

Overview of Changes in Air Monitoring Directive Calibration Chapter (Chapter 7)

Overview of changes from the 1989 AMD and 2006 AMD to 2014 revision

1989 AMD	2014 Revision	Description	Changes to Requirements
	Cal 2-G	Evacuation of regulators required	New requirement - common practice
	Cal 2-K	Non-linear calibrations need a minimum of 5 up-scale points	New requirement
	Section 2.2	Clauses for zero and high point calibration adjustment protocols	New requirement
	Section 3.2	Standards for ozone must be traceable to primary standard	New requirements
	Section 3.3	Flow calibration required	New requirements
	Cal 6-C	Ultrasonic systems – must be factory calibrated	New requirement – newer equipment
	Section 10	Assessment and corrective action – flag invalid data, if acceptance limits are not met need to take corrective action	New requirements
II C 1 (c) i	Section 2.0	Function checks when visiting a station	No change
II C 1 (c) ii	Cal 4-B	Daily zero and span	No change
II C 1 (c) iii	Cal 4-A(b)	Zero span not to exceed 1 hour	No change
II C 1 (c) iv	Cal 4-A (e) and Table 2	Deviation of greater than $\pm 10\%$ of span check requires corrective action	No change
II C 1 (e) i	Cal 2-H	(e) & (f) require calibration after interruption in operation more than 4 consecutive days and if results indicate analyzer malfunction or change in calibration	New requirements - (e) & (f)

Overview of Changes in Air Monitoring Directive Calibration Chapter (Chapter 7)

II C 1 (e) ii paragraphs 1 and 4	Cal 3-B Cal 3-C	Calibration standards must be certified	No changes - paragraphs 2 and 3 are covered in Audit Chapter of the AMD (Chapter 8)
Table 1	Table 1, Section 5.0	Acceptable calibration methods	No change
II C 1 (e) iii	Cal 2-D	Calibrated at normal operating temperature	Removed ranges and the requirement for “deviation from recommended range should not be greater than a factor of 0.5 to 1.5 with the recording medium accuracy of 1% or better of full scale.”
II C 1 (e) iv	Cal 9-B	Generate a calibration curve	No change
II C 1 (e) v	Cal 2-J	Calibration points	No change
II C 1 (e) vi	Section 9.0 paragraph after Cal 9-C	Correction factor	No change
II C 1 (e) vii	Section 9.0, Section 5.0	Calibration acceptance limits Multi-point calibration procedure	New requirements - currently in use No change
II C 1 (e) viii	Cal 11-C, 11-D Cal 5-A p, q, etc. Cal 5-A z and aa	Calibration records 20 minutes stable response Max time to reach stable response for initial point 20 minutes	No change Reduced from 20 to 15 minutes No change - also indicated 45 min for NH ₃ analyzers (Cal 5-A aa)
II C 1 (e) ix	Cal 2-C (b) Cal 5-A (a and b)	General – normal sampling mode and through all filters.... Filter change	No change, Cal 2-D(b) repeats Cal 5-A(b)
II C 1 (e) x	Section 9.0 Appendix J Cal 11-A Cal 11-F	Calibration acceptance limits Report example Data and calculations with analyzer Calibration reports kept at station	New requirement - currently in use New requirement - reports at station the same
II C 1 (e) xi	Cal 10-A,B and C	Invalid calibration	No change
II C 1 (e) xii	Cal 5-A (e)	Permeation stabilization & move	No change

Overview of Changes in Air Monitoring Directive Calibration Chapter (Chapter 7)

II C 1 (f to k)			Moved - requirements included in other clauses
II C 1 (l) paragraph 5	Section 6.0	Wind instruments	Reduced interval for inspection and calibration to one year from two years for mechanical instruments
II C 1 (m)	Cal 8-A	Other analyzers	No change
II C 1 (n)	New Audit section	Calibration audits	Moved = appears in Audit Chapter (Chapter 8)
II C 2 (b) ii	Cal 7-A	Calibrate hi-vols every 3 months	No change
II C 2 (b) iii	Cal 7-B	Standard method or other proven method	No change
Appendix A-8			
section 7	Cal 7-C	Orifice calibration unit against 1° std	No change
section 7.1	Cal 7-D (a to l)	Orifice calibration steps	No change
section 7.2	Cal 7-E (a to m)	High-vol calibration steps	No change
section 8	Appendix I	High-vol sampling calculations	No change
Appendix A-10			
1.5 (All)	Appendix F	Guidance - Flow Measurements and Corrections	No change
1.6 (all)		Calibration Procedures, calculations and Acceptance Limits	
1.6.1	Section 2.0 introduction	Purpose of Calibration	No change
1.6.2	Cal 5-A	Multi-point calibration procedure	No change
1.6.3	Cal 3-B	Primary Standard Gases	No change
1.6.4	Cal 3-C,	Secondary Standard Gases	No change
1.6.5	Cal 5-A (e) Section 5.1 Appendix D	Dynamic Calibration using a permeation device Calculations	No change
1.6.6	Section 5.2 Appendix E	Dilution calibration Calculations	No change

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1.6.6.3 BUL-020a (2009)	Section 5.2.1 Appendix G Cal 5-D	Hydrocarbons calibration Calculations Calibrate with methane and propane	No change
1.6.7	Section 5.3 Appendix H	Gas phase titration Calculations	No change
1.6.7.2 B BUL-035 (2010)	Cal 5-H	NO ₂ /NO _x calibration procedure	Wording modified to match bulletin
1.6.7.2 C M3	Cal 5-I	O ₃ calibration, method 3-direct GPT	Wording updated method
1.6.8	Section 9.0	Calibration acceptance limits	New requirements - currently in use
1.7	Cal 11-E Appendix J	Calibration report contents Example of a report	No change
2.3	Section 2.0	Check procedure – wind instrument checked at each visit	No change
2.4	Cal 6-B	Factory calibration	Replaced wind tunnel calibration with requirement for factory calibration

AMD 2006	2014 Revision	Description	Changes to Requirements
2.9.34	Cal 1-A Section 2.1	Calibrated in accordance with AMD Multi-point calibration requirements	requirement the same
2.9.37 2.9.38			Repealed
2.9.40	Section 10 & 11	Assessment, corrective action and records	No change
2.9.41 2.9.42	Cal 2-I	Number of calibration standards	New requirements – need 3 test concentrations (AMD 2006 had 2)
2.9.43	Cal 2-J	Minimum standard requirement	No change
2.9.45	Cal 11-E	Calibration report requirements	No change
2.9.46		Uncertainty of measurement	Repealed
2.9.47	Cal 2-H	Calibration before and after repair	No change

”BUL-020a” and “BUL-035” refer to audit criteria update bulletins released by Alberta Environment – available from the AMD website.

GPT = Gas Phase Titration