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## 1. Product and Supplier Identification

- A. Product Name : Rectified Fermentation Ethanol
- B. Recommended Use and Restrictions on Use
- Recommended Use : Industrial use (Synthetic detergent, Organic synthesis resins, Inks, Dyes, Cleaning agent, Reagents, toilet soap, toilet water perfume, paint diluent, adhesive), medicine(antiseptic)
  - Restrictions on Use : Restrict except for recommended use
- C. Manufacturer/Supplier/Distributor Identification
- Company Name : Korea Alcohol Industrial Co., LTD.
  - Address
    - . Headquarters : 14, Tapsil-ro 35beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, South Korea
    - . Ulsan Office/Plant : 66, Sanggae-ro, Nam-gu, Ulsan
  - Information Service or Emergency Tel. : [Http://www.ka.co.kr](http://www.ka.co.kr) / (+82)031-881-8100, 052-259-4761~2
  - Division : Business Department, Environmental Safety Team

## 2. Hazards Identification

- A. Classification
- |                        |  |
|------------------------|--|
| Flammable Liquid       | Category 2<br>(Flash Point < 23°C, Boiling point > 35°C) |
| Carcinogenic to humans | Category 1   |
| Carcinogenicity        | Category 1A (in Alcoholic beverage)                      |
- B. Warning
- Label
 




  - Hazard Communication : DANGER!
  - Label Element
    - H225 Highly flammable Liquid and Vapor
    - H319 Cause eye irritation.
    - H350 May cause cancer (in Alcoholic beverage)
  - Terms for Precaution
    - Precaution
      - P201 Obtain special instructions before use.
      - P202 Do not handle until all safety precautions have been read and understood.
      - 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.

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- P264 Wash hands thoroughly after handling
- P280 Wear protective gloves/protective clothing/eye protection/face protection
- Response
  - P303+P361+P353 If on skin(or hair) Take off immediately all contaminated clothing  
Rinse skin with water/shower.
  - 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 water spray/alcohol resistant foam for extinction.
- Storage
  - P403+P235 Store in a well-ventilated place and keep cooling.
  - P405 Store in lockable storage area.
- Disposal
  - P501 Dispose of contents/container by incineration or recycle.

C. Other

NFPA

- Health 1
- Flammability 3
- Reactivity 0

### 3. Composition

Chemical name : Anhydrous Ethanol  
 Synonyms : Ethanol  
 CAS number : 64-17-5

Content(%) :	Name	Trade names and Synonyms	KE NO.	Content (vol%)
	Ethyl Alcohol	Ethyl alcohol ; Ethanol solution ; Alcohol ; Fermentation alcohol ; Algrain ; Ethyl hydrate ; Ethyl hydroxide	KE-13217	95.0 vol%

### 4. First Aid Measures

A. Eye contact

Do not rub your eyes.

Immediately flush eyes with plenty of water for at least 15 minutes and call a doctor/physician.

Get medical attention immediately.

B. Skin contact

Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Laundering enough contaminated clothing before reuse.

Get medical attention immediately.

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- C. Inhalation contact
  - When exposed to large amounts of steam and mist, move to fresh air.
  - Take specific treatment if needed.
  - Get medical attention immediately.
- D. Ingestion contact
  - Please be advised by doctor whether induction of vomit is demanded or not.
  - Rinse your mouth with water immediately.
  - Get medical attention immediately.
- E. Notes to physician
  - Notify medical personnel of contaminated situations and have them take appropriate protective measures.

## 5. Fire Fighting Measure

- A. Suitable(or unsuitable) extinguish media
  - Dry chemical, carbon dioxide, regular foam extinguishing agent, spray
  - Avoid use of water jet for extinguishing
  - Wear fire fighting clothing, fire fighting helmets, fire fighting gear, fire fighting gloves, and respirator when fighting fire.
- B. Specific hazards arising from the chemical
  - Highly flammable liquids and vapors.
  - Violent polymerization may cause fire and explosion.
  - Vapors can be transferred to the ignition sources of ignition.
  - During burning, pyrolysis or combustion can produce irritating and highly toxic gases.
  - May form explosive mixture at or above flash point.
  - Containers may explode on heating.
  - Highly flammable : Easily ignited by heat, sparks and flames.
  - Leaks may present a fire/explosion hazard.
  - Vapors are explosive at room, outdoors, and at the sewers.
  - Vapors may form explosive mixtures with air.
  - Vapors may travel to the source of ignition and backfire.
  - Vapors may cause dizziness or suffocation.
  - Inhalation and contact may irritate or burn the skin and eyes.
- C. Special protective actions for fire-fighting
  - For large fires, use an unmanned waterproofing device, and if not, leave it to burn.
  - Do not approach if the tank is covered by a flame.
  - Find and use appropriate evolutionary methods for your surroundings.
  - Wear appropriate protective equipment if necessary.
  - Vapor or gas is burned at distant ignition sources can be spread quickly.
  - Due to the extremely low flash point, irrigating fire extinguishing may be less effective when put out a fire.

## 6. Accidental release measures

- A. Personal precautions, protective equipment and emergency procedures
  - Accidental release wear protection : Chemical resistant protective gloves, goggles, protective

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face, chemical resistant, respiratory protection.

Ventilate closed spaces before entering.

Do not touch spilled material. Stop leak if you can do it without risk.

Move container to safe area from the leak area.

Remove all sources of ignition.

Do not direct water at spill or source of leak.

Keep unauthorized people away, isolate hazard area and deny entry.

Avoid skin contact and inhalation.

B. Environment precautions

Prevent runoff and contact with waterways, drains or sewers.

If large amounts have been spilled, inform the relevant authorities.

C. Methods and materials for containment and cleaning up

– Large spill : Stay upwind and keep out of low areas. Dike for later disposal.

Notification to central government, local government. When emissions at least of the standard amount

Dispose of waste in accordance with local regulation.

Appropriate container for disposal of spilled material collected.

– Small leak : sand or other non-combustible material, please let use absorption.

Wipe off the solvent.

Dike for later disposal.

Do not use plastic containers.

## 7. Handling and Storage

A. Precaution for safe handling

Avoid contact with incompatible materials.

Save applicable laws and regulations.

Refer to Engineering controls and personal protective equipment.

Operators should wear antistatic footwear and clothing.

Do not inhale the vapors prolonged or repeated.

Avoid contact with heat, sparks, flame or other ignition sources.

B. Conditions for safe storage

Do not apply direct heat.

Avoid direct sunlight.

Store in original container only.

Please pay attention to incompatibilities materials and conditions to avoid.

Caution : Flammables.

Please collected in closed containers.

## 8. Exposure controls/personal protection

A. Control parameters – Occupational Exposure Limits

○ Domestic regulation : TWA – 1000ppm 1900mg/m<sup>3</sup>

○ ACGIH : STEL – 1000ppm (1880 mg/m<sup>3</sup>)

○ Biological exposure standard : Not available

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B. Engineering Controls

Business owner is recommended to maintain below recommended exposure limits for the working place with general exhaust of gas/vapour/mist/fume.

C. Personal protection

○ Respiratory protection

Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.

Respiratory protection is ranked in order from minimum to maximum.

Consider warning properties before use.

Any chemical cartridge respirator with organic vapor cartridge(s).

Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s).

Any air-purifying respirator with a full facepiece and an organic vapor canister.

For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure -demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.

○ Eye protection

Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.

Provide an emergency eye wash station and quick drench shower in the immediate work area.

○ Hand protection

Wear appropriate chemical resistant glove.

○ Body protection

Wear appropriate chemical resistant protective clothing.

## 9. Physical and Chemical properties

A. Appearance	:	Liquid, Colorless	※Source : HSDB
B. Odor	:	Wine or whisky odor	※Source : HSDB
C. Odor threshold	:	10 ppm	
D. pH	:	7 (10g/L, H <sub>2</sub> O, 20°C)	※Source : Chemical book
E. Melting/Freezing point	:	-114.1°C	※Source : HSDB
F. Boiling point	:	78.5°C	※Source : HSDB
G. <b>Flash</b> point	:	13°C(CC)	※Source : HSDB
H. Evaporation rate	:	No data	
I. Flammable(solid, gas)	:	No data	
J. Ignition or explosion range	:	3.3 / 27.7%	※Source : ICSC
K. Vapor pressure	:	5.8 kPa (20°C)	※Source : ICSC
L. Solubility	:	789,000 mg/l (20°C)	
		※Source : ECHA Registered Substances	
M. Vapor density	:	1.6 (Air=1)	※Source : ICSC
N. Specific gravity	:	0.81639 (15°C/15°C)	
O. n-octanol/water partition coeff.	:	-0.32 (Log Kow)	※Source : ICSC
P. Autoignition temperature	:	400°C	※Source : ICSC
Q. Decomposition temperature	:	No data	

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- R. Viscosity : 1.074 cP (20°C, mPa s) \*Source : ICSC  
S. Molecular formula/Weight : CH<sub>3</sub>CH<sub>2</sub>OH / 46.07

## 10. Stability and Reactivity

- A. Chemical stability & Possibility of hazardous reactions  
: This material is stable under recommended storage and handling conditions.  
Hazardous Polymerization will not occur.
- B. Conditions to avoid : Avoid contact with incompatible materials and condition.  
Avoid contact with heat, sparks, flame or other ignition sources.
- C. Incompatible materials : Not available
- D. Hazardous decomposition materials : Not available

## 11. Toxicological Information

- A. Information on the likely routes of exposure
- Respiratory tracts : Not available
  - Oral contact : Not available
  - Eye, Skin contact : Cause mild skin irritation.
- B. Delayed and immediate effects and also chronic effects from short and long term exposure
- Acute toxicity
    - Oral : LD50 = 7,060 mg/kg Rat (OECD Guideline 401)  
\*Source : ECHA
    - Dermal : Not available
    - Inhalation : LC50 = 30,300 mg/m<sup>3</sup>/4hr Mouse (OECD Guideline 403)  
\*Source : ECHA
  - Skin corrosive or Irritation : Skin corrosion/irritation test using rabbit does not result in irritation. (OECE Guideline 404, GLP)  
\*Source : ECHA
  - Acute eye damages or Irritation : Severe eye injuries/irritation tests using rabbits resulted in conjunctivitis, conjunctival edema, iris damage, and corneal damage. (Conjunctival index : 2.1, iris index : 0.44, Conjunctival edema index : 1.3, Corneal index : 1.1, OECD Guideline 405)  
\* Source : ECHA
  - Respiratory hypersensitivity : Not available
  - Skin hypersensitivity : Skin sensitization test using mouse(female/male) results in no skin sensitization. \* Source : ECHA
  - Carcinogenic : IARC GROUP 1(Ethanol in Alcoholic beverage)  
ACGIH A3(Ethanol in Alcoholic beverage)
  - Germ cells mutagenicity : The result of domestication test using in vivo rodent.(OECD Guideline 478) Negative spot test

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- results using in vivo mouse.(OECD Guideline 484)  
 Negative results from micronucleus test using in vivo mammalian red blood cells.(OECD Guideline 474)  
 Negative chromosome aberration test using in vivo mammalian bone marrow cells.(OECD Guideline 475)  
 ※Source : ECHA
- Reproductive toxicity : Developmental toxicity/teratogenicity/maternal toxicity test results using rats have no significant effect. (Developmental toxicity NOAEL = 4000mg/kg, Teratogenicity NOAEL = 5200mg/kg, Teratogenicity LOAEL = 8200mg/kg)(OECD Guideline 415)  
 ※Source : ECHA
  - Specific target organ toxicity(STOT) – single exposure  
 Oral toxicity test using rabbit eyes. The vestibular function was inhibited.  
 ※Source : HSDB
  - Specific target organ toxicity(STOT) – repeated exposure  
 Repeated oral toxicity tests(98d) with rats showed no significant effect.  
 ※Source : HSDB
  - Aspiration hazards : No data
- C. Numerical measures of toxicity : No data

## 12. Ecological Information

- A. Aquatic / Terrestrial / Ecology toxicity
  - Fish : LC50 > 100 mg/l 96 hr Pimephales promelas  
 ※출처 : SIDS 2005
  - Shellfish : LC50 5012 mg/l 48 hr Ceriodaphnia dubia  
 (Other Guideline : ASTM E729-80)  
 ※Source : ECHA
  - Birds : ErC50 275 mg/l 72 hr Chlorella vulgaris  
 (OECD Guideline 201) ※Source : ECHA
- B. Persistence and Biodegradability
  - Persistence : -0.32 log Kow ※Source : ICSC
  - Biodegradability : BOD5 / COD = 0.57 ※Source : IUCLID
- C. Bioaccumulation
  - Biodegradability : Biodegradability = 75% 20 day (Aerobic, etc., easily decomposed) (IUCLID)
  - Bioaccumulation : 1 ※Source : ECHA
- D. Soil mobility : Koc = 1
- E. Ozone Hazard : No data
- F. Other hazardous : No data

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### 13. Disposal Considerations

A. Method of disposal

Since more than two kinds of designaed waste is mixed, it is difficult to treat seperatly, then can be reduction or stabilization by incineration or similar process.

If water separation is possible, pre-process with Water separation process.

Dispose by incineration.

B. Caution

The user of this product must disposal by oneself or entrust to waste disposer or person who other's waste recycle and dispose, person who establish and operate waste disposal facilities.

Dispose of waste in accordance with all applicable laws and regulations.

### 14. Transport Information

- A. UN number : 1170
- B. UN Shipping name : ETHANOL(ETHYL ALCOHOL) or ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION)
- C. Hazard Class(Transport) : 3
- D. Packing class : II
- E. Marine pollutant : YES
- F. EmS code
- Fire : F-E
  - Spill : S-D

### 15. Regulatory Information

- A. Occupation Safety and Health Acts
- Working environment measurement materials : not applicable
  - Exposure standard setting materials : Applicable (Ethyl Alcohol)
  - Managed Hazardous Materials : not applicable
  - Special medical examination material : not applicable
  - Manufacture Restriction Materials : not applicable
  - Need Permissioin Materials : not applicable
  - Need PSM Materials : Product, applicable(Flammable liquids)
- B. Harmful chemical substance Management Acts
- Toxic Materials : not applicable
  - Emission Survey Materials : not applicable
  - Accident Prepare Materials : not applicable
  - Restriction Materials : not applicable
  - Permission Materials : not applicable
  - Prohibition Materials : not applicable
  - Related Law For Chemicals Registration, evaluation : Existing Chemicals (Ethanol, Water)
- C. Hazardous Safety Control Acts : 4 Class Alcohols, 400ℓ
- D. Waste Control Acts : **Classify according to the characteristics of the waste and dispose of it in accordance with applicable regulations of the Waste Management Act.**



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E. Other regulation and foreign regulation

- Persistent Organic Pollutants Control Acts : Not application
- EU Regulations
  - Classification results : Flam. Liq. 2
  - Hazard phases : H225
- US Regulations
  - OSHA Regulations (29CFR1910.119) : Not application
  - CERCLA 103 Regulations (40CFR302.4) : Not application
  - EPCRA 302 Regulations (40CFR355.30) : Not application
  - EPCRA 304 Regulations (40CFR355.40) : Not application
  - EPCRA 313 Regulations (40CFR372.65) : Not application
- Rotterdam Convention : Not application
- Stockholm Convention : Not application
- Montreal Protocol : Not application

## 16. Other Information

- A. References : This MSDS is prepared in accordance with Article 41 of the Industrial Safety and Health Act and Article 2016-19 of the Ministry of Employment and Labor (standards on the provision of material safety data).  
MSDS (KOSHA)  
TOXNET, U.S. National Library of Medicine  
International Chemical Safety Cards(ICSC)  
ECS-ESIS(European chemical Substances Information System), Chemical book, ECHA, HSDB  
IUCLID Chemical Data Sheet, EC-ECB  
NCIS, National Institute of Environmental Research  
Korea Information System for Chemical Safety Management
- B. Original preparation date : 2010, MAY. 07.
- C. Revision number and revision date : 5 / 2017, Jan. 23.  
6 / 2017, Mar. 14. - Application Of NO.2016-19 Revised Regulation(2016, April, 6. MOEL Notice)  
7 / 2017. Aug. 2 - Revised MSDS in Korea Safety and Health Corporation  
8 / 2019. Mar. 14 - Review the revision of the MSDS provided by the Occupational Safety and Health Agency for different item identifications.  
9 / 2020. Mar. 11 - Review the revision of the MSDS provided by the Occupational Safety and Health Agency for different item identifications.  
10 / 2020. April. 01 - Ulsan factory address added by customer request  
**11 / 2020. July. 07 - Regulation amended by the Waste Management Act by customer request**
- D. Other No data : This information is based on current available DB to protect workers' health, environment and safety.