

# APPENDIX B

## Department Procedures and Specifications

### § 1. Evaporative System Function Test.

The evaporative system pressure test procedure shall be as follows:

(1) Conform, as applicable, to the following requirements:

(i) Meet the specifications set forth in California BAR Exhaust Gas Analyzer Specifications, 1979 (Bar 80) and this section.

(ii) Meet Section 207B of the Federal Clean Air Act (42 U.S.C.A. § 7541(b)) warranty specifications.

(2) Conform with the following minimum automatic data collection (ADC) specifications:

(i) The ADC unit shall be completely compatible with the analytical equipment portion, known as the bench, of the exhaust emission analyzer.

(ii) There shall be an alpha-numeric keyboard capable of entering the following types of data for permanent transfer to a storage medium, and as set forth in subparagraph (IX). The system shall automatically enter data indicated (auto). Data shall be entered and stored to capture the following minimum information in the following steps:

(A) Date of test (auto)—mandatory entry, field programmed by manufacturer.

(B) Station number (auto)—mandatory entry, permanently set, 5 alpha-numeric characters, field programmed by manufacturer.

(C) Inspector number—mandatory entry, 9 numeric characters.

(D) Vehicle ID number—mandatory entry, title number or VIN, maximum characters used is 26.

(E) Test type—mandatory entry, initial test indicator, retest indicator.

(F) Vehicle year or engine year—mandatory entry.

(G) Cylinder code—mandatory entry, indicator to key in number of cylinders on the vehicle; rotary engines shall be coded as 2 cylinder engines.

(H) Vehicle type—mandatory entry, two categories designated for: passenger cars and trucks under 6,000 pounds GVWR and trucks 6,000 to 9,000 pounds GVWR. At this segment of the emission inspection, the emission inspection inspector shall proceed with the hang-up check. Upon successful completion of this check, the test may no longer be aborted requiring the emission inspector to insert the tailpipe probe and activate the Pennsylvania Emission Test automatically selecting the HC and CO standard required, plus the RPM and CO values required. Sample collection shall require 17 seconds; validation of the sample shall require 5 seconds; and emission sampling immediately after validation shall require 10 seconds.

(I) RPM reading (auto)—actual reading, display suppressed during emission test.

(J) Hydrocarbon (HC, auto)—reading in PPM, display suppressed during emission test.

(K) Carbon Monoxide (CO, auto)—reading in %, display suppressed during emission test.

(L) Carbon Dioxide (CO, auto)—reading in %, display suppressed during emission test.

(M) Invalid test (auto)—display suppressed, during emission test.

Four categories designated for:

CO pass/RPM pass;

CO pass/RPM fail;

CO fail/RPM pass;

CO fail/RPM fail.

(N) Pass/fail (auto)—display suppressed, during emission test.

Four categories designated for:

HC pass/CO pass;

HC pass/CO fail;

HC fail/CO pass;

HC fail/CO fail.

The automatic test results (auto) suppressed during the Pennsylvania emission test may be displayed after the information is automatically stored. This is an optional feature which may be provided by the manufacturer.

(O) Emission inspection fee—mandatory entry.

(P) Emission adjustment or repair performed—adjustment or repair indicator (Mandatory entry for retest entry, displayed only if retest is entered).

(Q) Waiver issued—yes indicator or no indicator (mandatory entry for retest entry, displayed only if retest is entered).

(R) Sticker number or training number—mandatory entry for pass or if waiver used, 11 alpha-numeric characters (display and entry required for passing test or waiver).

(S) Manufacturer's ID (auto)—2 alpha-numeric characters assigned by the Department.

(iii) Data shall be entered by a Certified Emission Inspection Inspector by the alpha-numeric keyboard in the sequence specified:

Mandatory entry data shall be completed before being allowed to proceed to the next data entry item, nonmandatory entry data are only required as specified. After completing the vehicle type entry the HC hang-up check shall be activated. Upon successful completion of this check the Emission Inspector may no longer abort the test and shall insert the probe into the subject vehicle's tailpipe and activate the Pennsylvania Emission Test. This shall automatically activate the collection, validation and emission sampling, and automatically key appropriate HC, CO, CO<sub>2</sub> and RPM limits, for pass/fail and invalid test decisions. The entry items designated display suppressed during emission test may not be shown on the display until the test is completed. Test data shall be automatically entered directly into storage and printed on the consumer reports. Data entry items designated field programmed by manufacturer shall be capable of programming changes to meet Emission I/M program required changes.

(iv) The analyzer shall be capable of use as a diagnostic tool and shall also be capable of testing for RPM, HC, CO and CO<sub>2</sub>, providing corresponding screens for diagnostic use when not activated in the Pennsylvania Emission Test.

(v) The keyboard shall be designed to accommodate the working environment of inspection facilities and to allow for wearing of gloves and contact with grease and oil compounds. The unit shall have the capacity to accommodate 16 present emission standards which may be changed by regulation.

(vi) The keyboard shall provide a capability function so that as data is improperly entered it can be corrected. The automatically-auto-entered data may not be affected by this function.

(vii) When the data is transferred from the storage medium, the unit shall provide the following test after loading the replacement storage medium.

(a) Record a predetermined test record as in subparagraph (ii) in which all number fields are filled with the number “one” and all alpha and alpha-numeric field are filled with the letter “A.”

(b) Stop recording.

(c) Read the predetermined test record now on the storage medium.

(d) Compare the predetermined test record on the storage medium with the predetermined record in memory:

(e) Prohibit the instrument from further recording on the storage medium and cause the instrument to indicate this storage medium failure to the operator if the predetermined test record does not correspond directly to that in the memory.

(f) Permit the system to proceed if the predetermined test record in the storage medium corresponds directly to that in the memory.

(viii) The hydrocarbon (HC) hang-up reading in the sampling system may not exceed 20 PPM hexane before each test as measured by the analyzer zeroed on room air. The analyzer shall be designed for automatic HC hang-up checks of the sampling system using room air. The analyzer shall have a selector switch, button with indicator light labeled “hang-up check” or other equivalent display prompter/indicator. Hang-up activation shall cause the analyzer to automatically sample room air through the sample line and probe. The check system shall continue to sample room air until the HC response is below 20 PPM hexane. When the HC level stabilizes below this value, an indication that testing may begin shall be displayed. The analyzer shall be precluded from operating until the HC level is met. The analyzer shall also be locked out unless a successful hang-up check has been performed since the last activation of the test sequence or the HC analyzer has not experienced an HC level greater than that specified in this subparagraph.

(ix) Engine tachometer/idle lockout shall be treated as follows:

(a) A digital tachometer shall be integrated with the console for the purposes of measuring engine speed according to the number of cylinders indicated 1 through 12 cylinder vehicles, in the data entry section. The hook-up to the engine shall be by means of an inductive pick-up.

(b) The following table provides maximum engine RPMs allowable according to number of cylinders:

(i) Maximum idle speeds (shall be field programmed by the manufacturer).

(ii) More than 4 cylinders 1200 RPM maximum.

(iii) Four or less cylinders 1600 RPM maximum.

(c) A lock-out feature shall apply only to vehicles tested in the inspection mode and shall be provided in the tachometer that will cause an “invalid test” to occur and to be displayed, printed and stored if the test idle speed range is exceeded or if the speed fluctuates in excess of 20% of the reading. This data shall be field programmed by the manufacturer.

(x) The analyzer shall be equipped with an antidilution feature to identify vehicle exhaust system leaks and sample dilution. The technique for identifying leaks is monitoring the CO<sub>2</sub> levels in the exhaust. If the CO<sub>2</sub> reading is less than the lower limit, the analyzer shall display, print and store “invalid” test indication. The minimum acceptable CO<sub>2</sub> values shall be field programmed by the manufacturer. At least two lower-limit CO<sub>2</sub> values shall be capable of being used:

(a) Vehicle equipped with air pump: 4%.

(b) Vehicle without air pump: 6%.

(xi) In the record mode, if the space on the storage medium available for recording is not sufficient to record the entire test and information as specified in subparagraph (ii), the test may not proceed and the analyzer shall immediately lock out the testing mode of the analyzer until the manufacturer or service provider replaces the storage medium. The emission inspector shall be prohibited from replacing the storage medium.

(xii) The data collection system shall provide to the emission inspection inspector a visual display of the data as it is being entered, except for that data which is required under subparagraph (ii) to be suppressed during the emission test.

(xiii) The analyzer system shall have the capability to provide an electronic-mechanical span/zero check every hour. If the check is not made or fails either span or zero (gas calibration or electrical component failure), the analyzer shall automatically lock out any capability of activating an emission test until the analyzer is properly adjusted or repaired. In addition, gas span checks or leak checks, checked on a weekly basis (180 calendar hours), which fail shall cause the analyzer to automatically lock out any capability of activating an enhanced emission test until the analyzer is properly adjusted or repaired.

(3) Vehicles shall fail the evaporative system pressure test if the system cannot maintain a system pressure above 8 inches of water for 2 minutes after being pressurized to 14 +/- 0.5 inch of water or if no pressure drop is detected when the gas cap is loosened as described in this section. Additionally, vehicles shall fail the evaporative test if the canister is missing or obviously damaged, if hoses are missing or obviously disconnected, or if the gas cap is missing.

## § 2. Evaporative System Function Tests.

(a) Evaporative system pressure test, the evaporative system pressure test procedure shall be as follows:

(1) An evaporative system pressure test shall be performed on 1981 and newer model year subject vehicles.

(2) The test sequence shall consist of the following steps:

(i) Test equipment shall be connected to the fuel tank canister hose at the canister end. The gas cap shall be checked to ensure that it is properly, but not excessively tightened, and shall be tightened if necessary.

(ii) The system shall be pressurized to 14 +/- 0.5 inch of water without exceeding 26 inches of water system pressure.

(iii) The pressure source shall be closed off, the evaporative system sealed and pressure decay monitored for 2 minutes.

(iv) The gas cap shall be removed after 2 minutes and the evaporative system monitored for a sudden pressure drop, indicating that the fuel tank was pressurized.

(v) The inspector shall be responsible for ensuring that items that are disconnected in the conduct of the test procedure are properly reconnected at the conclusion of the test procedure. Damage done to the evaporative emission control system during this test shall be repaired at the expense of the inspection station.

(3) Vehicles shall fail the evaporative system pressure test if the system cannot maintain a system pressure above 8 inches of water for 2 minutes after being pressurized to 14 +/- 0.5 inch of water or if no pressure drop is detected when the gas cap is loosened as described in this section. Additionally, vehicles shall fail the evaporative test if the canister is missing or obviously damaged, if hoses are missing or obviously disconnected, or if the gas cap is missing.

(b) Fuel filler (gas) cap test. The fuel filler (gas) cap test procedure shall be as follows:

(1) A fuel filler (gas) cap integrity test shall be performed on 1981 and newer vehicle either as part of the evaporative system pressure test or as a stand alone test.

(2) The stand alone test will be conducted using test equipment approved by the Department.

(3) If the fuel filler (gas) cap was tested using stand alone test equipment, the cap shall be pressurized to a pressure of 28 inches, +/- 1.0 inches.

(4) The flow shall be turned off and the decay or pressure monitored for up to 2 minutes.

(5) If at any time during the 2 minutes of the fuel filler (gas) cap test the pressure drops from the starting pressure by more than 6 inches of water, the test shall be terminated and the vehicle shall be determined to fail the fuel filler (gas) cap test. If the pressure does not drop more than 6 inches during the test, the vehicle shall pass the gas cap test.

(c) Subsequent test procedures and equipment approved by the EPA. If the EPA develops or approves other emission test procedures or equipment, including test procedures or equipment prescribed in this section, the Department may adopt the subsequently approved emission test procedures and equipment consistent with section 4706(e) of the Vehicle Code (relating to prohibition of expenditures for the Emission Inspection Program).