



SAFETY DATA SHEET

Prepared to U.S. OSHA HazCom 1910.120 and the UN Global Harmonization Standard (Version 8)

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

PRODUCT IDENTIFIER

PRODUCT IDENTIFIER/TRADE NAME (AS LABELED): Antiseptic Hand Sanitizer Gel
OTHER MEANS OF IDENTIFICATION: None
RECOMMENDED PRODUCT USE: Consumer Product Hand Sanitizer
RESTRICTIONS ON USE: Other Than Recommended Use

SUPPLIER OF THE SAFETY DATA SHEET

U.S. SUPPLIER/MANUFACTURER'S NAME: Higley Industries, Inc.
ADDRESS: 585 Huff Street, Dubuque, IA 52003 USA
BUSINESS PHONE: (563) 557-1121 [8 am to 5 pm CT]
EMERGENCY PHONE: Infotrac: 1-800-535-5053 (U.S. and Canada) [24 hours]
EMAIL ADDRESS FOR PRODUCT/SDS INFORMATION: info@higley.com
COMPANY WEBSITE: <https://www.higleyinc.com>
DATE OF PREPARATION: April 12, 2020
DATE OF REVISION: New

2. HAZARD IDENTIFICATION

GLOBAL HARMONIZATION LABELING AND CLASSIFICATION: Classified in accordance with UN Global Harmonization Standard (Version 8) under U.S. OSHA Hazard Communication Standard 1910.120.

Classification: Flammable Liquid Category 2, Carcinogenic Category 2, Eye Irritation Category 2A, Skin Irritation Category 2, Aspiration Toxicity Category 2, Specific Target Organ Toxicity (Ingestion-Optic Nerve) Single Exposure Category 2

Signal Word: Danger

Hazard Statements: Highly flammable liquid and vapor. Suspected of causing cancer. Causes serious eye irritation. Causes skin irritation. May be harmful if swallowed and enters airways. May cause damage to the optic nerve if swallowed.

Precautionary Statements:

Prevention: Obtain, read and follow all safety instructions before use. Keep away from heat, sparks, open flames or hot surfaces. — No smoking. Ground/bond container and receiving equipment. Use explosion-proof electrical, ventilating, lighting or other equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Do not breathe mist, vapors or spray. Wash thoroughly all contaminated tissues after handling. Do not eat, drink or smoke when using this product. Wear protective gloves, protective clothing, eye protection, face protection.

Response: In case of fire: Use materials appropriate for surrounding fire for extinction. IF SWALLOWED: Get emergency medical help immediately. Do NOT induce vomiting. IF ON SKIN (or hair): Remove immediately all contaminated clothing. Rinse skin with water or shower. If skin irritation occurs: Get medical attention. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention. Specific treatment (remove from exposure and treat symptoms). IF exposed or concerned: emergency Get medical help immediately.

Storage: Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up.

Disposal: Dispose of contents/containers in accordance with all local, regional, national and international regulations.

Hazard Symbol/Pictogram: GHS02, GHS07, GHS08



Percent of Unknown Acute Toxicity & Acute Toxicity Estimates (ATE): Toxicity data for water are irrelevant in an industrial setting; data are available for the Ethanol by all routes. The calculated ATE for this mixture by route of exposure are as follows: Oral: > 10,000 mg/kg; Dermal: > 15,000 mg/kg; Inhalation: > 32,000 ppm (4 hrs)

EMERGENCY OVERVIEW: Product Description: This product is a clear, flammable liquid, with somewhat sweet or ethereal odor. **Health Hazards:** May be harmful by ingestion. Inhalation of high concentration of vapor or spray may cause harm. Inhalation may cause respiratory irritation and narcotic effects, depending on concentration and duration of exposure. Direct eye exposure may cause moderate to severe eye irritation, depending on duration and concentration of contact. Repeated or prolonged skin exposure may lead to drying of the skin, redness or cracking of the skin. Ethanol is a suspected carcinogen, based on animal data. Refer to Section 11 (Toxicological Information) for more detailed information on potential health effects. **Flammability Hazards:** This product is flammable and can ignite if exposed to high temperature and direct flame. If involved in a fire, this product will release smoke, acrid vapors and toxic gases (e.g., carbon oxides, acrolein and unburned alcohols). **Reactivity Hazards:** This product is not normally reactive. **Environmental Hazards:** This product has not been tested for effects on the environment. Release of this product to the environment may cause harm to plants and animals. All intentional and accidental release should be avoided. **Emergency Response Considerations:** Emergency responders must wear proper personal protective equipment (and have appropriate fire protection) suitable for the situation to which they are responding.

3. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #%	% v/v	LABEL ELEMENTS GHS Classification under U.S. OSHA Hazard Communication Standard Hazard Statement Codes
Ethanol	64-17-5	62-80%	HARMONIZED CLASSIFICATION - ANNEX VI OF REGULATION (EC) NO 1272/2008 (CLP REGULATION) Classification: Flammable Liquid Cat. 2 Hazard Statement Codes: H225 ADDITIONAL NOTIFIED CLASSIFICATION: Classification: Carcinogen Cat. 2, Eye Irritation/Damage 2A, Skin Irritation Cat. 2, Specific Target Organ Toxicity (Optic Nerve) Single Exposure Cat. 2 Hazard Statement Codes: H351, H319, H315, H371
2-Methylpropanol-2-ol	75-65-0	< 0.5 - 10%	HARMONIZED CLASSIFICATION - ANNEX VI OF REGULATION (EC) NO 1272/2008 (CLP REGULATION) Classification: Flammable Liquid Cat. 2, Eye Irritation Cat. 2A, Acute Inhalation Toxicity Cat. 4, Specific Target Organ Toxicity (Inhalation-Respiratory Irritation) Single Exposure Cat. 3 Hazard Statement Codes: H225, H319, H332, H335 ADDITIONAL NOTIFIED CLASSIFICATION: Classification: Specific Target Organ Toxicity (Inhalation-Narcotic Effect) Single Exposure Cat. 3 Hazard Statement Codes: H336
Non-Hazardous Thickener (< 1%) and Water	7732-18-5	Balance	Classification: Not Applicable

No unknown ingredients

4. FIRST-AID MEASURES

PROTECTION OF FIRST AID RESPONDERS: RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS MATERIAL WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. Rescuers should be taken for medical attention, if necessary. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary.

DESCRIPTION OF FIRST AID MEASURES: If adverse effect occurs after exposure, seek medical attention. Take copy of label and SDS to physician or other health professional with victim(s). Remove victim(s) to fresh air, as quickly as possible.

Skin Exposure: If skin contact causes adverse effect, wash with soap and water. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention if any adverse effect continues after flushing.

GHS Precautionary Statements for Skin Exposure: IF ON SKIN (or hair): Remove immediately all contaminated clothing Wash thoroughly all contaminated tissues after handling. If skin irritation occurs: Get medical attention.

Eye Exposure: If aerosols from this product enter the eyes, open victim's eyes while under gentle running water. Quickly and gently blot or brush product off the face. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 20 minutes, while holding the eyelid(s) open. If a contact lens is present, DO NOT delay irrigation or attempt to remove the lens until flushing is done. If necessary, continue flushing during transport to emergency care facility. Seek medical attention if adverse effect continues after flushing.

GHS Precautionary Statements for Eye Exposure: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. eye irritation persists: Get medical attention.

Inhalation: If aerosols of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if any adverse effect occurs after removal for fresh air.

GHS Precautionary Statements for Inhalation Exposure: Do not breathe mists, sprays, fume. Get medical help if you feel unwell.

Ingestion: If large quantity of this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING, unless directly by medical personnel. Have victim rinse mouth with water or drink several cupfuls of water if conscious. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow. If vomiting occurs, lean patient forward or place on left side (head-down position if possible) to maintain an open airway and prevent aspiration.

GHS Precautionary Statements for Ingestion Exposure: IF SWALLOWED: Get emergency medical help immediately. Do NOT induce vomiting. Do not eat, drink or smoke when using this product.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions, skin conditions, or disorders involving the "Target Organs" (see Section 11, "Toxicological Identification") may be aggravated by exposure to this product.

IMPORTANT SYMPTOMS AND EFFECTS, WHETHER ACUTE OR DELAYED: See Sections 2 (Hazard Identification) and 11 (Toxicological Information) for more detailed information.

Acute: Non-toxic if swallowed (LD50 oral, rat > 10,000 mg/kg). Non-toxic in contact with skin (LD50 skin, rabbit > 15,800 mg/kg). Mild irritant to skin. May cause drowsiness or dizziness. Practically non-toxic by inhalation (LC50 inhalation, rat > 20 mg/L/4 hrs). Causes serious eye irritation. All potential effects are dependent on concentration and duration of exposure.

Symptoms/Effects After Inhalation: EXPOSURE TO HIGH CONCENTRATIONS: Coughing, dry or sore throat, central nervous system depression, dizziness, headache, narcosis.

Symptoms/Effects After Skin Contact: Dermatitis, dry skin.

Symptoms/Effects After Eye Contact: Moderate to severe irritation of eye tissue.

Symptoms/Effects After Ingestion: AFTER ABSORPTION OF LARGE QUANTITIES: Central nervous system depression. Headache. Dilation of the blood vessels. Low arterial pressure. Nausea. Vomiting. Abdominal pain. Disturbed motor response. Disturbances of consciousness. FOLLOWING SYMPTOMS MAY APPEAR LATER: Body temperature fall. Slowing respiration.

Chronic: Prolonged or repeated skin exposure can cause dermatitis (dry, red skin, itching, cracking of the skin, skin rash/inflammation).

4. FIRST-AID MEASURES (Continued)

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT IF NEEDED: Treat symptoms and eliminate exposure. If necessary, administer liver function tests, and eye and vision exams. The following treatment is suggested for various alcohols for ingestion exposure:

- Gastric lavage with 3–5% sodium bicarbonate, unless more than 2 hours have elapsed since ingestion occurred. Do not use apomorphine. Syrup of ipecac may be a safe way to empty stomach, if given promptly after ingestion.
- Oxygen and artificial respiration as needed for hypoventilation.
- Treat for circular collapse, dehydration and acidosis by intravenous infusions of isotonic sodium chloride or sodium bicarbonate.
- Intravenous glucose can be administered if hypoglycemia occurs.
- Hemodialysis can be done in severe cases in which the alkali treatment may be delayed or is incomplete.
- Keep patient warm. Avoid aspiration of vomitus.

5. FIRE-FIGHTING MEASURES

FLASH POINT (per ethanol %): 60%: 17.9°C (64.2°F); 70%: 16°C (61°F)

AUTOIGNITION TEMPERATURE: For Ethanol: 363-425°C (685-797°F)

FLAMMABLE LIMITS (in air by volume, %): For Ethanol: UEL: 3.3%; LEL: 19.0%

ELECTRICAL CONDUCTIVITY @ 25°C: For Ethanol: 1.35 pS/m x 10

FIRE EXTINGUISHING MEDIA: Fire extinguishing materials that can be used against fires of this product include carbon dioxide, dry chemical powder, 'ABC' Class, or appropriate foam. Consideration for surrounding materials must be taken into account.

UNSUITABLE FIRE EXTINGUISHING MEDIA: None known.

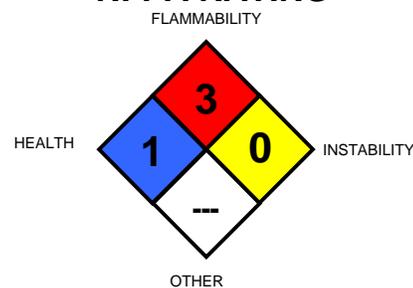
SPECIAL HAZARDS ARISING FROM THE MIXTURE: This product and vapors from the product are highly flammable. When involved in a fire, this material may ignite and produce irritating vapors and toxic gases (carbon oxides, acrolein and unburned alcohols). Closed containers can rupture in fire conditions. Vapors from the product may travel to a source of ignition, and flashback to a leak or open container. Vapors are heavier than air and may accumulate in confined spaces creating an explosion hazard.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: The vapors of this product may be ignited by static electrical energy.

SPECIAL PROTECTIVE ACTIONS FOR FIRE-FIGHTERS: Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment. Chemical resistant clothing may be necessary. Move containers from fire area if it can be done without risk to personnel. Water spray can be used to cool fire-exposed containers. Water fog or spray can also be used by trained fire-fighters to disperse this product's vapors and to protect personnel. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas. Rinse contaminated equipment thoroughly with soapy water before returning such equipment to service.

NFPA RATING



Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate
3 = Serious 4 = Severe * = Chronic hazard

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS AND EMERGENCY PROCEDURES: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. Eliminate any possible sources of ignition and provide maximum explosion-proof ventilation. Use only non-sparking tools and equipment during the response. Call INFOTRAC (1-800-535-5053 (U.S. and Canada) [24 hours]. The atmosphere must at least 19.5 percent Oxygen before non-emergency personnel can be allowed in the area without Self-Contained Breathing Apparatus and fire protection.

PERSONAL PROTECTIVE EQUIPMENT: Proper protective equipment should be used. Use only non-sparking tools and equipment.

Small Spills: Wear rubber gloves, splash goggles, and appropriate body protection.

Large Spills: Minimum Personal Protective Equipment should be rubber gloves, rubber boots, face shield, and Tyvek suit. Minimum level of personal protective equipment for releases in which the level of oxygen is less than 19.5% or is unknown must be **Level B: triple-gloves (rubber gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard hat, and Self-Contained Breathing Apparatus.**

METHODS FOR CLEAN-UP AND CONTAINMENT:

Small Spills: Carefully absorb spill using polypads or other non-reactive absorbent. Place spilled material in appropriate container for disposal, sealing tightly. Remove all residue before decontamination of spill area.

Large Spills: Access to the spill area should be restricted. For large spills, dike or otherwise contain spill and absorb spill with polypads or other non-reactive absorbent material.

All Spills: Place all spill residue in a double plastic bag or other containment and seal. Decontaminate the area thoroughly. Do not mix with wastes from other materials. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations). For spills on water, contain, minimize dispersion and collect. Dispose of recovered material and report spill per regulatory requirements.

ENVIRONMENTAL PRECAUTIONS: Avoid release to the environment. Run-off water may be contaminated by other materials and should be contained to prevent possible environmental damage.

REFERENCE TO OTHER SECTIONS: See information in Section 8 (Exposure Controls – Personal Protection) and Section 13 (Disposal Considerations) for additional information.

7. HANDLING and STORAGE

PRECAUTIONS FOR SAFE HANDLING: All employees who handle this material should be trained to handle it safely. Minimize all exposure to this substance. As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing this product. Keep away from incompatible materials, heat, sparks, and other sources of ignition. Use non-sparking tools. Bond and ground containers during transfers of material. Containers of this product must be properly labeled. Spills of the product may be slippery and present a slip hazard.

GHS Statements for Safe Handling: Keep away from heat, sparks, open flames, hot surfaces; No Smoking. Ground/bond container and receiving equipment. Use explosion-proof electrical, ventilating, and lighting/equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Do not breath mists, sprays, fume. Wash all contaminated tissues after handling. Do not eat, drink or smoke when using this product. Wear protective gloves, clothing, eye protection and face protection.

CONDITIONS FOR SAFE STORAGE: Keep container tightly closed when not in use. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers or in a diked area, as appropriate. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Containers should be separated from oxidizing materials by a minimum distance of 20 ft. or by a barrier of non-combustible material at least 5 ft. high having a fire-resistance rating of at least 0.5 hours. Storage areas should be made of fire-resistant materials. Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Refer to NFPA 30, *Flammable and Combustible Liquids Code*, for additional information on storage. Have appropriate extinguishing equipment in the storage area (such as sprinkler systems or portable fire extinguishers). Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged. Empty containers may contain residual product; therefore, empty containers should be handled with care. Have appropriate extinguishing equipment in the storage area (such as sprinkler systems or portable fire extinguishers). Vapors are heavier than air and may accumulate in confined spaces creating an oxygen-deficient and explosion hazard.

GHS Statements for Safe Handling: Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Always use this product in areas where adequate ventilation is provided. Decontaminate equipment thoroughly, before maintenance begins. Collect all rinsates and dispose of according to applicable Federal, State, or local procedures, or applicable standards.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/CONTROL PARAMETERS:

Ventilation and Engineering Controls: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in this section, if applicable. Exhaust directly to the outside, taking necessary precautions for environmental protection. Ensure eyewash/safety shower stations and appropriate fire protection is available near areas where this product is used.

Occupational/Workplace Exposure Limits/Guidelines: Only components with established exposure limits are given.

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR							
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELs		NIOSH	OTHER
		TWA	STEL	TWA	STEL	TWA	STEL	IDLH	
Ethanol	64-175	NE	1000 ppm	1000 ppm	NE	1000 ppm	NE	3300 ppm (based on 10% of LEL)	DFG MAKs: TWA: 200 ppm PEAK: 4•MAK 15 min. average value, 1-hr interval, 4 per shift DFG MAK Pregnancy Risk Classification: C DFG MAK Germ Cell Mutagen Category: 5 Carcinogen: TLV-A3, MAK-5
2-Methyl-propan-2-ol	75-65-0	100 ppm	NE	100 ppm	150 ppm (vacated 1989 PEL)	100 ppm	150 ppm	1600 ppm	DFG MAKs: TWA: 20 ppm PEAK: 4•MAK 15 min. average value, 1-hr interval, 4 per shift DFG MAK Pregnancy Risk Classification: C Carcinogen: TLV-A4

ACGIH Biological Exposure Indices (BEIs): No Biological Exposure Indices (BEIs) have been established for components of this product.

PERSONAL PROTECTIVE EQUIPMENT: The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132), U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), 29 CFR 1910.133 for eye protection, 29 CFR 1910.138 for hand protection, 29 CFR 1910.136 for foot protection. Please reference applicable regulations and standards for relevant details.

Respiratory Protection: Maintain airborne contaminant concentrations below exposure limits listed in this section, if applicable. If respiratory protection is needed, use only protection authorized applicable regulations and standards. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of -facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under appropriate regulations and standards. The following are U.S. NIOSH respiratory equipment recommendations for the main component, Ethanol.

ETHYL ALCOHOL

CONCENTRATION RESPIRATORY PROTECTION

Up to 3300 ppm: Any Supplied-Air Respirator (SAR), or any Self-Contained Breathing Apparatus (SCBA) with a full facepiece.

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions: Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.

Escape: Any appropriate escape-type, SCBA.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

PERSONAL PROTECTIVE EQUIPMENT (continued):

Eye Protection: Splash goggles or safety glasses. If necessary, refer to applicable regulations and standards for further information.

Hand Protection: Wear butyl rubber, Teflon™, Barricade™, Chemrel™, nitrile or similar gloves for routine industrial use. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this SDS. If necessary, refer to applicable regulations and standards.

Body Protection: When chemical contact is possible, use splash apron, work uniform, and shoes or coverlets to prevent skin contact. Full-body chemical protective clothing is recommended for emergency response procedures. If necessary, refer to applicable regulations and standards. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in appropriate regulations and standard.

Recommended Materials for Protective Clothing:

EXCELLENT RESISTANCE (resistance to breakthrough > 8 hrs): Butyl rubber, Viton®, Viton(R)/Butyl Rubber, Barrier® - PE/PA/PE, Silver Shield® - PE/EVAL/PE, Saranex®, Microchem® 4000, Tychem® CPF3, Tychem® Responder® CSM, Zytron® 500.

GOOD RESISTANCE (resistance to breakthrough > 4 hrs): Neoprene.

LESS RESISTANCE (resistance to breakthrough 1-4 hrs): Nitrile rubber.

POOR RESISTANCE (resistance to breakthrough less than 1 hr): Natural rubber, Polyvinyl alcohol (PVAL), Polyvinyl chloride (PVC).

9. PHYSICAL and CHEMICAL PROPERTIES

The following values are for this product:

FORM: Gel.

MOLECULAR WEIGHT: Mixture

ODOR: Mildly sweet or ethereal.

PERCENT SOLIDS: 0%

FLASH POINT (per ethanol %): 60%: 17.9°C (64.2°F); 70%: 16°C (61°F)

HOW TO DETECT THIS SUBSTANCE (identification/warning properties): The odor and gelled appearance may be a distinctive property as the TLV of the main component, Ethanol, is 5 to 10 times the odor threshold.

The following values are for the main component, Ethanol:

MOLECULAR WEIGHT: 46.07

ODOR: Sweet, ethereal, like wine or whiskey.

ODOR THRESHOLD: 49-716 ppm. Geometric mean: 180 ppm (detection); 100 ppm (recognition)

VISCOSITY DYNAMIC @ 20°C: 1.17 mPa.s (1.17 cPs)

EVAPORATION RATE (n-butyl acetate): 2.4

VAPOR DENSITY (air = 1): 1.59

FREEZING POINT: -114°C (-173.2°F)

BOILING POINT: 78.3°C (172.9°F)

FLASH POINT (closed cup): 13.875°C (57°F)

FLAMMABLE LIMITS IN AIR: UEL: 3.3%; LEL: 19.0%

SATURATION VAPOR CONCENTRATION @ 20°C: 58,200 ppm (5.82%)

MINIMUM IGNITION ENERGY: 0.65 mJ

CRITICAL TEMPERATURE: 235°C (455°F)

SATURATION CONCENTRATION @ 20°C: 58200 ppm (5.82%)

SOLUBILITY IN WATER @ 20°C: Soluble in all proportions.

OTHER SOLUBILITIES: Soluble in all proportions with diethyl ether, acetone, benzene, chloroform, methanol and some other organic solvents.

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Log P(oct) = -0.31 (experimental)

COLOR: Clear.

MOLECULAR FORMULA: Mixture.

ODOR THRESHOLD: Not determined.

OXIDIZING PROPERTIES: Not an oxidizer.

MOLECULAR FORMULA: C₂H₆O

SPECIFIC GRAVITY @ 20°C: 0.789

VISCOSITY KINEMATIC @ 20°C: 1.48 mm²/s (1.48 cPs)

EVAPORATION RATE (diethyl ether): 8.3

VAPOR PRESSURE @ 20°C: 5.9 kPa (44.25 mm Hg)

MELTING POINT: Not applicable.

pH: Very weak acid and very weak base.

FLAMMABILITY: Highly flammable.

AUTOIGNITION TEMPERATURE: 363-425°C (685-797°F)

SPECIFIC CONDUCTIVITY: 5.8 µS/m

CRITICAL PRESSURE: 47 atm, 47,600 hPa

DECOMPOSITION TEMPERATURE: Not available.

10. STABILITY and REACTIVITY

REACTIVITY: May be reactive to water-reactive compounds.

CHEMICAL STABILITY: Stable under conditions of standard temperature.

DECOMPOSITION PRODUCTS: **Combustion:** carbon oxides, acrolein and unburned alcohols. **Hydrolysis:** None known.

MATERIALS WITH WHICH PRODUCT IS INCOMPATIBLE: This product would be incompatible with heat, elevated temperatures, strong oxidizers, hydrogen peroxide, perchloric acid, metal perchlorates (e.g. silver perchlorate or magnesium perchlorate), mercuric nitrate, silver nitrate, silver and nitric acid, or silver oxide and aqueous ammonia, alkali metals (e.g. sodium or potassium), bromine pentafluoride or bromides, sodium hydrazide, zirconium tetrachloride, phosphorus (III) oxide, potassium tert-butoxide, acids, acid anhydrides, or acid chlorides (e.g. acetyl chloride), calcium oxide or cesium oxide, platinum black catalyst, bromine and phosphorus or iodine and phosphorus.

Corrosivity to Metals: Due to Ethanol content, this product may corrode some grades of aluminum.

Corrosivity to Plastics: Ethanol can attack plastics, such as acrylics, styrene-acrylonitrile, polyurethane (rigid), polystyrene and polymethacrylate acrylic; and elastomers, such as polyacrylate, polyurethane, nylon 11, nylon 12, flexible polyvinyl chloride (PVC) and low-density polyethylene (LDPE) at room temperature. 90% Ethanol attacks nylon 12 plastic.

POSSIBILITY OF HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid exposure or contact to ignition sources, extreme temperatures, and incompatible chemicals.

11. TOXICOLOGICAL INFORMATION

SYMPTOMS OF EXPOSURE BY ROUTE OF EXPOSURE: The most significant routes of occupational exposure are inhalation and contact with skin and eyes. The symptoms of exposure to this product, via route of entry, are as follows:

Inhalation: Exposure to this product by inhalation may cause irritation of the respiratory system. Symptoms may include difficulty breathing, labored breathing, dizziness and cough. Inhalation of high concentration may cause adverse effects on the central nervous system such as drowsiness, dizziness and incoordination.

Contact with Eyes: Vapors of this product can irritate the eyes. This product will cause immediate pain, redness, tearing and irritation if splashed into the eyes. Prolonged eye contact may cause moderate to severe irritation.

Contact with Skin: Recommended use of the product is not expected to cause irritation. Prolonged or repeated skin exposure can cause dermatitis and defatting of the skin, causing dry, red, itchy skin. After regular application of hand disinfectants containing Ethanol relatively low but measurable blood concentrations of Ethanol and its metabolite acetaldehyde may occur, which are, however, below acute toxic levels. Only in children, especially through lacerated skin, can percutaneous toxicity occur. Ethanol use is associated with skin irritation or contact dermatitis, especially in humans with an aldehyde dehydrogenase (ALDH) deficiency.

Skin Absorption: The main component, Ethanol, is absorbed into normal, intact skin, and may reach the blood stream to be systemically distributed in the human body. Ethanol has been used as a mechanism to facilitate transdermal absorption of other materials (such as medications). Topically applied Ethanol acts as a skin penetration enhancer and may facilitate the transdermal absorption of xenobiotics (e.g. carcinogenic contaminants in cosmetic formulations). Care should be taken to avoid skin exposure to potentially harmful chemicals while using this product. Ingestion of alcoholic beverages can increase the rate of skin absorption of Ethanol that is topically applied.

Ingestion: Ingestion is not anticipated to be a significant route of exposure for this product. If this product is swallowed, irritation of the mouth, throat, esophagus and other tissues of the digestive, depending concentration of exposure by this route. Symptoms of ingestion may include vomiting, diarrhea, and nausea. Information in literature regarding the human fatal dose for Ethanol is variable but greater than 2 g/kg along with blood ethanol concentrations in excess of 300 mg/dL (which, assuming a volume of distribution of ~60% of human body weight, would equate to 1.8 g/kg - remarkably consistent with the previous figure. Crudely, an LC50 of ~ 2g/kg in humans can be assumed. Ingestion of large quantity may cause adverse central nervous system effects as described under 'Inhalation'.

Chronic ingestion of ethanol as alcoholic beverages can cause significant adverse health effects, but these effects are not relevant to normal use of this product are not discussed in this SDS.

Injection: Injection is not anticipated to be a significant route of exposure for this product. Injection of this product (via puncture with a contaminated object) can cause pain and irritation in addition to the wound.

HEALTH EFFECTS OR RISKS FROM EXPOSURE:

Acute: Exposure to this product can moderately irritate contaminated eyes, and mucous membranes.

Chronic: Chronic skin exposure to this product may cause dermatitis. Chronic ingestion of Ethanol (as alcoholic beverages) can cause damage to the liver.

TARGET ORGANS: **Acute:** Respiratory system, skin, eyes, central nervous system. **Chronic:** Skin, blood, liver, reproductive system.

TOXICITY DATA FOR PRODUCT: This product has not been tested for toxicity by any route of exposure.

Percent of Unknown Acute Toxicity & Acute Toxicity Estimates (ATE): Toxicity data for water are irrelevant in an industrial setting; data are available for the Ethanol by all routes. The calculated ATE for this mixture by route of exposure are as follows: Oral: > 10,000 mg/kg; Dermal: > 15,000 mg/kg; Inhalation: > 32,000 ppm (4 hrs)

TOXICITY DATA FOR COMPONENTS: Currently, the following toxicology data are available for the Ethanol and Proprietary Glyceride components. Only available human data, corrosion data, LD50 Oral-Rat, Oral-Mouse, Skin-Rat, Skin-Rabbit and LC50 Inhalation-Rat data are given.

ETHANOL:

Open Irritation Test (Skin-Rabbit) 400 mg: Mild
 Standard Draize Test (Skin-Rabbit) 20 mg/24 hours: Moderate
 Standard Draize Test (Eye-Rabbit) 500 mg: Severe
 Standard Draize Test (Eye-Rabbit) 500 mg/24 hours: Mild
 Rinsed with Water (Eye-Rabbit) 100 mg/ seconds: Moderate
 TDLo (Oral-Human) 22,500 mg/kg/4 weeks-intermittent: Endocrine: other changes;
 Blood: other changes
 TDLo (Oral-Human) 0.5 mg/kg: Behavioral: changes in psychophysiological tests
 TDLo (Oral-Human) 400 mg/kg: Behavioral: alteration of operant conditioning
 TDLo (Oral-Human) 0.7 gm/kg/10 minutes: Behavioral: changes in psychophysiological tests
 TDLo (Oral-Human) 0.5 gm/kg: Behavioral: somnolence (general depressed activity), changes in psychophysiological tests
 TDLo (Oral-Human) 1.4 gm/kg: Behavioral: euphoria, changes in psychophysiological tests; Gastrointestinal: nausea or vomiting
 TDLo (Oral-Infant) 11,712 µL/kg: Behavioral: general anesthetic; Cardiac: arrhythmias (including changes in conduction); Lungs, Thorax, or Respiration; dyspnea

TDLo (Oral-Child) 14400 mg/kg/30 minutes (intermittent): Behavioral: coma; Lungs, Thorax, or Respiration: dyspnea; Gastrointestinal: nausea or vomiting

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	2*
----------------------	--------	-----------

FLAMMABILITY HAZARD	(RED)	3
----------------------------	-------	----------

PHYSICAL HAZARD	(YELLOW)	0
------------------------	----------	----------

PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8

For Routine Industrial Use and Handling Applications

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate
 3 = Serious 4 = Severe * = Chronic hazard

ETHANOL (continued):

TDLo (Oral-Woman) 1200 mg/kg/3 hours: Endocrine: changes in gonadotropins;
Endocrine: other changes; Blood: other changes
TDLo (Oral-Woman) 256 gm/kg/12 weeks: Behavioral: hallucinations, distorted
perceptions; Endocrine: effect on menstrual cycle
TDLo (Oral-Woman) 41 gm/kg: female 41 week(s) after conception: Reproductive:
Effects on Newborn: Apgar score (human only), other neonatal measures or
effects, drug dependence
TDLo (Oral-Woman) 0.7 gm/kg: Behavioral: changes in psychophysiological tests
TDLo (Oral-Woman) 250 mg/kg: female 37 week(s) after conception: Reproductive:
Effects on Embryo or Fetus: other effects to embryo

TDLo (Oral-Woman) 5860 mL/kg: female 3-year(s) pre-mating: 100 day(s) post-birth:
Reproductive: Specific Developmental Abnormalities: craniofacial (including nose
and tongue); Effects on Newborn: behavioral, delayed effects
TDLo (Oral-Man) 3371 µL/kg: Behavioral: altered sleep time (including change in
righting reflex), excitement, coma
TDLo (Oral-Man) 700 mg/kg: Behavioral: changes in psychophysiological tests
TDLo (Oral-Man) 50 mg/kg: Gastrointestinal: alteration in gastric secretion, other
changes

11. TOXICOLOGICAL INFORMATION (Continued)

TOXICITY DATA FOR COMPONENTS (continued):

ETHANOL (continued):

TDLo (Oral-Man) 1430 µg/kg: Behavioral: changes in motor activity (specific assay), ataxia, antipsychotic
TDLo (Intravenous-Human) 1.6 gm/kg/6 hours: Biochemical: Metabolism (Intermediary): other
TDLo (Intravenous-Human) 0.89 mL/kg: Vascular: regional or general arteriolar constriction, measurement of regional blood flow
TDLo (Intravenous-Man) 0.57 gm/kg: Behavioral: changes in psychophysiological tests
TDLo (Intravenous-Woman) 8 gm/kg: female 32 week(s) after conception: Reproductive: Effects on Newborn: Apgar score (human only), other neonatal measures or effects
TDLo (Intraarterial-Man) 0.071 mL/kg: Vascular: acute arterial occlusion
TDLo (Multiple Routes-Man) 3660 mg/kg: Endocrine: evidence of thyroid hypofunction
TDLo (Intrauterine-Woman) 200 mg/kg: female 5-day(s) pre-mating: Reproductive: Fertility: female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated)
TCLo (Inhalation-Human) 2500 mg/m³/20 minutes: Peripheral Nerve and Sensation: recording from afferent nerve
LDLo (Oral-Child) 2 gm/kg: Lungs, Thorax, or Respiration: other changes; Liver: fatty liver degeneration; Blood: other changes
LDLo (Oral-Human) 1400 mg/kg: Behavioral: sleep, headache; Gastrointestinal: nausea or vomiting
LDLo (Subcutaneous-Infant) 19,440 mg/kg: Behavioral: convulsions or effect on seizure threshold, coma; Nutritional and Gross Metabolic: body temperature decrease
LC₅₀ (Inhalation-Rat) 20,000 ppm/10 hours
LC₅₀ (Inhalation-Mouse) 39 gm/m³/4 hours

OTHER TOXICITY INFORMATION:

Toxicologically Synergistic Materials: Alcohols may interact synergistically with chlorinated solvents (e.g. carbon tetrachloride), aromatic hydrocarbons (e.g. xylene) or dithiocarbamates (e.g. disulfiram). Most of the specific information about the interactions of Ethanol with other chemicals results from studies involving alcohol consumption and exposure to chemicals. Occupational exposure to Ethanol is much lower and any interactive effects would be substantially reduced or absent. Ethanol has been associated with an increase in the toxicity of many chemicals including other alcohols, ketones (e.g. acetone and methyl ethyl ketone), benzene, toluene, halogenated hydrocarbons (e.g. carbon tetrachloride, trichloroethylene, chloroform, and methylene chloride), aromatic amines and nitrosamines. Ethanol enhances the activity of many chemicals that are harmful to the liver (hepatotoxic agents). There is also a synergistic effect between Ethanol and certain metals (e.g. chromium, cobalt, manganese and mercury) or compounds containing these metals. Animal studies have shown that short- and long-term ingestion exposure to Ethanol can result in enhanced dermal absorption of chemicals applied to the skin. Dimethylformamide and cyanamide) can decrease or slow the metabolism of Ethanol thereby increasing the toxic effects of Ethanol.

Potential for Accumulation: Ethanol does not accumulate. It is readily absorbed by the oral or inhalation routes of exposure, but skin uptake is low. Human absorption of the vapor has been reported to be 33-62%, and independent of air concentration and ventilation rate. Most Ethanol is metabolized before it is eliminated.

CARCINOGENIC POTENTIAL OF COMPONENTS: The components of this product are listed by agencies tracking the carcinogenic potential of chemical compounds, as follows:

ETHANOL: ACGIH TLV-A3 (Confirmed Animal Carcinogen with Unknown Relevance to Humans); MAK-5 (Substances with Carcinogenic and Genotoxic Effects, the potency of which is considered to be so low that, provided the MAK and BAT values are observed, no significant contribution to cancer risk is to be expected.)

The remaining components of this product are not found on the following lists: U.S. EPA, U.S. NTP, U.S. OSHA, U.S. NIOSH, GERMAN MAK, IARC, or ACGIH and therefore are neither considered to be nor suspected to be cancer-causing agents by these agencies.

SENSITIZATION TO THE PRODUCT: Available information is insufficient to conclude that Ethanol is an occupational skin sensitizer. Approximately 20 cases of Ethanol allergic skin reactions confirmed by positive patch tests have been identified. In most cases, the exposure to Ethanol was not occupational. In some cases, a previous history of allergies was also identified. Limited studies suggest that contact sensitivity to Ethanol may be related to an ethnic sensitivity, similar to the Oriental ethnic sensitivity, which results in skin flushing following ingestion of alcoholic beverages. Limited research indicates that some of the cases may actually be a non-allergic wheal reaction (non-allergic contact urticaria). In the three occupational exposure cases located, patch testing with ethanol proved positive. Prior history of allergies was not discussed for any of the cases. Therefore, no firm conclusions can be drawn from these reports.

REPRODUCTIVE TOXICITY INFORMATION: The components of this product are not known to cause mutagenic, embryotoxic, teratogenic or reproductive toxicity effects to humans.

Mutagenicity: There is insufficient information available to conclude that Ethanol is mutagenic. Ethanol has caused mutagenic effects in tests using live animals. However, these effects have generally been observed at very high oral doses and the observations are not considered relevant to an occupational setting. There are no reports of mutagenic effects in people with occupational exposures. Mutagenic effects (such as increased frequencies of chromosomal aberrations, sister chromatid exchanges and aneuploidy) have been observed in the white blood cells of alcoholics. However, it is not possible to conclude that these effects relate directly to ethanol exposure, because of other potential causes, such as smoking and exposure to other potentially harmful chemicals at the same time.

Embryotoxicity/Teratogenicity: There is no evidence of developmental toxicity following occupational exposure to Ethanol. When ingested as alcoholic beverages, there are clear correlations that ethanol can cause adverse effects to the human fetus. Animal evidence clearly demonstrates that ingestion of Ethanol can cause embryotoxicity, teratogenicity and fetotoxicity, but only in the presence of maternal toxicity. No effects were observed in one study with very high inhalation exposures, despite the observation of significant harmful effects in the mothers. Therefore, ethanol is not considered an occupational developmental hazard.

ETHANOL (continued):

LD₅₀ (Oral-Rat) 7060 mg/kg: Lungs, Thorax, or Respiration: other changes
LD₅₀ (Oral-Rat) 7 gm/kg
LD₅₀ (Oral-Mouse) 3450 mg/kg
Immunological Including Allergic: decreased immune response
DNA Inhibition (Human-Lymphocyte) 220 mmol/L
Micronucleus Test (Oral-Human) 817.6 gm/kg/6 years/intermittent
Cytogenetic Analysis (Human-Lymphocyte) 2.5 pph/24 hours
Cytogenetic Analysis (Human-Lymphocyte) 1160 gm/L
Cytogenetic Analysis (Human-Fibroblast) 12,000 ppm
Cytogenetic Analysis (Human-Leukocyte) 1 pph/72 hours-continuous
Cytogenetic Analysis (Oral-Human) 49,014 gm/kg/25 years
Sister Chromatid Exchange (Human-Lymphocyte) 500 ppm/72 hours-continuous
2-METHYLPROPANOL-2-OL:
TDLo (Eye-Human) 72.5 mg/m³: Sense Organs and Special Senses (Eye): conjunctive irritation
Standard Draize Test (Skin-Rabbit) 500 µL/24 hours: Mild
Standard Draize Test (Eye-Rabbit) 100 µL/24 hours: Severe
LC₅₀ (Inhalation-Rat) > 10,000 ppm/4 hours: Behavioral: ataxia; Lungs, Thorax, or Respiration: dyspnea, pulmonary emboli
LD₅₀ (Oral-Rat) 2743 mg/kg: Sense Organs and Special Senses (Eye): lachrymation; Lungs, Thorax, or Respiration: respiratory depression; Gastrointestinal: other changes
LD₅₀ (Oral-Rat) 3500 mg/kg
LD₅₀ (Oral-Mouse) 3559 mg/kg: Sense Organs and Special Senses (Eye): corneal damage; Cardiac: pulse rate; Lungs, Thorax, or Respiration: dyspnea
LD₅₀ (Oral-Rabbit) 3600 mg/kg
LD₅₀ (Skin-Rabbit) > 2 gm/kg: Skin and Appendages: dermatitis, other (after systemic exposure)

11. TOXICOLOGICAL INFORMATION (Continued)

REPRODUCTIVE TOXICITY INFORMATION (continued):

Reproductive Toxicity: The components of this product are not reported to cause reproductive effects in humans. There is no evidence of reproductive toxicity following occupational exposure to Ethanol. Effects on reproductive organs, including decreased testicular weight, decreased numbers of motile sperm, decreased ovarian function and irregular fertility cycles, have been observed in animals given very large oral doses of Ethanol. However, no confirmed effects on fertility or reproductive capability have been observed. Therefore, ethanol is not considered an occupational reproductive toxin. Reproductive effects have been observed in people who have consumed large amounts of alcoholic beverages. Human population studies have shown testicular atrophy and sperm effects in alcoholic men, but these effects are generally accompanied by cirrhosis of the liver. Some studies have shown early menopause in alcoholic women. The effects from long-term high alcohol consumption cannot be related to people who are occupationally exposed to ethanol because the nature and degree of exposure is significantly different.

12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

MOBILITY: This product has not been tested for mobility in soil. It is expected to have high mobility due to components. Ethanol has a high mobility in soils.

PERSISTENCE AND BIODEGRADABILITY: This product has not been tested for persistence or biodegradability. The following information is available for the main component. Values for the main component, Ethanol indicate that it has a low persistent value and will rapidly biodegrade in water, soil and air.

BIO-ACCUMULATION POTENTIAL: This product has not been tested for bio-accumulation potential. The estimated BCF of 3 for Eth suggests Ethanol has low bioaccumulation potential. A BCF will therefore be below 3 for the product.

ECOTOXICITY: This product has not been tested for aquatic toxicity. No component of this product meets the criteria of a marine pollutant. However, release of large quantity to aquatic and terrestrial organism may cause harm. The following aquatic toxicity data is available in literature for Ethanol.

LC₅₀ (*Daphnia magna* Water flea) 48 hours = 9268-14221 mg/L; LC₅₀ (*Pimephales promelas*, fathead minnow) 96 hours = 14.2-15.3 mg/L

OTHER ADVERSE EFFECTS: The components of this product have no known ozone depletion potential.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHODS: It is the responsibility of the generator to determine at the time of disposal whether the product meets the criteria of a hazardous waste per regulations of the area in which the waste is generated and/or disposed of. Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Shipment of wastes must be done with appropriately permitted and registered transporters.

DISPOSAL CONTAINERS: Waste materials must be placed in and shipped in appropriate 5-gallon or 55-gallon poly or metal waste pails or drums. Permeable cardboard containers are not appropriate and should not be used. Ensure that any required marking or labeling of the containers be done to all applicable regulations.

PRECAUTIONS TO BE FOLLOWED DURING WASTE HANDLING: Wear proper protective equipment when handling waste materials. Dispose of in accordance with applicable Federal, State, and local procedures and standards.

GHS Disposal Precautionary Statements: Store locked up.

U.S. EPA WASTE NUMBER: Wastes of this product should be tested to see if it meets criteria for waste characteristic ignitability (D001).

14. TRANSPORTATION INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION REGULATIONS: This product is classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101. **NOTE:** Due to the current COVID-19 Coronavirus crisis in the United States, the DOT has put in place temporary quantity and labeling exemptions for shipments of Sanitizers containing Ethyl Alcohol that are manufactured to FDA/CDC Guidance Document recommendations, to facilitate rapid distribution of the product. This DOT Notice of Enforcement Discretion expires 3 months from its date of issuance (April 2, 2020) or until the time when the public health emergency is over, whichever is sooner. Information for this exemption can be found here: <https://www.phmsa.dot.gov/news/temporary-relief-notice-transportation-hand-sanitizer-during-covid-19-emergency>

Information for shipping under this exemption is as follows:

For Small Quantities of up to 1 Gallon (e.g. gallon bottles, 32-ounce bottles and below) and Individual Bottles of over 1 Gallon and up to 8 Gallons.

Inner (individual boxes) and outer packagings (case boxes) must both be labeled or marked with the company name and the following: 'Sanitizer – Containing Ethyl Alcohol' (see example on following page). All inner packagings must be leak tight and securely closed, secured against shifting, and protected against damage.

- For packagings that contain 1 gallon or less in individual containers, place inner packaging inside outer package; closures upward. Secure and cushion within the outer package to prevent breakage, leakage, and movement in transport. Net contents of all inner packagings in any single outer packaging cannot exceed 8 gallons (e.g., 8 x 1-gallon receptacles). No hazardous material shipping papers or hazmat labels are required. Case boxes that contain up to, but cannot exceed, 8 gallons each, can be loaded onto a pallet and shrink wrapped for shipping.
-

14. TRANSPORTATION INFORMATION (Continued)

U.S. DEPARTMENT OF TRANSPORTATION REGULATIONS (continued):

For Small Quantities of up to 1 Gallon (e.g. gallon bottles, 32-ounce bottles and below) and Individual Bottles of over 1 Gallon and up to 8 Gallons (continued).

- For packings that contain larger than 1-gallon containers, overpacked in crates, cages, carts, boxes or similar overpacks; closures upward. Secure in such a way as to prevent breakage, leakage, and movement in transport. Case boxes that contain up to, but cannot exceed, 8 gallons each, can be loaded onto a pallet and shrink wrapped for shipping.



Non-Bulk Quantities Classification Detail.

DOT or UN-specification packaging meeting PG II performance standards must be used. The total net capacity cannot exceed 119 gallons. This includes 55 or 85-gallon drums or other approved containers. DOT or UN-specification packaging must be prepared and closed according to manufacturer's instructions. Containers must have secure closures that are leak tight. Secure containers against movement or damage in vehicle. See below for example of containers with flammable liquids, class 3 label. The following classification applies:

<u>UN identification number:</u>	UN 1987
<u>Proper Shipping Name:</u>	Alcohols, n.o.s. (Ethyl Alcohol)
<u>Hazard Class Number and Description:</u>	3 (Flammable)
<u>Packing Group:</u>	II
<u>DOT Label(s) Required:</u>	3 (Flammable)
<u>North American Emergency Response Guidebook Number, 2020:</u>	127 (a copy of this guide must accompany the shipping papers)



The Flammable Liquids label must be 3.9 inches on each side. Shipping papers (with ERG #127) must accompany the driver of the transport vehicle that communicates :UN 1987, Alcohols, n.o.s. (ethyl alcohol), 3, PGII, the number and type of packages and total quantity (include a unit of measure –e.g., lbs, kgs, gallons, liters). In addition, DOT-PHMSA registration requirements are waived. Vehicle placarding is required if quantities exceed an aggregate gross quantity of 1,001 lbs on a transport vehicle. All applicable motor carrier requirements apply (§177.804). Familiarity with these guidelines and accompanying guidance document as a substitute for training requirements.

For all shipments over 119-gallon total, the following shipping classification applies. All full Hazardous Materials Regulations apply to shipments over 119-gallons. This classification will also apply to non-limited quantity or non-ORM-D shipments.

<u>UN identification number:</u>	UN 1170
<u>Proper Shipping Name:</u>	Ethanol Solution
<u>Hazard Class Number and Description:</u>	3 (Flammable)
<u>Packing Group:</u>	II
<u>DOT Label(s) Required:</u>	3 (Flammable, Package Orientation)
<u>North American Emergency Response Guidebook Number, 2020:</u>	127

Marine Pollutant: No component meets the criteria of a Marine Pollutant, per Appendix B to 49 CFR 172.101

NOTE: Shipments of this product may be shipped under small quantity and limited quantity exceptions as indicated under 49 CFR §173.4 and 49 CFR §173.150, if all requirements are met.

Small Quantity Exception (49 CFR 173.4): Small quantities of Class 3 material are not subjected to other requirements of the Hazardous Materials Regulations (Subchapter C) when the maximum quantity per inner receptacle is limited to 30 mL (1 oz). Refer to 49 CFR 173.4 for specific information in packaging small quantity materials.

Limited Quantity Exceptions [49 CFR 173.150(b)]: Limited quantities for Class 3, Packing Group II materials have inner packagings not over 1.0 L (0.3 gal) net capacity each, packed in strong outer packaging.

14. TRANSPORTATION INFORMATION (Continued)

U.S. DEPARTMENT OF TRANSPORTATION REGULATIONS (continued): After the COVID-19 crisis is over, the following ORM-D shipment information and Limited Quantity of Retail Products Containing Ethyl Alcohol information will apply.

ORM-D Consumer Commodity Shipments: Shipments of this product by ground transportation that meet criteria for ORM-D Consumer Commodity shipments can be shipped in appropriate packagings, marked with Consumer Commodity and an ORM-D label. Shipments are not shipped as Hazardous Materials and there are no requirements for a class 3 Flammable Liquids label, UN Classification number or shipping papers. Even though your packaging need not be a UN performance package, it must meet the requirements of 49 CFR 173.24 and 49 CFR 173.24(a) and must be capable of meeting the ISTA Procedure 3A. ORM-D shipments can be sent to Canada, but cannot be sent to Puerto Rico, Hawai'i, Alaska or Catalina Island (in California). ORM-D shipment cannot exceed 0.3-gallon, net volume. ORM-D Shipments will be allowed until December 31, 2020, after which they will no longer be allowed.

INTERNATIONAL AIR TRANSPORT ASSOCIATION DESIGNATION: This product is classified as dangerous goods, per rules of IATA.

<u>UN Identification Number:</u>	UN 1170
<u>Proper Shipping Name:</u>	Ethanol Solution
<u>Hazard Class Number and Description:</u>	3 (Flammable)
<u>Packing Group:</u>	II
<u>Hazard Label(s) Required:</u>	Class 3 (Flammable)
<u>Excepted Quantities:</u>	E2
<u>Passenger and Cargo Aircraft Packing Instruction:</u>	353
<u>Passenger and Cargo Aircraft Maximum Net Quantity Per Pkg.:</u>	5 L
<u>Passenger and Cargo Aircraft Limited Quantity Packing Instruction:</u>	Y341
<u>Passenger and Cargo Aircraft Limited Quantity Maximum Net Quantity Per Pkg.:</u>	1 L
<u>Cargo Aircraft Only Packing Instruction:</u>	364
<u>Cargo Aircraft Only Maximum Net Quantity Per Pkg.:</u>	60 L
<u>Special Provisions:</u>	A3, A58, A180
<u>ERG Code:</u>	3L

15. REGULATORY INFORMATION

U.S. REGULATIONS:

U.S. SARA Reporting Requirements: Ethanol is not subject to Sections 302, 304, and 313 reporting requirements under the Superfund Amendment and Reauthorization Act.

U.S. SARA Threshold Planning Quantity: There are no specific Threshold Planning Quantities for this material. The default Federal SDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. SARA 302 Extremely Hazardous Threshold Planning Quantity (TPQ): Not applicable.

U.S. SARA 304 Extremely Hazardous Reportable Quantity (RQ): Not applicable.

U.S. CERCLA Reportable Quantity (RQ): Not applicable.

U.S. TSCA INVENTORY STATUS: The components of this product listed are listed on the TSCA Inventory.

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65): In the form of alcoholic beverages to be consumed, the Ethanol component of this product is on the California Proposition 65 lists as a compound that is known to cause developmental harm. This does not apply to Ethanol that is not consumed as a beverage.

16. OTHER INFORMATION

REVISIONS DETAILS: New. REFERENCES AND DATA SOURCES: Contact the supplier for information.

METHODS OF EVALUATING INFORMATION FOR THE PURPOSE OF CLASSIFICATION: Bridging principles were used to classify this product.

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc. • PO Box 1961, Hilo, HI 96721 • (800) 441-3365 • (808) 969-4846

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. Higley Industries assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, Higley Industries assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in the use of the material.

16. OTHER INFORMATION (Continued)

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on an SDS. Some of these, which are commonly used, include the following:

CAS #: This is the Chemical Abstract Service Number that uniquely identifies each constituent.

EXPOSURE LIMITS IN AIR:

CEILING LEVEL: The concentration that shall not be exceeded during any part of the working exposure.

DFG MAK Germ Cell Mutagen Categories: 1: Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed humans. 2: Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed mammals. 3A: Substances which have been shown to induce genetic damage in germ cells of human of animals, or which produce mutagenic effects in somatic cells of mammals *in vivo* and have been shown to reach the germ cells in an active form. B: Substances which are suspected of being germ cell mutagens because of their genotoxic effects in mammalian somatic cell *in vivo*; in exceptional cases, substances for which there are no *in vivo* data, but which are clearly mutagenic *in vitro* and structurally related to known *in vivo* mutagens. 4: Not applicable (Category 4 carcinogenic substances are those with non-genotoxic mechanisms of action. By definition, germ cell mutagens are genotoxic. Therefore, a Category 4 for germ cell mutagens cannot apply. At some time in the future, it is conceivable that a Category 4 could be established for genotoxic substances with primary targets other than DNA [e.g. purely aneugenic substances] if research results make this seem sensible.) 5: Germ cell mutagens, the potency of which is considered to be so low that, provided the MAK value is observed, their contribution to genetic risk for humans is expected not to be significant.

DFG MAK Pregnancy Risk Group Classification: **Group A:** A risk of damage to the developing embryo or fetus has been unequivocally demonstrated. Exposure of pregnant women can lead to damage of the developing organism, even when MAK and BAT (Biological Tolerance Value for Working Materials) values are observed. **Group B:** Currently available information indicates a risk of damage to the developing embryo or fetus must be considered to be probable. Damage to the developing organism cannot be excluded when pregnant women are exposed, even when MAK and BAT values are observed. **Group C:** There is no reason to fear a risk of damage to the developing embryo or fetus when MAK and BAT values are observed. **Group D:** Classification in one of the groups A-C is not yet possible because, although the data available may indicate a trend, they are not sufficient for final evaluation.

IDLH-Immediately Dangerous to Life and Health: This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury.

LQ: Limit of Quantitation.

MAK: Federal Republic of Germany Maximum Concentration Values in the workplace.

NE: Not Established. When no exposure guidelines are established, an entry of NE is made for reference.

NIC: Notice of Intended Change.

NIOSH CEILING: The exposure that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling shall be assumed as a 15-minute TWA exposure (unless otherwise specified) that shall not be exceeded at any time during a workday.

PEL-Permissible Exposure Limit: OSHA's Permissible Exposure Limits. This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL that was vacated by Court Order.

SKIN: Used when there is a danger of cutaneous absorption.

STEL-Short Term Exposure Limit: Short Term Exposure Limit, usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hr TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

TLV-Threshold Limit Value: An airborne concentration of a substance that represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour.

TWA-Time Weighted Average: Time Weighted Average exposure concentration for a conventional 8-hr (TLV, PEL) or up to a 10-hr (REL) workday and a 40-hr workweek.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS:

This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards.

HEALTH HAZARD: 0 (Minimal Hazard): No significant health risk, irritation of skin or eyes not anticipated. *Skin Irritation:* Essentially non-irritating. PII or Draize = "0". *Eye Irritation:* Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = "0". *Oral Toxicity LD₅₀ Rat.* < 5000 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit.* < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC₅₀ Rat.* < 20 mg/L. 1 (Slight Hazard: Minor reversible injury may occur; slightly or mildly irritating. *Skin Irritation:* Slightly or mildly irritating. *Eye Irritation:* Slightly or mildly irritating. *Oral Toxicity LD₅₀ Rat.* > 500-5000 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit.* > 1000-2000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat.* > 2-20 mg/L; 2 (Moderate Hazard: Temporary or transitory injury may occur. *Skin Irritation:* Moderately irritating; primary irritant; sensitizer. PII or Draize > 0, < 5. *Eye Irritation:* Moderately to severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 0, ≤ 25. *Oral Toxicity LD₅₀ Rat.* > 50-500 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit.* > 200-1000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat.* > 0.5-2 mg/L; 3 (Serious Hazard: Major injury likely unless prompt action is taken, and medical treatment is given; high level of toxicity; corrosive. *Skin Irritation:* Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. PII or Draize > 5-8 with destruction of tissue. *Eye Irritation:* Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. *Oral Toxicity LD₅₀ Rat.* > 1-50 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit.* > 20-200 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat.* > 0.05-0.5 mg/L; 4 (Severe Hazard: Life-threatening; major or permanent damage may result from single or repeated exposure. *Skin Irritation:* Not appropriate. Do not rate as a "4", based on skin irritation alone. *Eye Irritation:* Not appropriate. Do not rate as a "4", based on eye irritation alone. *Oral Toxicity LD₅₀ Rat.* ≤ 1 mg/kg. *Dermal Toxicity LD₅₀Rat or Rabbit.* ≤ 20 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat.* ≤ 0.05 mg/L).

FLAMMABILITY HAZARD: 0 (Minimal Hazard-Materials that will not burn in air when exposure to a temperature of 815.5°C [1500°F] for a period of 5 minutes.); 1 (Slight Hazard-Materials that must be pre-heated before ignition can occur. Material require considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur. Including: Materials that will burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes or less; Liquids, solids and semisolids having a flash point at or above 93.3°C [200°F] (e.g. OSHA Class IIIB, or; Most ordinary combustible materials [e.g. wood, paper, etc.]; 2 (Moderate Hazard-Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not, under normal conditions, form hazardous atmospheres in air, but under high ambient temperatures or moderate heating may release vapor in sufficient quantities to produce hazardous atmospheres in air, including: Liquids having a flash-point at or above 37.8°C [100°F]; Solid materials in the form of coarse dusts that may burn rapidly but that generally do not form explosive atmospheres; Solid materials in a fibrous or shredded form that may burn rapidly and create flash fire hazards (e.g. cotton, sisal, hemp; Solids and semisolids that readily give off flammable vapors);

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued): 3 (Serious Hazard- Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures, or, unaffected by ambient temperature, are readily ignited under almost all conditions, including: Liquids having a flash point below 22.8°C [73°F] and having a boiling point at or above 38°C [100°F] and below 37.8°C [100°F] [e.g. OSHA Class IB and IC]; Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are readily dispersed in air [e.g., dusts of combustible solids, mists or droplets of flammable liquids]; Materials that burn extremely rapidly, usually by reason of self-contained oxygen [e.g. dry nitrocellulose and many organic peroxides]; 4 (Severe Hazard-Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and which will burn readily, including: Flammable gases; Flammable cryogenic materials; Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C [73°F] and a boiling point below 37.8°C [100°F] [e.g. OSHA Class IA; Material that ignite spontaneously when exposed to air at a temperature of 54.4°C [130°F] or below [e.g. pyrophoric].

PHYSICAL HAZARD: 0 (Water Reactivity: Materials that do not react with water. Organic Peroxides: Materials that are normally stable, even under fire conditions and will not react with water. Explosives: Substances that are Non-Explosive. Unstable Compressed Gases: No Rating. Pyrophorics: No Rating. Oxidizers: No "0" rating allowed. Unstable Reactives: Substances that will not polymerize, decompose, condense or self-react.); 1 (Water Reactivity: Materials that change or decompose upon exposure to moisture. Organic Peroxides: Materials that are normally stable but can become unstable at high temperatures and pressures. These materials may react with water but will not release energy. Explosives: Division 1.5 & 1.6 substances that are very insensitive explosives or that do not have a mass explosion hazard. Compressed Gases: Pressure below OSHA definition. Pyrophorics: No Rating. (Oxidizers: Packaging Group III; Solids: any material that in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65%) / cellulose mixture and the criteria for Packing Group I and II are not met. Unstable Reactives: Substances that may decompose, condense or self-react, but only under conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosive hazard. Substances that readily undergo hazardous polymerization in the absence of inhibitors.); 2 (Water Reactivity: Materials that may react violently with water. Organic Peroxides: Materials that, in themselves, are normally unstable and will readily undergo violent chemical change but will not detonate. These materials may also react violently with water. Explosives: Division 1.4 – Explosive substances where the explosive effect are largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. Compressed Gases: Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. Pyrophorics: No Rating. Oxidizers: Packaging Group II Solids: any material that, either in concentration tested, exhibits a mean burning time of less than or equal to the mean burning time of a 2:3 potassium bromate/cellulose mixture and the criteria for Packing Group I are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise of a 1:1 aqueous sodium chlorate solution (40%) / cellulose mixture and the criteria for Packing Group I are not met. Unstable Reactives: Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure, but have a low potential for significant heat generation or explosion. Substances that readily form peroxides upon exposure to air or oxygen at room temperature); 3 (Water Reactivity: Materials that may form explosive reactions with water. Organic Peroxides: Materials that are capable of detonation or explosive reaction, but require a strong initiating source, or must be heated under confinement before initiation; or materials that react explosively with water. Explosives: Division 1.2 – Explosive substances that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but do not have a mass explosion hazard. Compressed Gases: Pressure ≥ 514.7 psi absolute at 21.1°C (70°F) [500 psig]. Pyrophorics: No Rating. Oxidizers: Packaging Group I Solids: any material that, in either concentration tested, exhibits a mean burning time less than the mean burning time of a 3:2 potassium bromate/cellulose mixture. Oxidizers: Liquids: Any material that spontaneously ignites when mixed with cellulose in a 1:1 ratio, or which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50%) / cellulose mixture. Unstable Reactives: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a moderate potential to cause significant heat generation or explosion.); 4 (Water Reactivity: Materials that react explosively with water without requiring heat or confinement. Organic Peroxides: Materials that are readily capable of detonation or explosive decomposition at normal temperature and pressures. Explosives: Division 1.1 & 1.2-explosive substances that have a mass explosion hazard or have a projection hazard. A mass explosion is one that affects almost the entire load instantaneously. Compressed Gases: No Rating. Pyrophorics: Add to the definition of Flammability "4". Oxidizers: No "4" rating. Unstable Reactives: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a high potential to cause significant heat generation or explosion.).

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:

HEALTH HAZARD: 0 (materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 2000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 2000 mg/kg. Materials that are essentially non-irritating to the respiratory tract, eyes and skin. 1 (materials that, under emergency conditions, can cause significant irritation): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 10 mg/L but less than or equal to 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 1000 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 500 mg/kg but less than or equal to 2000 mg/kg. Materials that cause slight to moderate irritation to the respiratory tract, eyes and skin. 2 (materials that, under emergency conditions, can cause temporary incapacitation or residual injury): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 5,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 2 mg/L but less than or equal to 10 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 200 mg/kg but less than or equal to 1000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 50 mg/kg but less than or equal to 500 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause severe tissue damage, depending on duration of exposure. Materials that are respiratory irritants. Materials that cause severe, but reversible irritation to the eyes or are lachrymators. Materials that are primary skin irritants or sensitizers.

16. OTHER INFORMATION (Continued)

DEFINITIONS OF TERMS (continued):

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

HEALTH HAZARD (continued): 3 (materials that, under emergency conditions, can cause serious or permanent injury): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 1,000 ppm but less than or equal to 3,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 5 mg/kg but less than or equal to 50 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 3000 ppm and that does not meet the criteria for degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause frostbite and irreversible tissue damage. Materials that are respiratory irritants. Cryogenic gases that cause frostbite and irreversible tissue damage. Materials that are corrosive to the respiratory tract. Materials that are corrosive to the eyes or cause irreversible corneal opacity. Materials that are corrosive to the skin. **4** (materials that, under emergency conditions, can be lethal): Gases and vapors whose LC₅₀ for acute inhalation toxicity less than or equal to 1,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD₅₀ for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD₅₀ for acute oral toxicity is less than or equal to 5 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 1000 ppm.

FLAMMABILITY HAZARD: 0 Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand: Materials that will not burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. **1** Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur: Materials that will burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. Liquids, solids and semisolids having a flash point at or above 93.4°C (200°F) (i.e. Class IIIB liquids). Liquids with a flash point greater than 35°C (95°F) that do not sustain combustion when tested using the *Method of Testing for Sustained Combustibility*, per 49 CFR 173, Appendix H or the UN *Recommendation on the Transport of Dangerous Goods, Model Regulations* (current edition) and the related *Manual of Tests and Criteria* (current edition). Liquids with a flash point greater than 35°C (95°F) in a water-miscible solution or dispersion with a water non-combustible liquid/solid content of more than 85 percent by weight. Liquids that have no fire point when tested by ASTM D 92 Standard Test Method for Flash and Fire Points by Cleveland Open Cup, up to a boiling point of the liquid or up to a temperature at which the sample being tested shows an obvious physical change. Combustible pellets with a representative diameter of greater than 2 mm (10 mesh). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed-up flash point of the solvent. Most ordinary combustible materials. **2** Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air: Liquids having a flash point at or above 37.8°C (100°F) and below 93.4°C (200°F) (i.e. Class II and Class IIIA liquids.) Solid materials in the form of powders or coarse dusts of representative diameter between 420 microns (40 mesh) and 2 mm (10 mesh) that burn rapidly but that generally do not form explosive mixtures in air. Solid materials in fibrous or shredded form that burn rapidly and create flash fire hazards, such as cotton, sisal and hemp. Solid materials in fibrous or shredded form that burn rapidly and create flash fire hazards, such as cotton, sisal and hemp. Solids and semisolids that readily give off flammable vapors. Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **3** Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions: Liquids having a flash point below 22.8°C (73°F) and having a boiling point at or above 37.8°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (73°F) and below 37.8°C (100°F) (i.e. Class IB and IC liquids). Materials that, on account of their physical form or environmental conditions, can form explosive mixtures with air and are readily dispersed in air. Flammable or combustible dusts with a representative diameter less than 420 microns (40 mesh). Materials that burn with extreme rapidity, usually by reason of self-contained oxygen (e.g. dry nitrocellulose and many organic peroxides). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. **4** Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily: Flammable gases. Flammable cryogenic materials. Any liquid or gaseous materials that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. Class IA liquids). Materials that ignite when exposed to air, Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

INSTABILITY HAZARD: 0 Materials that in themselves are normally stable, even under fire conditions: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) below 0.01 W/mL. Materials that do not exhibit an exotherm at temperatures less than or equal to 500°C (932°F) when tested by differential scanning calorimetry. **1** Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 0.01 W/mL and below 10 W/mL. **2** Materials that readily undergo violent chemical change at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 100W/mL. **3** Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 100 W/mL and below 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. **4** Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) of 1000 W/mL or greater. Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (NFPA). **Flash Point** - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. **Autoignition Temperature**: The minimum temperature required to initiate combustion in air with no other source of ignition. **LEL** - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. **UEL** - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Human and Animal Toxicology: Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m³** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, RTECS - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used.

Other Information: **BEI** - ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

REPRODUCTIVE TOXICITY INFORMATION:

A **mutagen** is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An **embryo toxin** is a chemical that causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance that interferes in any way with the reproductive process.

ECOLOGICAL INFORMATION:

EC is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. **TL_m** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{oc}** and is used to assess a substance's behavior in the environment.

REGULATORY INFORMATION:

U.S. and CANADA: **ACGIH:** American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). **DOT** is the U.S. Department of Transportation. Superfund Amendments and Reauthorization Act (**SARA**); the U.S. Toxic Substance Control Act (**TSCA**); Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act (**CERCLA** or **Superfund**); and various state regulations. This section also includes information on the precautionary warnings which appear on the material's package label. **OSHA** - U.S. Occupational Safety and Health Administration.