

and restarted. This procedure may also be used for 1988–1989 model year Ford Motor Company vehicles but may not be used for other vehicles. The probe may be removed from the tailpipe or the sample pump turned off if necessary to reduce analyzer fouling during the restart procedure.

(ii) The mode timer starts (mt=0) 5 seconds after the dynamometer speed has reached zero. The minimum idle mode length is determined as described in paragraph (d)(2)(iii) of this section. The maximum idle mode length is 90 seconds elapsed time (mt=90).

(iii) The pass/fail analysis begins after an elapsed time of ten seconds (mt=10). A pass or fail determination is made for the vehicle and the mode is terminated in accordance with paragraphs (d)(2)(iii) (A) through (D) of this section.

(A) The vehicle passes the idle mode and the test is immediately terminated if, prior to an elapsed time of 30 seconds (mt=30), measured values are less than or equal to 100 ppm HC and 0.5 percent CO.

(B) The vehicle passes the idle mode and the test is terminated at the end of an elapsed time of 30 seconds (mt=30) if, prior to that time, the criteria of paragraph (d)(2)(ii)(A) of this section are not satisfied, and the measured values are less than or equal to the applicable short test standards as determined by the procedure described in paragraph (a)(2) of this section.

(C) The vehicle passes the idle mode and the test is immediately terminated if, at any point between an elapsed time of 30 seconds (mt=30) and 90 seconds (mt=90), measured values are less than or equal to the applicable short test standards described in paragraph (a)(2) of this section.

(D) The vehicle fails the idle mode and the test is terminated if none of the provisions of paragraphs (d)(2)(ii)(A), (B), and (C) of this section is satisfied by an elapsed time of 90 seconds (mt=90).

[58 FR 58409, Nov. 1, 1993]

§ 85.2220 Preconditioned two speed idle test—EPA 91.

(a) *General requirements*—(1) *Exhaust gas sampling algorithm.* The analysis of exhaust gas concentrations begins ten

seconds after the applicable test mode begins. Exhaust gas concentrations must be analyzed at a minimum rate of once every 0.75 second. The measured value for pass/fail determinations is a simple running average of the measurements taken over five seconds.

(2) *Pass/fail determination.* A pass or fail determination is made for each applicable test mode based on a comparison of the short test standards contained in §§ 85.2203 and 85.2204, and the measured value for HC and CO as described in paragraph (a)(1) of this section. A vehicle passes the test mode if any pair of simultaneous values for HC and CO are below or equal to the applicable short test standards. A vehicle fails the test mode if the values for either HC or CO, or both, in all simultaneous pairs of values are above the applicable standards.

(3) *Void test conditions.* The test immediately terminates and any exhaust gas measurements are voided if the measured concentration of CO plus CO₂ falls below six percent or the vehicle's engine stalls at any time during the test sequence.

(4) *Multiple exhaust pipes.* Exhaust gas concentrations from vehicle engines equipped with multiple exhaust pipes must be sampled simultaneously.

(5) The test is immediately terminated upon reaching the overall maximum test time.

(b) *Test sequence.* (1) The test sequence consists of a first-chance test and a second-chance test as described in paragraphs (b)(1) (i) and (ii) of this section.

(i) The first-chance test, as described under paragraph (c) of this section, consists of a first-chance high-speed mode followed immediately by a first-chance idle mode.

(ii) The second-chance test as described under paragraph (d) of this section is performed only if the vehicle fails the first-chance test.

(2) The test sequence begins only after the requirements described in paragraphs (b)(2) (i) through (iv) of this section are met.

(i) The vehicle is tested in as-received condition with the transmission in neutral or park and all accessories

turned off. The engine must be at normal operating temperature (as indicated by a temperature gauge, temperature lamp, touch test on the radiator hose, or other visual observation indicating that overheating has not occurred).

(ii) For all pre-1996 model year vehicles, a tachometer shall be attached to the vehicle in accordance with the analyzer manufacturer's instructions. For 1996 and newer model year vehicles the OBD data link connector will be used to monitor RPM. In the event that an OBD data link connector is not available or that an RPM signal is not available over the data link connector, a tachometer shall be used instead.

(iii) The sample probe is inserted into the vehicle's tailpipe to a minimum depth of 10 inches. If the vehicle's exhaust system prevents insertion to this depth, a tailpipe extension must be used.

(iv) The measured concentration of CO plus CO₂ must be greater than or equal to six percent.

(c) *First-chance test.* The test timer starts (tt=0) when the conditions specified in paragraph (b)(2) of this section are met. The overall maximum test time is 290 seconds (tt=290). The first-chance test consists of a high-speed mode followed immediately by an idle mode.

(1) *First-chance high-speed mode.* (i) The mode timer starts (mt=0) when the vehicle engine speed is between 2200 and 2800 rpm. If the engine speed falls below 2200 rpm or exceeds 2800 rpm for more than two seconds in one excursion, or more than six seconds over all excursions within 30 seconds of the final measured value used in the pass/fail determination, the measured value is invalidated and the mode continued. If any excursion lasts for more than ten seconds, the mode timer resets to zero (mt=0) and timing resumes. The high-speed mode length is 90 seconds elapsed time (mt=90).

(ii) The pass/fail analysis begins after an elapsed time of ten seconds (mt=10). A pass or fail determination is made for the vehicle and the mode is terminated in accordance with paragraphs (c)(1)(ii)(A) through (C) of this section.

(A) The vehicle passes the high-speed mode and the mode is terminated at an

elapsed time of 90 seconds (mt=90) if any measured values are less than or equal to the applicable short test standards as determined by the procedure described in paragraph (a)(2) of this section.

(B) The vehicle fails the high-speed mode and the mode is terminated if the requirements of paragraph (c)(1)(ii)(A) of this section are not satisfied by an elapsed time of 90 seconds (mt=90).

(C) *Optional.* The vehicle may fail the first-chance test and any subsequent test may be omitted if no exhaust gas concentration lower than 1800 ppm HC is found at an elapsed time of 30 seconds (mt=30).

(2) *First-chance idle mode.* (i) The mode timer starts (mt=0) when the vehicle engine speed is between 350 and 1100 rpm. If the engine speed exceeds 1100 rpm or falls below 350 rpm, the mode timer resets to zero and resumes timing. The minimum first-chance idle mode length is determined as described in paragraph (c)(2)(ii) of this section. The maximum first-chance idle mode length is 90 seconds elapsed time (mt=90).

(ii) The pass/fail analysis begins after an elapsed time of ten seconds (mt=10). A pass or fail determination is made for the vehicle and the mode is terminated in accordance with paragraphs (c)(2)(ii) (A) through (D) of this section.

(A) The vehicle passes the idle mode and the test is immediately terminated if, prior to an elapsed time of 30 seconds (mt=30), measured values are less than or equal to 100 ppm HC and 0.5 percent CO.

(B) The vehicle passes the idle mode and the test is terminated at the end of an elapsed time of 30 seconds (mt=30) if, prior to that time, the criteria of paragraph (c)(2)(ii)(A) of this section are not satisfied, and the measured values are less than or equal to the applicable short test standards as determined by the procedure described in paragraph (a)(2) of this section.

(C) The vehicle passes the idle mode and the test is immediately terminated if, at any point between an elapsed time of 30 seconds (mt=30) and 90 seconds (mt=90), the measured values are less than or equal to the applicable short test standards as determined by

the procedure described in paragraph (a)(2) of this section.

(D) The vehicle fails the idle mode and the test is terminated if none of the provisions of paragraphs (c)(2)(ii) (A), (B), and (C) of this section is satisfied by an elapsed time of 90 seconds (mt=90). Alternatively, the vehicle may be failed if the provisions of paragraphs (c)(2) (i) and (ii) of this section are not met within the elapsed time of 30 seconds.

(d) *Second-chance test.* (1) If the vehicle fails either mode of the first-chance test, the test timer resets to zero (tt=0) and a second-chance test begins. The second-chance test is performed based on the first-chance test failure mode or modes as described in paragraphs (d)(1) (i) through (iii) of this section.

(i) If the vehicle failed only the first-chance high-speed mode, the second-chance test consists of a second-chance high-speed mode as described in paragraph (d)(2) of this section. The overall maximum test time is 280 seconds (tt=280).

(ii) If the vehicle failed only the first-chance idle mode, the second-chance test consists of a second-chance preconditioning mode followed immediately by a second-chance idle mode as described in paragraphs (d) (3) and (4) of this section. The overall maximum test time is 425 seconds (tt=425).

(iii) If both the first-chance high-speed mode and first-chance idle mode were failed, the second-chance test consists of the second-chance high-speed mode followed immediately by the second-chance idle mode as described in paragraphs (d) (2) and (4) of this section. However, if during this second-chance procedure, the vehicle fails the second-chance high-speed mode, then the second-chance idle mode may be eliminated. The overall maximum test time is 425 seconds (tt=425).

(2) *Second-chance high-speed mode—(i) Ford Motor Company and Honda vehicles.* The engines of 1981–1987 model year Ford Motor Company vehicles and 1984–1985 model year Honda Preludes must be shut off for not more than ten seconds and then restarted. The probe may be removed from the tailpipe or the sample pump turned off if necessary to reduce analyzer fouling dur-

ing the restart procedure. This procedure may also be used for 1988–1989 model year Ford Motor Company vehicles but may not be used for other vehicles.

(ii) The mode timer resets (mt=0) when the vehicle engine speed is between 2200 and 2800 rpm. If the engine speed falls below 2200 rpm or exceeds 2800 rpm for more than two seconds in one excursion, or more than six seconds over all excursions within 30 seconds of the final measured value used in the pass/fail determination, the measured value is invalidated and the mode continued. The minimum second-chance high-speed mode length is determined as described in paragraphs (d)(2) (iii) and (iv) of this section. If any excursion lasts for more than ten seconds, the mode timer resets to zero (mt=0) and timing resumes. The maximum second-chance high-speed mode length is 180 seconds elapsed time (mt=180).

(iii) In the case where the second-chance high-speed mode is not followed by the second-chance idle mode, the pass/fail analysis begins after an elapsed time of ten seconds (mt=10). A pass or fail determination is made for the vehicle and the mode is terminated in accordance with paragraphs (d)(2)(iii) (A) through (D) of this section.

(A) The vehicle passes the high-speed mode and the test is immediately terminated if, prior to an elapsed time of 30 seconds (mt=30), measured values are less than or equal to 100 ppm HC and 0.5 percent CO.

(B) The vehicle passes the high-speed mode and the test is terminated if at the end of an elapsed time of 30 seconds (mt=30) if, prior to that time, the criteria of paragraph (d)(2)(iii)(A) of this section are not satisfied, and the measured values are less than or equal to the applicable short test standards as determined by the procedure described in paragraph (a)(2) of this section.

(C) The vehicle passes the high-speed mode and the test is immediately terminated if, at any point between an elapsed time of 30 seconds (mt=30) and

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180 seconds (mt=180), the measured values are less than or equal to the applicable short test standards as determined by the procedure described in paragraph (a)(2) of this section.

(D) The vehicle fails the high-speed mode and the test is terminated if none of the provisions of paragraphs (d)(2)(iii) (A), (B), and (C) of this section is satisfied by an elapsed time of 180 seconds (mt=180).

(iv) In the case where the second-chance high-speed mode is followed by the second-chance idle mode, the pass/fail analysis begins after an elapsed time of ten seconds (mt=10). A pass or fail determination is made for the vehicle and the mode is terminated in accordance with paragraphs (d)(2)(iv)(A) and (B) of this section.

(A) The vehicle passes the high-speed mode and the mode is terminated at the end of an elapsed time of 180 seconds (mt=180) if any measured values are less than or equal to the applicable short test standards as determined by the procedure described in paragraph (a)(2) of this section.

(B) The vehicle fails the high-speed mode and the mode is terminated if paragraph (d)(2)(iv)(A) of this section is not satisfied by an elapsed time of 180 seconds (mt=180).

(3) *Second-chance preconditioning mode.* The mode timer starts (mt=0) when engine speed is between 2200 and 2800 rpm. The mode continues for an elapsed time of 180 seconds (mt=180). If the engine speed falls below 2200 rpm or exceeds 2800 rpm for more than five seconds in any one excursion, or 15 seconds over all excursions, the mode timer resets to zero and resumes timing.

(4) *Second-chance idle mode—(i) Ford Motor Company and Honda vehicles.* The engines of 1981-1987 model year Ford Motor Company vehicles and 1984-1985 model year Honda Preludes must be shut off for not more than ten seconds and then restarted. The probe may be removed from the tailpipe or the sample pump turned off if necessary to reduce analyzer fouling during the restart procedure. This procedure may also be used for 1988-1989 model year Ford Motor Company vehicles but may not be used for other vehicles.

(ii) The mode timer starts (mt=0) when the vehicle engine speed is between 350 and 1100 rpm. If the engine speed exceeds 1100 rpm or falls below 350 rpm the mode timer resets to zero and resumes timing. The minimum second-chance idle mode length is determined as described in paragraph (d)(4)(iii) of this section. The maximum second-chance idle mode length is 90 seconds elapsed time (mt=90).

(iii) The pass/fail analysis begins after an elapsed time of ten seconds (mt=10). A pass or fail determination is made for the vehicle and the mode is terminated in accordance with paragraphs (d)(4)(iii) (A) through (D) of this section.

(A) The vehicle passes the second-chance idle mode and the test is immediately terminated if, prior to an elapsed time of 30 seconds (mt=30), measured values are less than or equal to 100 ppm HC and 0.5 percent CO.

(B) The vehicle passes the second-chance idle mode and the test is terminated at the end of an elapsed time of 30 seconds (mt=30) if, prior to that time, the criteria of paragraph (d)(4)(iii)(A) of this section are not satisfied, and the measured values are less than or equal to the applicable short test standards as determined by the procedure described in paragraph (a)(2) of this section.

(C) The vehicle passes the second-chance idle mode and the test is immediately terminated if, at any point between an elapsed time of 30 seconds (mt=30) and 90 seconds (mt=90), measured values are less than or equal to the applicable short test standards described in paragraph (a)(2) of this section.

(D) The vehicle fails the second-chance idle mode and the test is terminated if none of the provisions of paragraphs (d)(4)(iii) (A), (B), and (C) of this section is satisfied by an elapsed time of 90 seconds (mt=90).

[58 FR 58411, Nov. 1, 1993, as amended at 61 FR 40947, Aug. 6, 1996]

§ 85.2221 [Reserved]

§ 85.2222 On-board diagnostic test procedures.

The test sequence for the inspection of on-board diagnostic systems on 1996