

be expected to be encountered in normal operation and use, for the purposes of investigating a potential defeat device.

(c) For cold temperature CO emission control, the Administrator will use a guideline to determine the appropriateness of the CO emission control at ambient temperatures between 25 °F (−4 °C) and 68 °F (20 °C). The guideline for CO emission congruity across the intermediate temperature range is the linear interpolation between the CO standard applicable at 25 °F (−4 °C) and the CO standard applicable at 68 °F (20 °C). For vehicles that exceed this CO emissions guideline upon intermediate temperature cold testing:

(1) If the CO emission level is greater than the 20 °F (−7 °C) emission standard, the vehicle will automatically be considered to be equipped with a defeat device without further investigation.

(2) If the CO emission level does not exceed the 20 °F emission standard, the Administrator may investigate the vehicle design for the presence of a defeat device under paragraph (d) of this section.

(d) For vehicle designs designated by the Administrator to be investigated for possible defeat devices:

(1) The manufacturer must show to the satisfaction of the Administrator that the vehicle design does not incorporate strategies that unnecessarily reduce emission control effectiveness exhibited during the Federal emissions test procedure when the vehicle is operated under conditions which may reasonably be expected to be encountered in normal operation and use.

(2) Information Submissions Required:

(i) The manufacturer will provide an explanation containing detailed information (including information which the Administrator may request to be submitted) regarding test programs, engineering evaluations, design specifications, calibrations, on-board computer algorithms, and design strategies incorporated for operation both during and outside of the Federal emission test procedure.

(ii) For purposes of investigations of possible cold temperature CO defeat devices under this paragraph (d), the manufacturer shall provide an expla-

nation which must show, to the satisfaction of the Administrator, that CO emissions are reasonably controlled in reference to the linear guideline, across the intermediate temperature range.

[57 FR 31900, July 17, 1992]

§ 86.094-17 Emission control diagnostic system for 1994 and later light-duty vehicles and light-duty trucks.

(a) All light-duty vehicles and light-duty trucks shall be equipped with an emission control diagnostic system capable of identifying, for each vehicle's useful life, the following types of deterioration or malfunction which could cause emission increases greater than or exceeding the following threshold levels as measured and calculated in accordance with test procedures set forth in subpart B of this part. Paragraphs (a)(2) and (a)(3) of this section do not apply to diesel cycle light-duty vehicles or light-duty trucks. Paragraphs (a)(1) through (a)(4) of this section do not apply to natural gas-fueled light-duty vehicles and light-duty trucks until the 1998 model year.

(1) Catalyst deterioration before it results in both an exhaust emission exceedance of 0.6 g/mi HC and an exhaust emission increase of 0.4 g/mi HC.

(2) Engine misfire before it results in an exhaust emission increase of greater than 0.4 g/mi HC, 3.4 g/mi CO, or 1.0 g/mi NO_x.

(3) Oxygen sensor deterioration before it results in an exhaust emission increase of greater than 0.2 g/mi HC, 1.7 g/mi CO, or 0.5 g/mi NO_x.

(4) Any other deterioration or malfunction within the powertrain which occurs in actual use and which results in an exhaust emission increase of greater than 0.2 g/mi HC, 1.7 g/mi CO, or 0.5 g/mi NO_x, or any vapor leak which results in an evaporative emissions increase of greater than 30.0 g/test measured over the first 24 hours of the diurnal portion of the revised evaporative emissions test procedure, in accordance with test procedures set forth in subpart B of this part, for vehicles certified to that test procedure.

(b)(1) The electronic evaporative emission purge control, if equipped, and all emission-related powertrain

components connected to a computer shall, at a minimum, be monitored for circuit continuity. In lieu of monitoring circuit continuity, a functional system check may be performed provided the manufacturer can demonstrate that the functional check is equivalent or superior to the circuit continuity monitor. All components required by these regulations to be monitored shall be evaluated periodically, but no less frequently than once per Urban Dynamometer Driving Schedule as defined in appendix I, paragraph (a), of this part, or similar trip.

(2) For non-diesel cycle light-duty vehicles and light-duty trucks, the emission control diagnostic system shall at a minimum, monitor catalytic converters and oxygen sensors and shall detect misfiring cylinders.

(3) Oxygen sensor deterioration or malfunction which renders that sensor incapable of performing its function as part of the OBD system shall be identified on vehicles so equipped.

(c) The emission control diagnostic system shall incorporate a malfunction indicator light (MIL) readily visible to the vehicle operator. When illuminated, it shall display "Check Engine," "Service Engine Soon," or a similar phrase approved by the Administrator. A vehicle shall not be equipped with more than one general purpose malfunction indicator light for emission-related problems; separate specific purpose warning lights (e.g. brake system, fasten seat belt, oil pressure, etc.) are permitted. The use of red for the OBD-related malfunction indicator light is prohibited.

(d) The MIL shall illuminate and remain illuminated when any of the conditions specified in paragraphs (a) and (b) of this section are met, or whenever the engine control enters a default or secondary mode of operation. The MIL shall blink under any period of operation during which engine misfire is occurring at a level likely to cause catalyst damage as determined by the manufacturer. The MIL shall also illuminate when the vehicle's ignition is in the "key-on" position before engine starting or cranking and extinguish after engine starting if no malfunction has previously been detected. If a fuel system or engine misfire malfunction

has previously been detected, the MIL may be extinguished if the malfunction does not reoccur during three subsequent sequential trips during which engine speed is within 375 rpm, engine load is within 10 percent, and the engine's warm-up status is the same as that under which the malfunction was first detected, and no new malfunctions have been detected. If any malfunction other than a fuel system or engine misfire malfunction has been detected, the MIL may be extinguished if the malfunction does not reoccur during three subsequent sequential trips during which the monitoring system responsible for illuminating the MIL functions without detecting the malfunction, and no new malfunctions have been detected.

(e)(1) The emission control diagnostic system shall record code(s) indicating the status of the emission control system. Absent the presence of any fault codes, separate status codes shall be used to identify correctly functioning emission control systems and those emission control systems which need further vehicle operation to be fully evaluated. Fault codes shall be stored for deterioration or malfunction causing MIL illumination; the fault code shall identify the type of malfunction.

(2) For a single misfiring cylinder, the fault code(s) shall identify the cylinder, unless the manufacturer submits data and/or an engineering evaluation which adequately demonstrate that the misfiring cylinder cannot be reliably identified under certain operating conditions; multiple misfiring cylinders need not be uniquely identified if a distinct multiple misfire fault code is stored.

(3) A fault code shall be stored when the emission control system reverts to a default or secondary mode of operation.

(4) The diagnostic system may erase a fault code if the same fault is not re-registered in at least 40 engine warm-up cycles, and the malfunction indicator light (see paragraph (d) of this section) is not illuminated for that fault code.

(f) *Available Diagnostic Signals.* (1) Upon determination of the first malfunction of any component or system, "freeze frame" engine conditions

present at the time shall be stored in computer memory. Should a subsequent fuel system or misfire malfunction occur, any previously stored freeze frame conditions shall be replaced by the fuel system or misfire conditions (whichever occurs first). Stored engine conditions shall include, but are not limited to: Engine speed, open or closed loop operation, fuel system commands, coolant temperature, calculated load value, fuel pressure, vehicle speed, air flow rate, and intake manifold pressure if the information needed to determine these conditions is available to the computer. For freeze frame storage, the manufacturer shall include the most appropriate set of conditions to facilitate effective repairs. If the fault code causing the conditions to be stored is erased in accordance with paragraph (c) of this section, the stored engine conditions may also be erased.

(2) The following signals in addition to the required freeze frame information shall be made available on demand through the serial port on the standardized data link connector, if the information is available to the on-board computer or can be determined using information available to the on-board computer: Diagnostic trouble codes, engine coolant temperature, fuel control system status (closed loop, open loop, other), fuel trim, ignition timing advance, intake air temperature, manifold air pressure, air flow rate, engine RPM, throttle position sensor output value, secondary air status (upstream, downstream, or atmosphere), calculated load value, vehicle speed, and fuel pressure. The signals shall be provided in standard units based on SAE specifications incorporated by reference in paragraph (h) of this section. Actual signals shall be clearly identified separately from default value or limp home signals. In addition, the capability to perform bi-directional diagnostic control based on SAE specifications shall be made available on demand through the serial port on the standardized data link connector per SAE specifications as referenced in paragraph (h) of this section.

(3) For all emission control components and systems for which specific on-board evaluation tests are con-

ducted (catalyst, oxygen sensor, etc.), the results of the most recent test performed by the vehicle, and the limits to which the system is compared shall be available through the data link per SAE J1979 specifications as referenced in paragraph (h) of this section beginning no later than the 1997 model year. The Administrator may allow a pass/fail indication for the most recent test results for those monitored components and systems for which such an indication is more appropriate (e.g., misfire detection, fuel system monitoring, etc.).

(4) The OBD requirements to which the vehicle is certified (i.e., California OBD II or Federal OBD), and the major emission control systems monitored by the OBD system consistent with paragraph (h)(3) of this section, shall be available through the serial data port on the standardized data link connector per SAE specifications as referenced in paragraph (h) of this section.

(g) The emission control diagnostic system is not required to evaluate components during malfunction conditions if such evaluation would result in a risk to safety or component failure.

(h) The emission control diagnostic system shall provide for standardized access and conform with the following Society of Automotive Engineers (SAE) standards. The following SAE documents are incorporated by reference. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the SAE documents may be obtained from the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096-0001. Copies may be inspected at Docket No. A-90-35 at EPA's Air docket (LE-131), room 1500 M, 1st Floor, Waterside Mall, 401 M St., SW., Washington, DC, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

(1) SAE J1850 "Class B Data Communication Network Interface," (AUG91) shall be used as the on-board to off-

board communications protocol. All emission related messages sent to the scan tool over a J1850 data link shall use the Cyclic Redundancy Check and the three byte header, and shall not use inter-byte separation or check-sums.

(2) Basic diagnostic data (as specified in § 86.094-17(f)) shall be provided in the format and units in SAE J1979 "E/E Diagnostic Test Modes," (DEC91). Basic bi-directional diagnostic capability shall be available and be consistent with SAE J1979 messages.

(3) Fault codes shall be consistent with SAE J2012 "Recommended Format and Messages for Diagnostic Trouble Code Definitions," (MAR92) Part C.

(4) The connection interface between the OBD system and test equipment and diagnostic tools shall meet the functional requirements of SAE J1962 "Diagnostic Connector," (JUN92).

(5) Limitation of Access—Any limitation of access to the diagnostic system shall be consistent with § 86.094-18. Access to vehicle calibration data, vehicle odometer, and keyless entry codes can be limited under the provisions of § 86.094.

(i) Upon application by the manufacturer, the Administrator may either waive the requirements of this section for specific components of any class or category of light-duty vehicles or light-duty trucks for model years 1994 or 1995 (or both), or through the 1999 model year, the Administrator may accept an OBD system as compliant even though specific requirements are not fully met. Such waivers or compliances without meeting specific requirements will be granted only if compliance would be infeasible or unreasonable considering such factors as, but not limited to, technical feasibility, lead time and production cycles including phase-in or phase-out of engines or vehicle designs and programmed upgrades of computers, and if any unmet requirements are not carried over from the previous model year except where unreasonable hardware modifications would be necessary to correct the non-compliance, and the manufacturer has demonstrated an acceptable level of effort toward compliance as determined by the Administrator. For alternate fueled vehicles (i.e. natural gas, lique-

fied petroleum gas, or methanol), beginning with the model year for which alternate fuel emission standards are applicable and extending through the 1999 model year, manufacturers may request the Administrator to waive specific monitoring requirements of this section for which monitoring may not be reliable with respect to the use of the alternate fuel. At a minimum, all vehicles covered by this section, including those receiving a waiver as described in this paragraph, shall be equipped with an OBD system meeting either the California OBD I requirements, or some acceptable portion of the California OBD II or federal OBD requirements as specified in this section, except that for the 1994 and 1995 model years EPA may grant a waiver to a system less than OBD I giving consideration to such factors as manufacturer projections of very low sales volume for an engine family (e.g., 5000 or less), scheduled phase-out of significant engine technology with the 1994 or 1995 model years for that engine family, and whether or not the engine, or any similar engine within the manufacturer's product line, has ever been equipped with an OBD I or similar OBD system.

(j) Demonstration of compliance with California OBD II requirements (Title 13 California Code section 1968.1) as modified pursuant to California Mail Out #95-34 (September 26, 1995), shall satisfy the requirements of this section through the 1998 model year except that compliance with Title 13 California Code section 1968.1(d), pertaining to tampering protection, is not required to satisfy the requirements of this section.

[58 FR 9485, Feb. 19, 1993, as amended at 59 FR 48497, Sept. 21, 1994; 59 FR 15247, Mar. 23, 1995; 60 FR 37945, July 25, 1995; 60 FR 39266, Aug. 2, 1995; 61 FR 45903, Aug. 30, 1996; 63 FR 7719, Feb. 17, 1998]

§ 86.094-21 Application for certification.

(a) A separate application for a certificate of conformity shall be made for each set of standards (or family emission limits, as appropriate) and each class of new motor vehicles or new