ISOPROPANOL

Characteristics

Isopropanol is a colourless, clear, volatile liquid under standard conditions. It can react with air or oxygen to form unstable peroxides. Isopropanol can be manufactured from propene via a strong acid process (indirect hydration), a weak acid process, or a non-acid process. Isopropanol has widespread use as a solvent and as a component of many industrial, commercial, and consumer products. Isopropanol is also a naturally occurring metabolic product in a variety of microorganisms and plants; as such, it occurs naturally in a wide variety of foods.

The major sectors in Alberta that release isopropanol to air are: mineral extractions, chemical manufacturing, and pharmaceutical manufacturing. The main pathway of entry of isopropanol into the environment is through atmospheric emissions during production, handling, storage, transport, use, and disposal.

Effects

Isopropanol is rapidly absorbed into the bloodstream following inhalation exposure. In general, data shows that isopropanol is of low short-term and long-term toxicity, does not produce adverse effects on reproduction and development, and is not genotoxic or carcinogenic. Short-term exposure to isopropanol is characterized primarily by upper respiratory tract irritation and central nervous system effects. Symptoms include shortness of breath, dizziness, lack of muscle coordination, headache, confusion, flushing, hypothermia, contracted pupils, and lack of eye-hand coordination. Air concentrations associated with these symptoms ranged from 980 to 1,970 mg m^{-3} (400 to 800 ppm) for exposure durations of 3 minutes to 8 hours. No data regarding the long-term systematic toxicity of isopropanol to humans by any exposure route have been identified.

Objectives in Other Jurisdictions

Relatively few jurisdictions have established an ambient air quality objective for isopropanol. The majority of the existing air quality objectives are derived from either the American Conference of Governmental Industrial Hygienists Threshold Limit Value-Time-Weighted-Average or Short-Term Exposure Limit values of 984 mg m^{-3} (400 ppm) or 1,230 mg m^{-3} (500 ppm), respectively (either of which are adjusted by the specific agency with various modifying and uncertainty factors), or reference concentration values established by the Office of Environmental Health Hazard Assessment – California Environmental Protection Agency. The

Ontario Ministry of Environment and Texas Commission on Environmental Quality criteria differ from the other jurisdictions reviewed in that they are based upon odour effects of isopropanol, rather than health effects data. Air quality objectives set by the agencies reviewed in the assessment report ranged from: 3,200 to 120,000 $\mu g\ m^{-3}$ (1,300 to 48,800 ppb) for 1-hour; 220 to 98,300 $\mu g\ m^{-3}$ (89 to 40,000 ppb) for 24-hour; and 785 to 7,000 $\mu g\ m^{-3}$ (320 to 2,850 ppb) for annual.

Alberta Ambient Air Quality Objectives

Alberta ambient air quality objectives are issued by Alberta Environment, under Section 14 (1), the *Environmental Protection and Enhancement Act, 1992* (EPEA). Based upon the available information, Alberta hereby adopts:

- From Texas, an Alberta Ambient Air Quality Objective for isopropanol of 7850 $\mu g\ m^{-3}$ (3,190 ppb) as a 1-hour average concentration.

Reference

Cantox Environmental Inc., 2003: *Assessment Report on Isopropanol For Developing Ambient Air Quality Objectives.* Prepared for Alberta Environment. Edmonton, Alberta, Canada. 84 p.