



Environment and
Climate Change Canada

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Canada



Multi-Sector Air Pollutants Regulations (MSAPR)

Testing Requirements

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Please note

The *Canadian Environmental Protection Act, 1999* and the *Multi-Sector Air Pollutants Regulations* prevail over the text of this document in case of any discrepancies or inconsistencies. This document does not supersede or modify the Act or the regulations.

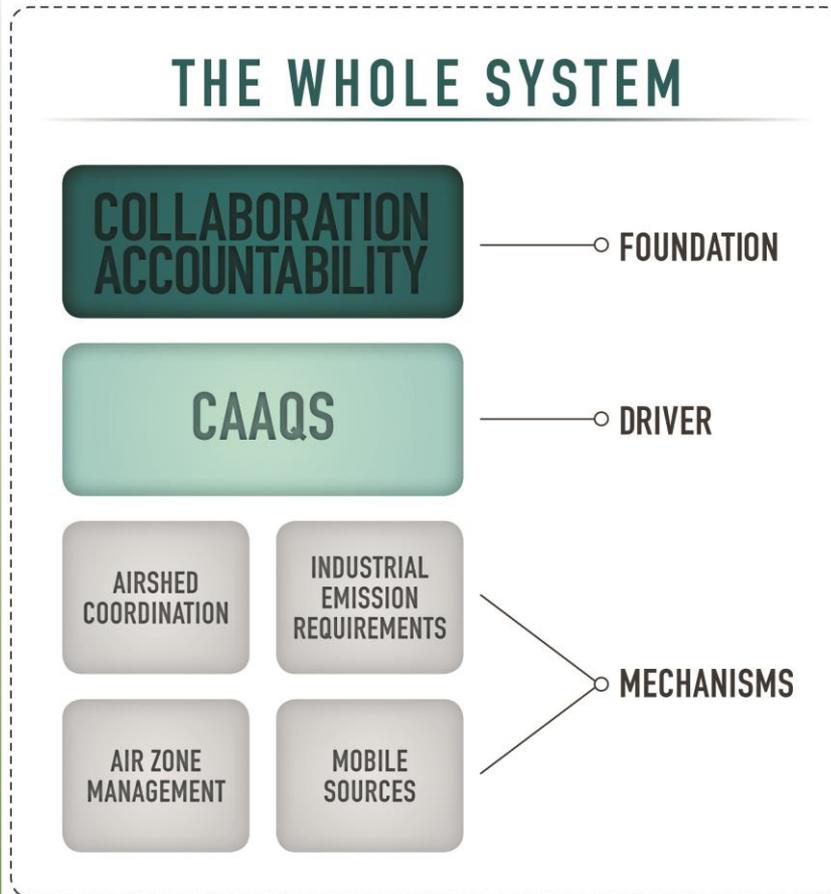


Our Agenda

- AQMS Overview
- MSAPR Overview
- Boilers and Heaters Overview
- Boilers and Heaters Testing Options
- The Alternative Rule
- Summary
- Questions



Air Quality Management System (AQMS)



Provides a comprehensive and cross-Canada framework for collaborative actions by the federal, provincial, and territorial governments to improve air quality

The major elements:

- Canadian Ambient Air Quality Standards (CAAQS)
- Air quality management through local air zones and regional airsheds
- Industrial Emissions Requirements
- Intergovernmental working group to improve collaboration and reduce emissions from mobile sources



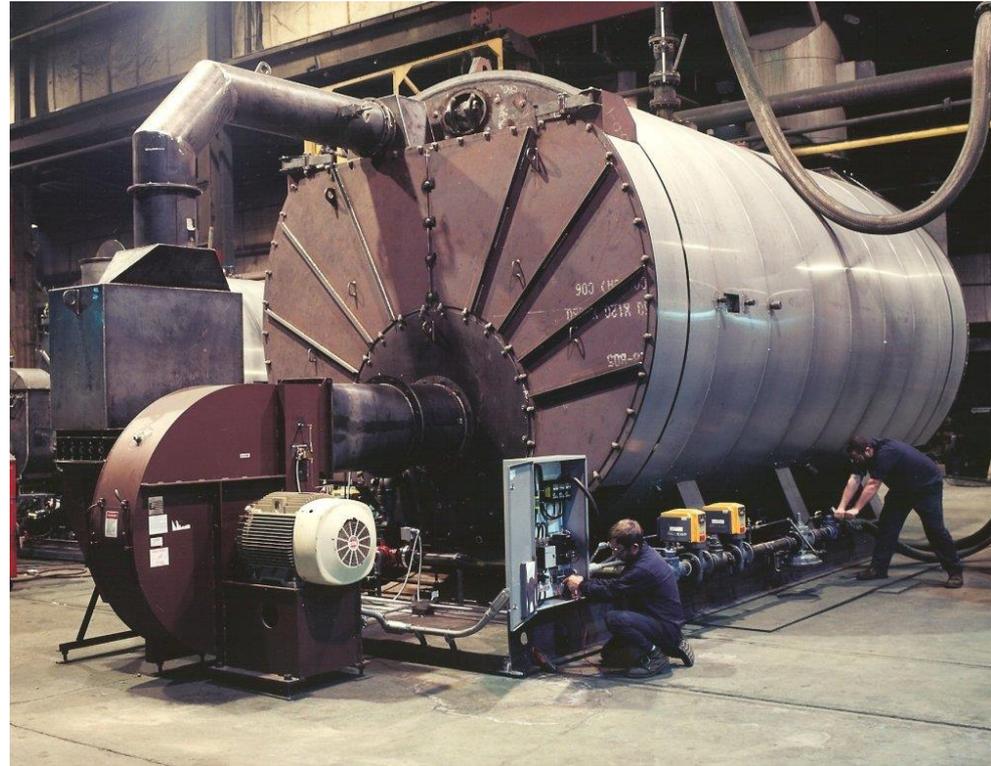
MSAPR Overview

- Proposed Multi-Sector Air Pollutants Regulations (MSAPR) were published in Canada Gazette, Part I on June 7, 2014 for consultation
- MSAPR was registered on June 17, 2016 and came into effect on that date. They were published in Canada Gazette Part II on June 29, 2016
- MSAPR establishes requirements for emissions of:
 - NO_x from boilers and heaters across various industrial sectors
 - NO_x from stationary engines across various industrial sectors
 - NO_x and SO₂ from cement manufacturing facilities



Boilers and Heaters - Overview

- A boiler burns gaseous fossil fuels, such as natural gas, to produce steam or to heat another fluid for use in industrial facilities.
- A heater directly heats the material being processed.



Boilers and Heaters Coverage

- New and existing boilers and heaters that combust gaseous fossil fuel and that have a rated capacity of greater than or equal to 10.5 GJ/h
- In certain facilities in the following sectors: aluminium and alumina, base metal smelting, cement, chemicals and fertilizers, electricity, iron ore pellets, iron, steel and ilmenite, natural gas pipelines, oil sands, potash, pulp and paper, and upstream oil and gas.
- Boilers and heaters are NOT subject to MSAPR if they are in facilities of other sectors (e.g., commercial, residential, institutional)



Boilers and Heaters

Compliance Obligations

Modern

Fuel Type	Equipment Type	NO _x Emission intensity (g/GJ)	Consideration	Maximum Value (g/GJ)
Natural Gas (>90% methane)	Boiler	16	Efficiency	18
	Heater	16	Air Preheat	19
Alternative Gaseous Fuel (<90% methane)	Boiler	20.8	Efficiency	23
	Heater	20.8	Air Preheat	25

Transitional

- 26 g/GJ for equipment between 10.5 and 105 GJ/hour (inclusive)
- 40 g/GJ for equipment greater than 105 GJ/hour

Pre-existing

- 26 g/GJ
- only for Class70/80 after a major modification or by 2036/2026



Boilers and Heaters

Testing Requirements

MSAPR incorporates by reference test methods for:

- NO_x emission intensities
 - stack testing
 - continuous monitoring
- Fuel characteristics
 - Chemical composition
 - Water content
 - High Heating Value (HHV)

so that regulatees can provide information to ECCC in MSAPR reports (e.g. the classification report)



Interpretation (ss. 2(2) – 2(7))

“Incorporates by reference”

(2) For the purpose of interpreting any document that is incorporated by reference into these Regulations, “should” must be read to mean “must” and any recommendation or suggestion must be read as an obligation, unless the context requires otherwise. For greater certainty, the context of the accuracy or precision of a measurement can never require otherwise.

(3) The EC CEMS Code is to be read as set out in Schedule 1.

(4) The Alberta CEMS Code is to be read as set out in Schedule 2.

(5) Any EPA method that is incorporated by reference into these Regulations must be read without reference to the exercise of discretion by the EPA or by the Administrator of the EPA.

(6) In the event of an inconsistency between a provision of these Regulations and a document that is incorporated by reference into these Regulations, the provision prevails to the extent of the inconsistency.

(7) Any method of the EPA or ASTM that is incorporated by reference into these Regulations is incorporated as amended from time to time.



Boilers and Heaters

Testing Methods

MSAPR references test methods from the US EPA, ASTM, Alberta, and ECCC.

- Methods from the US EPA (e.g. Method 7E) are incorporated “as amended from time to time”
- Methods from ASTM (e.g. ASTM-D6522-11) are also incorporated “as amended from time to time”
- Methods from Alberta and ECCC are not. Specific versions are identified and must be used. If a newer version is published, MSAPR will need to be amended in order to that newer version is available to regulatees.



Boilers and Heaters

NO_x stack testing (i/ii)

MSAPR specifies two methods to measure NO_x concentrations (see S.28)

EPA Method 7E: Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure),

ASTM D6522-11: Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers



Boilers and Heaters

NO_x stack testing (ii/ii)

MSAPR also specifies test methods are needed to convert the concentration measurements (ppmv) of 7E or D6522 to an emission intensity (g/GJ) (see S.28, S.29):

EPA Method 1: Sample and Velocity Traverses for Stationary Sources

EPA Method 1A: Sample and Velocity Traverses for Stationary Sources With Small Stacks or Ducts

EPA Method 3A: Determination of Oxygen and Carbon Dioxide Concentrations in Emissions From Stationary Sources (Instrumental Analyzer Procedure),

Appendix A of the EC CEMS Code

EPA Method 4: Determination of Moisture Content in Stack Gases

EPA Method 2: Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S pitot tube),



Boilers and Heaters

NO_x continuous monitoring

In some scenarios, MSAPR requires continuous emissions monitoring of NO_x emission intensity. Either of the following protocols may be used:

- Protocols and Performance Specifications for Continuous Monitoring of Gaseous Emissions from Thermal Power Generation (EPS 1/PG/7) — published with revisions in December 2005
- Continuous Emission Monitoring System (CEMS) Code (Pub. No.: Ref. 107) — published in May 1998

with the caveat that the modifications listed in Schedule 1 (for PG/7) and Schedule 2 (for the AB CEMS Code) must also be followed.



Boilers and Heaters

NO_x monitoring – identical equipment

In some scenarios, MSAPR does not require that a CEMS be installed on large equipment:

- If it is associated with an 'identical' boiler or heater that does have a CEMS (see S.26 and S.34)
- If the boiler or heater's NO_x emission intensity, as measured with a stack test, is less than 80% of its obligation for the initial test and for the next two annual compliance tests (see S.38)
- In both cases, the NO_x emission intensity must continue to be measured annually with a stack test.



Boilers and Heaters

Fuel chemical composition

MSAPR specifies two test methods to determine the percentage of methane in gaseous fuel and its composition (see S.16 and S.23):

ASTM D1945-03: Standard Test Method for Analysis of Natural Gas by Gas Chromatography, or

ASTM D1946-90: Standard Practice for Analysis of Reformed Gas by Gas Chromatography

and seven methods to determine the composition of liquid fuels, solid fuels, or those derived from waste. For example, for liquid fuels (see S.23) :

ASTM D5291-10: Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum Products and Lubricants



Boilers and Heaters

Fuel – Higher Heating Value

MSAPR specifies four methods to determine the Higher Heating Value (HHV) of a gaseous fuel (see S.22). For example

ASTM D1826-94: Standard Test Method for Calorific (Heating) Value of Gases in Natural Gas Range by Continuous Recording Calorimeter

And six methods to determine the HHV of solid, liquid, or waste fuels (see S.22). For example:

ASTM D240-09: Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter



MSAPR (S.112 – S.119)

Alternative Rule

In certain circumstances, ECCC could approve the use of an ‘alternative’ test method that replaces one that is referenced by MSAPR (note that the text below is not regulatory text):

1. The alternative rule must be required under provincial law

AND

2. It is either a modification of a rule that is referenced by MSAPR

OR

It is a completely different method that is published by a government of a state, an international organization of states, or an internationally recognized organization that develops standards or methods.



Boilers and Heaters

Alternative Rule – How to apply

The application must include:

- Information concerning the applicant,
- Information about the relevant boiler or heater,
- An indication of the rule that is to be replaced,
- Information about the alternative rule,
 - Evidence that it is required by the province,
 - Evidence that it is “at least as rigorous and effective as that rule that is to be replaced.”

The regulatee may no longer use the originally referenced rule, unless he/she notifies ECCC that he/she is no longer using the alternative rule.



Boilers and Heaters

Summary

1. MSAPR specifies test methods for NO_x emission intensities and fuel characteristics
2. The specified test methods are in common use
3. There is a mechanism available to apply for an alternative rule



Boilers and Heaters

For more information

Questions?

If you have additional questions, email ECCC at
ec.combustion.ec@canada.ca

For more information on MSAPR:

<http://www.ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=220>

