AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

Pollutant	Reference or equivalent	Manual or automated	Applicable part 50 appendix	Applicable subparts of part 53					
				A	B	C	D	E	F
		Automated	J	✓		✓	✓		
$PM_{2.5}$	Reference	Manual	L	✓				✓	
	Equivalent Class I	Manual	L	✓		✓		✓	
	Equivalent Class II	Manual	L[1]	✓		✓[2]		✓	✓[1 2]
	Equivalent Class III.	Automated	L[1]	✓		✓		✓	✓[1]
$PM_{10-2.5}$	Reference	Manual	L, O	✓				✓	
	Equivalent Class I	Manual	L, O	✓		✓		✓	
	Equivalent Class II	Manual	L, O	✓		✓[2]		✓	✓[1 2]
	Equivalent Class III.	Automated	L[1], O[1]	✓		✓		✓	✓[1]

1. Some requirements may apply, based on the nature of each particular candidate method, as determined by the Administrator.
2. Alternative Class III requirements may be substituted.

[75 FR 35597, June 22, 2010]

APPENDIX A TO SUBPART A OF PART 53—REFERENCES

(1) American National Standard Quality Systems—Model for Quality Assurance in Design, Development, Production, Installation, and Servicing, ANSI/ISO/ASQC Q9001–1994. Available from American Society for Quality, P.O. Box 3005, Milwaukee, WI 53202 (*http://qualitypress.asq.org*).

(2) American National Standard Quality Systems for Environmental Data and Technology Programs—Requirements with guidance for use, ANSI/ASQC E4–2004. Available from American Society for Quality P.O. Box 3005, Milwaukee, WI 53202 (*http://qualitypress.asq.org*).

(3) Dimensioning and Tolerancing, ASME Y14.5M-1994. Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.

(4) Mathematical Definition of Dimensioning and Tolerancing Principles, ASME Y14.5.1M-1994. Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.

(5) ISO 10012, Quality Assurance Requirements for Measuring Equipment-Part 1: Meteorological confirmation system for measuring equipment):1992(E). Available from American Society for Quality Control, 611 East Wisconsin Avenue, Milwaukee, WI 53202.

(6) Quality Assurance Guidance Document 2.12. Monitoring $PM_{2.5}$ in Ambient Air Using Designated Reference or Class I Equivalent Methods. U.S. EPA, National Exposure Research Laboratory, Research Triangle Park, NC, November 1998 or later edition. Currently available at *http://www.epa.gov/ttn/amtic/pmqainf.html*.

[62 FR 38784, July 18, 1997, as amended at 71 FR 61278, Oct. 17, 2006]

Subpart B—Procedures for Testing Performance Characteristics of Automated Methods for SO_2, CO, O_3, and NO_2

SOURCE: 76 FR 54326, Aug. 31, 2011, unless otherwise noted.

§ 53.20 General provisions.

(a) The test procedures given in this subpart shall be used to test the performance of candidate automated methods against the performance requirement specifications given in table B–1 to subpart B of part 53. A test analyzer representative of the candidate automated method must exhibit performance better than, or not outside, the specified limit or limits for each such performance parameter specified (except range) to satisfy the requirements of this subpart. Except as provided in paragraph (b) of this section, the measurement range of the candidate method must be the standard range specified in table B–1 to subpart B of part 53 to satisfy the requirements of this subpart.

(b) *Measurement ranges.* For a candidate method having more than one selectable measurement range, one range must be the standard range specified in table B–1 to subpart B of part 53, and a test analyzer representative of the method must pass the tests required by this subpart while operated in that range.

(i) *Higher ranges.* The tests may be repeated for one or more higher (broader) ranges (*i.e.*, ranges extending to higher

concentrations) than the standard range specified in table B–1 to subpart B of part 53, provided that the range does not extend to concentrations more than four times the upper range limit of the standard range specified in table B–1 to subpart B of part 53. For such higher ranges, only the tests for range (calibration), noise at 80% of the upper range limit, and lag, rise and fall time are required to be repeated. For the purpose of testing a higher range, the test procedure of § 53.23(e) may be abridged to include only those components needed to test lag, rise and fall time.

(ii) *Lower ranges.* The tests may be repeated for one or more lower (narrower) ranges (*i.e.,* ones extending to lower concentrations) than the standard range specified in table B–1 to subpart B of part 53. For methods for some pollutants, table B–1 to subpart B of part 53 specifies special performance limit requirements for lower ranges. If special low-range performance limit requirements are not specified in table B–1 to subpart B of part 53, then the performance limit requirements for the standard range apply. For lower ranges for any method, only the tests for range (calibration), noise at 0% of the measurement range, lower detectable limit, (and nitric oxide interference for SO_2 UVF methods) are required to be repeated, provided the tests for the standard range shows the applicable limit specifications are met for the other test parameters.

(iii) If the tests are conducted and passed only for the specified standard range, any FRM or FEM determination with respect to the method will be limited to that range. If the tests are passed for both the specified range and one or more higher or lower ranges, any such determination will include the additional higher or lower range(s) as well as the specified standard range. Appropriate test data shall be submitted for each range sought to be included in a FRM or FEM method determination under this paragraph (b).

(c) For each performance parameter (except range), the test procedure shall be initially repeated seven (7) times to yield 7 test results. Each result shall be compared with the corresponding performance limit specification in table B–1 to subpart B of part 53; a value higher than or outside the specified limit or limits constitutes a failure. These 7 results for each parameter shall be interpreted as follows:

(1) Zero (0) failures: The candidate method passes the test for the performance parameter.

(2) Three (3) or more failures: The candidate method fails the test for the performance parameter.

(3) One (1) or two (2) failures: Repeat the test procedures for the performance parameter eight (8) additional times yielding a total of fifteen (15) test results. The combined total of 15 test results shall then be interpreted as follows:

(i) One (1) or two (2) failures: The candidate method passes the test for the performance parameter.

(ii) Three (3) or more failures: The candidate method fails the test for the performance parameter.

(d) The tests for *zero drift*, *span drift*, *lag time*, *rise time*, *fall time*, and *precision* shall be carried out in a single integrated procedure conducted at various line voltages and ambient temperatures specified in § 53.23(e). A temperature-controlled environmental test chamber large enough to contain the test analyzer is recommended for this test. The tests for *noise*, *lower detectable limit*, and *interference equivalent* shall be conducted at any ambient temperature between 20 °C and 30 °C, at any normal line voltage between 105 and 125 volts, and shall be conducted such that not more than three (3) test results for each parameter are obtained in any 24-hour period.

(e) If necessary, all measurement response readings to be recorded shall be converted to concentration units or adjusted according to the calibration curve constructed in accordance with § 53.21(b).

(f) All recorder chart tracings (or equivalent data plots), records, test data and other documentation obtained from or pertinent to these tests shall be identified, dated, signed by the analyst performing the test, and submitted.

NOTE TO § 53.20: Suggested formats for reporting the test results and calculations are provided in Figures B–2, B–3, B–4, B–5, and B–6 in appendix A to this subpart. Symbols and

abbreviations used in this subpart are listed in table B–5 of appendix A to this subpart.

§ 53.21 Test conditions.

(a) *Set-up and start-up* of the test analyzer shall be in strict accordance with the operating instructions specified in the manual referred to in § 53.4(b)(3). Allow adequate warm-up or stabilization time as indicated in the operating instructions before beginning the tests. The test procedures assume that the test analyzer has a conventional analog measurement signal output that is connected to a suitable strip chart recorder of the servo, null-balance type. This recorder shall have a chart width of at least 25 centimeters, chart speeds up to 10 cm per hour, a response time of 1 second or less, a deadband of not more than 0.25 percent of full scale, and capability either of reading measurements at least 5 percent below zero or of offsetting the zero by at least 5 percent. If the test analyzer does not have an analog signal output, or if a digital or other type of measurement data output is used for the tests, an alternative measurement data recording device (or devices) may be used for recording the test data, provided that the device is reasonably suited to the nature and purposes of the tests, and an analog representation of the analyzer measurements for each test can be plotted or otherwise generated that is reasonably similar to the analog measurement recordings that would be produced by a conventional chart recorder connected to a conventional analog signal output.

(b) *Calibration* of the test analyzer shall be carried out prior to conducting the tests described in this subpart. The calibration shall be as indicated in the manual referred to in § 53.4(b)(3) and as follows: If the chart recorder or alternative data recorder does not have below zero capability, adjust either the controls of the test analyzer or the chart or data recorder to obtain a + 5% offset zero reading on the recorder chart to facilitate observing negative response or drift. If the candidate method is not capable of negative response, the test analyzer (not the data recorder) shall be operated with a similar offset zero. Construct and submit a calibration curve showing a plot of recorder scale readings or other measurement output readings (vertical or y-axis) against pollutant concentrations presented to the analyzer for measurement (horizontal or x-axis). If applicable, a plot of base analog output units (volts, millivolts, milliamps, *etc.*) against pollutant concentrations shall also be obtained and submitted. All such calibration plots shall consist of at least seven (7) approximately equally spaced, identifiable points, including 0 and 90 ±5 percent of the upper range limit (URL).

(c) Once the test analyzer has been set up and calibrated and the tests started, manual adjustment or normal periodic maintenance is permitted only every 3 days. Automatic adjustments which the test analyzer performs by itself are permitted at any time. The submitted records shall show clearly when any manual adjustment or periodic maintenance was made during the tests and describe the specific operations performed.

(d) If the test analyzer should malfunction during any of the performance tests, the tests for that parameter shall be repeated. A detailed explanation of the malfunction, remedial action taken, and whether recalibration was necessary (along with all pertinent records and charts) shall be submitted. If more than one malfunction occurs, all performance test procedures for all parameters shall be repeated.

(e) Tests for all performance parameters shall be completed on the same test analyzer; however, use of multiple test analyzers to accelerate testing is permissible for testing additional ranges of a multi-range candidate method.

§ 53.22 Generation of test atmospheres.

(a) Table B–2 to subpart B of part 53 specifies preferred methods for generating test atmospheres and suggested methods of verifying their concentrations. Only one means of establishing the concentration of a test atmosphere is normally required, provided that that means is adequately accurate and credible. If the method of generation can produce accurate, reproducible concentrations, verification is optional. If the method of generation is