

**OVERVIEW OF EPA'S CHANGES TO PART 75 CEMS
"GUIDANCE ON RECERTIFICATION AND
DIAGNOSTIC TEST EVENTS"**

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Overview of EPA's Changes to Part 75 CEMS "Guidance on Recertification and Diagnostic Test Events"

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INTRODUCTION

The EPA Clean Air Markets Division published on October 30, 2003, "Part 75 Emission Monitoring Policy Manual", a revised edition to the previously titled "Acid Rain Program Policy Manual". This Policy Manual includes new guidance on recertification and diagnostic testing. This guidance is located in Chapter 13, Question 13.21. The guidance on recertification and diagnostic test events provides test policy for the following CEMS types and components;

1. Dry-Extractive CEMS,
2. Dilution-Extractive CEMS,
3. In-Situ CEMS,
4. Flow Monitors,
5. Flue Gas Moisture Sensors,
6. Fuel Flow Meters, and
7. DAHS.

The revised guidance on recertification and diagnostic test events includes more examples of specific spare parts, which replacement or repair will require a diagnostic test event. Also, listed are more components that require a diagnostic test event if routine maintenance is performed. An important new addition to the revised guidance document is an addendum titled, "Alternative Diagnostic Tests". The alternative diagnostic tests include an **Abbreviated Linearity Check** and **Alternative System Response Test**.

Additionally, the guidance documents states; *"EPA recognizes that this guidance cannot possibly address every situation that may arise and is not binding for situations that it does address. You may want to contact EPA concerning your specific situation, particularly in cases where:*

- (1) *An event occurs that is not listed in the Tables, and you do not know which (if any) tests are required: or*

(b) An event occurs which is listed in the Tables, but for which you believe, based on sound engineering judgment or other technical considerations, that the tests listed in the Tables may be inappropriate or unnecessary.”

This paper will present an overview of the revised “Guidance on Recertification and Diagnostic Test Events”. Also the paper will identify and provide recommendations for appropriate diagnostic tests for those test events listed in the Question 13.21 Tables that Thermo Electron Corporation (Thermo) believe, based on sound engineering judgment and technical knowledge of our specific analyzers, are not appropriate or necessary. This paper will only make diagnostic test recommendations specific for Thermo Electron Corporation SO₂, NO_x, and CO₂ analyzers and Dilution-Extractive and Dry-Extractive sample acquisition systems. Tables for Thermo SO₂, NO_x, and CO₂ analyzers and Dilution-Extractive and Dry-Extractive sample acquisition systems will be presented in this paper with recommendations to either “Agree with EPA” or list specific diagnostic tests that Thermo believes are appropriate for its analyzers.

The EPA guidance on recertification and diagnostic test events found in Question 13.21 of EPA’s Clean Air Markets Division’s Part 75 Emission Monitoring Policy Manual provides recertification and diagnostic test event policy for the following CEMS types and components;

1. Dry-Extractive CEMS,
2. Dilution-Extractive CEMS,
3. In-Situ CEMS,
4. Flow Monitors,
5. Flue Gas Moisture Sensors,
6. Fuel Flow Meters, and
7. DAHS.

A copy of Chapter 13, Question 13.21 can be found in an Addendum to this paper. The discussion of EPA’s “Alternative Diagnostic Tests” is found on pages 13-26 and 13-27 of this document.

Thermo Electron Corporation Recommended Diagnostic Tests For Thermo Products

Thermo was contacted by several larger and small electric utility industry Part 75 sources that were using **Thermo** analyzers, requesting input on what diagnostic test would be appropriate for specific parts replacement and/or maintenance activities. These **Thermo** analyzer clients believed that some of the suggested test events were not necessary.

The Emission Monitoring Support Group of Dominion – Virginia Power provided **Thermo** a spreadsheet with the Emission Monitoring Support ‘Group’s recommended diagnostic tests based on their experience and knowledge of **Thermo** analyzers and dilution probe systems. **Thermo** reviewed their information and developed the following tables of suggested diagnostic tests.

For that diagnostic test where **Thermo** agreed with the suggested diagnostic tests given in Section 13, Question 13.21, **Thermo** listed in its tables, “**Agree with EPA**” in those cases where **Thermo** did not agree with the suggested recertification or diagnostic test; **Thermo** listed its recommended tests.

The following tables are specific to **Thermo Electron Corporation**, Model 42 and 42C NO_x, Model 43 and 43C SO₂, and Model 41 and 41C CO₂, analyzers and Thermo’s EPM and STI dilution extractive systems.

ACKNOWLEDGEMENTS

Thermo Electron Corporation would like to thank Brian Newell and David Nuchols of Dominion – Virginia Power’s Emission Monitoring Support Group for providing the initial suggested list of “inappropriate or unnecessary” diagnostic tests from which **Thermo** used as baseline for our evaluation and suggested appropriate diagnostic tests.

Recertification and Diagnostic Test Policy for SO2 Analyzers

Thermo Model 43A, 43B, 43H, 43C & 43CHL SO2 Analyzers	EPA Recommendations - EMPM 10/28/2003							Thermo Electron Corporation's Recommendations for its Analyzers	
Description of Event	Event	RAT	7 DAY CAL	Cycle Time	Linearity	Calibration	Submit	Comments	
Permanently replace SO2 with like kind analyzer	R	X	X		X	X	X	Is a re-cert event with like kind. Modify RT's 510 and 530 (No cycle time)	Agree with EPA
Permanently replace SO2 with new analyzer	R	X	X	X	X	X	X	Modify RT's 510 and 530 Re-cert all test required.	Agree with EPA
Replace or repair any of the following									
photomultiplier tube lamp	D				5	X	A	EPA will conditionally allow the abbreviated linearity check and the alternative system response check (see footnotes 5&6) For repair or replacement of other major components of new monitoring technologies in this policy	Calibration Only
analyzer pump	D			6	5	X	A		Calibration Only
capillary tube	D			6	5	X	A		Calibration Only
sample cell	D				5	X	A		Agree with EPA
optical filter	D				5	X	A		Calibration Only
Replace or repair circuit board	D				5	X	A	EPA will conditionally allow abb. Linearity (5)	Operational Ck & Calibration
Replace or repair or perform routine maintenance(as specified in the QA/QC plan) on a minor analyzer componenet, including but not limited to:									
PMT base	D					X		For repair or replacement of other minor components that are not listed here perform a diagnostic calibration error test. EPA recommends that each facility develop its own list of major and minor componenets and document this list within their QA/QC plan. if there is uncertainty whether a component is major or minor, contact EPA for a case by case ruling.	Agree with EPA
O-rings	D					X			Agree with EPA
Optical windows	D					X			Agree with EPA
High voltage power supply	D					X			Agree with EPA
Thermistor	D					X			Agree with EPA
Reaction chamber heater	D					X			Agree with EPA
DC power supply	D					X			Agree with EPA
Display	D					X			Agree with EPA
Footnotes:									
(1) The relevant tests for CEMS are listed in 75.20(c)(1)									
(2) "R" means a recertification event and "D" means diagnostic test event									
(3) The 7-day calibration error test is not required for a regular non-redundant backup system. (75.20(d)(2)(I))									
(4) A calibration error is required after every repair or corrective maintenance event that may affect system accuracy (Part 75, App B, sec 2.1.3(a)). If conditional data validation is used, a probationary calibration error test is required. 75.20(b)(3)(ii).									
(5) A full, hands-off linearity check is recommended. However, an abbreviated linearity check is conditionally allowed. If the abbreviated test is not passed, consider it to be an aborted linearity check and perform a full linearity check. <u>Note:</u> monitors with span values > 30 ppm are exempt from linearity checks									
(vi) A full cycle time test is recommended. However, the alternative system response check is conditionally allowed. If the system response check is not passed, perform a full cycle time checks.									
(X) "X" means that this test is required or that EDR record type 556 must be reported.									
(A) Report EDR record type 556 only if the full linearity check or cycle time test is performed. Keep the results of all successful alternative diagnostic tests on-site and do not report them to EPA.									

Recertification and Diagnostic Test Policy for NOx Analyzers

Thermo Model 42, 42D, 42H, 42C, 42C/D, 42CHL & 42CLS - NOx Analyzers	EPA Recommendations - EMPM 10/28/2003							Thermo Electron Corporation's Recommendations for its Analyzers	
Description of Event	Event	RAT	7 DAY CAL	Cycle Time	Linearity	Calibration	Submit	Comments	
Permanently replace NOx with like kind analyzer	R	X	X		X	X	X	Is a re-cert event with like kind. Modify RT's 510 and 530 (No cycle time)	Agree with EPA
Permanently replace NOx with new analyzer	R	X	X	X	X	X	X	Modify RT's 510 and 530 Re-cert all test required.	Agree with EPA
Replace or repair any of the following									
photomultiplier tube	D				5	X	A	EPA will conditionally allow the abbreviated linearity check and the alternative system response check(see footnotes 5&6) For repair or replacement of other major components that are not listed here (e.g., major components of new monitoring technologies or monitoring technology not address in this policy), contact EPA for a case-by case ruling.	Agree with EPA
internal analyzer particulate filter	D			6		X	A		Calibration Only
analyzer vacuum pump	D			6	5	X	A		Calibration Only
ozone generator	D				5	X	A		Calibration Only
capillary tube	D			6	5	X	A		Calibration Only
reaction chamber	D				5	X	A		Agree with EPA
NO2 converter	D				5	X	A		Calibration Only
ozone dryer	D				5	X	A		Calibration Only
optical filter	D				5	X	A		Agree with EPA
Replace or repair circuit board	D				5	X	A		EPA will conditionally allow abb. Linearity (5)
Replace or repair or perform routine maintenance(as specified in the QA/QC plan) on a minor analyzer componenet, including but not limited to:									
PMT base	D					X		For repair or replacement of other minor components that are not listed here perform a diagnostic calibration error test. EPA recommends that each facility develop its own list of major and minor componenets and document this list within their QA/QC plan. If there is uncertainty whether a component is major or minor, contact EPA for a case by case ruling.	Agree with EPA
O-rings	D					X			Agree with EPA
Optical windows	D					X			Agree with EPA
High voltage power supply	D					X			Agree with EPA
Thermistor	D					X			Agree with EPA
Reaction chamber heater	D					X			Agree with EPA
Photomultiplier cooler	D					X			Agree with EPA
Photomultiplier cooler fins	D					X			Agree with EPA
DC power supply	D					X			Agree with EPA
Valve	D					X			Agree with EPA
Display	D					X			Agree with EPA

Footnotes:

- (1) The relevant tests for CEMS are listed in 75.20(c)(1)
- (2) "R" means a recertification event and "D" means diagnostic test event
- (3) The 7-day calibration error test is not required for a regular non-redundant backup system. (75.20(d)(2)(i))
- (4) A calibration error is required after every repair or corrective maintenance event that may affect system accuracy (Part 75, App B, sec 2.1.3(a). I if conditional data validation is used, a probationary calibration error test is required. 75.20(b)(3)(ii)).
- (5) A full, hands-off linearity check is recommended. However, an abbreviated linearity check is conditionally allowed. If the abbreviated test is not passed, consider it to be an aborted linearity check and perform a full linearity check. **Note:** monitors with span values> 30 ppm are exempt from linearity checks
- (vi) A full cycle time test is recommended. However, the alternative system response check is conditionally allowed. If the system response check is not passed, perform a full cycle time checks.
- (X) "X" means that this test is required or that EDR record type 556 must be reported.
- (A) Report EDR record type 556 only if the full linearity check or cycle time test is performed. Keep the results of all successful alternative diagnostic tests on-site and do not report them to EPA.

Recertification and Diagnostic Test Policy for Dilution-Extractive CEMS

Thermo EPM Dilution-Extractive Probes								EPA Recommendations - EMPM 10/28/2003		Thermo Electron Corporation's Recommendations
Description of Event	Event	RAT	7 DAY CAL	Cycle Time	Linearity	Calibration	Submit	Comments	Recommendations	
Change from Dilution CEMS to in-situ CEMS	R	X	X	X	X	X	X	Re-cert event all tests required. RT 510,520,530	Agree with EPA	
Change from Dilution CEMS to extractive CEMS	R	X	X	X	X	X	X	Re-cert event all tests required. RT 510,520,530	Agree with EPA	
Change from in-stack dilution to out of stack dilution methodology (or vice-versa)	R	X	X	X	X	X	X	Re-cert event all tests required. RT 510,520,530	Calibration & Linearity Only	
Replace or repair any of the following										
Replace or repair signal wiring in CEMS shelter	D					X			Agree with EPA	
Replace or repair sample tubing in CEMS shelter	D					X		EPA recommends pressure/vacumn leak ck.	Agree with EPA	
Replace or repair vacumn pump or pressure pump(not the analyzer pump)	D					X		EPA recommends a leak check also.	Agree with EPA	
Replace critical orifice in dilution system with orifice of different size	R	X	X	6	X	X	X	Re-cert testing must be performed.	Calibration & Linearity Only	
Replace critical orifice in dilution system with orifice of same size	D				5	X	A	EPA allows abb. Linearity footnote 5	Agree with EPA	
Disassemble and reassemble dilution probe for maintenance or service.	D				5	X	A	EPA allows abb. Linearity footnote 5	Agree with EPA	
								Pressure/vacumn leak check.	Agree with EPA	
Permanently replace umbilical line	D	X		6		X	X	RATA is necessary. Press/vac lk ck	Agree with EPA	
Replace CEMS probe(same probe length, location and dilution ratio)	D			6	5	X	A	EPA allows abb. Linearity footnote 5. P/V lk ck.	Agree with EPA	
Change probe length and/or location	R	X		6		X	X	Re-cert event . Alternative response allowed	Agree with EPA	
Routine probe filter maintenance(clean or replace coarse filter)	D					X			Agree with EPA	
Replace probe heater or sample line heaters	D					X			Agree with EPA	
Major modification to dilution air supply.	D				5	X	A	EPA will cond. Allow abb. Linearity check	Agree with EPA	
								EPA recommends performing pressure/vac lk ck.		

Footnotes:

(1) The relevant tests for CEMS are listed in 75.20(c)(1)

(2) "R" means a recertification event and "D" means diagnostic test event

(3) The 7-day calibration error test is not required for a regular non-redundant backup system. (75.20(d)(2)(i))

(4) A calibration error is required after every repair or corrective maintenance event that may affect system accuracy (Part 75, App B, sec 2.1.3(a)). If conditional data validation is used, a probationary calibration error test is required. 75.20(b)(3)(ii).

(5) A full, hands-off linearity check is recommended. However, an abbreviated linearity check is conditionally allowed. If the abbreviated test is not passed, consider it to be an aborted linearity check and perform a full linearity check. Note: monitors with span values > 30 ppm are exempt from linearity checks

(vi) A full cycle time test is recommended. However, the alternative system response check is conditionally allowed. If the system response check is not passed, perform a full cycle time checks.

(X) "X" means that this test is required or that EDR record type 556 must be reported.

(A) Report EDR record type 556 only if the full linearity check or cycle time test is performed. Keep the results of all successful alternative diagnostic tests on-site and do not report them to EPA.

Recertification and Diagnostic Test Policy for Dry-Extractive CEMS

**Thermo Electron Corporation's
Recommendations**

EPA Recommendations - EMPM 10/28/2003

<i>Description of Event</i>	Event	RAT	7 DAY CAL	Cycle Time	Linearity	Calibration	Submit	Comments	Recommendations
Change from extractive CEMS to in-situ CEMS	R	X	X	X	X	X	X	Re-cert event all tests required. RT 510,520,530	Agree with EPA
Change from extractive CEMS to dilution CEMS	R	X	X	X	X	X	X	Re-cert event all tests required. RT 510,520,530	Agree with EPA
<i>Replace or repair any of the following</i>									
Replace or repair signal wiring in CEMS shelter	D					X			Agree with EPA
Replace or repair sample tubing in CEMS shelter	D					X		EPA recommends pressure/vacumn leak ck.	Agree with EPA
Replace or repair vacumn pump or pressure pump(not the analyzer pump)	D					X		EPA recommends a leak check also.	Agree with EPA
Replace or repair moisture removal system (chiller)	D					X		EPA recommends pressure/vacumn leak ck.	Agree with EPA
Replace CEMS probe (same probe length and location)	D					X		EPA recommends pressure/vacumn leak ck.	Agree with EPA
Change probe length and / or location	R	X		6		X	X	Probe location change is a re-cert.Footnote(6)	Agree with EPA
Routine probe filter maintenance (e.g. clean or replace coarse filter)	D					X			Agree with EPA
Permanently replace umbilical line	D	X		6		X	X	EPA recommends pressure/vacumn leak ck. RATA is necessary.	Agree with EPA
Replace probe heater or sample line heaters	D					X			Agree with EPA

Footnotes:

(1) The relevant tests for CEMS are listed in 75.20(c)(1)

(2) "R" means a recertification event and "D" means diagnostic test event

(3) The 7-day calibration error test is not required for a regular non-redundant backup system. (75.20(d)(2)(i))

(4) A calibration error is required after every repair or corrective maintenance event that may affect system accuracy (Part 75, App B, sec 2.1.3(a)). I

If conditional data validation is used, a probationary calibration error test is required. 75.20(b)(3)(ii).

(5) A full, hands-off linearity check is recommended. However, an abbreviated linearity check is conditionally allowed. If the abbreviated test is not passed, consider it to be an aborted linearity check and perform a full linearity check. Note: monitors with span values > 30 ppm are exempt from linearity checks

(vi) A full cycle time test is recommended. However, the alternative system response check is conditionally allowed. If the system response check is not passed, perform a full cycle time checks.

(X) "X" means that this test is required or that EDR record type 556 must be reported.

(A) Report EDR record type 556 only if the full linearity check or cycle time test is performed. Keep the results of all successful alternative diagnostic tests on-site and do not report them to EPA.

Question 13.21 NEW

Topic: Recertification and Diagnostic testing

Background: According to § 75.20(b), "whenever the owner or operator makes a replacement, modification, or change in the certified continuous emission monitoring system or continuous opacity monitoring system that may significantly affect the ability of the system to accurately measure or record the SO₂ or CO₂ concentration, stack gas volumetric flow rate, NO_x emission rate, percent moisture, or opacity, or to meet the requirements of § 75.21 or appendix B to this part, the owner or operator shall recertify the continuous emission monitoring system or continuous opacity monitoring system according to the procedures in this paragraph."

Section 75.20(b) goes on to give the following examples of events which require recertification: "replacement of the analyzer; change in location or orientation of the sampling probe or site; and complete replacement of an existing continuous emission monitoring system or continuous opacity monitoring system. The owner or operator shall recertify a continuous opacity monitoring system whenever the monitor path length changes or as required by an applicable State or local regulation or permit."

Section 75.20(b)(1) states that "for all recertification testing, the owner or operator shall complete all initial certification tests in paragraph (c) of this section that are applicable to the monitoring system, except as otherwise approved by the Administrator."

Section 75.20(b) also states that "any change to a flow monitor or gas monitor for which a RATA is not necessary shall not be considered a recertification event. In such cases, any other tests that are necessary to ensure continued proper operation of the monitoring system (e.g., 3-load flow RATAs following changes to flow monitor polynomial coefficients, linearity checks, calibration error tests, DAHS verifications, etc.) shall be performed as diagnostic tests, rather than as recertification tests."

Question: Can EPA provide guidance on recertification and diagnostic test events and the appropriate quality-assurance tests for each event?

Answer: The following Tables describe various events as either recertification events or diagnostic test events and outline the appropriate tests to be performed for each event. The Tables clarify which types of changes to a monitoring system may "significantly affect the ability of the system to accurately measure or record" emissions or flow rate and therefore require recertification testing and which types of changes require less rigorous diagnostic testing "to ensure continued proper operation of the monitoring system."

The recertification events listed in the Tables include the examples given in § 75.20(b) (i.e., analyzer replacements, complete monitoring system replacements, and changes in probe location). The Tables also identify other

events that EPA believes are likely to have the potential to significantly affect the accuracy of the monitoring system and that EPA therefore intends to treat as recertification events in applying § 75.20(b). These events are: (1) changing from in-stack dilution methodology to out-of-stack dilution methodology; and (2) replacement of the critical orifice in a dilution extractive system with an orifice of a different size.

Section 75.20(b)(1) specifies that for recertification, the same battery of tests which was performed for initial certification must be repeated, unless otherwise approved by the Administrator. The Tables reflect EPA's intention to require, for most of the recertification events listed in the Tables, the full battery of certification tests to be repeated. However, note that in a number of instances, EPA intends to exercise its authority under § 75.20 (b)(1) to require less than the full battery of tests.

The diagnostic test events listed in the Tables are the types of component replacements and repairs which are most commonly done on continuous monitoring systems. The Tables reflect EPA's intention to require only certain tests for these events. The diagnostic tests listed for each event are consistent with case-by-case determinations previously made by EPA and are tests that EPA believes are likely to be necessary to ensure continued proper operation of the monitoring system. To reduce the testing burden, EPA is allowing two simplified diagnostic tests to be performed in lieu of more rigorous tests, in some cases. The simplified diagnostic tests (which are described in greater detail in the Addendum following the Tables) are as follows:

- (1) Abbreviated Linearity Check - This test may be performed in some instances, in lieu of a full linearity check. The test consists of a single sequence of injections of low (20-30% of span), mid (50-60% of span) and high (80-100% of span) calibration gases. The results of the test are acceptable if the linearity error (LE) does not exceed 5.0% of the reference gas tag value (or, alternatively, for low-emitters, if $|R - A|$ does not exceed 5 ppm), at all three gas levels. If these specifications are not met, a full, "hands-off" linearity check must be performed; and
- (2) Alternative System Response Check - This test may be performed in some instances, in lieu of a cycle time test. The test can be done as part of a daily calibration error test, by using a timer (e.g., a stopwatch) to determine how long it takes for the monitor reading to reach 95% of the upscale calibration gas tag value. The results are acceptable if the 15 minute cycle time specification in Part 75, Appendix A is met.

EPA notes that § 75.63(a)(2) requires, for all recertification events, submission of a recertification application no later than 45 days after completion of the required tests. However, the regulations do not require submittal of a formal application for approval after completion of diagnostic tests.

Sections 75.64(a)(2), 75.65 and 75.63 (a)(2)(iii) require that recertification test results and the results of diagnostic tests be submitted electronically in the appropriate quarterly EDR report. In accordance with § 75.64(d) and with section III.C (19) of the EDR Version 2.1/2.2 Reporting Instructions, EDR record type 556 is used for this purpose. However, note that RT 556 is not required for events where the only required tests are daily calibration error checks and/or the simplified diagnostic tests described above.

EPA recognizes that this guidance cannot possibly address every situation that may arise and is not binding for situations that it does address. You may want to contact EPA concerning your specific situation, particularly in cases where:

- (1) An event occurs that is not listed in the Tables, and you do not know which (if any) tests are required; or
 - (b) An event occurs which is listed in the Tables, but for which you believe, based on sound engineering judgment or other technical considerations, that the tests listed in the Tables may be inappropriate or unnecessary.

Note: EPA has not included a table for opacity monitors in this policy guidance. The proper recertification and diagnostic tests for a continuous opacity monitoring system (COMS) are the tests required by Performance Specification 1 (PS-1) in Appendix B of 40 CFR, Part 60 and by any other applicable state or Federal regulation(s).

Recertification and Diagnostic Test Policy for Dry-Extractive CEMS⁽¹⁾

Description of Event	Event	RATA	7 Day Cal Error	Cycle Time Test	Linearity Check	Calibration Error	Submit RT	Comments
Permanently replace NO _x , SO ₂ , O ₂ or CO ₂ analyzer with like-kind analyzer as defined in Part 75 Policy Manual Question 7.22.	R	X	X		X	X	X	The rule indicates that the permanent replacement of an analyzer is a recertification event. EPA does not require the cycle time test in this case, since the analyzer is like-kind and the rest of the system is the same. Modify RTs 510 and 530 as necessary.
Permanently replace NO _x , SO ₂ , O ₂ or CO ₂ analyzer with new analyzer which does not qualify as a like-kind analyzer.	R	X	X	X	X	X	X	Modify RTs 510, and 530 as necessary. The rule indicates that the permanent replacement of an analyzer is a recertification event. Thus, all tests are required.
Replace or repair any of the following components:								EPA will conditionally allow the abbreviated linearity check and the alternative system response check (see footnotes (5) and (6)) For repair or replacement of other major components that are not listed here (e.g., major components of new monitoring technologies or monitoring technology not addressed in this policy), contact EPA for a case-by case ruling.
Photomultiplier	D				(5)	X	A	
Lamp	D				(5)	X	A	
Internal analyzer particulate filter	D			(6)		X	A	
Analyzer vacuum pump	D			(6)	(5)	X	A	
Capillary tube	D			(6)	(5)	X	A	
Ozone generator	D				(5)	X	A	
Reaction chamber	D				(5)	X	A	
NO ₂ converter	D				(5)	X	A	
Ozonator dryer	D				(5)	X	A	
Sample Cell	D				(5)	X	A	
Optical filters	D				(5)	X	A	
Replace or repair circuit board	D				(5)	X	A	EPA will conditionally allow the abbreviated linearity check (see footnote (5))
Replace, repair or perform routine maintenance (as specified in the QA/QC plan) on a minor analyzer component, including, but not limited to:								For repair or replacement of other minor components that are not listed here perform a diagnostic calibration error test. EPA recommends that each facility develop its own list of major and minor components and document this list within their QA/QC plan. If there is uncertainty whether a component is major or minor, contact EPA for a case-by-case ruling.
PMT base	D						X	
O-rings	D						X	
Optical windows	D						X	
High voltage power supply	D						X	
Zero air scrubber	D						X	
Thermistor	D						X	
Reaction chamber heater	D						X	
Photomultiplier cooler	D						X	
Photomultiplier cooler fins	D						X	
DC power supply	D						X	
Valve	D						X	
Display	D						X	
Replace or repair signal wiring in CEMS shelter.	D						X	

Recertification and Diagnostic Test Policy for Dry-Extractive CEMS ⁽¹⁾

Description of Event	Event	RATA	7 Day Cal Error	Cycle Time Test	Linearity Check	Calibration Error	Submit RT	Comments
Replace or repair sample tubing in CEMS shelter.	D					X		EPA recommends performing both a pressure and vacuum leak check. The term "sample tubing" includes any sample or calibration tubing, the sample or calibration manifold, and the solenoid valve.
Replace or repair vacuum pump or pressure pump (not the analyzer pumps)	D					X		EPA recommends that a leak check be performed, also.
Replace or repair moisture removal system (chiller).	D					X		EPA recommends performing both a pressure and vacuum leak check.
Replace CEMS probe (same probe length and location).	D					X		EPA recommends performing both a pressure and vacuum leak check.
Change probe length and/ or location.	R	X		(6)		X	X	The rule indicates that a probe location change is a recertification event. EPA will conditionally allow the alternative system response check to be performed (see footnote (6)).
Routine probe filter maintenance (e.g., clean or replace coarse filter).	D					X		
Permanently replace umbilical line.	D	X		(6)		X	X	EPA recommends performing both a pressure and vacuum leak check. EPA believes that permanently replacing an umbilical line can introduce bias into the system. Therefore, a RATA is necessary. Sources can use conditional data validation to minimize loss of data.
Replace probe heater or sample line heaters.	D					X		
Change from extractive CEMS to in-situ CEMS.	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of a system is a recertification event. Thus, all tests are required. Modify RTs 510, 520, and 530, as necessary
Change from extractive CEMS to dilution CEMS.	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of a system is a recertification event. Thus, all tests are required. Modify RT's 510, 520, and 530, as necessary

- (1) The relevant tests for CEMS are listed in § 75.20 (c)(1).
- (2) "R" means a recertification event, and "D" means diagnostic test event.
- (3) The 7-day calibration error test is not required for a "regular" non-redundant backup system (§ 75.20(d)(2)(i)).
- (4) A calibration error is required after every repair or corrective maintenance event that may affect system accuracy (Part 75, Appendix B, section 2.1.3 (a)). If conditional data validation is used, a probationary calibration error test is required (§ 75.20(b)(3)(ii)).

- (5) A full, "hands-off" linearity check is recommended. However, an abbreviated linearity check is conditionally allowed (see Appendix, below). If the abbreviated test is not passed, consider it to be an aborted linearity check and perform a full linearity check. Note: SO₂ and NO_x monitors with span values ≤ 30 ppm are exempted from linearity checks.
- (vi) A full cycle time test is recommended. However, the alternative system response check is conditionally allowed. If the system response check is not passed, perform a full cycle time test.
- (X) "X" means that this test is required or that EDR record type 556 must be reported.
- (A) Report EDR record type 556 only if the full linearity check or cycle time test is performed. Keep the results of all successful alternative diagnostic tests on-site and do not report them to EPA.

Recertification and Diagnostic Test Policy for Dilution-Extractive CEMS ⁽¹⁾

Description of Event	Event	RATA	7 Day Cal	Cycle Time Test	Linearity Check	Calibration Error	Submit RT	Comments
Permanently replace NO _x , SO ₂ , O ₂ or CO ₂ analyzer with like-kind analyzer as defined in the Part 75 Policy Manual, Question 7.22.	R	X	X		X	X	X	The rule indicates that the permanent replacement of an analyzer is a recertification event. EPA does not require the cycle time test in this case, since the analyzer is like-kind and the rest of the system is the same. Modify RTs 510 and 530 as necessary.
Permanently replace NO _x , SO ₂ , O ₂ or CO ₂ analyzer with new analyzer which does not qualify as a like-kind analyzer.	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of an analyzer is a recertification event. Thus, all tests are required. Modify RT's 510, 530 as necessary.
Replace or repair any of the following components:								EPA will conditionally allow the abbreviated linearity check and the alternative system response check (see footnotes (5) and (6)) For repair or replacement of other major components that are not listed here (e.g., major components of new monitoring technologies or monitoring technology not addressed in this policy), contact EPA for a case-by case ruling.
Photomultiplier	D				(5)	X	A	
Lamp	D				(5)	X	A	
Internal analyzer particulate filter	D			(6)		X	A	
Analyzer vacuum pump	D			(6)	(5)	X	A	
Capillary tube	D			(6)	(5)	X	A	
Ozone generator	D				(5)	X	A	
Reaction chamber	D				(5)	X	A	
NO ₂ converter	D				(5)	X	A	
Ozonator dryer	D				(5)	X	A	
Sample Cell	D				(5)	X	A	
Optical filters	D				(5)	X	A	
Replace or repair circuit board	D				(5)	X	A	EPA will conditionally allow the abbreviated linearity check (see footnote (5))
Replace, repair or perform routine maintenance (as specified in the QA/QC plan) on a minor analyzer component, including, but not limited to:								For repair or replacement of other minor components that are not listed here perform a diagnostic calibration error test. EPA recommends that each facility develop its own list of major and minor components and document this list within their QA/QC plan. If there is uncertainty whether a component is major or minor, contact EPA for a case-by-case ruling.
PMT base	D					X		
O-rings	D					X		
Optical windows	D					X		
High voltage power supply	D					X		
Thermistor	D					X		
Reaction chamber heater	D					X		
Photomultiplier cooler	D					X		
Photomultiplier cooler fins	D					X		
DC power supply	D					X		
Valve	D					X		
Display	D					X		

Recertification and Diagnostic Test Policy for Dilution-Extractive CEMS ⁽¹⁾

Description of Event	Event	RATA	7 Day Cal	Cycle Time Test	Linearity Check	Calibration Error	Submit RT	Comments
Replace or repair signal wiring in CEMS shelter.	D					X		
Replace or repair sample tubing in CEMS shelter.	D					X		EPA recommends performing both a pressure and vacuum leak check. The term "sample tubing" includes any sample or calibration tubing, the sample or calibration manifold, and the solenoid valve.
Replace or repair vacuum pump or pressure pump (not the analyzer pumps).	D					X		EPA recommends that a leak check be performed, also.
Replace critical orifice in dilution system with orifice of different size.	R	X	X	(6)	X	X	X	Changing the size of the critical orifice (outside the manufacturer's tolerances for individual orifices) will significantly change the dilution ratio, may cause moisture problems and could introduce additional bias into the CEM system. Therefore, recertification testing must be performed.
Replace critical orifice in dilution system with orifice of the same size (within the manufacturer's specified tolerance).	D				(5)	X	A	EPA will conditionally allow the abbreviated linearity check (see footnote (5)).
Disassemble and reassemble dilution probe for maintenance or service.	D				(5)	X	A	EPA recommends performing both a pressure and vacuum leak check. EPA will conditionally allow the abbreviated linearity check (see footnote (5)).
Permanently replace umbilical line.	D	X		(6)		X	X	EPA believes that permanently replacing an umbilical line can introduce bias into the system. Therefore, a RATA is necessary. Sources can use conditional data validation to minimize loss of data. EPA recommends performing both a pressure and vacuum leak check.
Replace CEMS probe (same probe length, location and dilution ratio).	D			(6)	(5)	X	A	Potential non-linear response with the new probe requires a linearity check. EPA will conditionally allow the abbreviated linearity check and the alternative system response check to be performed (see footnotes (5) and (6)). EPA recommends performing both a pressure and vacuum leak check.
Change probe length and/or location.	R	X		(6)		X	X	The rule indicates that a probe location change is a recertification event. EPA will conditionally allow the alternative system response check to be performed (see footnote (6)).
Routine probe filter maintenance (e.g., clean or replace coarse filter).	D					X		
Replace probe heater or sample line heaters.	D					X		

Recertification and Diagnostic Test Policy for Dilution-Extractive CEMS⁽¹⁾

Description of Event	Event	RATA	7 Day Cal	Cycle Time Test	Linearity Check	Calibration Error	Submit RT	Comments
Change from dilution CEMS to in-situ CEMS.	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of a system is a recertification event. Thus, all tests are required. Modify RTs 510, 520 and 530, as necessary
Change from dilution CEMS to extractive CEMS.	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of a system is a recertification event. Thus, all tests are required. Modify RTs 510, 520, and 530, as necessary
Change from in-stack dilution to out-of-stack dilution methodology (or vice-versa).	R	X	X	X	X	X	X	EPA considers this to be equivalent to a monitoring system replacement. The rule indicates that the permanent replacement of a system is a recertification event. Thus, all tests are required.
Major modification to dilution air supply.	D				(5)	X	A	EPA will conditionally allow the abbreviated linearity check (see footnote (5)). EPA recommends performing both a pressure and vacuum leak check.

- (vii) The relevant tests for CEMS are listed in § 75.20 (c)(1).
- (2) "R" means a recertification event, and "D" means diagnostic test event.
- (3) The 7-day calibration error test is not required for a "regular" non-redundant backup system (§ 75.20(d)(2)(i)).
- (4) A calibration error is required after every repair or corrective maintenance event that may affect system accuracy (Part 75, Appendix B, section 2.1.3 (a)). If conditional data validation is used, a probationary calibration error test is required (§ 75.20 (b)(3)(ii)).
- (5) A full, "hands-off" linearity check is recommended. However, an abbreviated linearity check is conditionally allowed (see Addendum, below). If the abbreviated test is not passed, consider it to be an aborted linearity check and perform a full linearity check. Note: SO₂ and NO_x monitors with span values ≤ 30 ppm are exempted from linearity checks.
- (vi) A full cycle time test is recommended. However, the alternative system response check is conditionally allowed. If the system response check is not passed, perform a full cycle time test.
- (X) "X" means that this test is required or that EDR record type 556 must be reported.
- (A) Report EDR record type 556 only if the full linearity check or cycle time test is performed. Keep the results of all successful alternative diagnostic tests on-site and do not report them to EPA.

Recertification and Diagnostic Test Policy for In-situ CEMS ⁽¹⁾

Description of Event	Event	RATA	7 Day Cal Error	Cycle Time	Linearity Check	Calibration Error	Submit RT	Comments
Permanently replace NO _x , SO ₂ , O ₂ or CO ₂ analyzer with like-kind analyzer as defined in Part 75 Policy Manual Question 7.22.	R	X	X		X	X	X	The rule indicates that the permanent replacement of an analyzer is a recertification event. EPA does not require the cycle time test in this case, since the analyzer is like-kind and the rest of the system is the same. Modify RTs 510 and 530 as necessary.
Permanently replace NO _x , SO ₂ , O ₂ or CO ₂ analyzer with new analyzer which does not qualify as a like-kind analyzer.	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of an analyzer is a recertification event. Thus, all tests are required. Modify RT's 510, 530 as necessary.
Replace or repair any of the following components:								EPA will conditionally allow the abbreviated linearity check (see footnote (5)). For repair or replacement of other major components that are not listed here, contact EPA for a case-by case ruling.
Light source	D				(5)	X	A	
Projection mirrors	D				(5)	X	A	
UV filter	D				(5)	X	A	
Fiberoptic cable	D				(5)	X	A	
Spectrometer grating	D				(5)	X	A	
Spectrometer mirrors	D				(5)	X	A	
Spectrometer mirror motor	D				(5)	X	A	
Replace or repair circuit board	D				(5)	X	A	EPA will conditionally allow the abbreviated linearity check (see footnote (5)).
Replace or repair minor analyzer component or perform routine analyzer maintenance (as specified in the QA/QC plan).	D					X		Examples include display, filter replacement, power cord replacement, power supply, valves, and analyzer pumps.
Change from in-situ to dry-extractive or dilution-extractive methodology.	R	X	X	X	X	X	X	The rule indicates that the permanent replacement of a system is a recertification event. Thus, all tests are required. Modify RT's 510, 520 and 530, as necessary.

Recertification and Diagnostic Test Policy for In-situ CEMS ⁽¹⁾

Description of Event	Event	RATA	7 Day Cal Error	Cycle Time	Linearity Check	Calibration Error	Submit RT	Comments
Change monitor location or measurement path	R	X	X			X	X	The 7-day calibration error test is required, since location changes may cause analyzer to drift, e.g., due to thermal effects or vibration. Modify RT's 510, 520, and 530, as necessary.

- (1) The relevant tests for CEMS are listed in § 75.20 (c)(1).
- (2) "R" means a recertification event, and "D" means diagnostic test event.
- (3) The 7-day calibration error test is not required for a "regular" non-redundant backup system (see § 75.20(d)(2)(i)).
- (4) A calibration error is required after every repair or corrective maintenance event that may affect system accuracy (Part 75, Appendix B, section 2.1.3 (a)). If conditional data validation is used, a probationary calibration error test is required (§ 75.20(b)(3)(ii)).
- (5) A full, "hands-off" linearity check is recommended. However, an abbreviated linearity check is conditionally allowed (see Addendum, below). If the abbreviated test is not passed, consider it to be an aborted linearity check and perform a full linearity check. Note: SO₂ and NO_x monitors with span values ≤ 30 ppm are exempted from linearity checks.
- (X) "X" means that this test is required or that EDR record type 556 must be reported.
- (A) Report EDR record type 556 only if the full linearity check is performed. Keep the results of all successful alternative diagnostic tests on-site and do not report them to EPA.

Recertification and Diagnostic Test Policy for Flow Monitors ⁽¹⁾

Description of Event	Event	RATA	Abbreviated Flow	Leak Check	7 Day Cal Error	Calibration Error	Report RT 556	Comments
Permanently replace flow monitor (includes like-kind monitor).	R	X		X	X	X	X	Edit RT 510 and 530 as needed.
Replace or repair major component of flow monitor, such as:								Perform abbreviated flow to load ratio test. Perform a RATA if abbreviated flow to load test is failed. (Part 75, App. B, section 2.2.5.3). Note that there are no appropriate 600-level EDR records for reporting the abbreviated flow-to-load ratio diagnostic test. Therefore, only RT 556 is required when this diagnostic test is performed. Keep the test data and calculated results on-site, in a format suitable for inspection.
Ultrasonic transducer	D		X			X	X	
Ultrasonic transducer interface (electronics)	D		X			X	X	
Differential Pressure Probe	D		X	X		X	X	
Differential Pressure Transducer/transmitter electronics	D		X	X		X	X	
Thermal Probe	D		X			X	X	
Thermal Electronics to condition/convert probe signal to calculated flow	D		X			X	X	
Replace or repair minor component of flow monitor, such as:								Perform any diagnostic testing as recommended by the manufacturer.
Ultrasonic Purge system components, such as filters or fans	D					X		
Differential Pressure Back-purge probe cleaning system components	D			X		X		
Thermal Probe cleaning system components	D					X		
Change polynomial coefficients or K factors used to compute flow.	D	X				X	X	3-load RATA required, except for monitors installed on peaking units and bypass stacks, which require only a normal-load RATA. (§75.20(c)(2)(ii)(A))

- (1) The relevant tests for FLOW CEMS are listed in § 75.20 (c)(2) and Part 75, Appendix B, sections 2.2.2 and 2.2.5.3.
- (2) "R" means a recertification event, and "D" means diagnostic test event.
- (3) For differential pressure flow monitor only .
- (4) The 7-day calibration error test is not required for a "regular" non-redundant backup system (see § 75.20 (d)(2)(i)).
- (5) A calibration error is required after every maintenance event that may affect system accuracy (Appendix B, section 2.1.3 (a)). If conditional data validation is used, a probationary calibration error test is required (§ 75.20 (b)(3)(ii)).
- (X) "X" means that this test is required or that EDR record type 556 must be reported.

Recertification and Diagnostic Test Policy for Flue Gas Moisture Sensors ⁽¹⁾

Description of Event	Event	RATA (3)	Report RT 556	Comments
Permanently replace a flue gas moisture sensor	R	X	X	Edit RT 510 as necessary.
Replace or repair moisture sensor electronics.	D			Perform any diagnostic testing as recommended by the manufacturer.
Change the K-factor or mathematical algorithm used to compute percent moisture	D	X	X	If a K-factor or mathematical algorithm is used to set up the sensor vs. Method 4, the rule requires a diagnostic RATA whenever this K-factor or algorithm is changed.

- (1) The relevant tests for a moisture meter are listed in § 75.20 (c)(6), Appendix A, section 6.5.7, and Appendix B, section 2.3
- (2) "R" means a recertification event, and "D" means diagnostic test event.
- (3) Moisture RATA consists of comparison with EPA Method 4
- (X) "X" means that this test is required or that EDR record type 556 must be reported.

Recertification and Diagnostic Test Policy for Fuel Flowmeters ⁽¹⁾

Description of Event	Event	Flowmeter	Transmitter	Primary Element	Re-determine Flow	Report RT	Comments
Replace a fuel flowmeter with one certified by design (e.g., orifice, nozzle, or venturi-type).	R		X	X	X	X	Edit RT 510 and 540 as necessary.
Replace a fuel flowmeter with one certified by actual calibration.	R	X				X	Edit RT 510 and 540 as necessary.
Replace primary element of a fuel flowmeter that was certified by actual calibration.	D	X				X	Examples of primary elements include vortex shedding element of vortex fuel flowmeter, turbine of turbine meter, coriolis flow tubes or vibrating element of coriolis meter, and transmitters or transducers of ultrasonic meters.
Replace primary element of fuel flowmeter that was certified by design with an element of the same dimensions.	D			X		X	
Replace primary element of fuel flowmeter that was certified by design with an element of different dimensions.	D			X	X	X	
Replace or repair flowmeter electronics.	D						Perform any diagnostic testing as recommended by the manufacturer.

- (1) The relevant tests for fuel flowmeter are listed in Part 75, Appendix D, sections 2.1.5 and 2.1.6.
- (2) "R" means a recertification event, and "D" means diagnostic test event.
- (3) Calibration by a reference flowmeter, by the manufacturer or by a laboratory (Part 75, Appendix D, section 2.1.5).
- (4) Transmitter calibrations and primary element inspection only apply to orifice, nozzle and venturi-type fuel flowmeters (Part 75, Appendix D, sections 2.1.6.1 and 2.1.6.4).
- (5) Redetermine orifice, nozzle or venturi flow coefficients using the procedures of AGA Report No. 3 or ASME MFC-3M whenever you change the size of the primary orifice, nozzle or venturi (Part 75, Appendix D, section 2.1.5.1)
- (X) "X" means that this test is required or that EDR record type 556 must be reported.

Diagnostic Test Policy for DAHS ⁽¹⁾								
Description of Event	Event Status	Formula	Missing Data	RATA	Linearity Check	Calibration	Submit RT	Comments
Replace entire DAHS (i.e., different vendor).	D	X	X			X	X	Modify RT 510 as necessary.
Upgrade DAHS to support a new EDR version using existing hardware, same equations and algorithms to calculate emissions data.	D	X	X				X	See Policy Manual question 14..96.
Change or insert new temperature, pressure or molecular weight correction algorithms ⁽³⁾ in DAHS, for dilution systems	D			X	X	X	X	EPA recommends these type of changes be made immediately prior to the RATAs for affected systems.
Change or insert mathematical algorithm ⁽³⁾ in DAHS, for correcting measured NO concentration to total NO _x	D			X		X	X	EPA recommends this type of change be made immediately prior to the RATA for affected system.
Change missing data algorithm in DAHS.	D		X				X	

- (1) The relevant tests are listed in §§ 75.20 (c)(1) and (c)(9).
 (2) "R" means a recertification event, and "D" means diagnostic test event.
 (3) Contact EPA to discuss the appropriate diagnostic tests if other types of mathematical algorithms are changed or inserted in the DAHS
 (X) "X" means that this test is required or that EDR record type 556 must be reported.

References: § 75.20(b), § 75.21, Appendix B

Key Words: Recertification Test Requirements, Diagnostic Testing

History: First published in October 2003 Revised Manual

Addendum: Alternative Diagnostic Tests

Introduction

For certain component repairs, replacements or other changes made to a monitoring system, EPA will conditionally allow alternative diagnostic tests to be performed, in lieu of a full Part 75 quality-assurance test. The conditions are that if the alternative test is failed, the monitoring system will be considered out-of-control until corrective actions are taken and a full Part 75 QA test of the same type has been passed, "hands-off." The results of successful alternative diagnostic tests need only be kept on-site (e.g., recorded in maintenance logs) and do not have to be reported to EPA.

Abbreviated Linearity Check

For gas monitors, an abbreviated linearity check is allowed in place of a full linearity check, wherever "(5)" is indicated in the "Linearity Check" column in the Tables above. The monitor must be "in-control" with respect to its RATA requirement before beginning this check (see Appendix B, section 2.2.3 (a)). The abbreviated linearity check procedure is as follows:

- (1) Perform a "hands-off" calibration error test of the monitor. The calibration error for both the zero and upscale gases must be within the performance specifications in section 3.1 of Appendix A. That is:
 - For SO₂ and NO_x monitors, the calibration error (CE) must not exceed 2.5% of the span value. Alternatively, for SO₂ or NO_x span values < 200 ppm, the results are acceptable if the absolute difference between the tag value of the reference gas and the analyzer response, i.e., $|R - A|$, does not exceed 5 ppm; or
 - For CO₂ and O₂ monitors, the CE, expressed as $|R - A|$, must not exceed 0.5% CO₂ or O₂.

You may perform routine or non-routine calibration adjustments prior to the hands-off calibration error test, as described in sections 2.1.3 (b) and (c) of Appendix B.

- (2) Following the hands-off daily calibration error test, check the linearity of the monitor (also "hands-off"), by performing 3 sequential calibration gas injections, i.e., one injection of a low-level gas (20-30% of span value), one mid-level gas injection (50-60% of span value) and one high-level injection (80-100% of span value). These three calibration gases are the same ones used for a full Part 75 linearity check. You may use the conditional data validation procedures in § 75.20 (b)(3) for the abbreviated linearity check. If you elect to use this option, the calibration error test in (1), above, may serve as the probationary calibration error test, and the abbreviated linearity check must be completed within 168 unit operating hours of the probationary calibration error test.

- (3) The results of the abbreviated linearity check are acceptable if the Part 75 linearity specification is met for each gas injection. That is:
 - For SO₂ and NO_x monitors, the linearity error (LE) must not exceed 5.0% of the tag value of the reference gas. Alternatively, the results are acceptable if $|R - A|$ does not exceed 5 ppm; or
 - For CO₂ and O₂ monitors, the LE must not exceed 5.0% of the reference gas tag value. Alternatively, the results are acceptable if $|R - A|$ does not exceed 0.5% CO₂ or O₂.
- (4) If the abbreviated linearity check is passed, keep the results on-site for inspection and audit purposes. Do not report the results to EPA. Report only the results of the hands-off calibration error test in EDR record type 230.
- (5) If the abbreviated linearity check is failed, treat it as an aborted linearity check (see section 2.2.3 (b)(2) of Appendix B) and follow it up with a full linearity check. Use the data validation rules in section 2.2.3 (e) of Appendix B pertaining to aborted linearity checks. Since an aborted linearity check affects data validation, it must be reported to EPA in the electronic quarterly report (see section 2.2.3 (h) in Appendix B and the EDR Reporting Instructions for RT 601).

Alternative System Response Test

For gas monitors, an alternative system response test is allowed in place of a full cycle time test, wherever "(6)" is indicated in the "Cycle Time Test" column in the Tables above. The alternative system response test procedure is as follows:

- (1) Initiate a daily calibration error check of the monitor.
- (2) Wait until a stable reading with the zero-level calibration gas has been attained. Start a timer (e.g., a stopwatch) when injection of the upscale calibration gas begins.
- (3) Stop the timer when the analyzer reading reaches the 95% response level (i.e., when the measured gas concentration has risen to a level that is within 5% of the tag value of the upscale calibration gas).
- (4) The results of the alternative system response test are acceptable if the measured response time is ≤ 15 minutes.
- (5) If the alternative system response time is failed, declare the monitor out-of-control. Follow up with a full cycle time test after corrective actions are taken.