

CEMS Code

Correlation Table

The following correlation table provides a reference for the amended and replaced sections of the 1998 CEMS Code. Columns on the right replace the corresponding columns on the left upon the effective date of the revised CEMS Code, January 1, 2022, unless otherwise noted in the CEMS Code.

Disclaimer

This table is for reference purposes and has been produced for convenience only. The CEMS Code will take precedence over this table in specifying requirements and effective dates.

1998 CEMS Code		2021 CEMS Code	
Section	Title	Section	Title / Notes
1.0	Introduction	1.0	Introduction
1.1	General	1.0	Introduction
1.2	Purpose and Intent	1.1	Purpose and Intent
1.3	CEMS Data Use	1.4	CEMS Data Use
1.4	Implementation	1.2	Application and Implementation
1.5	Application of CEMS Code to Existing and New CEMS Installations	1.2	Application and Implementation
1.5.1	Code Requirements for Existing Installations	1.2	Application and Implementation - all requirements apply to existing CEMS, unless otherwise noted in the clause
1.5.2	Code Requirements for New Installations	1.2	Application and Implementation - requirements which apply only to new CEMS are noted in clauses
--		1.3	Amendments
1.6	CEMS Technology	1.5	CEMS Technology
1.7	Endorsement	1.1	Purpose and Intent
1.8	CEMS Data Retention Requirements	1.6	CEMS Data and Records Retention
1.9	Monitoring Plan	2.0	Monitoring Plan
2.0	Design Specifications	3.0	Design Specifications and Test Procedures

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Section	Title	Section	Title / Notes
2.1	Design Specifications for Gas Analyzers	3.1	Design Specifications for Gas Analyzers
2.1.1	Interference Rejection	3.1	Table 1
2.1.2	Temperature-Responsive Drifts	3.1	Table 1
2.1.3	Cycle-time/Response Time	--	
--		3.1.1	Operating Range
2.2	Design Specifications for In-Stack Opacity Monitors	3.2	Design Specifications for In-Stack Opacity Analyzers
2.2.1	Peak and Mean Spectral Responses	3.2-A	- new in-stack opacity analyzers going forward required to meet ASTM D6216
2.2.2	Angle of View	3.2-A	
2.2.3	Angle of Projection	3.2-A	
2.2.4	Simulated zero and upscale calibration system	3.2-A	
2.2.5	Access to external optics	3.2-A	
2.2.6	Automatic zero compensation	3.2-A	
2.2.7	External calibration filter access	3.2-A	
2.2.8	Optical Alignment sight	3.2-A	
2.3	Design Specifications for Flow Monitors	3.3	Design Specifications for Flow Analyzers and Temperature Sensors
2.3.1	Cleaning	3.3	Table 2 - cleaning of flow analyzers - calibration of flow analyzers
2.3.2	Calibration	7.2-C 7.2-P	
2.4	Design Specifications for Temperature Sensors	3.3	Design Specifications for Flow Analyzers and Temperature Sensors
2.5	Specifications for the Data Acquisition System	3.4	Specifications for Data Acquisition and Handling
2.5.1	General	3.4.1	DAS Requirements
2.5.2	Data Recorder Resolution	3.4.2	Data Resolution and Validity
2.5.3	Availability	3.4.3	CEMS Availability
--		3.4.4	Use of Back-up Data Sources
2.5.4	Backfilling and Substitution for Missing Data	8.0	Missing Data Estimation and Temporary Replacement Systems
3.0	Installation Specifications	4.0	Installation Specifications and Test Procedures
3.1.1	Measurement Locations	4.1	Location of the Sampling Site

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Section	Title	Section	Title / Notes
3.1.2	Point CEM Systems	4.1	Location of the Sampling Site
3.1.3	Flow Monitors	4.1	Location of the Sampling Site
--		4.2	Location of Test Gas Injection Port
3.2	Representativeness	4.3	Representativeness
3.2.1	Stratification Test Procedure	4.4	Stratification Test
4.0	Performance Specifications and Test Procedures	6.0	Performance Specifications and Test Procedures
4.1	General	--	
4.1.1	Initial Certification Requirements and Test Procedures	5.0	Certification, Recertification and Component Replacement
--		5.1	Certification Requirements
--		5.2	Major Component Replacement and Recertification
		5.3	Minor Component Replacement
4.2	Performance Specifications	6.1	Performance Specifications
4.2.1	Performance Specifications for Sulphur Dioxide, Oxides of Nitrogen, and Carbon Monoxide Emission Monitoring Systems	6.1.1	Performance Specifications for Typical Gas Analyzers
4.2.2	Performance Specifications for Oxygen and Carbon Dioxide Monitors	6.1.1	Performance Specifications for Typical Gas Analyzers
4.2.3	Performance Specifications for Total Reduced Sulphur Monitoring Systems	6.1.1	Performance Specifications for Typical Gas Analyzers
4.2.4	Performance Specifications for In-Stack Opacity Monitoring Systems	6.1.2	Performance Specifications for In-Stack Opacity Analyzers
4.2.5	Performance Specifications for Volumetric Flow/Velocity Monitoring Systems	6.1.3	Performance Specifications for Flow Analyzers and Temperature Sensors
4.2.6	Performance Specifications for Temperature Sensors	6.1.3	Performance Specifications for Flow Analyzers and Temperature Sensors
4.2.7	Performance Specifications for other Pollutant Monitoring Systems	6.1.4	Performance Specifications and Targets for Other Monitoring Systems
4.3	Test Procedures - Administrative	--	
4.4	Test Procedures for Verifying Design Specifications	3.5	Test Procedures for Verifying Design Specifications
4.4.1	Analyzer Interference Rejection	3.5.1	Analyzer Interference Rejection Test
4.4.2	Analyzer Temperature-Responsive Zero and Calibration Drifts	3.5.2	Analyzer Temperature-Responsive Zero and Span Drift Test

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Section	Title	Section	Title / Notes
4.4.3	Manufacturer's Certificate of Conformance	3.5-A 3.5-B	
4.5	Performance Specification Test Procedures	6.2	Performance Specification Test Procedures
4.5.1	Conditioning Test Period	5.0	Certification, Recertification and Component Replacement - not required, but recommended
4.5.2	Operational Test Period	5.1.1	Operational Test Period
--		6.2.1	Reference Method
--		6.2.2	Test Gas Requirements
4.5.3	Calibration Drift Test Protocol for Gas and Flow Monitoring Systems	6.2.3	Calibration Drift Test
4.5.4	Linearity	6.2.4	Linearity Test and Alternate Biannual Audit
4.5.5	Flow Monitor Calibration Drift	6.2.3	Calibration Drift Test
4.5.6	Flow Monitor Orientation Sensitivity	6.2.6	Flow Analyzer Orientation Sensitivity Test
4.5.7	System Cycle Time/Response Time Test	--	
4.5.8	Relative Accuracy and Bias Tests for Gas Monitoring Systems	6.2.5	Relative Accuracy and Bias Test
4.5.9	Relative Accuracy Test for Flow Monitors	6.2.5	Relative Accuracy and Bias Test
4.5.10	Relative Accuracy Test for Temperature Sensors	6.2.5	Relative Accuracy and Bias Test
5.0	Quality Assurance and Quality Control	7.0	Quality Assurance and Quality Control
5.1	Quality Assurance Plan (QAP) for CEMS	7.1	Quality Assurance Plan
5.1.1	Section 1 - Quality Assurance Activities	7.0	Quality Assurance and Quality Control
5.1.2	Section 2 - Quality Control Activities	7.0	Quality Assurance and Quality Control
5.1.3	Inspection, Verification, and Calibration	7.2 7.6	Inspection, Verification and Calibration Out-of-Control Periods
5.2	Relative Accuracy Test Audits and Cylinder Gas Audits	--	
5.2.1	General Requirements (applicability)	7.3	RATA and CGA Frequency
5.2.2	Relative Accuracy Test Procedures	6.2.5	Relative Accuracy and Bias Test
5.2.3	Cylinder Gas Audits	6.2.4	Linearity Test and Alternate Biannual Audit

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Section	Title	Section	Title / Notes
5.2.4	Test Procedure Requirements	6.2.5	Relative Accuracy and Bias Test
--		7.3.1	Reduced RATA Frequency
--		7.4	In-Stack Opacity Analyzer Quarterly 3-Point Linearity Check
--		7.5	Flow-to-Load Check
5.3	Annual Evaluation	7.7	Annual Evaluation
5.4	Minimum System Availability Requirements	6.1 3.4.3	Performance Specifications CEMS Availability
--		8.0	Missing Data Estimation and Temporary Replacement Systems
6.0	Reporting Requirements	9.0	Reporting Requirements
6.1	General	9.0	Reporting Requirements
6.2	Quality Assurance Reporting Requirements	- repealed and replaced by Air Monitoring Directive Chapter 9 Reporting (effective January 1, 2019)	
--		10.0	Predictive Emission Monitoring Systems
Appendix A – Definitions		Appendix A – Definitions and Acronyms	
Appendix B – Relative Accuracy Sample Calculations		Appendix D – Relative Accuracy and Bias Example Calculations	
Appendix C – Bibliography		11.0	Bibliography
--		Appendix B – Stratification Test Procedure	
--		Appendix C – Recommended Quality Control Checks Following Minor Component Replacement	
--		Appendix E – Flow-to-Load Check	