



Technical Highlights

Clean Screening in Inspection and Maintenance Programs

EPA has recently completed a draft guidance document on the use of clean screening in Inspection and Maintenance (I/M) programs. Clean screening is designed to exempt certain cars from the I/M requirement, on the strength of other evidence of the high probability that they are clean enough to pass anyway. Based on a preliminary assessment of data currently available, EPA believes it is possible to excuse up to one-third of cars from inspection each year, with only a 5 to 10 percent loss in emission reductions.

Background

Clean screening is the term used to describe methods that states can use to excuse cars from a scheduled I/M emissions test. Typical I/M programs require every car to appear at a testing station once each year or every other year for a test of the vehicle's tailpipe emissions; some states test other emissions components—such as the gas cap and the fuel lines—as well. Over the last several years, vehicle emission systems have become more reliable and durable, and many cars pass the I/M test.

Guidance Issued

EPA's draft guidance has been distributed for state comment and independent scientific peer review, and EPA is accepting comments on the guidance until July 11, 1998. Once EPA has reviewed the comments and incorporated them as appropriate, the guidance will be finalized in the fall of 1998.

The options included in the draft guidance are aimed at making I/M programs more efficient and cost effective for states and car owners, by focusing inspections on vehicles more likely to be high emitters in need of repair. There will be some increase in vehicle emissions as a result of the changes in these I/M programs. It is important to note that the estimates included in the draft guidance are based on the latest and best information currently available. However, EPA expects at least certain aspects of the estimates to change somewhat before they are finalized. Once the clean screening guidance is finalized, EPA may revise the estimates from time to time as better information and understanding of clean screening options becomes available.

The draft guidance provides descriptions and projected emission impacts for three types of clean screening, which differ with respect to the type of evidence required to exempt cars from regular I/M. These are listed below:

Remote Sensing Clean Screening

Overview

In this concept, roadside remote sensing is used to excuse specific cars from their next annual or biennial I/M test because they pass remote sensing. Obviously, this has owner convenience and cost advantages. After skipping one scheduled test, cars would have to get the next one, unless they again pass a remote sensing test. In practical application, cars would have to pass two different remote sensing tests, at

different times or places, and within a limited time window (e.g., no more than twelve months before the scheduled I/M test).

Effect on vehicle population

The number of vehicles excused from testing depends on the stringency of the remote sensing test and the fleet coverage of the remote sensing program. Up to fifty percent coverage of the fleet has been demonstrated; more should be possible with resources and experience. A 50 percent pass rate on the remote sensing test and 80 percent fleet coverage for example would mean that about 40 percent of the fleet would be excused each year. This is likely to be the highest pass rate and coverage an area should consider. An exemption fraction of one-third may be more typical.

SIP credit ramifications

Use of remote sensing for clean screening will typically reduce the credit ascribable to the I/M program because some cars with high tailpipe emissions may appear clean in a remote sensing test and will be excused from I/M tailpipe testing and repair for that I/M cycle. Also, remote sensing cannot identify low versus high emitting vehicles with respect to evaporative HC emissions. However, older cars have a much higher incidence of evaporative problems than newer cars, and remote sensing clean screening tends to fail most older cars because they so frequently have defective parts causing high tailpipe emissions. When such older cars with both high tailpipe and high evaporative emissions report for their regular I/M test, having failed to pass the remote sensing tailpipe

test, both problems can be identified and fixed. Therefore, the loss of evaporative HC credits is much less than the portion of the fleet exempted, but may be as or more significant than the loss of tailpipe credit.

An analysis performed for one state example indicates that by using remote sensing cutpoints that excuse 37 percent of remotely tested vehicles with a fleet coverage of 80 percent, the loss in tailpipe HC benefit is about 4 percent and the loss in overall HC benefit is 5 to 8 percent. By using remote sensing clean screening to measure NOx with a tight NOx cutpoint, NOx benefit losses can be limited to 6 percent, for the 80 percent coverage example. If only HC and CO cutpoints are used, the NOx benefit loss can be as high as 22 percent.

However, it is important to note that use of remote sensing clean screening for NOx reduces the number of cars that are excused from regular testing. The effectiveness of remote sensing varies among cars of different model years, so the overall effect will depend on the calendar year of interest and the mix of cars on the road.

Vehicle Emissions Profiling

Overview

This is a method of ranking vehicles for the likelihood that they need emissions repairs, using statistics on the historic failure rate of vehicles of very similar design. For example, failure rates of vehicle models in the Arizona IM240 program can be used to predict whether a certain group of nearly identical cars in another state will have a

high or low failure rate. This information can be used in either of two ways, or in both ways.

In Low Emitter Profiling, the ranking would be used as a clean screening tool to determine what cars should be excused from testing. In High Emitter Profiling, the ranking is used to require some type of special testing regime for the cars most likely to need repair. This special testing could involve special testing stations, annual instead of biennial testing, etc. It is possible to add other information into the ranking process. For example, remote sensing readings or the most recent I/M outcome of the specific vehicle in question could be used, assuming such data is available. Generally, extra information can improve the ranking's accuracy, and thereby reduce the credit loss from screening out a given number of vehicles from their next regular I/M test.

Effect on vehicle population

This varies and is dependent on a number of factors, including the exemption fraction, the fleet mix, and the information used in the vehicle ranking process. For example, by expanding the ranking information used, states can fine-tune their profiling. Thus, the effect on the vehicle population can be customized to a certain degree—dependent on the fleet mix and sophistication of the vehicle ranking process—within the goal of clean-screening a specific percentage of the vehicle population. Credit losses increase quickly when the exemption fraction is higher than 50 percent.

Credit ramifications

Low emitter profiling carries a credit loss due to the fact that some cars will be incorrectly clean screened out of traditional I/M testing. In general, recent studies indicate that vehicle profiling can support clean screening with roughly the same immediate emission credit ramifications as remote sensing (i.e., in the range of 5 to 8 percent loss in credit) for all pollutants. This, however, is also dependent on the specific profiling utilized by the state. The draft guidance contains a special note regarding the preliminary and evolving nature of the estimates of credit losses with low emitter profiling.

Model Year Exemptions

Overview

This approach exempts cars until they reach a certain age, on the premise that virtually all cars are clean when sold and most remain clean for at least several years. Many states now wait until a car is four or five years old before the first required inspection. Some give the owner the option of inspection during these years. It is the state's choice whether to assess a program fee on new cars while they are exempt from testing.

Effect on vehicle population

Again, the effect varies, given the fleet mix (i.e., vehicle age distribution) of a specific area. EPA recommends that states exempt cars from testing until they are at least four years old.

Credit ramifications

The effect of model year exemptions in specific I/M areas can be estimated using

existing features of MOBILE5b. States with a simple system of scheduling inspections on the anniversary of a new vehicle sales date should have no difficulty analyzing scenarios for themselves. Overall, the loss of credit for exempting the four newest model years is quite small, and EPA believes most states can find ways to compensate for it if needed to keep the SIP approvable. States with more complex scheduling may need to consult EPA.

For More Information

A copy of the draft guidance and related information is available electronically from the EPA Internet server at:

<http://www.epa.gov/oms/models.htm>

For further information on the draft guidance, please contact Joe Somers at:

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