

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, alternate fuel vehicles shall be equipped with an OBD system meeting OBD requirements to the extent feasible as approved by the Administrator.

(j) Demonstration of compliance with California OBD II requirements (Title 13 California Code Sec. 1968.1), as modified pursuant to California Mail Out #97-24 (December 9, 1997), shall satisfy the requirements of this section, except that compliance with Title 13 California Code Secs. 1968.1(b)(4.2.2), pertaining to evaporative leak detection, and 1968.1(d), pertaining to tampering protection, are not required to satisfy the requirements of this section, and the deficiency fine provisions of 1968.1(m)(6.1) and (6.2) shall not apply.

(k) For engine families required to have an emission control diagnostic system (an OBD system), certification will not be granted if, for any test vehicle approved by the Administrator in consultation with the manufacturer, the malfunction indicator light does not illuminate under any of the following circumstances, unless the manufacturer can demonstrate that any identified OBD problems discovered during the Administrator's evaluation will be corrected on production vehicles. Only paragraphs (k)(5) and (k)(6) of this section apply to diesel cycle vehicles and diesel cycle trucks where such vehicles and trucks are so equipped.

(1) A catalyst is replaced with a deteriorated or defective catalyst, or an electronic simulation of such, resulting in an increase of 1.5 times the NMHC standard above the NMHC emission level measured using a representative 4000 mile catalyst system.

(2) An engine misfire condition is induced resulting in exhaust emissions exceeding 1.5 times the applicable standards for NMHC, CO or NO_x.

(3) Any oxygen sensor is replaced with a deteriorated or defective oxygen sensor, or an electronic simulation of such, resulting in exhaust emissions

exceeding 1.5 times the applicable standard for NMHC, CO or NO_x.

(4) A vapor leak is introduced in the evaporative and/or refueling system (excluding the tubing and connections between the purge valve and the intake manifold) greater than or equal in magnitude to a leak caused by a 0.040 inch diameter orifice, or the evaporative purge air flow is blocked or otherwise eliminated from the complete evaporative emission control system.

(5) A malfunction condition is induced in any emission-related powertrain system or component, including but not necessarily limited to, the exhaust gas recirculation (EGR) system, if equipped, the secondary air system, if equipped, and the fuel control system, singularly resulting in exhaust emissions exceeding 1.5 times the applicable emission standard for NMHC, CO or NO_x.

(6) A malfunction condition is induced in an electronic emission-related powertrain system or component not otherwise described above that either provides input to or receives commands from the on-board computer resulting in a measurable impact on emissions.

[64 FR 23925, May 4, 1999, as amended at 65 FR 6853, Feb. 10, 2000; 69 FR 18803, Apr. 9, 2004; 71 FR 51488, Aug. 30, 2006]

§ 86.1806-04 On-board diagnostics.

This § 86.1806-04 includes text that specifies requirements that differ from § 86.1806-01. Where a paragraph in § 86.1806-01 is identical and applicable to § 86.1806-04 this may be indicated by specifying the corresponding paragraph and the statement “[Reserved]. For guidance see § 86.1806-01.”

(a)-(g). [Reserved]. For guidance see § 86.1806-01.

(h) Reference materials. The OBD system shall provide for standardized access and conform with the following Society of Automotive Engineers (SAE) standards and/or the following International Standards Organization (ISO) standards. The following documents are incorporated by reference, see § 86.1:

(1) SAE material. (i) SAE J1850 “Class B Data Communication Network Interface,” (Revised, May 2001) 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 checksums.

(ii) Basic diagnostic data (as specified in §§ 86.094-17(e) and (f)) shall be provided in the format and units in SAE J1979 “E/E Diagnostic Test Modes—Equivalent to ISO/DIS 15031-5:April 30, 2002”, (Revised, April 2002).

(iii) Diagnostic trouble codes shall be consistent with SAE J2012 “Diagnostic Trouble Code Definitions—Equivalent to ISO/DIS 15031-6:April 30, 2002”, (Revised, April 2002).

(iv) The connection interface between the OBD system and test equipment and diagnostic tools shall meet the functional requirements of SAE J1962 “Diagnostic Connector—Equivalent to ISO/DIS 15031-3:December 14, 2001” (Revised, April 2002).

(v) All acronyms, definitions and abbreviations shall be formatted according to SAE J1930 “Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms” Equivalent to ISO/TR 15031-2:April 30, 2002”, (Revised, April 2002).

(vi) All equipment used to interface, extract and display OBD-related information shall meet SAE J1978 “OBD II Scan Tool” Equivalent to ISO 15031-4:December 14, 2001”, (Revised, April 2002).

(vii) As an alternative to the above standards, heavy-duty vehicles may conform to the specifications of the SAE J1939 series of standards (SAE J1939-11, J1939-13, J1939-21, J1939-31, J1939-71, J1939-73, J1939-81).

(2) ISO materials. Copies of these materials may be obtained from the International Organization for Standardization, Case Postale 56, CH-1211 Geneva 20, Switzerland.

(i) ISO 9141-2 “Road vehicles—Diagnostic systems—Part 2: CARB requirements for interchange of digital information,” (February 1, 1994) may be used as an alternative to SAE J1850 as the on-board to off-board communications protocol.

(ii) ISO 14230-4:2000(E) “Road vehicles—Diagnostic systems—KWP 2000 requirements for Emission-related sys-

tems”, (June 1, 2000) may also be used as an alternative to SAE J1850.

(iii) ISO 15765-4.3:2001 “Road Vehicles-Diagnostics on Controller Area Network (CAN)—Part 4: Requirements for emission-related systems”, (December 14, 2001) may also be used as an alternative to SAE J1850.

(i) [Reserved]. For guidance see § 86.1806-01.

(j) *California OBDII compliance option.* For light-duty vehicles, light-duty trucks, and heavy-duty vehicles weighing 14,000 pounds GVWR or less, demonstration of compliance with California OBD II requirements (Title 13 California Code of Regulations § 1968.2 (13 CCR 1968.2)), as modified, approved and filed on April 21, 2003, shall satisfy the requirements of this section, except that compliance with 13 CCR 1968.2(e)(4.2.2)(C), pertaining to 0.02 inch evaporative leak detection, and 13 CCR 1968.2(d)(1.4), pertaining to tampering protection, are not required to satisfy the requirements of this section. Also, the deficiency provisions of 13 CCR 1968.2(i) do not apply. The deficiency provisions of paragraph (i) of this section and the evaporative leak detection requirement of paragraph (b)(4) of this section apply to manufacturers selecting this paragraph for demonstrating compliance. In addition, demonstration of compliance with 13 CCR 1968.2(e)(16.2.1)(C), to the extent it applies to the verification of proper alignment between the camshaft and crankshaft, applies only to vehicles equipped with variable valve timing.

(k) [Reserved]. For guidance see § 86.1806-01.

(1) *Thresholds for California OBD II Compliance Option.* For the purposes of complying with the provisions set forth above in paragraph (j), vehicles certified to Tier 2 standards shall utilize multiplicative factors from the California vehicle type (i.e. LEV II, ULEV II) corresponding to the Tier 2 to which the vehicles are certified. Vehicles certified to Tier 2, Bin 4 emissions standards shall utilize the Tier 2 Bin 4 emission standards and the CARB ULEV II multiplicative factors to determine the appropriate OBD malfunction threshold for all pollutants except NO_x, for which they shall utilize that CARB

SULEV II multiplicative factors. Vehicles certified to Tier 2, Bin 3 emissions standards shall utilize the Tier 2 Bin 3 emission standards and the CARB ULEV II multiplicative factors to determine the appropriate OBD malfunction threshold for all pollutants except NO_x, for which they shall utilize that CARB SULEV II multiplicative factors. Vehicles certified to Tier 2, Bin 2 emissions standards shall utilize the Tier 2 Bin 2 emission standards and the CARB SULEV II multiplicative factors to determine the appropriate OBD malfunction threshold. Vehicles certified to Tier 2 Bin 7 or higher shall utilize the CARB LEV II multiplicative factors to determine the appropriate OBD malfunction threshold.

[68 FR 35799, June 17, 2003, as amended at 70 FR 75410, Dec. 20, 2005; 71 FR 51488, Aug. 30, 2006]

§ 86.1806-05 On-board diagnostics.

(a) *General.* (1) Except as provided by paragraph (a)(2) of this section, all light-duty vehicles, light-duty trucks and complete heavy-duty vehicles weighing 14,000 pounds GVWR or less (including MDPVs) must be equipped with an onboard diagnostic (OBD) system capable of monitoring all emission-related powertrain systems or components during the applicable useful life of the vehicle. All systems and components required to be monitored by these regulations must be evaluated periodically, but no less frequently than once per applicable certification test cycle as defined in paragraphs (a) and (d) of Appendix I of this part, or similar trip as approved by the Administrator.

(2) Diesel fueled MDPVs and heavy-duty vehicles weighing 14,000 pounds GVWR or less that are not MDPVs must meet the OBD requirements of this section according to the phase-in schedule in paragraph (1) of this section. Paragraph (1) of this section does not apply to Otto-cycle MDPVs.

(3) An OBD system demonstrated to fully meet the requirements in § 86.004-17 may be used to meet the requirements of this section, provided that such an OBD system also incorporates appropriate transmission diagnostics as may be required under this section, and provided that the Administrator

finds that a manufacturer's decision to use the flexibility in this paragraph (a)(3) is based on good engineering judgement.

(b) *Malfunction descriptions.* The OBD system must detect and identify malfunctions in all monitored emission-related powertrain systems or components according to the following malfunction definitions as measured and calculated in accordance with test procedures set forth in subpart B of this part (chassis-based test procedures), excluding those test procedures defined as "Supplemental" test procedures in § 86.004-2 and codified in §§ 86.158, 86.159, and 86.160.

(1) *Catalysts and particulate traps—(i) Otto-cycle.* Catalyst deterioration or malfunction before it results in an increase in NMHC emissions 1.5 times the NMHC standard or FEL, as compared to the NMHC emission level measured using a representative 4000 mile catalyst system.

(ii) *Diesel.* (A) If equipped, catalyst deterioration or malfunction before it results in exhaust emissions exceeding 1.5 times the applicable standard or FEL for NO_x or PM. This requirement applies only to reduction catalysts; monitoring of oxidation catalysts is not required. This monitoring need not be done if the manufacturer can demonstrate that deterioration or malfunction of the system will not result in exceedance of the threshold.

(B) If equipped with a particulate trap, catastrophic failure of the device must be detected. Any particulate trap whose complete failure results in exhaust emissions exceeding 1.5 times the applicable standard or FEL for NO_x or PM must be monitored for such catastrophic failure. This monitoring need not be done if the manufacturer can demonstrate that a catastrophic failure of the system will not result in exceedance of the threshold.

(2) *Engine misfire—(i) Otto-cycle.* Engine misfire resulting in exhaust emissions exceeding 1.5 times the applicable standard or FEL for NMHC, CO or NO_x; and any misfire capable of damaging the catalytic converter.

(ii) *Diesel.* Lack of cylinder combustion must be detected.