implement a decentralized vehicle testing program beginning June 4, 2012. The decentralized program involved adding 37 Lube Stops, 16 independent repair shops and 16 self-testing kiosks to the 23 existing testing stations. All of the new

testing options only do OBD II testing. The existing stations maintained the ability to do OBD II, dynamometer and idle tail pipe testing and opacity for diesel.

2.1.1 Ohio I/M Program Summary

40 CFR 51.366 (d) (1) (i) An estimate of the number of vehicles subject to the inspection program, including the results of analysis of the registration database;

In 2011, there were approximately 1,982,936 vehicles registered in northeast Ohio. The vast majority of these vehicles are tested biennially. In 2011, 848,972 vehicles were expected to undergo emission testing. In 2011, vehicles were exempted from the emissions testing process if they were:

- model year 1986 or older;
- model year 2008 or newer;
- greater than 10,000 pounds gross vehicle weight rating;
- motorcycles, recreational vehicles and motor homes; or
- vehicles operating on alternative fuels, such as propane or natural gas

Vehicles are required to have a valid vehicle emission certificate prior to titling or prior to registration renewal every other year.

2.1.2 Inspection Stations

40 CFR 51.366 (b)(1)(i): The number of inspection stations and lanes operating throughout the year:

All Ohio vehicles receive their inspections at one of the facilities operated by Envirotest Systems. In 2011, 23 stations and 79 lanes conducted emissions test throughout the year.

2.1.3 Inspectors

40 CFR 51.366 (b) (5) The number of inspectors licensed or certified to conduct testing;

Table 1: Number of Inspectors in 2011

	# of Inspectors
Trained and Licensed to conduct testing in 2011	188

2.1.4 Emissions Tests Administered

The Ohio I/M Program uses five different emissions tests. Gasoline-fueled vehicles receive gas cap tests and one of the following tests: On-Board Diagnostic (OBD II), transient (tailpipe), or two-speed idle (tailpipe). Diesel-fueled vehicles receive an OBD II or opacity test. Each type of test is described below. All vehicles also are visually inspected to confirm that a gas cap and catalytic converter are present. If a vehicle fails the visual inspection, it fails the overall test, even if it passed the emissions portion of the test. Fails for vehicles not having a catalytic converter do not receive an emissions test but do receive the gas cap test.

1. Gas cap tests check the vehicle's gas cap pressure to ensure the cap seals tightly and does not allow fuel vapors to evaporate into the air. If the vehicle fails the gas cap test, it fails the overall emissions test, even if the vehicle passed the exhaust portion of the test.
2. On-Board Diagnostics: On-board diagnostics (OBD II) is a complex computer pack installed on 1996 and newer cars and light trucks and 1997 and newer diesel vehicles. The computer continuously tracks and stores information about a vehicle's performance. The on-board computer turns on the "check engine" light if it finds a problem with a vehicle's emission control system. On January 5, 2004, Ohio began testing vehicles equipped with the OBD II systems. During the initial test in a vehicle's test cycle that is 2000 model year or older with 3 or more readiness monitors not set to ready, or vehicles that are 2001 or newer with 2 or more readiness monitors not set, the vehicle may be tested with the tailpipe test. In 2011, 80 percent of vehicles receiving emissions tests were tested using the OBD II system.
3. Transient tailpipe tests are used for most gasoline-powered vehicles that are not equipped with the OBD II equipment. For this test, Acceleration Simulation Mode (ASM 2525) standards are used. Vehicles are placed on a dynamometer, a treadmill-like device that puts resistance against the tires to simulate on-road driving. The vehicles are driven at 25 miles per hour for a minimum of 25 seconds and a maximum of 240 seconds. Tailpipe emissions are then measured and recorded. Readings for hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) are compared to each pollutant's pass/fail points. The pass/fail points vary by vehicle type (car vs truck), model year, and, for trucks, weight category. In 2011, 18 percent of vehicles receiving emissions tests were tested using the transient tailpipe test.

4. Two-speed idle (TSI) tests are used for gasoline-fueled vehicles that cannot receive an OBD II or tailpipe test. These vehicles, for the most part, cannot be driven on the dynamometer and are mainly dedicated 4-wheel-drive vehicles. This test measures emissions while the engine is operating at an elevated idle of 2,500 revolutions per minute (rpm) with no load on the engine which is followed with checking the vehicle emissions at idle upon failure of the loaded portion. The test measures HC and CO concentrations. This test does not measure NOx emissions. In 2011, 2 percent of vehicles receiving emissions tests were tested using the TSI test.

5. Opacity tests use opacity meters to determine the “density” of the exhaust emitted from the vehicle’s tailpipe. Only diesel vehicles receive an opacity test. In 2011, 0.2 percent of vehicles receiving emissions tests were tested using the opacity test.

2.2 Do the right vehicles get tested?

2.2.1 Overall motorist compliance with testing requirements

40 CFR 51.366 (d) (1) (ii): The percentage of motorist compliance based upon a comparison of the number of valid final tests with the number of subject vehicles;

In Ohio, the inspection lane computers determine which test a vehicle will receive based on model year and make information. Table 2 summarizes the 2011 overall compliance rate of the total number of unique vehicles registered in 2011 subjected to the test versus the number of vehicles receiving an I/M test. In 2011, the compliance rate was 99 percent.

Table 2: Motorist Compliance with Testing Requirements

	Vehicle Count	Compliance %
Overall Testing Compliance		
Vehicles Subject to 2011 Test	848,972	
Vehicles Tested in 2011	840,620	99%

In 2011, 12,288 of the 65,542 vehicles that failed their initial test did not receive a passing test, exemption, extension, or waiver before January 27, 2012.

2.2.2 Motorist Time Extensions

40 CFR 51.366 (d) (1) (v) The number of time extensions and other exemptions granted to motorists;

The E-Check program offers repair waivers to individuals on their vehicle who make an effort to repair their vehicle but cannot get it to pass E-Check. In most cases, a waiver will be issued if the vehicle meets the requirements. A waiver will then allow the vehicle to be registered with the State. If an individual spends at least \$200 on emissions-related repairs for a 1995 or older vehicle, shows a 30 percent improvement in emissions readings from the initial test readings, and passes a visual anti-tampering inspection he or she may qualify for a conditional pass waiver. There is also a repair cap waiver that allows the motorist to register the vehicle if he or she spends at least \$300 on emissions-related repairs, regardless of emissions improvements and passes a visual tampering inspection. When a waiver is issued, the vehicle does not need to test for two years, or the next scheduled E-Check test, whichever comes first.

Ohio EPA offers a variety of extensions and exemptions to individuals who need more time to repair a vehicle or cannot have the vehicle tested at the current time.

- Non-permanent exemptions apply to those individuals who can have their vehicle tested out-of-state, are in the military, are currently a student outside of Ohio, or have a vehicle that will not return to Ohio within one year. The exemption allows a motorist to register the vehicle without receiving an E-Check test.
- Extensions are only available to individuals who need more time to have repairs performed, have difficulty affording repairs for the vehicle or are temporarily located out-of-state in an area that does not have emissions testing and will return within one year. Extensions only extend the period of time that a vehicle has to comply with the program. A motorist has up to four to six months, depending on the type of extension, to comply with the current testing cycle.
- Permanent exemptions from testing are issued for vehicles with a gross vehicle weight rating (GVWR) over 10,000 pounds or operating on an alternative fuel source such as electric power, natural gas, butane, propane, and 100 percent alcohol.

Out-of-state exemptions, which require the motorist to have the vehicle tested in another state's testing program, account for the highest number of exemptions issued. The remaining exemptions allow the motorist to renew the vehicle's registration without ever receiving a test.

The extensions require that a vehicle receive a test, but more time is provided to have it completed. The category of “other” in Table 3 includes special circumstances such as survivor and trust non-permanent exemptions that would require a vehicle to be tested out of its normal test cycle.

Vehicles that run on electricity or alternative fuel, such as propane or natural gas, may receive a permanent exemption from the emission test requirement. Prior to receiving any permanent exemption, the vehicle must be inspected by authorized Ohio EPA Mobile Source Section personnel. The inspection will include an anti-tampering inspection to ensure that all necessary emission control equipment is correctly installed on the vehicle. Any vehicle that does not pass the necessary inspection will be subject to the vehicle emission testing requirements. Vehicles that are more than 10,000 pounds gross vehicle weight rating and are plated with non-commercial plates also will be subject to inspection by authorized Ohio EPA Mobile Sources Section personnel prior to receiving a permanent exemption from the vehicle emission testing requirement, to be consistent with our rules, specifically OAC 3745-26-12(C)(2).

Table 3: Number of Extensions or Exemptions Issued in 2011

Type of Extensions or Exemptions	Number Issued
Extensions	1,243
Waivers	13,496
Permanent Exemptions	369
Out of State Exemptions	2,496
Student Exemptions	196
Military Exemptions	586
Hardship Extensions	984
Other	23
Total Number of Waivers, Extensions and Exemptions Issues	19,393

2.2.3 Registration File Audits and Compliance with Deadlines

40 CFR 51.366 (d)(2)(i) A report of the program’s efforts and actions to prevent motorists from falsely registering vehicles out of the program area or falsely changing fuel type or weight class on the vehicle registration, and the results of special studies to investigate the frequency of such activity; and

(ii) The number of registration file audits, number of registrations reviewed, and compliance rates found in such audits.

Ohio EPA works with Ohio Bureau of Motor Vehicles' (BMV) Special Investigations Unit (SIU) to ensure that motorists are not falsely registering vehicles outside of a testing area to circumvent the testing requirements. When Ohio EPA receives a complaint regarding false registrations, Ohio EPA forwards the complaint to Ohio BMV SIU for investigation. Ohio BMV Registrar Offices also will forward any concerns they have about suspicious registrations along to the SIU Division. Overall in 2011, Ohio BMV SIU investigated 65 complaints regarding E-Check compliance. For 45 of the 65 investigations, Ohio BMV demonstrated vehicle registration violations for E-Check.

At this time, no registration file audits are performed to determine compliance with the vehicle emission testing program in northeast Ohio.

3 Is the testing equipment reliable?

40 CFR 51.366 (c) Quality Control Report: The program shall submit ... basic statistics on the quality control program for January through December of the previous year, including:

- (1) the number of emission testing sites and lanes in use in the program;
- (2) the number of equipment audits by station and lane;
- (3) the number and percentage of stations that have failed equipment audits; and
- (4) the Number and percentage of stations and lanes shut down as a result of equipment audits.

Within the Ohio I/M Program for 2011, there are 23 emission testing stations operating a total of 79 lanes.

Ohio EPA's equipment audit procedure is designed to verify that the lane equipment is operating within the tolerances specified by federal and State guidelines. Equipment audits are inspections of emissions testing equipment performed overtly at least two times per year per lane. Ohio EPA's equipment audits are performed by Agency staff and a contractor representative. If a lane fails any one of the audit criteria, the audit result is a fail and the lane is shut down until the issue is resolved.

Envirotest Systems Inc.'s equipment is required to undergo self-tests on either a per test, hourly, or weekly basis. The computer system will lock-down a lane if a self-test is not performed at the required time. The lane lock-down results in no additional vehicle testing occurring until the test is complete.

In 2011, each lane was successfully audited. A total of 353 equipment audits resulted in 314 audit passes and only 36 audit failures, or an overall failure rate of 10.2 percent. The 36 equipment audit failures occurred at 17 unique stations, or 74 percent of the stations, and across 26 unique lanes, or 33 percent of the lanes.

Table 4: Number of Equipment Audits at Each Testing Station

Facility	Number of Equipment Audits in 2009
WESTLAKE	18
BEREA	14
NORTH ROYALTON	15
PURITAS	21
EAST 55TH	26
VALLEY VIEW	15
ST. CLAIR	13
WARRENSVILLE	24
EUCLID	16
WILLOUGHBY	10
PAINESVILLE	12
CHARDON	6
AUBURN	9
ROOTSTOWN	8
KENT	12
TWINSBURG	18
CUYAHOGA FALLS	13
BROWN STREET	29
COPLEY	21
MEDINA	13
SPENCER	9
AMHERST	15
ELYRIA	16

4 Quality Assurance

4.1 Overt and Covert Audits

Ohio EPA performs overt and covert performance audits to assess station and inspector performance. The results of the different types of audits are detailed below.

4.1.1 Overt Audits

40 CFR 51.366 (b) (1) (i) The number of inspection stations and lanes operating throughout the year;

For 2011, 23 stations operated 79 emission testing lanes.

40 CFR 51.366 (b) (2) The number of inspection stations and lanes operating throughout the year:
(i) receiving overt performance audits in the year; or
(ii) not receiving overt performance audits in the year.

During overt performance audits, Ohio EPA staff verify that Envirotest Systems personnel are performing the emissions test in the proper manner while providing adequate customer service to Ohio's motorists. The performance audit is broken into three sections. The first section is *Test Procedures*, designed to evaluate how well the inspectors perform the emissions test procedures and interact with the motorists. The second section is *Safety Conditions*, designed to evaluate if Envirotest provides motorists with a safe testing environment. The third section is *Station Appearance*, designed to evaluate if the stations are being kept in a customer friendly condition. Ohio EPA staff record audit findings on a form and conduct exit interviews with the station manager, informing the station manager of the results.

All 23 stations and 79 testing lanes operating in 2011 received overt performance audits. The number of overt audits per lane ranged from 1 audit to 15 in 2011. Upon arriving at a station, Ohio EPA staff will audit only the lanes that are open for testing during a performance audit.

40 CFR 51.366 (b) (2) (v) Number of stations and lanes ... that have been shut down as a result of overt performance audits;

No station or lane was shut down as the result of an overt performance audit in 2011.

4.1.2 Covert audits

40 CFR 51.366 (b) (2) The number of inspection stations and lanes operating throughout the year:
(iii) receiving covert performance audits in the year; or
(iv) not receiving covert performance audits in the year.

During covert audits, Ohio EPA staff will verify that Envirotest Systems' personnel are performing the emissions test in the proper manner, while providing adequate customer service to Ohio's motorists. The *Test Procedures* section of the covert audit is identical to the *Test Procedures* of the overt audit and is scored as such.

All stations received covert performance audits in 2011. Covert audits were performed on 37 unique testing lanes.

40 CFR 51.366 (b) (8) The total number of covert vehicles available for undercover audits over the year; and
(9) the number of covert auditors available for undercover audits.

Ohio EPA dedicates three vehicles for covert audits. The vehicles are tampered prior to testing to ensure that the vehicle fails the proper emission tests. A college intern is hired to work during a three month period to supplement and assist in trying to achieve covert audit goals.

4.1.3 Covert audit results

40 CFR 51.366 (b) (3) The number of covert audits:
(i) conducted with the vehicle set to fail per test type;
(ii) conducted with the vehicle set to fail any combination of two or more tests;
(iii) resulting in a false pass per test type; or
(iv) resulting in a false pass for any combination of two or more test types.

Most covert vehicles are set up to fail the tailpipe test, and, if applicable, not allow the OBD II test to be performed by clearing the readiness monitors. A "false pass" during a covert audit is an inspection pass when the vehicle was set to fail. The audit does not directly indicate whether the false pass was a result of the equipment or the inspector. If a false pass was the result of the improper test being performed on the vehicle, Ohio EPA initiates enforcement action against Envirotest Systems. Most times, Envirotest Systems provides proper test procedures and/or additional training as follow-up action against false passes.

Table 5: 2011 covert audit results

Conducted with the vehicle set to fail per test type	
ASM	35
OBD	15
Conducted with the vehicle set to fail any combination of two or more test types	
ASM & OBD	0
Resulting in a false pass per test type	
ASM	0
OBD	0
Resulting in a false pass for any combination of two or more test types	
ASM & OBD	0

As seen in table five, 0 of the 50, or 0 percent, of the covert audits resulted in false passes.

4.2 Inspector Performance

As stated in Section 2.1.3, 188 inspectors were licensed or certified to conduct testing in 2011.

40 CFR 51.366 (b) (4) The number of inspectors and stations:
 (i) that were suspended or fired or otherwise prohibited from testing as a result of covert audits
 (ii) that were suspended, fired, or otherwise prohibited from testing for other causes, and
 (iii) that received fines.

40 CFR 51.366 (b) (6) The number of hearings:
 (i) held to consider adverse actions against inspectors and stations; and
 (ii) resulting in adverse actions against inspectors and stations.

Ohio EPA and Envirotest Systems Inc. keep records of all fraud and bribery issues occurring at the testing stations. All cases brought to either Ohio EPA or Envirotest Systems Inc. are investigated thoroughly. If the situation warrants use of other agencies, such as the Ohio State Highway Patrol, the agencies work together to resolve these cases. Many of the fraud and bribery cases involve customers attempting to bribe an inspector for a passing test. Few cases involve fraud or bribery on the part of a station inspector. The table below summarizes the results of Ohio EPA’s enforcement actions against stations and inspectors.

Table 6: Non-customer initiated fraud and bribery cases

The number of inspectors and stations	# inspectors	# stations
That were suspended, fired, or otherwise prohibited from testing as a result of covert audits	0	0
That were suspended, fired, or otherwise prohibited from testing for other causes	0	0

4.3 Fines collected

40 CFR 51.366 (b) (4) The number of inspectors and stations: (iii) that received fines;
 40 CFR 51.366 (b) (7) the total amount collected in fines from inspectors and stations.

Ohio EPA has not collected fines from stations or inspectors.

4.4 Station Compliance Documents

40 CFR 51.366 (d) (1) (iii) The total number of compliance documents issued to inspections stations;
 (iv) the number of missing compliance documents; and
 (vi) the number of compliance surveys conducted, number of vehicles surveyed in each, and the compliance rates found.

Ohio EPA works with Envirotest Systems and Ohio BMV to ensure that no false compliance documents may be passed to Ohio BMV, resulting in vehicle registrations being approved. Each compliance document is printed with a specific type of printer, making the print difficult to copy. Furthermore, each compliance document issued contains a code that the BMV will verify prior to registration issuance. If the compliance code on the compliance certificate cannot be verified, Ohio BMV will reject the vehicle registration attempt.

5 Emission Tests Results

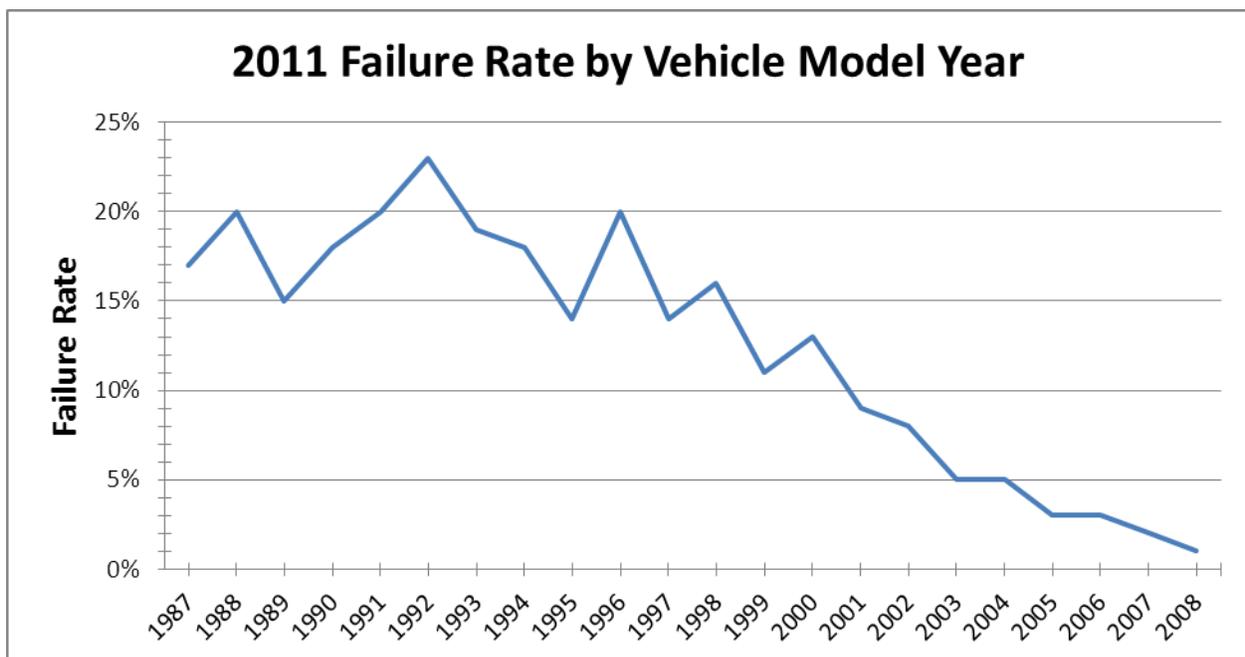
Of the 840,620 unique vehicles that received an emissions test in 2011, 65,542 vehicles, or 7.8 percent, failed their initial test. The Ohio E-Check program requires that motorists repair the vehicle and receive a passing test, waiver, or extension prior to the vehicle registration date.

Please note:

- Waivers were issued to vehicles that had repairs performed and were still unable to pass a retest. In 2011, waivers were granted to 13,496 vehicles, or 20.6 percent, that initially failed the vehicle test.
- Of the vehicles that failed the initial test during 2011, 12,288 vehicles, or 18.7 percent, had neither passed a retest, obtained a waiver, nor obtained an extension as of January 27, 2012.

Details of all 2011 emission test results are available on the Ohio EPA website at www.epa.ohio.gov/dapc/echeck/whycheck/annual_reports.aspx

The following figure shows 2011 emission failure rates by model year. As can be seen, the age of a vehicle has a significant impact on failure rate.



5.1 Emission Reductions from Repaired Tailpipe-tested Vehicles in 2011

40 CFR 51.366 (a) (5) The average increase or decrease in tailpipe emission levels for HC, CO, and NOx after repairs by model year and vehicle type for vehicles receiving a mass emissions test.

U.S. EPA requires states to calculate emissions reductions from vehicles that are repaired after failing a tailpipe test. Approximately 8,334 tailpipe-tested vehicles that failed their initial test were successfully repaired and passed a tailpipe retest. Vehicles showed an average reduction of 69 percent for hydrocarbons (HC), 86 percent for carbon monoxide (CO), and 57 percent for oxides of nitrogen (NOx). A breakdown of average improvement by vehicle model year and type is shown in Attachment B.