

1. Product and Company Identification

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Product Name	ETHANOL (ABSOLUTE)
Part Number	RXSOL-60-6184-002
Trade name	Ethanol (Industrial, Absolute or Anhydrous, Light Spirits, Extra Neutral Potable, Neutral Potable, Rectified Extra Neutral and High Purity Extra Neutral Potable Alcohol)
Chemical family	Aliphatic Alcohol
Chemical name	Ethanol
Synonyms	Ethyl Alcohol, See Trade name
Chemical abstract No	64-17-5
Molecular Mass	46,08
NIOSH No	KQ 6300000
Hazchem code	2(S) E; 3(S) E

Company Details:

RX MARINE INTERNATIONAL
105, A wing , BSEL , TECH PARK.
VASHI ,NEW BOMBAY 400703 INDIA

Branch : Kandla, Mumbai, Vizag, Chennai, Kolkata Fujairah UAE and Omans

Phone	+91 22 20871200 - 1400
Fax	+91 22 27612100 ::::AOH :0091 9821214367
Email	123@rxmarine.com
Website	www.rxmarine.com

2. Composition / Information on ingredients

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Hazardous components	Ethyl Alcohol (99.50 %v /v)
CAS	64-17-5
EEC classification	200 578 6 30
R Phrases	R11 (Highly Flammable)

3. Hazards Identification

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Classification of the substance	EU-GHS / CLP Flammable liquid Flam. Flam. Liq. 2
	Hazard Class and Category Code(s) Liq. 2 Serious eye Irritation Eye Irrit. 2
	EU-DSD / DPD Highly flammable R11
	Indication(s) of danger and R phrase(s)
Label elements EU-GHS / CLP	
Signal word	Danger

Hazard statement(s)	IH225 Highly flammable liquid and vapour.
Precautionary statements	H319 Causes serious eye irritation. P210: Keep away from heat / sparks / open flames / hot surfaces ? No smoking. P233: Keep container tightly closed. P240: Ground/bond container and receiving equipment. P241: Use explosion-proof electrical / ventilating / lighting equipment. P242: Use only non-sparking tools. P243: Take precautionary measures against static discharge. P280: Wear protective gloves / protective clothing /eye protection. P264: Wash skin thoroughly after handling. P303+ P361+P353: If on skin or hair remove/ take off immediately all contaminated clothing. Rinse skin with water. P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P337+P313: If eye irritation persists: Get medical advice/attention. P370 + P378: In case of fire: Use powder, alcohol-resistant foam, lots of water, carbon dioxide for extinction. P403 + P235: Store in a well-ventilated place. Keep cool. P501:Disposal: Dispose of contents / container to a specialised waste disposal plant in accordance with local / regional regulations
Main Hazard	Harmful if swallowed or inhaled. Possible aspiration hazard if swallowed (can enter lungs and cause damage). May be irritating to the skin, eyes and respiratory tract. Over exposure may cause CNS depression. Possible reproductive hazard.
Flammability	Flash Point 12°C. Extremely flammable liquid (R11). Ignition temperature 425°C.
Chemical Hazard	Ethanol is a flammable liquid whose vapours can form ignitable and explosive mixtures with air at normal room temperatures. Thus, an aqueous mixture containing 30% ethanol can produce a flammable mixture of vapour and air at 29°C, and even one containing only 5% alcohol can produce a flammable mixture at 62°C.1 Ethanol reacts vigorously with a wide range of oxidizing materials and other chemicals2 .e.g. Disulphuryl Difluoride, Silver Nitrate, Bromine Pentafluoride, Potassium Perchlorate, Nitrosyl Perchlorate, Chromyl Chloride, Chloryl Perchloride, Uranyl Perchlorite, Chromium Trioxide, Fluorine Nitrate, Dioxygen Difluoride, Uranium Hexafluoride, Iodine Heptafluoride, Tetrachlorosilane, Permanganic acid, Nitric acid [the nitric acid fizz reaction used formally for cleaning laboratory glassware should not be used3,5], Hydrogen Peroxide, Peroxodisulphuric acid, Potassium Dioxide, Sodium Peroxide, Potassium Permanganate, Ruthenium (VIII) Oxide, Platinum, Potassium6 , Potassium tert Butoxide, Silver Oxide and Sodium7 .
Biological Hazard	Ethanol is rapidly oxidized in the body to acetaldehyde, then to acetate, and finally to carbon dioxide and water; un-oxidized alcohol is excreted in the urine and expired in the air. 8,9
Reproductive hazard	Some evidence of foetotoxicity26-28 and teratogenicity29 has been observed in experimental animals treated with high doses of ethanol during gestation. Alcohol may induce spontaneous abortions, may impair fertility, may cause harm to the unborn child and may cause harm to

	breast fed babies. The reproductive hazards have been determined after repeated excessive consumption of ethanol; these effects are not likely to occur through exposure below the Occupational Exposure Limits in the working environment.
Health effects ☞ eyes	Moderately irritating. Exposure to liquid, vapours, fumes or mist may cause irritation. Direct contact may cause irritation, redness, pain, corneal inflammation and possible corneal damage.
Health effects ☞ skin	Repeated or prolonged contact may result in defatting, redness, pain, itching, inflammation, cracking and possible secondary infection. Repeated skin contact may result in allergic skin reaction in a very small proportion of individuals.
Health effects ☞ ingestion	Large doses lead to alcohol poisoning while repeated ingestion can lead to alcoholism. Alcohol abuse and dependence can have a profound effect on work performance and tendency to accidents at work. ¹¹⁻¹³ The presence of denaturants, e.g. Methanol, pyridines, and benzene in industrial alcohol greatly increase the toxicity on ingestion. Ethanol drinking is also suspected of increasing the toxic effect of other chemicals encountered in the laboratory and the workplace by inhibition of their metabolism or excretion ¹⁴ ; e.g. 1, 1, 1
	☞Trichloroethane ¹⁵ , Xylene, Trichloroethylene and Dimethylformamide ¹⁶ , Benzene ¹⁷ and Lead. ^{18, 19} May cause harmful central nervous system effects. Effects may include excitation, euphoria, headache, dizziness, drowsiness, blurred vision, fatigue, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death. Severe acute intoxication may cause Hypoglycaemia, Hypothermia and extensor rigidity. Prolonged or frequent contact may result in liver injury.
Health effects ☞ inhalation	Intoxicating if continuously inhaled for a long period of time. Occupational Exposure Limits (8-hour reference period) 1000ppm (1900mg/m ³). ³⁰ May cause respiratory tract irritation.
Carcinogenicity	Long-term consumption of alcoholic beverages demonstrates an increase in the occurrence of breast cancer and colorectal cancer. Malignant tumours of the oral cavity, Pharynx, Larynx, Oesophagus and Liver is also causally related to the consumption of alcoholic beverages. ³¹ Some studies ^{20, 21} have shown an excess incidence of laryngeal cancer over the expected from exposure to synthetic alcohol, with Diethyl Sulphate probably being the causative agent
Mutagenicity	Ethanol has been found to be non- mutagenic in the Salmonella microsome test, ²² but some transient mutagenic changes have been observed in male, but not female, mice treated with rather large doses. ²³⁻²⁵ Ethanol is mutagenic in man via its first metabolite, Acetaldehyde. Acetaldehyde induces chromosomal aberrations, sister-chromatid exchanges and cross-links between DNA strands. ³²
Neurotoxicity	Over exposure may cause Central Nervous System (CNS) depression

4. First Aid Measures

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Product in eye	Flush immediately with water or neutral saline solution for at least 15 minutes. Seek medical attention.
Product on skin	Remove contaminated clothing and rinse contaminated area with soap and water. If skin irritation persists, seek medical attention.
Product ingested	If victim is conscious, give 1-3 glasses of water or milk to dilute stomach contents. If spontaneous vomiting occurs, or when vomiting is induced, monitor for breathing difficulty. Do not make an unconscious or semi ☞ conscious person vomit. Keep affected person warm at rest. Get medical attention for substantial ingestions and/or gastrointestinal symptoms.
Product inhaled	Remove the victim to fresh air. If not breathing, ensure open airway and institute cardiopulmonary resuscitation (CPR). If breathing is weak, irregular or has stopped apply artificial respiration. Oxygen may be

beneficial. Keep affected person warm and at rest. Get immediate medical attention.

5. Fire-fighting Measures

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Extinguishing media

Use dry chemical, alcohol foam or carbon dioxide to extinguish fire. Water may be ineffective but should be used to cool fire- exposed containers, structures and to protect personnel. If leak or spill has not ignited, ventilate area and use water spray to disperse gas or vapour and to protect personnel attempting to stop a leak. Use water to dilute spills and to flush them away from sources of ignition. Do not flush down public sewers or other drainage systems.

Special Hazards

Flammable

Flash point : 12°C - 17°C

Flammability/explosion limits : 3, 3 - 20%v/

Dangerous when exposed to heat or flame. Vapours form flammable or explosive mixtures with air at room temperature. Vapour or gas may spread to distant ignition sources and flash back. Run off to sewer may cause fire or explosion hazard. Containers may explode in heat of fire. Vapours may concentrate in confined areas. Irritating or toxic substances may be emitted upon thermal decomposition. Hazardous composition products such as carbon oxides may form.

Protective clothing

Exposed fire fighters should wear approved self-contained breathing apparatus with full face mask and full protective equipment.

6. Accidental Release Measures

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Personal precautions

Exposed fire fighters should wear approved self-contained breathing apparatus with full face mask and full protective equipment.

Environmental Precautions

Prevent liquid entering sewers. Do not allow to enter surface waters, storm drains, etc.

Small spills

Take immediate steps to stop and contain the spill. Caution should be exercised regarding personnel safety and exposure to be spilled material. Eliminate all sources of ignition and wear protective clothing. Absorb small spills onto paper towels and evaporate in a safe place e.g. in a fume hood. Flush the contaminated area with plenty of water.

Large spills

Stop leak if you can do it without risk. Contact your local fire department. Eliminate all sources of ignition and static; restrict access to area until completion of clean-up procedure. Wear adequate protective equipment, use self-contained breathing apparatus in confined poorly-ventilated areas. Large quantities should be absorbed on to sand, vermiculite or an equivalent absorbent material and removed to a safe area for disposal. Flush the contaminated area with plenty of water. Incineration is the recommended method of disposal

7. Handling and Storage

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Suitable material

Ethanol is not corrosive to metals and may be stored in stainless steel, mild steel or aluminium containers. Ethanol may also be stored in HDPE containers.

Ground lines and equipment used during transfer to reduce the possibility of static spark-initiated fire or explosion. Store in approved flammable liquid storage containers. Keep containers tightly closed as this material readily absorbs moisture. Store away from incompatible materials. Store in a cool, dry well-ventilated area away from sparks, flames and other sources of ignition. Eliminate all sources of static electricity. Use non-sparking electrical and ventilation systems. Storage criteria: Flammable Liquid store

8. Exposure controls and personal protection

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Engineering Control

Engineering control methods to reduce hazardous exposures are preferred. General methods include mechanical ventilation (dilution and local exhaust), process or personnel enclosure, control of process conditions and process modification (e.g. substitution of a less hazardous material). Administrative controls and personal protective equipment may also be required. Use a non-sparking, grounded ventilation system separate from other exhaust ventilation systems. Exhaust directly to the outside. Supply sufficient replacement air to make up for air removed by exhaust system.

Personal Protection Respiratory

If exposure limits are exceeded or if irritation is experienced, an approved respirator for organic vapours is generally acceptable. For high concentrations and for oxygen-deficient atmospheres, use approved air-supplied respirator. Full respiratory protection should be readily available in case of spillage.

Exposure Limits:

Country	8 Hour TWA Hygiene Limit	STEL
US (OSHA)	1900 mg/m ³ (1000ppm)	None
US (ACGIH)	1900 mg/m ³ (1000ppm)	None
Germany (MAK)*	960 mg/m ³ (500ppm)	Peak limit cat. II, I
UK (OES)	1920 mg/m ³ (1000ppm)	None
Slovak Republic	960 mg/m ³ (500ppm)	1920 mg/m ³ (1000ppm) (30 min, 4x per shift)
Czech Republic	1000 mg/m ³	3000 mg/m ³

Personal protection hand

Rubber (Butyl) or neoprene gloves are recommended.

Personal protection eye

Prevent eye contact with this material. Wear chemical tight safety goggles where eye exposure is reasonably probable. Provide an eyewash station immediately accessible to the work area. Contact lenses should not be worn when working with this chemical.

Personal protection skin

Avoid skin contact. When working with this substance, wear appropriate chemical protective gloves. Wear protective suit/ overalls. Depending upon conditions of use, additional protection may be necessary such as face shield, apron, etc.

Other protection

Provide a safety shower immediately accessible to the work area.

9. Physical and chemical properties

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Appearance

Colourless, volatile liquid

Odour

Characteristic pleasant odour

pH

Neutral

Boiling point

74°C - 80°C

Melting point	- 130°C to - 112°C
Flash point	12°C - 17°C
Flammability	3, 3 $\frac{1}{2}$ 19% v/v
Auto-flammability	363°C
Explosive properties	Vapours can form explosive mixtures with air. All sources of ignition or static must be.
excluded. Oxidizing properties	None
Vapour pressure	59 mm Hg at 20°C
Density	785.3 kg/m ³ $\frac{1}{2}$ 809 kg/m ³ at 25°C
Solubility $\frac{1}{2}$ water	Miscible with water in all proportions
Solubility $\frac{1}{2}$ solvent	Miscible with ether, methanol, chloroform and acetone
Solubility $\frac{1}{2}$ coefficient	1100 @ 37°C ³³

10. Stability and reactivity

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Reactivity	Stable at normal ambient temperature and pressure.
Chemical Stability	No decomposition if stored and applied as directed.
Incompatible materials	See section 3 (chemical hazards).
Hazardous decomposition products	Incomplete combustion can generate carbon monoxide and carbon dioxide
Condition to Avoid	Overheating, flames, sources of ignition or static electricity. Oxidizing agents. Vapour/ air mixtures are explosive. Keep away from heat and sources of ignition.

11. Toxicological information

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Acute toxicity	Short-term hazards Acute oral toxicity Ethanol : LD₅₀ rat: 7,060 mg/kg; literature value Acute inhalation toxicity Ethanol : LC₅₀ rat: 66,000 mg/l; literature value; 4 h Acute dermal toxicity Ethanol : LDLo rabbit: 20,000 mg/kg; literature value NOAEL - 2400 mg/kg (2%) - for rats LOAEL $\frac{1}{2}$ 3600 mg/kg (3%) - for rats Redness, pain (refer to Section 3 for further information) Refer to Section 3. Refer to Section 3 Refer to Section 3 Refer to Section 3 Refer to Section 3
Skin and eye contact	
Chronic toxicity	
Carcinogenicity	
Mutagenicity	
Neurotoxicity	
Reproductive hazards	

12. Ecological information

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Aquatic toxicity $\frac{1}{2}$ fish	In high concentration it harms fish and plankton; LC ₅₀ (fish, 96 hours) $\frac{1}{2}$
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Aquatic toxicity ☞ daphnia	15.3 mg/L (Pimephales promelas)
Aquatic toxicity ☞ algae	Threshold for deleterious effects in small crustaceans upwards of 7.800 mg/l; EC50 (Daphnia, 48 hours) ☞ 5012 mg/L (Ceriodaphnia dubia)
Biodegradability	Toxic threshold concentration: Pseudomonas putida upwards of 6.500mg/l, Scenedesmus quadricauda upwards of 5.000mg/l, Microsystis aeruginosa upwards of 1.450ml/L
	IC50 (algae, 72 hours) ☞ 275 mg/L
	This product is readily biodegradable. Ethanol is widely recognized as being readily biodegradable in the environment as it is both a metabolite of and nutrient for microbes. There are no persistent.
Bio ☞ accumulation	This product is not expected to bio accumulate through the food chains in the environment. The very low log KOW of ☞0.31 is indicative of a low bioaccumulation potential.
Mobility	This product is likely to volatilize rapidly into the air because of its high vapour pressure. The product is poorly absorbed onto soils or sediments. Adsorption coefficient (KOC) solid phase/liquid phase = 1 (highly mobile)
German wgk	1 (low hazard to water)

13. Disposal considerations

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Disposal methods	Only under conditions approved by local authorization. See also Section 6.
Disposal of packaging	Empty containers may contain flammable and hazardous residues. Always obey hazard warnings.

14. Transport information

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UN Number	1170
Substance Identity No	UN 1170
ADR/RID class	3
ADR/RID item No	3(b)
ADR/RID hazard identity No	3
IMDG ☞ shipping name	Ethanol
IMDG ☞ class	3
IMDG ☞ packaging group	II
IMDG ☞ marine pollutant	Not a marine pollutant
IMDG ☞ EMS No	F-E, S-D
IMDG ☞ MFAG table No	3074
IATA ☞ shipping name	Ethanol Solutions
IATA ☞ class	3
IATA ☞ subsidiary risk(s)	Flammable liquid
ADNR ☞ class	UN ☞No.:1170; Class 3, Packaging Group II
UK ☞ description	Not available
UK- emergency action class	Not available
UK ☞ classification	Not available
Tremcard No	1170

15. Regulatory information

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EEC hazard classification	200 578 - 6
Risk phases	R11
Safety phases	S2, S7, S9, S16, S33
National legislation	Hazardous Substances Act 15 of 1973 and Regulations
	Occupational Health and Safety Act 85 of 1993 (Hazardous Chemical Substances Regulations)
International Legislation	IATA Dangerous Goods Regulation (DGR) 59th Edition 2018
	IMDG Code, International Maritime Dangerous Goods Code, 2008 Edition, Volume 1 and 2

16. Other information

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Other Information

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