Provincial Air Quality Objective

Information Sheet

British Columbia Ambient Air Quality Objectives

Introduction

The British Columbia *Environmental Management Act*[1] provides the Minister of Environment with the authority to develop objectives to manage air quality in B.C. Air quality objectives are non-legally-binding limits that are used to:

- Gauge current and historical air quality,
- Guide decisions on environmental impact assessments and authorizations,
- Guide airshed planning efforts,
- Inform regulatory development, and
- Develop and apply episode management strategies such as air quality advisories.

Status of Air Quality Criteria in B.C.

The province of B.C. uses a suite of ambient air quality criteria that have been developed provincially and nationally to inform decisions on the management of air contaminants (see Tables 1, 2 and 3). These include Provincial Air Quality Objectives (AQOs)[2], National Ambient Air Quality Objectives (NAAQOs)[3] and Canadian Ambient Air Quality Standards (CAAQS).[4] Metro Vancouver has also established air quality objectives that apply within its region.[5]

For any particular averaging period, a range of air quality criteria may exist, reflecting the different conditions under which the criteria were historically applied. To begin streamlining the existing framework of air quality criteria and to better reflect current practices (subject to site-specific considerations by the Director), only the most stringent criteria for each averaging period and management level are identified in Table 1, along with those CAAQS currently in effect or set to come into effect. The contents of this table will be updated as new objectives are adopted or clarifications are made.

For more information on air quality objectives, visit here or contact:

B.C. Ministry of Environment and Parks
Environmental Policy and Initiatives Branch/Air Section
BCAirQualityObjectives@gov.bc.ca

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[1] https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/03053_00
[2] For more information, see: www.gov.bc.ca/airqualityobjectives
[3] Canada Gazette, Part I, Department of the Environment, *National Ambient Air Quality Objectives for Air Contaminants*, August 12, 1989.
[4] CAAQS for $PM_{2.5}$ and ozone were endorsed by the Minister of Environment in 2012 and by the Canadian Council of Ministers of the Environment. CAAQS supersede the Canada-wide Standards for Particulate Matter and Ozone. CAAQS for SO_2 and NO_2 were endorsed by the Canadian Council of Ministers of the Environment in 2016 and 2017, respectively. See Table 2 for more information.
[5] For more information, see: https://metrovancouver.org/services/air-quality-climate-action/ambient-air-quality-objectives

Table 1. Summary of B.C. ambient air quality objectives, including CAAQS currently in effect. Those criteria published in the original units are highlighted in bold. Where conversions have been made between ppb and μg/m^3, calculations are based on 25°C and 1 atm. See Table 2 for a summary of all current and future CAAQS.

Contaminant	Avg. Period	Air Quality Objective		Source	Date Adopted by Source
		μg/m^3	ppb		
Formaldehyde (HCHO)	1 hour	60[6]	50	Provincial AQO	1995
Nitrogen Dioxide (NO_2)	1-hour	113	60[7]	Provincial AQO	2021
		79	42[7]	2025 CAAQS	2017
	Annual	32	17[8]	Provincial AQO	2021
		23	12[8]	2025 CAAQS	2017
Ozone (O_3)	1-hour	160	82	NAAQO[9]	1989
	8-hour	118	60[10]	2025 CAAQS Provincial AQO	2019
Particulate Matter <2.5 microns ($PM_{2.5}$)	24-hour	25[11]	-	Provincial AQO	2009
		27[12]	-	2020 CAAQS	2013
		23	-	2030 CAAQS	2025
	Annual	8[13]	-	Provincial AQO	2009
		8.8[14]	-	2020 CAAQS	2017
		8	-	2030 CAAQS	2025
Particulate Matter <10 microns (PM_{10})	24-hour	50	-	Provincial AQO	1995
Sulphur Dioxide (SO_2)	1-hour	170	65[15]	2025 CAAQS Provincial AQO	2017
	Annual	10.5	4[16]	2025 CAAQS Provincial AQO	2017
Total Suspended Particulate (TSP)	24-hour	120	-	NAAQO	1974
	Annual	60[17]	-	NAAQO	1974

[6] Target level for managing formaldehyde in an airshed. Episode level of 370 μg/m^3 is level above which immediate steps should be taken to reduce the release of formaldehyde into the atmosphere.
[7] Achievement based on annual 98th percentile of daily one-hour maximum (D1HM), averaged over three consecutive years.
[8] Achievement based on annual average of 1-hour concentrations over one year.
[9] NAAQOs for ozone have been superseded by the CAAQS, but the 1-hour NAAQO of 82 ppb is retained for air quality advisories.
[10] Achievement based on annual 4th highest daily 8-hour maximum, averaged over three consecutive years.
[11] Achievement based on annual 98th percentile of daily average, over one year.
[12] Achievement based on annual 98th percentile of daily average, averaged over three consecutive years.
[13] Achievement based on annual average, over one year. Planning goal of 6 μg/m^3 provides voluntary target to guide airshed planning efforts and encourage communities to maintain good air quality in face of economic growth and development.
[14] Achievement based on annual average, averaged over three consecutive years.
[15] Achievement based on annual 99th percentile of D1HM, averaged over three consecutive years, effective January 1, 2020; used to inform new air management decisions beginning January 1, 2017 and all air management decisions beginning January 1, 2020.
[16] Achievement based on annual average of 1-hour concentrations over one year.
[17] Based on geometric mean.

Table 2. Summary of Canadian Ambient Air Quality Standards (CAAQS) developed by the Canadian Council of Ministers of the Environment (CCME).[18]

Contaminant	Averaging Period	Numerical Value after Implementation Date				Achievement Statistic
		2015	2020	2025	2030	
NO_2	1-hour	-	60 ppb	42 ppb	-	3-year average of annual 98th percentile of daily maximum 1-hour average concentrations
	Annual	-	17 ppb	12 ppb	-	Average over single calendar year of all 1-hour average concentrations
O_3	8-hour	63 ppb	62 ppb	60 ppb	-	3-year average of annual 4th highest of daily maximum 8-hour average concentrations
$PM_{2.5}$	24-hour	28 µg/m^3	27 µg/m^3	-	23 µg/m3	3-year average of annual 98th percentile of daily 24-hour average concentrations
	Annual	10 µg/m^3	8.8 µg/m^3	-	8 µg/m3	3-year average of annual average of all 1-hour concentrations
SO_2	1-hour	-	70 ppb	65 ppb	-	3-year average of annual 99th percentile of daily maximum 1-hour average concentrations
	Annual	-	5 ppb	4 ppb	-	Average over a single calendar year of all 1-hour average concentrations

Table 3. B.C. Pollution Control Objectives (used for reference purposes).[19]

Contaminant	Avg. Period	Air Quality Objective		Source	Date Adopted
		µg/m^3	ppb		
Carbon Monoxide (CO)	1 hour	**14,300**	**13,000**	PCOs for Food-processing, Agriculturally Orientated, and Other Misc. Industries	1975
	8 hour	**5,500**	**5,000**		1975
Total Reduced Sulphur (TRS) compounds measured as H_2S	1 hour	**7**	**5**	PCOs for the Forest Products Industry	1977
	24 hour	**3**	**2**		1977

[18] For more information, see: https://ccme.ca/en/air-quality-report

[19] Pollution Control Objectives were developed by the B.C. Ministry of Environment and the B.C. Department of Lands, Forest and Water Resources in the 1970s for five source sectors. These criteria, which referred to all discharges to the environment, were rescinded in 2006, but the ambient air quality objectives continue to be used for reference purposes.