

occurs first. Repeat as specified in paragraph (c)(3) of this section for multiple exhaust pipes, if necessary.

(5) The engine speed is reduced to free idle with transmission in neutral. Record exhaust concentrations after stabilized readings are obtained or at the end of 30 seconds, whichever occurs first. Repeat as specified in paragraph (c)(3) of this section for multiple exhaust pipes, if necessary.

(6) For vehicles with multiple exhaust pipes, the separate results from each pipe for each mode (as specified in paragraphs (c)(3), (4), and (5) of this section) must be numerically averaged for each pollutant, unless hardware which is capable of simultaneously sampling multiple tailpipe vehicles has been used.

(7) The idle mode final results shall be the lowest HC and lowest CO readings from steps (3) and (5).

(d) Exhaust concentration measurements from both the idle mode and the high-speed mode are not required. The short test may be used to evaluate emissions from either mode alone or from both modes, the choice being made by the jurisdiction implementing the inspection program. If exhaust concentrations are not measured on a given mode, the vehicle must be operated at the specified test condition for 15 to 30 seconds. The final idle mode, described in paragraph (c)(5) of this section, may be omitted if only high-speed mode exhaust concentrations are to be measured or if the vehicle is below idle standards on the first measurement, paragraph (c)(3) of this section. The high-speed mode may be omitted if only idle mode exhaust concentrations are to be measured and if the vehicle is below idle standards on the first measurement.

[49 FR 24323, June 12, 1984. Redesignated and amended at 58 FR 58403, 58404, Nov. 1, 1993]

§ 85.2215 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 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 an idle mode followed by a high-speed mode.

(ii) The second-chance high-speed mode, as described under paragraph (c) of this section, immediately follows the first-chance high-speed mode. It is performed only if the vehicle fails the first-chance test. The second-chance idle mode, as described under paragraph (d) of this section, follows the second-chance high-speed mode and is performed only if the vehicle fails the idle mode of the first-chance test.

(2) The test sequence begins only after the requirements listed 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 and second-chance high-speed mode.* The test timer starts (tt=0) when the conditions specified in paragraph (b)(2) of this section are met. The overall maximum test time for the first-chance test and second-chance high-speed mode is 425 seconds (tt=425). The first-chance test consists of an idle mode followed immediately by a high-speed mode. This is followed immediately by an additional second-chance high-speed mode, if necessary.

(1) *First-chance idle mode.* (i) The mode timer starts (mt=0) when the vehicle engine speed is between 350 and 1100 rpm. If engine speed exceeds 1100 rpm or falls below 350 rpm, the mode timer resets to zero and resumes timing. The minimum idle mode length is determined as described in paragraph (c)(1)(ii) of this section. The maximum 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 terminated as described in paragraphs (c)(1)(ii) (A) through (E) of this section.

(A) The vehicle passes the idle mode and the mode 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 mode is terminated at the end of an elapsed time of 30 seconds (mt=30) if, prior to that time, the criteria of paragraph (c)(1)(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 mode 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 mode is terminated if none of the provisions of paragraphs (c)(1)(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)(1)(ii) (A) and (B) of this section are not met within an elapsed time of 30 seconds.

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

(2) *First-chance and second-chance high-speed modes.* This mode includes both the first-chance and second-chance high-speed modes, and follows immediately upon termination of the first-chance idle mode.

(i) The mode timer resets (mt=0) when the vehicle engine speed is between 2200 and 2800 rpm. If 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 minimum high-speed mode length is

determined as described under paragraphs (c)(2) (i) and (iii) of this section. The maximum high-speed mode length is 180 seconds elapsed time (mt=180).

(ii) *Ford Motor Company and Honda vehicles.* For 1981-1987 model year Ford Motor Company vehicles and 1984-1985 model year Honda Preludes, the pass/fail analysis begins after an elapsed time of ten seconds (mt=10) using the following procedure. This procedure may also be used for 1988-1989 model year Ford Motor Company vehicles but may not be used for other vehicles.

(A) For vehicles that *passed* the idle mode, a pass or fail determination is used to determine whether the high-speed test should be terminated *prior* to or at the end of an elapsed time of 180 seconds (mt=180), as described in paragraphs (c)(2)(ii)(A) (1) through (4) of this section.

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

(2) The vehicle passes the high-speed 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)(1) 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.

(3) 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 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.

(4) *Restart.* If at an elapsed time of 90 seconds (mt=90) the measured values are greater than the applicable short test standards as determined by the procedure described in paragraph (a)(2) of this section, the vehicle's engine must be shut off for not more than ten seconds after returning to idle and then is 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. The mode timer will stop upon engine shut off (mt=90) and resume upon engine restart. The pass/fail determination resumes as follows after 100 seconds have elapsed (mt=100).

(i) The vehicle passes the high-speed mode and the test is immediately terminated if, at any point between an elapsed time of 100 seconds (mt=100) and 180 seconds (mt=180), the measured values are less than or equal to the applicable short test standards described in paragraph (a)(2) of this section.

(ii) The vehicle fails the high-speed mode and the test is terminated if paragraph (c)(2)(ii)(A)(4)(i) of this section is not satisfied by an elapsed time of 180 seconds (mt=180).

(B) A pass or fail determination is made for vehicles that *failed* the idle mode and the high-speed mode terminated at the *end* of an elapsed time of 180 seconds (mt=180) as described in paragraphs (c)(2)(ii)(B) (1) and (2) of this section.

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

(2) *Restart.* If at an elapsed time of 90 seconds (mt=90) the measured values of HC and CO exhaust gas concentrations during the high-speed mode are greater than the applicable short test standards as determined by the procedure in paragraph (a)(2) of this section, the vehicle's engine must be shut off for not more than ten seconds after returning to idle and then is 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. The mode timer will stop upon engine shut off (mt=90) and resume upon engine restart. The pass/fail determination resumes, as described in paragraphs (c)(2)(ii)(B)(2) (i) and (ii) of this section after 100 seconds have elapsed (mt=100).

(i) The vehicle passes the high-speed mode and the mode is terminated at an elapsed time of 180 seconds (mt=180) if

any measured values of HC and CO exhaust gas concentrations during the high-speed mode are less than or equal to the applicable short test standards as determined by the procedure described in paragraph (a)(2) of this section.

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

(iii) *All other light-duty motor vehicles.* The pass/fail analysis for vehicles not specified in paragraph (c)(2)(ii) of this section begins after an elapsed time of ten seconds (mt=10) using the procedure described in paragraphs (c)(2)(iii)(A) and (B) of this section.

(A) For vehicles that *passed* the idle mode, a pass or fail determination is used to determine whether the high-speed mode should be terminated *prior* to or at the end of an elapsed time of 180 seconds (mt=180), as described in paragraphs (c)(2)(iii)(A) (1) through (4) of this section.

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

(2) The vehicle passes the high-speed 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)(iii)(A)(1) 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 in paragraph (a)(2) of this section.

(3) 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 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.

(4) The vehicle fails the high-speed mode and the test is terminated if none of the provisions of paragraphs (c)(2)(iii)(A) (1), (2), and (3) of this section is satisfied by an elapsed time of 180 seconds (mt=180).

(B) A pass or fail determination is made for vehicles that *failed* the idle mode and the high-speed mode terminated at the *end* of an elapsed time of 180 seconds (mt=180) as described in paragraphs (c)(2)(iii)(B) (1) and (2) of this section.

(1) The vehicle passes the high-speed mode and the mode is terminated at 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.

(2) The vehicle fails the high-speed mode and the test is terminated if paragraph (c)(2)(iii)(B)(1) of this section is not satisfied by an elapsed time of 180 seconds (mt=180).

(d) *Second-chance idle mode.* If the vehicle fails the first-chance idle mode and passes the high-speed mode, the test timer resets to zero (tt=0) and a second-chance idle mode begins. The overall maximum test time for the second-chance idle mode is 145 seconds (tt=145). The test consists of an idle mode only.

(1) 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 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.

(2) 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)(3) of this section. The maximum second-chance idle mode length is 90 seconds elapsed time (mt=90).

(3) 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 second-chance idle mode is terminated in accordance with paragraphs (d)(3) (i) through (iv) of this section.

(i) 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), any measured values are less than or equal to 100 ppm HC and 0.5 percent CO.

(ii) 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)(3)(i) 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.

(iii) 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), 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.

(iv) The vehicle fails the second-chance idle mode and the test is terminated if none of the provisions of paragraphs (d)(3) (i), (ii), and (iii) of this section is satisfied by an elapsed time of 90 seconds (mt=90).

[58 FR 58405, Nov. 1, 1993, as amended at 61 FR 40947, Aug. 6, 1996]

§ 85.2216 Loaded test—EPA 81.

(a)(1) *General calendar year applicability.* The test procedure described in this section may be used to establish Emissions Performance Warranty eligibility through December 31, 1993, except as allowed in paragraph (a)(2) of this section.

(2) *Special calendar and model year applicability.* (i) The extended applicability described in paragraphs (a)(2) (ii) through (iv) of this section is restricted to 1995 and earlier model year vehicles or engines.

(ii) In a state for which the Administrator has approved a State Implementation Plan revision providing for the implementation of a basic decentralized program meeting the requirements of part 51, subpart S of this chapter, according to the schedule specified in § 51.373 of this chapter, the test procedure described in this section may be

used to establish Emissions Performance Warranty eligibility through December 31, 1993.

(iii) In a state for which the Administrator has approved a State Implementation Plan revision providing for the implementation of a basic centralized program meeting the requirements of part 51, subpart S of this chapter, according to the schedule specified in § 51.373 of this chapter, the test procedure described in this section may be used to establish Emissions Performance Warranty eligibility through June 30, 1994.

(iv) In a state for which the Administrator has approved a State Implementation Plan revision providing for the implementation of an enhanced program meeting the requirements of part 51, subpart S of this chapter, according to the schedule specified in § 51.373 of this chapter, the test procedure described in this section may be used to establish Emissions Performance Warranty eligibility through December 31, 1995.

(b) *General requirements.* Vehicles shall be tested in as-received condition. Engines shall be at normal operating temperature and not overheating (as indicated by gauge, warning light or boiling radiator) with all accessories off. An auxiliary cooling fan is optional.

(c) *Test sequence.* (1) The dynamometer and analyzers shall be warmed-up, in stabilized operating condition and adjusted as required in §§ 85.2216 and 85.2217.

(2) The vehicle shall be placed on the dynamometer.

(3) The sample probe shall be inserted into the tailpipe.

(4) *Optional.* A high speed mode, maximum 50 mph and 30 seconds duration, is permitted if vehicle overheating does not occur.

(5) Drive for automatic or 3rd gear for manual transmissions shall be used. The vehicle shall be operated at 30 ± 1 mph roll speed while measuring exhaust HC and CO. Record exhaust concentrations after stabilized readings are obtained or at the end of 30 seconds, whichever occurs first. This process shall be repeated as necessary for multiple exhaust pipes, or hardware which is capable of simultaneously