



MSAPC ADVISORY CIRCULAR

U.S. ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF AIR AND WASTE MANAGEMENT ●

MOBILE SOURCE AIR POLLUTION CONTROL

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Subject: Modifications to High Altitude Vehicles for Temporary Operation
at Low Altitudes; Prohibition of Use of Emission Control Defeat
Devices

A. Purpose

The purpose of this Advisory Circular is to notify manufacturers of the criteria on the basis of which EPA will evaluate the eligibility for certification of vehicles intended for sale at high altitudes that are equipped with any device which modifies the vehicle's emission control system during temporary use at low altitude, or that has maintenance instructions for the purpose of modifying the vehicle's emission control system for temporary use at low altitudes. The need for such criteria has arisen from the plans of some manufacturers to utilize such devices or maintenance instructions. This Advisory Circular amplifies and does not supersede Advisory Circular 24, Prohibition of Use of Emission Control Defeat Devices.

B. Background

1. On October 18, 1974 EPA promulgated regulations (39 FR 37300) for the certification of vehicles intended for sale in areas above 4,000 feet in elevation. The regulations require, in part, that manufacturers demonstrate through the certification process that their high altitude vehicle designs are capable of meeting the emission standards when tested under high altitude conditions. The regulations allow manufacturers the alternative to design vehicles intended for use at high altitude with (1) fixed calibrations capable of meeting emission standards only at high altitude, or (2) automatically variable calibrations capable of meeting emission standards at both low and high altitude without adjustment or modification.

2. Section 86.077-38 requires manufacturers who produce vehicles of a fixed calibration either to provide maintenance instructions to the vehicle owner describing the modifications or adjustments that are necessary to modify the vehicle so that it is capable of complying with emission standards at an altitude other than that of the original design, or to inform the vehicle owner in the owner's manual that the vehicle is not designed to be able to be converted to comply with emission standards at other than high altitude.

3. The preamble to the October 18, 1974 regulations emphasized that even though to be eligible for certification the manufacturer is required only to demonstrate compliance with emission standards at either high or low altitude, each manufacturer is required by the Clean Air Act to produce vehicles that meet emission standards during their useful life wherever sold or operated. This statutory requirement applies to all vehicles, even those intended by a manufacturer for sale in specific areas of the country or at specific altitudes.

4. Some manufacturers have indicated that vehicles with fixed calibrations intended for initial sale in high altitude locations may experience driveability and fuel economy penalties when operated in low altitude locations. To provide for the temporary operation of fixed calibration high altitude vehicles at low altitude, some manufacturers have advised EPA of plans to include devices or maintenance instructions which are intended, for the purpose of improving driveability and fuel economy, to modify the emission control system of the vehicle when the vehicle is temporarily operated at low altitude.

5. Because such devices or maintenance instructions have the potential of resulting in modifications to the vehicle's emission control system from the configuration in which such vehicles have demonstrated compliance with emission standards, such devices or maintenance instructions are considered by EPA to have potential for being classified as Auxiliary Emission Control Devices (AECD), i.e., defeat devices (see MSAPC Advisory Circular No. 24, dated December 11, 1972). This Advisory Circular is being issued to set forth the criteria EPA will use in determining the acceptability of such AECD or maintenance instructions.

C. Applicability

The policy outlined in this Advisory Circular is effective immediately. The provisions of this Advisory Circular apply to certification of light duty vehicles and light duty trucks beginning with the 1977 model year, and to running changes and field fixes which would involve the addition of any devices or maintenance instructions intended to improve low altitude driveability and fuel economy on 1977 and later model year light duty vehicles and light duty trucks intended for sale and use at high altitudes.

D. Discussion

1. Manufacturers have described to EPA several different approaches intended to be used on 1977 model year vehicles designed to be sold in high altitude locations to improve driveability and fuel economy during temporary operation of the vehicle at low altitude. These approaches include:

a. Specification of maintenance to be performed on the vehicle such as ignition timing or idle speed adjustments;

b. Inclusion of a manually operated lever or switch located either in the engine compartment or passenger compartment, designed to modify the vehicle's air-fuel mixture ratio or other engine operating parameters;

c. Inclusion of aneroid devices which automatically vary engine operating parameters in response to barometric pressure changes.

2. All of these approaches, while not necessarily sufficient to cause the vehicle to meet emission standards when tested under low altitude conditions, are designed to improve vehicle performance and fuel economy under such conditions. Such approaches may also improve or degrade emission performance of high altitude vehicles during the operation of those vehicles at low altitude.

3. EPA will evaluate such devices or maintenance instructions on the basis of the criteria set forth in section E. of this Advisory Circular, to determine the effect on emission levels resulting from use of these devices or adjustments. Manufacturers should fully describe such devices or adjustments in the Part I Application for Certification in order to avoid delay in completing EPA review, and to allow EPA to make an informed determination of the acceptability of the manufacturer's approach.

4. For the purpose of this Advisory Circular, the term "modification" means any change relating to the emission control system of a high altitude vehicle or any change to the calibration specifications of a high altitude vehicle for the purpose of improving the driveability or fuel economy of that vehicle for temporary operation at low altitudes, and includes both fixed modifications and automatically effected modifications.

E. Criteria for Acceptability of Modifications to High Altitude Vehicles for Temporary Operation at Low Altitudes

1. For any type of modification (whether pursuant to maintenance instructions or manual or automatic compensating devices), EPA will base its determination of the acceptability of the modification in part on its engineering judgment of the effect that such modification is likely to have on the vehicle's emission performance.

2. EPA will require emission data to determine the effect of the modification on the emission level of any vehicle for those modifications which EPA does not determine to be acceptable based solely on engineering evaluations. Generally, EPA will require the following test data to evaluate the effect of the modification on the vehicle's emission levels:

a. Test data which show the vehicle's emission levels at low altitude without the compensation device or adjustment in effect.

b. Test data which show the vehicle's emission levels at low altitude with the compensation device or adjustment in effect.

3. For manually operated devices, or for modifications that are recommended to be followed in an owner's manual, the manufacturer will be required to show that the device operation or modification is likely to be performed correctly. Such a showing shall include:

a. The adjustments or device operation are relatively simple and are not due to complexity likely to result in incorrect use or adjustment.

b. The incentive for customer misuse, (i.e., use of low altitude setting at high altitude, or vice versa) is low due to degradation in vehicle operator-perceived vehicle parameters such as fuel economy, general driveability and acceleration, or due to improvements in these parameters which are imperceptible to the vehicle operator.

c. Instructions for owner device operation or vehicle adjustments and precautions against misuse or misadjustment are adequate to insure proper operation.

F. Determination of Acceptability of Modifications to High Altitude Vehicles for Temporary Operation at Low Altitude

1. Emission performance criteria. If test data are required, EPA will approve use of the device or adjustment if such modification to the emission control system of the vehicle satisfies either of the following criteria:

a. If, based on test data obtained pursuant to the procedures in section E.2. above, all pollutant levels (HC, CO and NOx) are unchanged or lower at low altitude as a result of the modification than such levels at low altitude without the modification, the modification will be judged to have not reduced the effectiveness of the vehicle's emission control system and will be acceptable for use.

b. If the level of any pollutant obtained at low altitude as a result of the modification exceeds the level of that pollutant at low altitude without the modification, but does not exceed the applicable standards, the modification will be judged to have not reduced the effectiveness of the emission control system and will be acceptable for use.

2. Incentive for proper use criteria. For manually operated devices, or for modifications that are recommended to be made in an owner's manual, use of such modifications will be judged, in addition to the evaluation in section F.1., above, on the basis of the criteria set forth in section E.3. of this Advisory Circular.

G. Manufacturer's Liability Under Section 207 of the Clean Air Act

As indicated in the preamble to the October 18, 1974 regulations for the certification of vehicles intended for sale in high altitude locations, the Clean Air Act requires vehicles to meet emission standards for their useful life wherever sold or operated. Even though the October 18, 1974 high altitude certification regulations only require manufacturers to demonstrate compliance of high altitude vehicles by testing such vehicles at high altitude, manufacturers remain subject to section 207 of the Clean Air Act with respect to these vehicles should such high altitude vehicles be sold or operated at low altitude locations and fail to meet emission standards at any time during their useful life.



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