Section 8. Exposure Controls / Personal Protection

Exposure Limit Values

Ethyl Alcohol	TWA: 1000 (ppm) from ACGIH (TLV) [U.S.] [1999] TWA: 1000(ppm) from OSHA (PEL) [U.S.] TWA: 1900 (mg/m^3) from OSHA (PEL) [U.S.] TWA: 1000 (ppm) from NIOSH TWA: 1000 (ppm) [United Kingdom (UK)] TWA: 1920 (mg/m^3) [United Kingdom (UK)] TWA: 1000 STEL: 1250 (ppm) [Canada]
Isopropyl Alcohol	TWA: 983 STEL: 1230 (mg/m^3) [Australia] TWA: 200 STEL: 400 (ppm) from ACGIH (TLV) [U.S.] [1999] TWA: 980 STEL: 1225 (mg/m^3) from NIOSH TWA: 400 STEL: 500 ppm from NIOSH TWA: 400 STEL: 500(ppm) [United Kingdom (UK)] TWA: 999 STEL: 1259 (mg/m^3) [United Kingdom (UK)] TWA: 400 STEL: 500 (ppm) from OSHA (PEL) [U.S.] TWA: 980 STEL: 125 (mg/m^3) from OSHA (PEL) [U.S.]
Methyl Alcohol	TWA: 200 from OSHA (PEL) [U.S.] TWA: 200 STEL: 250 (ppm) from ACGIH (TLV) [U.S.] [1999] STEL:250 from NIOSH [U.S.] TWA: 200 STEL: 250 (ppm) from NIOSH SKIN TWA: 200 STEL: 250 (ppm) [Canada]

Consult local authorities from acceptable exposure limits.

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the workstation location.
Personal Protection	Safety glasses; gloves; lab coat; vapor respirator.
Personal Protection in Case of Large Spill	Splash goggles, full suit, vapor respirator, boots, gloves, a self contained breathing apparatus should be used to avoid inhalation o f the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Section 9. Physical and Chemical Properties

General Information	Physical State: Liquid Color: colorless, clear Odor: Alcohol like
Properties	Molecular Weight: N/A Boiling Point: 78.4°C (173.1°F) Melting Point: start to solidify at -88.5oC (-127.3°F) based on data for: Isopropyl alcohol. Weighted avg: -112°C (-169.6°F) Critical Temperature: 235oC(455oF) (Isopropyl alcohol) Specific Gravity: 0.81 (Water=1)

	Vapor Density (Air=1): 1.59 at 101 kPa Vapor Pressure: 5.9 kPa at 20°C pH: N/A Odor threshold: 100 ppm (Ethyl alcohol). Weighted avg: 97.15 ppm Water/Oil Dist. Coeff.: Equally soluble in oil and water Solubility in water: Easily soluble in cold water, hot water, n-octanol. Soluble in methanol, diethyl ether, acetone.

Section 10. Stability and Reactivity

Stability	Material is stable under normal conditions
Conditions of Instability	Excess heat, ignition sources, incompatible materials
Incompatibility with Various Substances	Reactive with oxidizing agents, acids, alkalis. Slightly reactive to reactive with metals.
Corrosivity	Non-corrosive in presence of glass
Special Remarks on Reactivity	Ethanol rapidly absorbs moisture from the air. Can react vigorously with oxides. The following oxidants have been demonstrated to undergo vigorous/explosive reaction with ethanol: barium perchlorate, bromine pentafluoride, calcium hypochlorite, chloryl perchlorate, chromium trioxide, chromyl chloride, dioxygen, difluoride, disulfuryl, difluoride, fluorine nitrate, hydrogen peroxide, iodine heptafluoride, nitric acid nitrosyl perchlorate, perchloric acid permanganic acid, peroxodisulfuric acid, potassium dioxide, potassium perchlorate, potassium permanganate, ruthenium(VII) oxide, silver perchlorate, silver peroxide, uranium hexafluoride, uranyl perchlorate. Ethanol reacts violently/explodes with the following compounds: acetyl bromide (evolves hydrogen bromide) acetyl chloride aluminum, sesquibromide ethylate, ammonium hydroxide & silver oxide, chlorate, chromic anhydride, cyanuric acid + water, dichloromethane + sulfuric acid + nitrate (or) nitrite, hydrogen peroxide + sulfuric acid, iodine + methanol + mercuric oxide, manganese perchlorate + 2,2-dimethoxy propane, perchlorates, permanganates + sulfuric acid, potassium superoxide, potassium tert-butoxide, silver & nitric acid, silver perchlorate, sodium hydrazide, sulfuric acid + sodium dichromate, tetrachlorisilane + water. Ethanol is also incompatible with platinium, sodium. No really safe conditions exist under which ethyl alcohol and chlorine oxides can be handled. Reacts vigorously with acetyl chloride.

Section 11. Toxicological Information

Routes of Entry	Absorbed through skin, eye contact, inhalation.
Toxicity to Animals	Acute oral toxicity (LD50): 3450 mg/kg [Mouse] (Ethyl Alcohol 200 Proof) Acute dermal toxicity (LD50): 12800 mg/kg [Rabbit] (Isopropyl alcohol)
Chronic Effects on Humans	**CARCINOGENIC EFFECTS:** Classified A4 (Not classifiable for human or animal) (Ethyl and isopropyl alcohol) **MUTAGENIC EFFECTS:** Mutagenic for bacteria and/or yeast (Ethyl and methyl alcohol) **TERATOGENIC EFFECTS:** Classified PROVEN for human (Ethyl alcohol). Classified POSSIBLE for human (Methyl alcohol) **DEVELOPMENTAL TOXICITY:** Classified development toxin [PROVEN] (Ethyl alcohol). Classified reproductive system/toxin/female, reproductive system/toxin/male [POSSIBLE] (Ethyl alcohol). Contains material which may cause damage to the following organs: kidneys, the reproductive system, heart, brain, peripheral nervous system, upper respiratory tract, skin, optic nerve.
Other Toxic Effects on Humans	Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).
Special Remarks on Chronic Effects on Humans	May affect genetic material (mutagenic). Causes adverse reproductive effects and birth defects (teratogenic), based on moderate to heavy consumption. May cause cancer based on animal data. Human: passes through the placenta, excreted in maternal milk (Ethyl alcohol 200 Proof).
Special Remarks on other Toxic Effects on Humans	Acute potential health effects: Skin: causes skin irritation Eyes: causes eye irritation Ingestion: may cause gastrointestinal tract irritation with nausea, vomiting, diarrhea, and alteration in gastric secretions. May affect the brain, behavior/central nervous system (central nervous system depression – amnesia, headache, muscular in coordination, excitation, mild euphoria, slurred speech, drowsiness, staggering gait, fatigue, changes in mood/personality, excessive talking, dizziness, ataxia, somnolence, coma/narcosis, hallucinations, distorted perceptions, general anesthetic), peripheral nervous system (spastic paralysis), vision (diplopia). Moderately toxic and narcotic in high concentrations. May also affect metabolism, blood, liver, respiration (dyspnea), and endocrine system. Contains Methanol, which may cause blindness if swallowed. May affect respiratory tract, cardiovascular (cardiac arrhythmias, hypotension), and urinary systems.

	Inhalation: May cause irritation of the respiratory tract and affect brain, behavior/central nervous system with symptoms similar to ingestion. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may cause dermatitis, an allergic reaction. Ingestion: Prolonged or repeated ingestion will have similar effects as acute ingestion. It may also affect the brain.

Section 12. Ecological Information

Ecotoxicity	Not available.
Products of Biodegradation	Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation	The product itself and its products of degradation are not toxic.

Section 13. Disposal Considerations

Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

Section 14. Transport Information

Proper Shipping Name	Alcohols (denatured ethanol)
Hazard Class & Division	Class 3: Flammable liquid
UN ID#	1987
Packing Group	II

Section 15. Regulatory Information

Other Regulations	OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
CERCLA	Hazardous Substances: Methyl alcohol: 5000 lbs (2268 kg)
SARA 313	Toxic chemical notification and release reporting: Isopropyl Alcohol 5%, Methyl alcohol 5%
DSCL (EEC)	R11- Highly flammable R36/38- Irritating to eyes and skin S7- Keep container tightly closed S16- Keep away from sources of ignition – No smoking S24/25- Avoid contact with skin and eyes S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S36/37- Wear suitable protective clothing and gloves

Section 16. Other Information

N/D=Not Determined, N/A= Not Applicable