



# **Alberta ambient air quality guideline for total reduced sulphur**

Ministry of Environment and Protected Areas, Government of Alberta

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Alberta Ambient Air Quality Guideline for Total Reduced Sulphur | Environment and Protected Areas

EPA, Air Policy, 2023 No.1

© 2024 Government of Alberta | July 19, 2024 | ISBN 978-1-4601-5522-6

## Alberta ambient air quality guideline for total reduced sulphur

Alberta ambient air quality guidelines<sup>1</sup> are issued by Alberta Environment and Protected Areas, under Section 14 (4), the *Environmental Protection and Enhancement Act*, 1992.

- The 30-minute average Alberta ambient air quality guideline for total reduced sulphur compounds (TRS) is 5 ppb<sup>2</sup>, to be used for odour management.

Note: Reported as 30-minute clock averages (i.e., 0-29 min, 30-59 min throughout the day).

### Characteristics

Total Reduced Sulphur (TRS) is a mixture of reduced sulphur compounds (RSC), which may include hydrogen sulphide, mercaptans (typically represented by methyl mercaptan), carbon disulphide, carbonyl sulphide, dimethyl sulphide and dimethyl disulphide. Reduced sulphur compounds are a group of inorganic and organic chemicals containing sulphur atoms in their lowest oxidation state. The group includes hundreds of individual species, of which only a few commonly occur in air.

Biogenic sulphur emissions are related to the aerobic generation of methylated sulphur during normal metabolism or to anaerobic decomposition of organic residues (e.g. marshes and tidal flats). Most of the global biogenic sulphur emissions have been observed over open oceans and coastal waters. In addition to oceans, other natural sources of RSC include volcanoes, biomass burning and soil.

Anthropogenic sources of reduced sulphur compounds include kraft pulp mills, natural gas wells, processing of natural gas and crude oil at upstream stages and downstream refining, smelting of non-ferrous ores, steel mills, manufacturing of certain abrasives, livestock farming and sewage treatment facilities.

### Effects

Total reduced sulphur and its components are malodorous compounds with the potential for adverse odour effects for these compounds. Health information is not available for all of the individual component compounds of the TRS mixture. However, for individual compounds with available health information, reported odour threshold values for these individual compounds often fall below the concentrations at which these individual compounds may result in adverse health effects.

Some jurisdictions use hydrogen sulphide as a surrogate for TRS in their toxicological assessments for the development of air quality standards. Alberta used the World Health Organization's (2000) odour guideline for hydrogen sulphide of 7 µg m<sup>-3</sup> 30-minute averaging period, converted to 5 ppb H<sub>2</sub>S, as the surrogate for this TRS guideline.

### Objectives in other jurisdictions

TABLE 1 SUMMARY OF SELECTED AIR QUALITY OBJECTIVES AND GUIDELINES FOR TOTAL REDUCED SULPHUR IN OTHER JURISDICTIONS

Jurisdiction		Averaging Time Value (µg m <sup>-3</sup> )		
		Short-term	1-hour	24-hour
British Columbia	Total Reduce Sulphur as Hydrogen Sulphide		7	3
Ontario	Ambient Air Quality Criteria - for pulp, paper and paperboard mills	13 (10-minute)		14
	Ambient Air Quality Criteria – other facilities	13 (10-minute)		7
Nebraska	Health-based standard that applies to Concentrated Animal Feeding Operations	139 (30-minute)		

<sup>1</sup> Refer to the Ambient Air Quality Objectives and Guidelines document for the use of Ambient Air Quality Guidelines.

<sup>2</sup> This value is not to be converted from ppb to µg m<sup>-3</sup> as TRS is a complex mixture.

## References

World Health Organization, 2000. Air Quality Guidelines for Europe. 2<sup>nd</sup> Edition. WHO Regional Publications, European Series, No. 91.