

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 sampling vehicles with multiple tailpipes may be used. Neither multiple readings nor simultaneous sampling hardware is necessary for exhaust systems in which the exhaust pipes originate from a common point.

(6) The vehicle must be idled 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)(5) of this section for multiple exhaust pipes, if necessary.

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

(d) Exhaust concentration measurements from both the loaded mode and the idle 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 the loaded mode the vehicle shall be operated at the specified test condition for 15 to 30 seconds. If idle exhaust concentrations are not measured, the idle mode may be omitted.

[49 FR 24323, June 12, 1984. Redesignated and amended at 58 FR 58403, 58407, Nov. 1, 1993]

#### § 85.2217 Loaded 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 seconds. 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 CO<sub>2</sub> 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 loaded mode using a chassis dynamometer followed immediately by an idle mode as described in paragraphs (c) (1) and (2) of this section.

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

(i) The dynamometer must be warmed up, in stabilized operating condition, adjusted, and calibrated in accordance with the procedures of § 85.2233. Prior to each test, variable-curve dynamometers must be checked for proper setting of the road-load indicator or road-load controller.

(ii) The vehicle is tested in as-received condition with 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).

(iii) The vehicle must be operated during each mode of the test with the gear selector in the position described

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in paragraphs (b)(2)(iii) (A) and (B) of this section.

(A) In drive for automatic transmissions and in second (or third if more appropriate) for manual transmissions for the loaded mode.

(B) In park or neutral for the idle mode.

(iv) 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.

(v) The measured concentration of CO plus CO<sub>2</sub> must be greater than or equal to six percent.

(c) *Overall test procedure.* The test timer starts (tt=0) when the conditions specified in paragraph (b)(2) of this section are met and the mode timer initiates as specified in paragraph (c)(1) of this section. The overall maximum test time is 240 seconds (tt=240). The test is immediately terminated upon reaching the overall maximum test time.

(1) *Loaded mode—(i) Ford Motor Company and Honda vehicles.* (Optional.) 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. 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) when the dynamometer speed is within the limits specified for the vehicle engine size according to the following schedule. If the dynamometer speed falls outside the limits for more than five seconds in one excursion, or 15 seconds over all excursions, the mode timer resets to zero and resumes timing. The minimum mode length is determined as described in paragraph (c)(1)(iii)(A) of this section. The maximum mode length is 90 seconds elapsed time (mt=90).

DYNAMOMETER TEST SCHEDULE

Gasoline engine size, No. cylinders	Roll speed, mph (kph)	Normal loading, brake hp (kilowatts)
4 or less .....	22-25 (35-40) .....	2.8-4.1 (2.1-3.1)
5-6 .....	29-32 (47-52) .....	6.8-8.4 (5.1-6.3)
7 or more .....	32-35 (52-56) .....	8.4-10.8 (6.3-8.1)

(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 (c)(1)(iii)(A) through (C) of this section.

(A) The vehicle passes the loaded 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), measured values are less than or equal to the applicable short test standard described in paragraph (a)(2) of this section.

(B) The vehicle fails the loaded mode and the mode is terminated if paragraph (c)(1)(iii)(A) of this section is not satisfied by an elapsed time of 90 seconds (mt=90).

(C) *Optional.* The vehicle may fail the loaded mode and any subsequent idle mode 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) *Idle mode—(i) Ford Motor Company and Honda vehicles.* (Optional.) 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. 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 (c)(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 (c)(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 (c)(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 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 terminates if none of the provisions of paragraphs (c)(2)(iii) (A), (B), and (C) of this section is satisfied by an elapsed time of 90 seconds (mt=90).

[58 FR 58407, Nov. 1, 1993]

**§ 85.2218 Preconditioned 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 ei-

ther 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 CO<sub>2</sub> 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 preconditioning mode followed by an 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