7.8 What performance specifications must be met for certification?

The Part 75 performance specifications that must be met for initial certification of CEMS are found in Section 3 of Appendix A. These specifications are summarized in Table 16. Table 16 shows that for certain tests, there is an alternative performance specification in addition to the principal, or main specification. Generally speaking, the purpose of the alternative specifications is to provide regulatory relief in cases where the main specification may be too stringent.

For example, for a source with low SO2 emissions, an SO2 monitor may have difficulty meeting the principal relative accuracy standard of 10.0%, but might be able to meet the alternative specification, which is a mean difference of 15 ppm or less between the CEMS and reference method.

For fuel flowmeters, the basic accuracy specification that must be met is 2.0% of the full-scale, or "upper range value" (URV) of the flowmeter. For flowmeters that are calibrated with a flowing fluid (e.g., in a laboratory), this accuracy specification must be met at three points across the normal measurement range of the instrument, i.e., covering the actual range of fuel flow rates that the meter will be used to measure.

For flowmeters that are certified by design (such as orifice meters), the 2.0% of URV accuracy standard is considered to be met if the primary element passes a visual inspection and each of the pressure, temperature and differential pressure transmitters is calibrated at 3 points or "levels" (low, mid and high) across its normal measurement range, using NIST-traceable equipment, and if:

- The accuracy of each transmitter is 1.0% of full-scale (or less) at each level; or
- If, at a particular level, the sum of the accuracies of the three transmitters is 4.0% or less.

Table 15 : EPA Reference Test Methods Used in Part 75 Applications

This EPA Reference Method[a].....	Or its Allowable Alternatives[b]....	Is Used to	In these Part 75 Applications.....
Method 1	Method 1A	Locate traverse points for flow rate measurement	Flow monitor RATAs
Method 2	Methods 2F, 2G, 2H and CTM-041[c]	Measure stack gas volumetric flow rate	Flow monitor RATAs
Method 3A	Methods 3, 3B	Measure diluent gas (O_2 or CO_2) concentrations	RATAs of: • NOx-diluent monitoring systems • CO_2 or O_2 monitoring systems • Flow monitors[d] Appendix E tests LME unit tests
Method 4	Wet bulb-dry bulb technique[d]	Measure the moisture content of stack gas	RATAs of: • Moisture monitoring systems • Flow monitors[d] • Certain gas monitors[e]
Method 6C	Methods 6,6A, 6B	Measure SO_2 concentration	SO_2 monitor RATAs
Method 7E	Methods 7, 7A, 7C, and 7D	Measure NO_x concentration	• RATAs of NO_x monitoring systems; • Appendix E tests; • LME unit tests

a. These reference methods are found in Appendices A-1 through A-4 in 40 CFR Part 60

b. Methods 3A, 6C and 7E are instrumental methods. Their allowable alternatives are wet-chemistry methods and are seldom, if ever, used because the results of the RATA (and hence, the quality-assured status of the CEM data) cannot be known until the laboratory analyses of the samples are completed.

c. Methods 2F and 2G correct the measured flow rates for angular (non-axial) flow. Method 2H (for circular stacks) and conditional test method CTM-041 (for rectangular stacks and ducts) are used to correct the measured flow rates for velocity decay near the stack wall, using a "wall effects adjustment factor" (WAF).

d. Molecular weight (MW) determinations are required in all flow RATAs. Measurements of diluent gas concentration and stack gas moisture content are needed to calculate the MW. Use of the wet bulb-dry bulb technique is restricted to these molecular weight determinations.

e. When the CEMS and reference method measure on a different moisture basis, moisture corrections are required.

Table 16: Performance Specifications for Part 75 Continuous Monitoring Systems

For this certification test.....	On this type of monitor or monitoring system.....	The main performance specification[a] is.....	The alternate performance specification is.....	And the conditions of the alternate specification are.....
7-day calibration error test	SO_2 or NO_x	± 2.5% of span value, on each of the 7 days	$\|R - A\| \leq 5$ ppm	Span value < 200 ppm
	Flow	± 3.0% of span value, on each of the 7 days	$\|R - A\| \leq 0.01"H_2O$	Applies only to DP-type flow monitors
	CO_2 or O_2	$\|R - A\| \leq 0.5\%$ CO_2 or O_2 on each of the 7 days	----------	----------
Linearity check	SO_2 or NO_x	$\|R - A_{avg}\| \leq 5.0\%$ of the reference gas tag value, at each calibration gas level	$\|R - A_{avg}\| \leq 5$ ppm	The alternate specification may be used at any gas level
	CO_2 or O_2	$\|R - A_{avg}\| \leq 5.0\%$ of the reference gas tag value, at each calibration gas level	$\|R - A_{avg}\| \leq 0.5\%$ CO_2 or O_2	The alternate specification may be used at any gas level
Cycle time test	Gas monitoring systems	15 minutes	----------	----------
RATA	SO_2 or NO_x concentration	10.0% RA	$\|RM_{avg} - C_{avg}\| \leq$ 15.0 ppm[b]	$RM_{avg} \leq 250$ ppm
	NO_x -diluent	10.0% RA	$\|RM_{avg} - C_{avg}\| \leq 0.020$lb/mmBtu	$RM_{avg} \leq 0.200$ lb/mmBtu
	Flow	10.0% RA at each load	$\|RM_{avg} - C_{avg}\| \leq 2.0$ ft/sec	$RM_{avg} \leq 10.0$ ft/sec
	CO_2 or O_2	10.0% RA	$\|RM_{avg} - C_{avg}\| \leq 1.0\%$ CO_2 or O_2	----------
	Moisture	10.0% RA	$\|RM_{avg} - C_{avg}\| \leq 1.5\%$ H_2O	--------
Flowmeter accuracy test	Fuel flowmeters	2.0% of full-scale, i.e., the upper range value (URV)	T, P and ΔP transmitters are accurate to 1.0% at each of three levels, or have a combined accuracy ≤ 4.0% at any level	Applies only to orifice, nozzle and venturi meters

[a] Note that $|R - A|$ is the absolute value of the difference between the reference gas (or signal) value and the analyzer reading. $|R - A_{avg}|$ is the absolute value of the difference between the reference gas concentration and the average of the analyzer responses, at a particular gas level.

[b] Note that $|RM_{avg} - C_{avg}|$ is the absolute difference between the mean reference method value and the mean CEMS value from the RATA. For stack flow monitors, convert the average monitored flow rate from scfh to an average velocity in units of actual ft/sec, for purposes of comparison with the RM average velocity