

# 2018 Draft CEMS Code

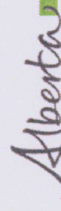
## Major Changes

December 18, 2018

#	Changes made from 1998 Code to 2018 Code	Applicable section(s) in 2018 Draft
1	Revisions to the CEMS Code do not require physical change-out of CEMS equipment that meet performance specifications. Change-out of analyzers will be based on the industrial operation's capital cycle of replacement.	General <b>Not Grand-Fathered In</b>
2	Some changes within the Code have a specified phase-in timeline. When no timeline is specified the requirement is effective when the Code takes effect (currently September 1, 2019 in draft).	General
3	Aligned with PG7 is some areas, as was requested by stakeholders. AEP is in communication with Environment and Climate Change Canada on revisions they are making to PG7.	General
4	Mandatory requirements have been made clear with italics, boxes and indexed clauses. Guidance is presented in regular text.	General
5	Added a decimal place to all specifications to make it clear and consistent where the line is drawn (e.g., 10.1% does not meet the RA specification of 10.0%; for CGA 2.1% exceeds the 2.0% specification).	General <b>More Stringent. Prior Rata @ 10.89% was pass</b>
6	Some provisions were added for facilities with intermittent operation (i.e., peaking facilities in the electricity sector).	General
7	Added requirement for submission of a proposal to use PEMS in place of an approval-required CEMS. Have not added specifications for PEMS (will be by-case-basis as now; likely referring to USEPA for reviewing proposals).	Section 1.5.1: Predictive Emissions Monitoring Systems
8	Changed monitoring plan submission timeline from minimum 60 days to minimum 90 days "prior to procurement" (for initial certification and for recertification). For unplanned changes requiring recertification, timeline to submit monitoring plan is on a by-case basis to allow facilities to bring CEMS back online as quickly as possible.	Section 2.0: Monitoring Plan <b>Increased to 90 days to submit plan.</b>
9	Added requirements to monitoring plan, however these changes will be going forward (no need to resubmit a monitoring plan that is already in place). Monitoring plan requirements apply to new CEMS and <u>recertification</u> of existing CEMS.	Section 2.0: Monitoring Plan <b>Must receive authorization before retrofit/install.</b>

**1.5X emission limit**

10	<p>Changed how range/full scale is determined (no longer based on emission limit). This now matches PG7 and is in line with the USEPA. Operating range for gas analyzers must encompass all anticipated concentrations for the gas being monitored, and if the average monthly concentration falls outside of the operating range specification, adjustments will be needed. [1-year phase-in after Code takes effect]</p>	<p>Section 3.1: Design Specifications for Gas Analyzers</p> <p><b>Requires Analyzer with wider range and xxx</b></p>
11	<p>Any analyzer purchased after the Code takes effect need to be capable of accepting flowing test gas (to challenge the entire system, calibrate the gas analyzer and conduct CGAs). Alternatives to using test gas for calibration drift tests and linearity tests are provided in the interim until a new analyzer is purchased (at the industrial operation's capital cycle of replacement).</p>	<p>Section 3.1: Design Specifications for Gas Analyzers Section 6.1.3: Calibration Drift Test Section 6.2.4: Linearity Test and Alternate Quarterly Audit</p>
12	<p>Added requirement for use of dual-range analyzers.</p>	<p>Section 3.1: Design Specifications for Gas Analyzers <b>Analyzer must have dual range</b></p>
13	<p>For in-stack opacity analyzer design, installation and operation, must now follow ASTM D6216 and USEPA Performance Specification 1. Performance specifications for in-stack opacity were kept the same as the 1998 Code.</p>	<p>Section 3.2: Design Specifications for In-Stack Opacity Analyzers Section 6.1.2: Performance Specifications for In-Stack Opacity Analyzers Section 6.2.3: Calibration Drift Test</p>
14	<p>A valid hour will be 45 minutes (75% of the hour). All valid hours and partial hours must be reported to the Regulator, as well as all data while the CEMS operates (including flagged invalid data). For other reporting intervals (e.g., 12-hour average), now require that minimum 90% valid hours must be available to report the interval as valid.</p>	<p>Section 3.4.2: Data Resolution and Validity Section 9.0: Reporting</p>
15	<p>DAS requirements added, including the requirement to collect and retain 1-minute base-level data for calculating a 1-hour average. In-stack opacity data resolution requirements added; must collect and retain 10-second base-level data for calculating 6-minute averages.</p>	<p>Section 3.4.2: Data Resolution and Validity</p>
16	<p>For percent availability, there is now no "special allowance" given for QA/QC activities. Percent availability must be still be 90% on a monthly basis, however the 10% is left for any and all maintenance activities.</p>	<p>Section 3.4.3: Data Availability <b>Even more important to have robust system.</b></p>
17	<p>Changed percent availability to be based on minutes of quality assured data, rather than four equalled spaced points or a valid hour. Now all minutes can be counted toward percent availability; they are not lost when the valid hour requirement isn't met.</p>	<p>Section 3.3.4: Data Availability</p>
18	<p>Added section on using historian or back-up data during primary DAS outage.</p>	<p>Section 3.4.5: Use of Historian or Back-up Data Sources <b>We can store at least six months data</b></p>
19	<p>Added requirements for locating test gas injection ports and introducing test gas for calibration drift tests and linearity tests.</p>	<p>Section 4.2: Location of Test Gas Injection Port</p>



20	Changed timing for completion of CEMS certification to within 90 unit operating days or 180 calendar days from the time emissions exit the stack, whichever occurs first.	Section 5.1: Certification Requirements
21	Removed Conditioning Test Period requirement.	Section 5.1: Certification Requirements
22	Removed requirement to conduct a response-time test for certification (and removed response time performance specifications).	Section 5.1: Certification Requirements Section 6.1 Performance Specifications
23	Added requirements for reporting results of certification – as per AMD Chapter 9.	Section 5.1: Certification Requirements
24	Recertification requires same tests as initial certification, however a shortened Operational Test Period and calibration drift test for replacement with a like-kind analyzer are allotted. Recertification must be complete within 30 days of primary CEMS/analyzer going offline.	Section 5.2: Recertification Requirements
25	For minor component replacement, repair or routine maintenance, must follow the manufacturer's instructions and the QAP for quality control checks. Added suggested quality control checks for replacement of minor CEMS components to appendix.	Section 5.3: Requirements for Minor Component Replacement Appendix B
26	Relative accuracy for gas analyzers was kept at 10%, but added a decimal place to 10.0% for better resolution. Anything over 10.0% is considered a fail. Relative accuracy specification is based on concentration (units of the analyzer). Must also determine and report relative accuracy in units of the standard (if applicable), but don't have to meet performance specification (just report).	Section 6.1.1: Performance Specifications for Gas Analyzers
27	Footnote A in Table 7 of the 1998 Code for relative accuracy was removed. A new alternate relative accuracy specification was added for when low emissions criteria are met: for emissions < 50 ppm, can compare RATA result to +/- 4 ppm average absolute difference or 10.0% absolute accuracy. This applies only to SO <sub>2</sub> , NO <sub>x</sub> and CO.	<b>More Stringent. Prior Rata @ 10.49% was a pass</b> Section 6.1.1: Performance Specifications for Gas Analyzers
28	Changed bias specification from +/- 4% of FS to +/- 5% of FS (in line with PG7) for gas analyzers, as full scale will now be lower with new analyzer operating range requirement. Added bias specification of +/- 5% of FS for flow analyzers When low emission criteria is met (< 50 ppm) for SO <sub>2</sub> , NO <sub>x</sub> and CO, need to calculate and record bias, but do not need to meet bias specification (already have to meet +/- 4 ppm average absolute difference for relative accuracy). Will continue to have no adjustment for bias.	Section 6.1: Performance Specifications Section 6.1.5: Relative Accuracy and Bias Test
29	Changed zero and span performance specifications: increased from 2% to 2.5% for zero and from 4% to 5% for span to align with the USEPA somewhat offset the required tightening of analyzer operating range.	Section 6.1: Performance Specifications
30	Added performance specifications for hydrogen sulphide (matches TRS specifications).	Section 6.1.1: Performance Specifications for Gas Analyzers
31	Changed flow relative accuracy specification from 15% to 10.0% to match gas analyzers.	Section 6.1.3: Performance Specifications for Flow Analyzers and Temperature Sensors

32	Added mercury analyzer performance specifications, based on CCME 2007 monitoring guideline for the mercury Canada-Wide Standard.	Section 6.1.4: Performance Specifications and Targets for Other Monitoring Systems
33	Added performance targets for other pollutant analyzers (ammonia, ethylene and ethylene oxide). These need to be tested and reported against but are not required to be met.	Section 6.1.4: Performance Specifications and Targets for Other Monitoring Systems
34	Changed requirements for test gases and pulled them into one section.	Section 6.2.2: Test Gas Requirements
35	Added alternatives to conducting calibrations with flowing gas (including the use of gas cells/cuvettes) and for CGAs (quarterly portable probe test, in line with PG7). This is for the interim until gas analyzer is replaced with one that is capable of accepting flowing test gas.	Section 6.2.3: Calibration Drift Test Section 6.2.4: Linearity Test and Alternate Quarterly Audit
36	Added requirement to conduct daily zero and span drift test on flow analyzers.	Section 6.2.3: Calibration Drift Test
37	Clarified that a flow RATA is required, at the same frequency as gas analyzers. Clarified that a RATA is required for temperature analyzers, at the same frequency as gas analyzers. If temperature sensor is the only CEMS component (no gas analyzers part of the CEMS), only 1 RATA is required per year.	Section 6.2.5: Relative Accuracy and Bias Test Section 7.2.4: RATA and CGA Frequency and Reduced RATA Frequency
38	Aligned QAP requirements with PG7 and added detail on what is required in each QAP section.	Section 7.1: Quality Assurance Plan
39	Removed requirement for daily inspection – now required to follow QAP. Calibration/certification of verification equipment required annually (according to equipment manufacturer or verification methodology, when applicable).	Section 7.2: Inspection, Verification and Calibration
40	Removed semi-annual span drift requirement for temperature sensors.	Section 7.2: Inspection, Verification and Calibration
41	RATA frequency reduction criteria added. Reduction to 1 RATA/yr is automatically granted when the RATA frequency reduction criteria are met. This criteria must be maintained to keep the reduced RATA frequency. Need to notify Director when RATA frequency is reduced as well as if reduction criteria has not be maintained.	Section 7.2.4: RATA and CGA Frequency and Reduced RATA Frequency
42	Added requirement for quarterly flow-to-load test (based on PG7) to test flow analyzers. Example provided in Appendix D. Results of the flow-to-load test are not required to be reported.	Section 7.2.5: Flow-to-Load Test Appendix D
43	Added requirement for a quarterly check of in-stack opacity analyzers using attenuation filters (a 3-point linearity check). Results of the quarterly 3-point linearity check are not required to be reported.	Section 7.2.6: In-Stack Opacity Analyzer Quarterly 3-Point Linearity Check
44	Added clarity on requirements when CEMS is out-of-control, including procedures required following a failed RATA or CGA.	Section 7.2.7: Out-of-Control Criteria

45	<p>Changed zero and span out-of-control conditions to be closer to USEPA Part 75. Out-of-control is now triggered at the first time the analyzer measures 2X the zero or span drift performance specification (rather than after 5 consecutive days as in the 1998 Code). Removed the 4X performance specification out-of-control criteria.</p> <p>Change is overall more stringent than the current Code, but still less stringent than the USEPA. Phase-in for the new out-of-control criteria is 1 year after Code takes effect. Added out-of-control criteria for flow analyzers as well as hydrogen sulphide, mercury, ammonia, ethylene oxide and ethylene analyzers.</p>	<p>Section 7.2.7: Out-of-Control Criteria</p> <p>Now critically important to review analyzer stability. Spec sheets should clearly state these specs..</p>
46	<p>Added requirements for follow up and taking action on annual evaluation findings.</p>	<p>Section 7.3: Annual Evaluation</p>
47	<p>Changed data requirements during CEMS outage. Missing data estimation is only permissible for up to 168 hours. After 168 hours, back-up or alternate monitoring needs to be put in place (options are provided). Method 4 in CEMS User Manual will require Director authorization prior to use.</p> <p>The goal of the revised Code is planning ahead for outages to reduce data loss and downtime wherever possible.</p>	<p>Section 8.0: Missing Data Estimation and Temporary Replacement Systems</p>
48	<p>For a temporary replacement CEMS/analyzer, a CGA is required to test/challenge the replacement in place of full recertification.</p> <p>For changes to the system that do not require recertification, Appendix B provides suggested testing. Onus is on facility to choose appropriate tests and follow the QAP and manufacturer recommendations for minor component change-out.</p>	<p>Section 8.0: Missing Data Estimation and Temporary Replacement Systems Appendix B</p> <p>Sec 8.0-A allows for using redundant back up analyzer. This is kept continual operation. - Hot swap..</p>
49	<p>CEMS reporting is now covered in the Air Monitoring Directive, however the revised CEMS Code adds some new requirements for reporting of data via FTP:</p> <ul style="list-style-type: none"> <li>• Must report all parameters (independent and dependent variables); for example must report flow, temperature, diluent gas.</li> <li>• Must report all CEMS data (valid and invalid data); invalid data must be flagged as such.</li> <li>• 1 year phase-in to report continuous temperature data if facility operates a temperature-only CEMS (no other parameters monitoring).</li> <li>• Gas concentration must consistently be wet or dry basis and must flag data accordingly.</li> </ul> <p><b>Note:</b> the CEMS User Manual will be updated once the revised CEMS Code is finalized.</p>	<p>Section 9.0: Reporting Requirements</p>

