

## § 90.306

## 40 CFR Ch. I (7-1-00 Edition)

and power output must meet the engine speed and torque accuracy requirements shown in Table 2 in Appendix A of this subpart. The dynamometer must be capable of performing the test cycle described in § 90.410.

### (b) *Dynamometer calibration accuracy.*

(1) The dynamometer test stand and other instruments for measurement of power output must meet the calibration frequency shown in Table 2 in Appendix A of this subpart.

(2) A minimum of three calibration weights for each range used is required. The weights must be equally spaced and traceable to within 0.5 percent of National Institute for Standards and Testing (NIST) weights. Laboratories located in foreign countries may certify calibration weights to local government bureau standards.

### § 90.306 **Dynamometer torque cell calibration.**

(a)(1) Any lever arm used to convert a weight or a force through a distance into a torque must be used in a horizontal position for horizontal shaft dynamometers ( $\pm$  five degrees). For vertical shaft dynamometers, a pulley system may be used to convert the dynamometer's horizontal loading into the vertical plane.

(2) Calculate the indicated torque (IT) for each calibration weight to be used by:

$$IT = \text{Moment Arm (meters)} \times \text{Calibration Weight (Newtons)}$$

(3) Attach each calibration weight specified in § 90.305(b)(2) to the moment arm at the calibration distance determined in paragraph (a)(2) of this section. Record the power measurement equipment response (N-m) to each weight.

(4) Compare the torque value measured to the calculated torque.

(5) The measured torque must be within two percent of the calculated torque.

(6) If the measured torque is not within two percent of the calculated torque, adjust or repair the system. Repeat steps in paragraphs (a)(1) through (a)(6) of this section with the adjusted or repaired system.

(b) Option. A master load-cell or transfer standard may be used to verify the torque measurement system.

(1) The master load-cell and read out system must be calibrated using weights specified in § 90.305(b)(2).

(2) Attach the master load-cell and loading system.

(3) Load the dynamometer to a minimum of three equally spaced torque values as indicated by the master load-cell for each in-use range used.

(4) The in-use torque measurement must be within two percent of the torque measured by the master system for each load used.

(5) If the in-use torque is not within two percent of the master torque, adjust or repair the system. Repeat steps in paragraphs (b)(2) through (b)(4) of this section with the adjusted or repaired system.

(c) Calibrated resistors may not be used for engine flywheel torque transducer calibration, but may be used to span the transducer prior to engine testing.

(d) Other engine dynamometer system calibrations such as speed are performed as specified by the dynamometer manufacturer or as dictated by good engineering practice.

### § 90.307 **Engine cooling system.**

An engine cooling system is required with sufficient capacity to maintain the engine at normal operating temperatures as prescribed by the engine manufacturer. Auxiliary fan(s) may be used to maintain sufficient engine cooling during engine dynamometer operation.

### § 90.308 **Lubricating oil and test fuels.**

(a) *Lubricating oil.* Use the engine lubricating oil which meets the engine manufacturer's specifications for a particular engine and intended usage.

(1) Manufacturers must use engine lubricants representative of commercially available engine lubricants.

(2) For 2-stroke engines, the fuel/oil mixture ratio must be that which is recommended by the manufacturer.

(b) *Test Fuels—Certification.* (1) The manufacturer must use gasoline having the specifications, or substantially equivalent specifications approved by the Administrator, as specified in Table 3 in Appendix A of this subpart