

Alberta Ambient Air Quality Objectives and Guidelines Summary

Issued April 2011

The Alberta *Environmental Protection and Enhancement Act* (EPEA) allows Alberta Environment to develop ambient air quality objectives and guidelines for all or part of the province to protect Alberta's air quality.

Alberta's objectives are equal to or more stringent than existing National Ambient Air Quality Objectives and Canada Wide Standards. 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 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				1999
1-hour average	90	50	Adopted from Texas	
Acetic acid				1999
1-hour average	250	102	Adopted from Texas	
Acetone				1999, reviewed 2005
1-hour average	5,900	2,400	Adopted from Texas	

Substance	$\mu\text{g m}^{-3}$ †	ppbv *	Basis	Effective/Review Date
Acrylic acid				January 1, 2004
1-hour average	<u>60</u>	<u>20</u>	Adopted from Texas	
Annual average	<u>1.0</u>	<u>0.34</u>	Adopted from California	
Acrylonitrile				January 1, 2004
1-hour average	<u>43</u>	<u>19</u>	Adopted from Texas	
Annual average	<u>2</u>	<u>0.9</u>	Adopted from California	
Ammonia				1976, reviewed 2004
1-hour average	<u>1,400</u>	<u>2,000</u>	Odour perception	
Arsenic				May 1, 2005
1-hour average	<u>0.1</u>	-	Adopted from Texas	
Annual average	<u>0.01</u>	-	Adopted from Texas	
Benzene				1999
1-hour average	<u>30</u>	<u>9.0</u>	Adopted from Texas	
Benzo[a]pyrene				June 1, 2009
Annual average	<u>0.30</u> ng m ⁻³	<u>2.9</u> x10 ⁻⁵	Chronic and carcinogenic human health effects	
Carbon disulphide				1999, reviewed 2005
1-hour average	<u>30</u>	<u>10</u>	Odour threshold	
Carbon monoxide				1975
1-hour average	<u>15,000</u>	<u>13,000</u>	Oxygen carrying capacity of blood	
8-hour average	<u>6,000</u>	<u>5,000</u>		
Chlorine				1999
1-hour average	<u>15</u>	<u>5.0</u>	Adopted from Texas	
Chlorine dioxide				1999
1-hour average	<u>2.8</u>	<u>1.0</u>	Adopted from Texas	
Chromium				1999
1-hour average	<u>1</u>	-	Adopted from Texas	
Cumene				May 1, 2005
1-hour average	<u>500</u>	<u>100</u>	Adopted from Texas	
Dimethyl ether				1999
1-hour average	<u>19,100</u>	<u>10,100</u>	Adopted from Texas	
2-Ethylhexanol				May 1, 2005
1-hour average	<u>600</u>	<u>110</u>	Adopted from Ontario	
Ethylbenzene				May 1, 2005
1-hour average	<u>2000</u>	<u>460</u>	Adopted from Texas	
Ethyl chloroformate				1999
1-hour average	<u>0.57</u>	<u>0.13</u>	Stack emission limits	
Ethylene				January 1, 2004
1-hour average	<u>1,200</u>	<u>1,050</u>	Crop yield	
3-day average	<u>45</u>	<u>40</u>	Crop yield	
Annual mean	<u>30</u>	<u>26</u>	Conifers and perennials	
Ethylene oxide				1999
1-hour average	<u>15</u>	<u>8.0</u>	Adopted from Ontario	
Formaldehyde				1999, reviewed 2007
1-hour average	<u>65</u>	<u>53</u>	Adopted from Texas	

Substance	$\mu\text{g m}^{-3}$ †	ppbv *	Basis	Effective/Review Date
n-Hexane				August 1, 2008
1-hour average	21,000	5,960	Derived from 24-hour California objective	
24-hour average	7,000	1,990	Adopted from California	
Hydrogen chloride				1999
1-hour average	75	50	Adopted from Texas	
Hydrogen fluoride				1999, reviewed 2009
1-hour average	4.9	6.0	Adopted from Texas	
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				1975
1-hour average	14	10	Odour perception	
24-hour average	4	3		
Isopropanol				May 1, 2005
1-hour average	7,850	3,190	Adopted from Texas	
Lead				1999
1-hour average	1.5	-	Adopted from Texas	
Manganese				May 1, 2005
1-hour average	2	-	Adopted from Texas	
Annual average	0.2	-	Adopted from Texas and California	
Methanol				1999
1-hour average	2,600	2,000	Adopted from Texas	
Methylene bisphenyl diisocyanate				1999
1-hour average	0.51	0.050	Adopted from Texas	
Monoethylamine				1999
1-hour average	1.19	0.645	Stack emission limits	
Nickel				May 1, 2005
1-hour average	6	-	Adopted from California	
Annual average	0.05	-	Adopted from California	
Nitrogen dioxide				1975, reviewed 2009
1-hour average	300	159	Respiratory effects	
Annual average	45	24	Vegetation	
Ozone (ground level)				1975, reviewed 2007
1-hour daily maximum	160	82	Pulmonary function	
Particulate Matter				
Fine - 2.5 microns or less				2007
24-hour average	30		Canada Wide Standard	
Total suspended				1975
24-hour average	100		Pulmonary effects	
Annual geometric mean	60			

Substance	$\mu\text{g m}^{-3}$ †	ppbv *	Basis	Effective/Review Date
Pentachlorophenol				November 1, 2004
1-hour average	<u>5.0</u>	<u>0.44</u>	Adopted from Texas	
Annual average	<u>0.5</u>	<u>0.04</u>	Adopted from Texas	
Phenol				1999
1-hour average	<u>100</u>	<u>26.0</u>	Adopted from Ontario	
Phosgene				1999
1-hour average	<u>4</u>	<u>1</u>	Adopted from Texas	
Propylene oxide				January 1, 2004
1-hour average	<u>480</u>	<u>200</u>	Adopted from Oklahoma	
Annual average	<u>30</u>	<u>13</u>	Adopted from California	
Styrene				1999
1-hour average	<u>215</u>	<u>52.0</u>	Adopted from Texas	
Sulphur dioxide				1975, reviewed 2008
1-hour average	<u>450</u>	<u>172</u>	Pulmonary function	
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				1999
1-hour average	<u>10</u>	<u>2.5</u>	Adopted from Texas	
Toluene				May 1, 2005
1-hour average	<u>1,880</u>	<u>499</u>	Adopted from Texas	
24-hour average	<u>400</u>	<u>106</u>	Adopted from Michigan and Washington	
Vinyl Chloride				1999
1-hour average	<u>130</u>	<u>51</u>	Adopted from Texas	
Xylenes				May 1, 2005
1-hour average	<u>2,300</u>	<u>530</u>	Adopted from Ontario	
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).

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

FOR MORE INFORMATION

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

Alberta Environment
Air Policy Branch
 Phone: (780) 427-4979
 Fax: (780) 644-8946

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