

Alberta Ambient Air Quality Objectives and Guidelines Summary

Issued August 2013

Alberta's ambient air quality objectives and guidelines are developed under the Alberta *Environmental Protection and Enhancement Act* (EPEA). Objectives are developed for all or part of the province to protect Alberta's air quality.

Alberta has developed or adopted objectives from other jurisdictions where there are no national objectives or Canada Wide Standards. Air quality objectives are generally established for one-hour, 24-hour, and annual averaging periods. Occasionally, the underlying information or ambient monitoring method requires that other averaging periods be used. For example, a three-day objective was set for ethylene as experimental evidence indicated that this was a more appropriate averaging period than 24-hours.

Objectives and guidelines are based on an evaluation of scientific, social, technical, and economic factors.

CONSULTATION

Alberta Environment works with a variety of stakeholders, including other government departments, the scientific community, environmental organizations, industry and the general public to prioritize substances and to

review Objectives and Guidelines.

REPORTING AIR QUALITY

The Ambient Air Quality Objectives are compared to actual air quality measurements to report on the state of Alberta's environment, special ambient air quality surveys and current air quality through the Air Quality Health Index.

INDUSTRIAL FACILITIES

All industrial facilities must be designed and operated such that the ambient air quality remains below Ambient Air Quality Objectives.

USE OF OBJECTIVES (Table 1)

Objectives are used:

- to determine adequacy of facility design
- to establish required stack heights and other release conditions
- to assess compliance and evaluate facility performance

USE OF GUIDELINES (Table 2)

Guidelines may be used:

- for airshed planning and management
- as a general performance indicator
- to assess local concerns

TABLE 1 ALBERTA AMBIENT AIR QUALITY OBJECTIVES

Substance	$\mu\text{g m}^{-3}$ †	ppbv *	Basis	Effective, Review Date**
Acetaldehyde				
1-hour average	90	50	Adopted from Texas	1999
Acetic acid				
1-hour average	250	102	Adopted from Texas	1999
Acetone				
1-hour average	5,900	2,400	Adopted from Texas	1999, reviewed 2005
Acrolein				
1-hour average	4.5	1.9	Adopted from Ontario (development of irritation)	October 1, 2013
24-hour average	0.40	0.17	Adopted from Ontario (development of lesions in upper airways)	

Substance	$\mu\text{g m}^{-3} \dagger$	ppbv *	Basis	Effective, Review Date**
Acrylic acid				
1-hour average	<u>60</u>	<u>20</u>	Adopted from Texas	January 1, 2004
Annual average	<u>1.0</u>	<u>0.34</u>	Adopted from California	
Acrylonitrile				
1-hour average	<u>43</u>	<u>19</u>	Adopted from Texas	January 1, 2004
Annual average	<u>2</u>	<u>0.9</u>	Adopted from California	
Ammonia				
1-hour average	<u>1,400</u>	<u>2,000</u>	Odour perception	1976, reviewed 2005
Arsenic				
1-hour average	<u>0.1</u>	-	Respiratory effects	May 1, 2005, reviewed 2013
Annual average	<u>0.01</u>	-	Carcinogenic effects	
Benzene				
1-hour average	<u>30</u>	<u>9.0</u>	Haematological effects	1999, reviewed 2012
Annual average	<u>3</u>	<u>0.9</u>	Carcinogenic effects	
Benzo[a]pyrene				
Annual average	<u>0.30</u> ng m ⁻³	<u>2.9</u> x10 ⁻⁵	Chronic and carcinogenic human health effects	June 1, 2009
Carbon disulphide				
1-hour average	<u>30</u>	<u>10</u>	Odour threshold	1999, reviewed 2005
Carbon monoxide				
1-hour average	<u>15,000</u>	<u>13,000</u>	Oxygen carrying capacity of blood	1975
8-hour average	<u>6,000</u>	<u>5,000</u>		
Chlorine				
1-hour average	<u>15</u>	<u>5.0</u>	Adopted from Texas	1999
Chlorine dioxide				
1-hour average	<u>2.8</u>	<u>1.0</u>	Adopted from Texas	1999
Chromium				
1-hour average	<u>1</u>	-	Adopted from Texas	1999
Cumene				
1-hour average	<u>500</u>	<u>100</u>	Adopted from Texas	May 1, 2005
Dimethyl ether				
1-hour average	<u>19,100</u>	<u>10,100</u>	Adopted from Texas	1999
2-Ethylhexanol				
1-hour average	<u>600</u>	<u>110</u>	Adopted from Ontario	May 1, 2005
Ethylbenzene				
1-hour average	<u>2000</u>	<u>460</u>	Adopted from Texas	May 1, 2005
Ethyl chloroformate				
1-hour average	<u>0.57</u>	<u>0.13</u>	Stack emission limits	1999
Ethylene				
1-hour average	<u>1,200</u>	<u>1,050</u>	Crop yield	January 1, 2004
3-day average	<u>45</u>	<u>40</u>	Crop yield	
Annual mean	<u>30</u>	<u>26</u>	Conifers and perennials	
Ethylene oxide				
1-hour average	<u>15</u>	<u>8.0</u>	Adopted from Ontario	1999

Substance	$\mu\text{g m}^{-3}$ †	ppbv *	Basis	Effective, Review Date**
Formaldehyde				
1-hour average	65	53	Adopted from Texas	1999, reviewed 2007
n-Hexane				
1-hour average	21,000	5,960	Derived from 24-hr California objective	August 1, 2008
24-hour average	7,000	1,990	Adopted from California	
Hydrogen chloride				
1-hour average	75	50	Adopted from Texas	1999
Hydrogen fluoride				
1-hour average	4.9	6.0	Adopted from Texas	1999, reviewed 2009
Fluoride content in forage - dry weight basis			Adopted from Ontario	2009
30-day average	35 $\mu\text{g g}^{-1}$		April 1 to October 31	
Average for any single 30-day period	80 $\mu\text{g g}^{-1}$		April 1 to October 31	
Average for two consecutive months	60 $\mu\text{g g}^{-1}$		April 1 to October 31	
Hydrogen sulphide				
1-hour average	14	10	Odour perception	1975
24-hour average	4	3		
Isopropanol				
1-hour average	7,850	3,190	Adopted from Texas	August 1, 2005
Lead				
1-hour average	1.5	-	Adopted from Texas	1999
Manganese				
1-hour average	2	-	Adopted from Texas	May 1, 2005
Annual average	0.2	-	Adopted from Texas and California	
Methanol				
1-hour average	2,600	2,000	Adopted from Texas	1999
Methylene bisphenyl diisocyanate				
1-hour average	0.51	0.050	Adopted from Texas	1999
Monoethylamine				
1-hour average	1.19	0.645	Stack emission limits	1999
Nickel				
1-hour average	6	-	Adopted from California	May 1, 2005
Annual average	0.05	-	Adopted from California	
Nitrogen dioxide				
1-hour average	300	159	Respiratory effects	1975, reviewed 2009
Annual average	45	24	Vegetation	
Ozone (ground level)				
1-hour daily maximum	160	82	Pulmonary function	1975, reviewed 2007
Particulate Matter				
Fine - 2.5 microns or less				2007
24-hour average	30		Canada Wide Standard	

Substance	$\mu\text{g m}^{-3}$ †	ppbv *	Basis	Effective, Review Date**
Total suspended particulate matter				1975
24-hour average	<u>100</u>		Pulmonary effects	
Annual geometric mean	<u>60</u>			
Pentachlorophenol				
1-hour average	<u>5.0</u>	<u>0.44</u>	Adopted from Texas	November 1, 2004
Annual average	<u>0.5</u>	<u>0.04</u>	Adopted from Texas	
Phenol				
1-hour average	<u>100</u>	<u>26.0</u>	Adopted from Ontario	1999
Phosgene				
1-hour average	<u>4</u>	<u>1</u>	Adopted from Texas	1999
Propylene oxide				
1-hour average	<u>480</u>	<u>200</u>	Adopted from Oklahoma	January 1, 2004
Annual average	<u>30</u>	<u>13</u>	Adopted from California	
Styrene				
1-hour average	<u>215</u>	<u>52.0</u>	Adopted from Texas	1999
Sulphur dioxide				
1-hour average	<u>450</u>	<u>172</u>	Pulmonary function	1975, reviewed 2008
24-hour average	<u>125</u>	<u>48.0</u>	Adopted from European Union - human health	
30-day average	<u>30</u>	<u>11</u>		
Annual average	<u>20</u>	<u>8.0</u>	Adopted from European Union - ecosystems	
Sulphuric acid				
1-hour average	<u>10</u>	<u>2.5</u>	Adopted from Texas	1999
Toluene				
1-hour average	<u>1,880</u>	<u>499</u>	Adopted from Texas	May 1, 2005
24-hour average	<u>400</u>	<u>106</u>	Adopted from Michigan and Washington	
Vinyl Chloride				
1-hour average	<u>130</u>	<u>51</u>	Adopted from Texas	1999
Xylenes				
1-hour average	<u>2,300</u>	<u>530</u>	Adopted from Ontario	May 1, 2005
24-hour average	<u>700</u>	<u>161</u>	Adopted from California	

† $\mu\text{g m}^{-3}$ is the weight, in micrograms, of the substance in one cubic meter of air.

* Standard conditions of 25°C and 101.325 kPa are used as the basis for conversion from $\mu\text{g m}^{-3}$ to ppbv (parts per billion by volume) or from mg m^{-3} to ppmv (parts per million by volume).

** The first date indicates when the objective was initially effective in Alberta. The second date in the column, if one is indicated, gives the last date the objective was reviewed

Note: Underscore indicates this digit is the last significant figure in the number e.g. 100 has two significant figures.

Note: The least significant figure is underlined to indicate calculation accuracy when converting from one unit to the other (e.g. $\mu\text{g m}^{-3}$ to ppbv). These numbers do not indicate reporting accuracy or precision. Refer to the Air Monitoring Directive for the Reporting Policy.

TABLE 2 ALBERTA AMBIENT AIR QUALITY GUIDELINES

Parameter	Guideline	Effective
Dustfall		
30 days	53 mg 100 cm ⁻²	In residential and recreation areas 1975
30 days	158 mg 100 cm ⁻²	In commercial and industrial areas
Particulate Matter		
Fine - 2.5 microns or less		
1-hour	80 µg m ⁻³	Derived from the Canada Wide Standard 2007
Static fluorides		
30 days	40 µg 100 cm ⁻²	Water soluble fluorides Pre 1976
The following are being phased out		
Static total sulphation		
	0.50 mg 100 cm ⁻²	SO ₃ equivalent per day as a 1-month accumulated loading Pre 1976
Static hydrogen sulphide		
	0.10 mg 100 cm ⁻²	SO ₃ equivalent per day as a 1-month accumulated loading Pre 1976

FOR MORE INFORMATION

For more information on Alberta's Ambient Air Quality Objectives, contact:

Alberta Environment
 Air Policy
 Phone: (780) 427-4979

Further information is available online at
www.environment.alberta.ca/