

§ 1065.295

for comparison with any proposed alternate measurement procedure under § 1065.10.

(c) *Pan design.* We recommend that you use a balance pan designed to minimize corner loading of the balance, as follows:

(1) Use a pan that centers the PM sample on the weighing pan. For example, use a pan in the shape of a cross that has upswept tips that center the PM sample media on the pan.

(2) Use a pan that positions the PM sample as low as possible.

(d) *Balance configuration.* Configure the balance for optimum settling time and stability at your location.

EFFECTIVE DATE NOTE: At 73 FR 37300, June 30, 2008, § 1065.290 was amended by revising paragraph (c)(1), effective July 7, 2008. For the convenience of the user, the revised text is set forth as follows:

§ 1065.290 PM gravimetric balance.

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(c) * * *

(1) Use a pan that centers the PM sample media (such as a filter) on the weighing pan. For example, use a pan in the shape of a cross that has upswept tips that center the PM sample media on the pan.

§ 1065.295 PM inertial balance for field-testing analysis.

(a) *Application.* You may use an inertial balance to quantify net PM on a sample medium for field testing.

(b) *Component requirements.* We recommend that you use a balance that meets the specifications in Table 1 of § 1065.205. Note that your balance-based system must meet the linearity verification in § 1065.307. If the balance uses an internal calibration process for routine spanning and linearity verifications, the process must be NIST-traceable. You may use an inertial PM balance that has compensation algorithms that are functions of other gaseous measurements and the engine's known or assumed fuel properties. The target value for any compensation al-

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gorithm is 0.0% (that is, no bias high and no bias low), regardless of the uncompensated signal's bias.

Subpart D—Calibrations and Verifications

§ 1065.301 Overview and general provisions.

(a) This subpart describes required and recommended calibrations and verifications of measurement systems. See subpart C of this part for specifications that apply to individual instruments.

(b) You must generally use complete measurement systems when performing calibrations or verifications in this subpart. For example, this would generally involve evaluating instruments based on values recorded with the complete system you use for recording test data, including analog-to-digital converters. For some calibrations and verifications, we may specify that you disconnect part of the measurement system to introduce a simulated signal.

(c) If we do not specify a calibration or verification for a portion of a measurement system, calibrate that portion of your system and verify its performance at a frequency consistent with any recommendations from the measurement-system manufacturer, consistent with good engineering judgment.

(d) Use NIST-traceable standards to the tolerances we specify for calibrations and verifications. Where we specify the need to use NIST-traceable standards, you may alternatively ask for our approval to use international standards that are not NIST-traceable.

§ 1065.303 Summary of required calibration and verifications.

The following table summarizes the required and recommended calibrations and verifications described in this subpart and indicates when these have to be performed:

TABLE 1 OF § 1065.303—SUMMARY OF REQUIRED CALIBRATION AND VERIFICATIONS

Type of calibration or verification	Minimum frequency ^a
§ 1065.305: accuracy, repeatability and noise.	<i>Accuracy:</i> Not required, but recommended for initial installation. <i>Repeatability:</i> Not required, but recommended for initial installation. <i>Noise:</i> Not required, but recommended for initial installation.

TABLE 1 OF § 1065.303—SUMMARY OF REQUIRED CALIBRATION AND VERIFICATIONS—Continued

Type of calibration or verification	Minimum frequency ^a
§ 1065.307: linearity	<p><i>Speed:</i> Upon initial installation, within 370 days before testing and after major maintenance.</p> <p><i>Torque:</i> Upon initial installation, within 370 days before testing and after major maintenance.</p> <p><i>Electrical power:</i> Upon initial installation, within 370 days before testing and after major maintenance.</p> <p><i>Clean gas and diluted exhaust flows:</i> Upon initial installation, within 370 days before testing and after major maintenance, unless flow is verified by propane check or by carbon or oxygen balance.</p> <p><i>Raw exhaust flow:</i> Upon initial installation, within 185 days before testing and after major maintenance, unless flow is verified by propane check or by carbon or oxygen balance.</p> <p><i>Gas analyzers:</i> Upon initial installation, within 35 days before testing and after major maintenance.</p> <p><i>PM balance:</i> Upon initial installation, within 370 days before testing and after major maintenance.</p> <p><i>Stand-alone pressure and temperature:</i> Upon initial installation, within 370 days before testing and after major maintenance.</p>
§ 1065.308: Continuous analyzer system response and recording.	Upon initial installation, after system reconfiguration, and after major maintenance.
§ 1065.309: Continuous analyzer uniform response.	Upon initial installation, after system reconfiguration, and after major maintenance.
§ 1065.310: torque	Upon initial installation and after major maintenance.
§ 1065.315: pressure, temperature, dew-point.	Upon initial installation and after major maintenance.
§ 1065.320: fuel flow	Upon initial installation and after major maintenance.
§ 1065.325: intake flow	Upon initial installation and after major maintenance.
§ 1065.330: exhaust flow	Upon initial installation and after major maintenance.
§ 1065.340: diluted exhaust flow (CVS)	Upon initial installation and after major maintenance.
§ 1065.341: CVS and batch sampler verification.	Upon initial installation, within 35 days before testing, and after major maintenance.
§ 1065.345: vacuum leak	Before each laboratory test according to subpart F of this part and before each field test according to subpart J of this part.
§ 1065.350: CO ₂ NDIR H ₂ O interference	Upon initial installation and after major maintenance.
§ 1065.355: CO NDIR CO ₂ and H ₂ O interference.	Upon initial installation and after major maintenance.
§ 1065.360: FID optimization, etc.	<p><i>Calibrate, optimize, and determine CH₄ response:</i> upon initial installation and after major maintenance.</p> <p><i>Verify CH₄ response:</i> upon initial installation, within 185 days before testing, and after major maintenance.</p>
§ 1065.362: raw exhaust FID O ₂ interference.	Upon initial installation, after FID optimization according to § 1065.360, and after major maintenance.
§ 1065.365: nonmethane cutter penetration	Upon initial installation, within 185 days before testing, and after major maintenance.
§ 1065.370: CLD CO ₂ and H ₂ O quench	Upon initial installation and after major maintenance.
§ 1065.372: NDUV HC and H ₂ O interference.	Upon initial installation and after major maintenance.
§ 1065.376: chiller NO ₂ penetration	Upon initial installation and after major maintenance.
§ 1065.378: NO ₂ -to-NO converter conversion.	Upon initial installation, within 35 days before testing, and after major maintenance.
§ 1065.390: PM balance and weighing	<p><i>Independent verification:</i> upon initial installation, within 370 days before testing, and after major maintenance.</p> <p><i>Zero, span, and reference sample verifications:</i> within 12 hours of weighing, and after major maintenance.</p>
§ 1065.395: Inertial PM balance and weighing.	<p><i>Independent verification:</i> upon initial installation, within 370 days before testing, and after major maintenance.</p> <p><i>Other verifications:</i> upon initial installation and after major maintenance.</p>

^a Perform calibrations and verifications more frequently, according to measurement system manufacturer instructions and good engineering judgment.

EFFECTIVE DATE NOTE: At 73 FR 37300, June 30, 2008, § 1065.303 was revised, effective July 7, 2008. For the convenience of the user, the revised text is set forth as follows:

§ 1065.303 Summary of required calibration and verifications.

The following table summarizes the required and recommended calibrations and verifications described in this subpart and indicates when these have to be performed:

TABLE 1 OF § 1065.303.—SUMMARY OF REQUIRED CALIBRATION AND VERIFICATIONS

Type of calibration or verification	Minimum frequency ^a
§ 1065.305: Accuracy, repeatability and noise.	Accuracy: Not required, but recommended for initial installation.
§ 1065.307: Linearity	Repeatability: Not required, but recommended for initial installation. Noise: Not required, but recommended for initial installation. Speed: Upon initial installation, within 370 days before testing and after major maintenance. Torque: Upon initial installation, within 370 days before testing and after major maintenance. Electrical power: Upon initial installation, within 370 days before testing and after major maintenance. Clean gas and diluted exhaust flows: Upon initial installation, within 370 days before testing and after major maintenance, unless flow is verified by propane check or by carbon or oxygen balance. Raw exhaust flow: Upon initial installation, within 185 days before testing and after major maintenance, unless flow is verified by propane check or by carbon or oxygen balance. Gas analyzers: Upon initial installation, within 35 days before testing and after major maintenance. PM balance: Upon initial installation, within 370 days before testing and after major maintenance. Stand-alone pressure and temperature: Upon initial installation, within 370 days before testing and after major maintenance.
§ 1065.308: Continuous analyzer system response and recording.	Upon initial installation, after system reconfiguration, and after major maintenance.
§ 1065.309: Continuous analyzer uniform response.	Upon initial installation, after system reconfiguration, and after major maintenance.
§ 1065.310: Torque	Upon initial installation and after major maintenance.
§ 1065.315: Pressure, temperature, dew-point.	Upon initial installation and after major maintenance.
§ 1065.320: Fuel flow	Upon initial installation and after major maintenance.
§ 1065.325: Intake flow	Upon initial installation and after major maintenance.
§ 1065.330: Exhaust flow	Upon initial installation and after major maintenance.
§ 1065.340: Diluted exhaust flow (CVS)	Upon initial installation and after major maintenance.
§ 1065.341: CVS and batch sampler verification ^b .	Upon initial installation, within 35 days before testing, and after major maintenance.
§ 1065.345: Vacuum leak	Before each laboratory test according to subpart F of this part and before each field test according to subpart J of this part.
§ 1065.350: CO ₂ NDIR H ₂ O interference	Upon initial installation and after major maintenance.
§ 1065.355: CO NDIR CO ₂ and H ₂ O interference.	Upon initial installation and after major maintenance.
§ 1065.360: FID calibration THC FID optimization, and THC FID verification.	Calibrate all FID analyzers: Upon initial installation and after major maintenance. Optimize and determine CH ₄ response for THC FID analyzers: upon initial installation and after major maintenance. Verify CH ₄ response for THC FID analyzers: Upon initial installation, within 185 days before testing, and after major maintenance.
§ 1065.362: Raw exhaust FID O ₂ interference.	For all FID analyzers: Upon initial installation, and after major maintenance.
§ 1065.365: Nonmethane cutter penetration	For THC FID analyzers: Upon initial installation, after major maintenance, and after FID optimization according to § 1065.360.
§ 1065.370: CLD CO ₂ and H ₂ O quench	Upon initial installation, within 185 days before testing, and after major maintenance.
§ 1065.372: NDUV HC and H ₂ O interference.	Upon initial installation and after major maintenance.
§ 1065.376: Chiller NO ₂ penetration	Upon initial installation and after major maintenance.
§ 1065.378: NO ₂ -to-NO converter conversion.	Upon initial installation, within 35 days before testing, and after major maintenance.
§ 1065.390: PM balance and weighing	Independent verification: Upon initial installation, within 370 days before testing, and after major maintenance. Zero, span, and reference sample verifications: Within 12 hours of weighing, and after major maintenance.
§ 1065.395: Inertial PM balance and weighing.	Independent verification: Upon initial installation, within 370 days before testing, and after major maintenance. Other verifications: Upon initial installation and after major maintenance.

^a Perform calibrations and verifications more frequently, according to measurement system manufacturer instructions and good engineering judgment.

^b The CVS verification described in § 1065.341 is not required for systems that agree within ± 2% based on a chemical balance of carbon or oxygen of the intake air, fuel, and diluted exhaust.