(iii) NO and NO_2 in purified nitrogen (the amount of NO_2 in this calibration gas must not exceed 5 percent of the NO content).

(iv) Oxygen in purified nitrogen.

(v) CO_2 in purified nitrogen.

(vi) Methane in purified synthetic air.

(2) The calibration gases in paragraph (c)(1) of this section must be traceable to within one percent of NIST gas standards or other gas standards we have approved. Span gases in paragraph (c)(1) of this section must be accurate to within two percent of true concentration, where true concentration refers to NIST gas standards, or other gas standards we have approved. Record concentrations of calibration gas as volume percent or volume ppm.

(3) You may use gases for species other than those in paragraph (c)(1) of this section (such as methanol in air gases used to determine response factors), as long as they meet the following criteria:

(i) They are traceable to within ±2 percent of NIST gas standards or other standards we have approved.

(ii) They remain within ±2 percent of the labeled concentration. Show this by measuring quarterly with a precision of ±2 percent (two standard deviations) or by using another method we approve. You may take multiple measurements. If the true concentration of the gas changes by more than two percent, but less than ten percent, you may relabel the gas with the new concentration.

(4) You may generate calibration and span gases using precision blending devices (gas dividers) to dilute gases with purified nitrogen or with purified synthetic air. Make sure the mixing device produces a concentration of blended calibration gases that is accurate to within ± 1.5 percent. To do so, you must know the concentration of primary gases used for blending to an accuracy of at least ± 1 percent, traceable to NIST gas standards or other gas standards we have approved. For each calibration incorporating a blending device, verify the blending accuracy between 15 and 50 percent of full scale. You may optionally check the blending device with an instrument that is linear by nature (for example, using NO gas with a CLD). Adjust the instrument's span value with the span gas connected directly to it. Check the blending device at the used settings to ensure that the difference between nominal values and measured concentrations at each point stays within ± 0.5 percent of the nominal value.

(d) *Oxygen interference gases.* Gases to check oxygen interference are mixtures of oxygen, nitrogen, and propane. The oxygen concentration must be 20–22 percent and the propane concentration must be 50–90 percent of the maximum value in the most typically used FID range. Independently measure the concentration of total hydrocarbons plus impurities by chromatographic analysis or by dynamic blending.

Subpart D—Analyzer and Equipment Calibrations

§ 1065.301 Overview.

Calibrate all analyzers and equipment at least annually, but make the actual frequency consistent with good engineering judgment. We may establish other guidelines as appropriate. Calibrate following specifications in one of three sources:

(a) Recommendations from the manufacturer of the analyzers or equipment.

(b) 40 CFR part 86, subpart F or subpart N.

(c) 40 CFR part 90, subparts D and E, as applicable.

§ 1065.305 International calibration standards.

(a) You may ask to use international standards for calibration.

(b) You need not ask for approval to use standards that have been shown to be traceable to NIST standards.

§ 1065.310 CVS calibration.

Use the procedures of 40 CFR 86.1319–90 to calibrate the CVS.

[69 FR 39261, June 29, 2004]

EFFECTIVE DATE NOTE: At 69 FR 39261, June 29, 2004, text was added to § 1065.310, effective Aug. 30, 2004.

§ 1065.315 Torque calibration.

You must use one of two techniques to calibrate torque: the lever-arm dead-weight or the transfer technique. You may use other techniques if you show they are equally accurate. The NIST "true value" torque is defined as the torque calculated by taking the product of an NIST traceable weight or force and a sufficiently accurate horizontal distance along a lever arm, corrected for the lever arm's hanging torque.

(a) The lever-arm dead-weight technique involves placing known weights at a known horizontal distance from the torque-measuring device's center of rotation. You need two types of equipment:

(1) *Calibration weights.* This technique requires at least six calibration weights for each range of torque-measuring device used. Equally space the weights and make sure each one is traceable to NIST weights. You also may use weights certified by a U.S. state government's bureau of weights and measures. If your laboratory is outside the U.S., see § 1065.305 for information about using non-NIST standards. You may account for effects of changes in gravitational constant at the test site.

(2) *Lever arm.* This technique also requires a lever arm at least 20 inches long. Make sure the horizontal distance from the torque-measurement device's centerline to the point where you apply the weight is accurate to within ±0.10 inches. You must balance the arm or know its hanging torque to within ±0.1 ft-lbs.

(b) The transfer technique involves calibrating a master load cell (dynamometer case load cell). You may calibrate the master load cell with known calibration weights at known horizontal distances. Or you may use a hydraulically actuated, precalibrated, master load cell and then transfer this calibration to the device that measures the flywheel torque. The transfer technique involves three main steps:

(1) Precalibrate a master load cell or calibrate it following paragraph (a)(1) of this section. Use known weights traceable to NIST with the lever arms specified in paragraph (b)(2) of this section. Run or vibrate the dynamometer during this calibration to reduce static hysteresis.

(2) Use lever arms at least 20 inches long. The horizontal distances from the master load cell's centerline to the dynamometer's centerline and to the point where you apply weight or force must be accurate to within ±0.10 inches. Balance the arms or know their net hanging torque to within ±0.1 ft-lbs.

(3) Transfer calibration from the case or master load cell to the torque-measuring device with the dynamometer operating at a constant speed. Calibrate the torque-measurement device's readout to the master load cell's torque readout at a minimum of six loads spaced about equally across the full useful ranges of both measurement devices. (Good engineering practice requires that both devices have about the same useful ranges of torque measurement.) Transfer the calibration so it meets the accuracy requirements in § 1065.105(a)(2) for readouts from the torque-measurement device.

Subpart E—Engine Selection, Preparation, and Service Accumulation

§ 1065.401 Selecting a test engine.

While all engine configurations within a certified engine family must comply with the applicable standards in the standard-setting part, you are not required to test each configuration for certification.

(a) Select for testing according to the following guidance the engine configuration within the engine family that is most likely to exceed an emission standard:

(1) Test the engine that we specify, whether we do this through general guidance or give you specific instructions.

(2) If we do not tell you which engine to test, follow any instructions in the standard-setting part.

(3) If we do not tell you which engine to test and the standard-setting part does not include specifications for selecting test engines, use good engineering judgment to select the engine configuration within the engine family that is most likely to exceed an emission standard.

(b) In the absence of other information, the following characteristics are