

driving cycles of the UDDS, as described in paragraph (a)(4) of this section.

(7) The manufacturer may, for certification testing, precondition vehicles at temperatures above 20 °F (-7 °C) and with temperature tolerances greater than those specified in §86.230(a) if the manufacturer has determined that such preconditioning does not decrease CO emissions during the testing specified in §86.237.

(b) Within five minutes of completion of preconditioning, the vehicle shall be shut off. During this five minute period, the vehicle shall not experience ambient temperatures less than 10 °F (-12 °C) nor more than 30 °F (-1 °C).

(c) One of the following two methods shall be utilized to stabilize the vehicle before the emissions test:

(1) *Storing at cold temperatures.* The vehicle shall be stored for not less than 12 hours nor for more than 36 hours prior to the cold start exhaust test. The ambient temperature (dry bulb) during this period shall be maintained at an average temperature of 20 °F±5 °F (-7 °C±2.8 °C) during each hour of this period and shall not be less than 10 °F (-12 °C) nor more than 30 °F (-1 °C). The ambient temperature reported shall be a simple average of the test cell temperature measured at constant intervals no more than one minute apart. In addition, the temperature may not exceed 25 °F (-4 °C) or fall below 15 °F (-9 °C) for more than three consecutive minutes.

(2) *Force-cooling or warming.* (i) The vehicle shall be stored for no more than 36 hours prior to cooling or warming for the cold start exhaust test. The vehicle shall not be stored at ambient temperatures which exceed 86 °F (30 °C) during this period.

(ii) Vehicle cooling may be accomplished by either force-cooling or force-warming the vehicle to the test temperature. If cooling is augmented by fans, the fans shall be placed in a vertical position for maximum drive train and engine cooling, not primarily oil pan cooling. Fans shall not be placed under the vehicle.

(iii) The ambient temperature need only be stringently controlled after the vehicle has been cooled to 20 °F±3 °F (-7 °C±1.7 °C), as determined by a rep-

resentative bulk oil temperature. A representative bulk oil temperature is the temperature of the oil measured near the middle of the oil, not at the surface or at the bottom of the oil pan. If two or more diverse locations in the oil are monitored, they must all meet the temperature requirements.

(iv) The vehicle must be stored for at least one hour after it has been cooled to 20 °F±3 °F (-7 °C±1.7 °C) prior to the cold start exhaust test. The ambient temperature (dry bulb) during this period shall average 20 °F±5 °F (-7 °C±2.8 °C) and shall not be less than 10 °F (-12 °C) nor more than 30 °F (-1 °C). In addition, the temperature may not exceed 25 °F (-4 °C) or fall below 15 °F (-9 °C) for more than three consecutive minutes.

(d) If the vehicle is stabilized at 20 °F (-7 °C) in a separate area and is moved through a warm area to the test cell, the vehicle must be restabilized in the test cell for at least six times the period the vehicle is exposed to warmer temperatures. The ambient temperature (dry bulb) during this period shall average 20 °F±5 °F (-7 °C±2.8 °C) and shall not be less than 10 °F (-12 °C) nor more than 30 °F (-1 °C). In addition, the temperature may not exceed 25 °F (-4 °C) or fall below 15 °F (-9 °C) for more than three consecutive minutes. The maximum time for moving a vehicle through a warm area shall be 10 minutes.

§§ 86.233-94—86.234-94 [Reserved]

§ 86.235-94 **Dynamometer procedure.**

(a) *Overview.* The emission sampling is completed over two test sequences, a “cold” start test after a minimum 12-hour and a maximum 36-hour soak according to the provisions of §86.232 and a “hot” start test following the “cold” start test by 10 minutes. Engine startup, operation over the UDDS, and engine shut-down make a complete cold start test. Engine startup and operation over the first 505 seconds of the driving schedule complete the hot start test. The exhaust emissions are diluted with ambient air and a continuously proportional sample is collected for analysis during each phase. The composite samples collected in bags are analyzed for hydrocarbons, carbon

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monoxide, carbon dioxide, and, optionally, other pollutants. A parallel sample of the dilution air is similarly analyzed for carbon monoxide and, optionally, hydrocarbons, carbon dioxide, and oxides of nitrogen.

(b) As long as an emission sample is not taken, practice runs over the prescribed driving schedule may be performed at test point for the purpose of finding the minimum throttle action to maintain the proper speed-time relationship or to permit sampling system adjustment.

(c) Humidity should be set low enough to prevent condensation on the dynamometer rolls.

(d) The dynamometer shall be warmed as recommended by the dynamometer manufacturer and using procedures or control methods that assure stability of the residual frictional horsepower.

(e) The time between dynamometer warming and the start of the emission test shall be no longer than 10 minutes if the dynamometer bearings are not independently heated. If the dynamometer bearings are independently heated, the emission test shall begin no longer than 20 minutes after dynamometer warming.

(f) If the dynamometer horsepower must be adjusted manually, it shall be set within one hour prior to the exhaust emission test phase. The test vehicle shall not be used to make the adjustment. Dynamometers using automatic control of preselectable power settings may be set anytime prior to the beginning of the emission test.

(g) The driving distance, as measured by counting the number of dynamometer roll or shaft revolutions, shall be determined for the transient cold start, stabilized cold start, and transient hot start phases of the test.

(h) Four-wheel drive vehicles will be tested in a two-wheel drive mode of operation. Full-time four-wheel drive vehicles will have one set of drive wheels temporarily disengaged by the vehicle manufacturer. Four-wheel drive vehicles which can be manually shifted to a two-wheel drive mode will be tested in the normal on-highway two-wheel drive mode of operation.

§ 86.236–94 Engine starting and re-starting.

The provisions of § 86.136 apply to this subpart.

§ 86.237–94 Dynamometer test run, gaseous emissions.

(a) The complete dynamometer test consists of a cold start drive of approximately 7.5 miles (12.1 kilometers) and a hot start drive of approximately 3.6 miles (5.8 kilometers).

(b) If the preconditioned vehicle is not already on the dynamometer, it shall be pushed into position.

(c) The vehicle is allowed to stand on the dynamometer during the ten minute time period between the cold and hot start test. The cold start test is divided into two periods. The first period, representing the cold start “transient” phase, terminates at the end of the deceleration which is scheduled to occur at 505 seconds of the driving schedule. The second period, representing the “stabilized” phase, consists of the remainder of the driving schedule, including engine shutdown. The hot start test is identical to the first part or transient phase of the cold start test. Therefore, the hot start test terminates after the first period (505 seconds) is run.

(d) The provisions of § 86.137(b) apply to this subpart.

§§ 86.238–94—86.239–94 [Reserved]

§ 86.240–94 Exhaust sample analysis.

The provisions of § 86.140 apply to this subpart.

§ 86.241–94 [Reserved]

§ 86.242–94 Records required.

The provisions of § 86.142–90 apply to this subpart.

§ 86.243–94 [Reserved]

§ 86.244–94 Calculations; exhaust emissions.

The provisions of § 86.144–94 apply to this subpart, except that NO_x measurements are optional. Should NO_x measurements be calculated, note that the humidity correction factor is not valid at colder temperatures.