



1. Product and Company Information

- (1) Product name: Alcohol (synthetic alcohol, 95 degrees / synthetic alcohol, 99 degrees).
(2) Application: Intermediate raw materials such as solvents, industrial products, and medical products.
This product is not suitable for drinking
(3) Supplier: Japan Synthetic Alcohol Co., Ltd.
(Emergency Contact) Sales Department
Address: UKISHIMACHŌ, Kawasaki-ku, Kawasaki city, Kanagawa Prefecture, Japan,
210-0862
Tel: 044-266-6571 Fax.: 044-266-6575

2. Summary of Hazards

- (1) GHS classification:

Physical hazards

Flammable liquids	Category 2
Pyrophoric liquid	Not applicable
Self-heating chemicals	Classification not possible
Metal corrosive chemicals	Classification not possible

Harmful to health

Acute toxicity (Oral)	Not applicable
Acute toxicity (Dermal)	Not applicable
Acute toxicity (Vapor)	Not applicable
Acute toxicity (Dust and mist)	Classification not possible
Skin corrosion and irritation	Not applicable
Serious damage to the eye or eye irritation	Category 2B
Respiratory sensitization	Classification not possible
Skin sensitization	Classification not possible
Germ cell mutagenicity	Classification not possible
Carcinogenic	Classification not possible
Reproductive toxicity	Category 1A
Specific target organ toxicity (Single exposure)	Category 3 (respiratory tract irritation, narcotic effect)
Specific target organ toxicity (Repeated exposure)	Category 1 (Liver)
	Category 2 (Central Nervous System)
Aspiration hazard	Classification not possible

Hazard to environment

Acute hazard to the aquatic environment	Not applicable
Chronic hazard to the aquatic environment	Not applicable
Hazard to the ozone layer	Classification not possible

Note: Hazard classes other than the listed above are "Not applicable"

(2) Graphic display:



(3) Signal words: Danger

(4) Hazard information:

Highly flammable liquid and vapor
Strong eye irritation
Risk of adverse effects on fertility or fetus
Risk of respiratory irritation
Risk of drowsiness or dizziness
Damage to organs (liver) due to long-term or repeated exposure
Damage to organs (central nervous system) due to long-term or repeated exposure

(5) Caution:

[Safety measures]

Read the safety data sheet carefully and do not handle until you understand all safety precautions.
Keep away from ignition sources such as heat, sparks, open flames, and hot surfaces. Non-smoking.
Keep the container closed tight.
Ground the container.
Use explosion-proof electrical, ventilation, and lighting equipment.
Use tools that do not generate sparks.
Take precautionary measures against static discharge.
Do not inhale dust, smoke, gas, mist, vapors, or spray.
Wash your hands thoroughly after handling.
Do not eat, drink, or smoke when using this product.
Use only outdoors or in well-ventilated areas.
Wear protective gloves, protective clothing, protective glasses, and face shield.

[First Aid Measures]

If you feel bad, contact your doctor.
If you feel bad, receive medical advice/attention.
If adhered to skin (or hair): Immediately take off all contaminated clothing.
Rinse skin with water / shower.
If inhaled: Go to an area with fresh air and rest in a position comfortable for breathing.
In case of exposure or concern of exposure: Receive medical advice/attention.
In the case of fire, spray a large amount of water or use a fire extinguisher for alcohol.
Next, if you wear contact lenses and they can be removed easily, remove the lenses.
In case of contact with eyes, wash carefully with water for several minutes. Then continue rinsing.
If eye irritation continues, receive medical advice/attention.

**[Storage]**

Store locked up.

Store in a well-ventilated place. Store in a cool place.

Keep container tightly closed.

[Disposal]

Contents/container must be processed in accordance with the law.

3. Composition and Information on Ingredients

(1) Distinction: Single product or Mixture:	Single product
(2) Chemical name or Common name:	Ethanol
(3) Alias:	Ethyl alcohol, Methyl carbinol, Hydroxyethyl, Ethyl hydrate, Alcohol, Wine Spirit
(4) Content:	95.0 vol% or more and 99.5 vol% or more
(5) Chemical formula:	C ₂ H ₅ OH
(6) Molecular weight:	46.07
(7) CAS number:	64-17-5 (ethanol)
(8) Official Gazette notice reference number:	(2)-202 (CSCL), existing chemical substances (Industrial Safety and Health Act)

4. First Aid Measures

(1) If inhaled:	Immediately move the victim to an area with fresh air and have them rest. If you feel bad, contact your doctor.
(2) If adhered to skin:	Remove/Take off the contaminated clothing immediately. Wash using running water. Wash well using soap. If you feel bad, contact your doctor.
(3) If in eyes:	Wash eyes carefully with an abundant amount of clean water for at least 15 minutes. If you wear contact lenses and they can be removed easily, remove the lenses and wash for a few more minutes. Immediately seek medical attention.
(4) If ingested:	Rinse the mouth thoroughly with water. Do not induce vomiting without instruction from a physician. Immediately seek medical attention.



5. Measures in Case of Fire

- (1) Extinguishing agent: Small fire: carbon dioxide, extinguishing powder, sprinkler, alcohol-resistant foam extinguishing agent
Large fire: sprinkler, water spray, alcohol-resistant foam extinguishing agent.
- (2) DO NOT use the following extinguishing agents: Straight stream.
- (3) Critical hazards: The container may explode if heated.
Extremely easy to burn, easily ignited from heat, sparks, and flame.
May ignite again after being extinguished.
- (4) Fire-fighting measures: Irritating, corrosive, or toxic gases may be generated during a fire.
If there is a possibility that the fire spread due to sprinklers, please use other appropriate extinguishing agents different from sprinklers, as shown above.
If the fire is large and the other fire extinguishing agents have no effect, use sprinklers.
If this can be done without risk, move the containers from the fire area.
If the containers cannot be moved, cool them and the surrounding area by using sprinklers.
After the fire, cool the containers sufficiently by using a large amount of water.
- (5) Protection equipment for firefighters: Wear appropriate protective equipment (gloves, glasses, mask, etc.) when fighting fire.

6. Accidental Release Measures

- (1) Preventive measures for human body: Prevent the entry of unauthorized personnel.
Protective equipment and emergency measures: Wear protective equipment in accordance with the situation (respiratory protective equipment, chemical protective clothing, gloves, boots, glasses, masks, etc.), and avoid inhalation or direct contact with the product.
- (2) Environmental precautions: Do not discharge leaking products into rivers, etc., as this may negatively impact the environment.
Be careful not to discharge contaminated waste water into the environment without being properly treated.
- (3) Containment and cleanup methods and equipment: In case of slight contamination, immediately wash the spilled location with a large amount of water.
In case of large contamination, collect as much of the leakage as possible in empty sealable containers and wash the location that could not be collected with a large amount of water.
- 4) Measures for preventing a secondary disaster: The product has permeable and volatile properties, so promptly remove all sources of ignition.



7. Handling and Storage

(1) Handling

Technical measures:	Wear protective equipment and take the measures described in "8. Exposure Prevention and Protection Measures".
Local and general ventilation:	Perform local and general ventilation as described in "8. Exposure Prevention and Protection Measures".
Safe handling precautions:	See "10. Stability and reactivity.
Avoid Contact:	See "10. Stability and reactivity.

(2) Storage

Technical measures:	Follow the applicable laws and regulations.
Incompatible materials:	See "10. Stability and reactivity.
Safe storage conditions:	Store locked up.
Safe packaging materials:	Use containers that have been regulated by the Fire Service Act and the UN transport method.

8. Exposure Prevention and Protection Measures

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|---|---|
| (1) Respiratory protective equipment: | If necessary, wear appropriate respiratory protective equipment (such as a protective mask and air breathing apparatus) in places where vapors are generated. |
| (2) Hand protective equipment: | If necessary or if there is risk of adhering to hands, wear impermeable rubber gloves. |
| (3) Eye protective equipment: | If there is a risk of entering eyes, wear appropriate eye protective equipment (protective glasses, goggles, face protection, etc.). |
| (4) Skin and body protective equipment: | If necessary, wear protective clothing, protective apron, protective shoes, etc. |

Information as 100% ethanol

Management concentration	Not defined
Allowable concentration	
Japan Society for Occupational Health	Not defined (Version 2013)
ACGIH	TLV-STEL 1000ppm (Version 2013)

9. Physical and Chemical Properties

Information as 100% ethanol

(1) Properties:	Colorless transparent liquid
(2) Odor:	Pungent odor
(3) pH:	No Information
(4) Melting Point and Freezing point:	-114.14 °C : HSDB(2013)
(5) Boiling point and Initial boiling point:	78.5 °C : Merck (14th, 2006)
(6) Flash Point:	13 °C (closed up) : Merck (14th, 2006)
(7) Evaporation rate (butyl acetate = 1):	No Information
(8) Explosive range:	3.3 - 19vol%: ICSC (2000)
(9) Vapor pressure:	59.3mmHg (25 °C) : HSDB (2013)
(10) Vapor density:	1.59 (Air=1) : HSDB (2013)
(11) Specific gravity (density):	0.789 (20 °C / 4 °C) : Merck (14th, 2006)
(12) Solubility:	Water-miscible : ICSC (2000) Miscible with most of the organic solvents: HSDB (2013)
(13) n- octanol / Water partition coefficient:	log Kow = -0.31 : HSDB (2013)
(14) Spontaneous ignition temperature:	363 °C : ICSC (2000)
(15) Decomposition temperature:	No Information
(16) Viscosity (Coefficient of viscosity):	1.074mPa · s at 20 °C : HSDB (2013)

10. Stability and reactivity

(1) Stability:	It is considered stable for storage and handling in accordance with laws and regulations.
(2) Possibility of hazardous reactions:	It gradually reacts with calcium hypochlorite , silver oxide, and ammonia, and poses a risk of fire or explosion. It reacts violently with oxidizing agents, such as nitric acid, silver nitrate, mercuric nitrate, magnesium perchlorate, and poses a risk of fire or explosion.
(3) Conditions to avoid:	No Information
(4) Incompatible materials:	Oxidizing agents, such as calcium hypochlorite , silver oxide, ammonia, nitric acid, silver nitrate, mercuric nitrate, magnesium perchlorate
(5) Hazardous decomposition products:	No Information

**11. Hazard information**

Information as 100% ethanol

Acute toxicity

- (1) Oral: Not applicable
Rats' LD50 value = 6,200mg/kg, 11,500mg/kg, 17,800mg/kg, 13,700mg/kg (PATTY (6th, 2012)), 15,010mg/kg, 7,000-11,000mg/kg (SIDS (2005), all values corresponded to Not applicable.
- (2) Dermal: Not applicable
On the basis of the rabbits' LDLo = 20,000mg/kg (SIDS (2005)), it corresponded to Not applicable.
- (3) Inhaled (Vapor): Not applicable
Both rat LC50=63,000ppmV (DFGOT vol.12 (1999)) and 66,280ppmV (124.7mg/L) (SIDS (2005)) corresponded to Not applicable. Furthermore, ppmV was used as reference value, as the density of the tested material showed value [70,223ppmv (132.4mg/l)], which is lower than 90% of the saturated vapor pressure concentration 78,026ppmv (147.1mg/l).
- (4) Inhaled (Mist): Classification not possible
Due to insufficient data
- (5) Skin corrosion and skin irritation: Not applicable
After the 4-hour exposure test using rabbits (OECD TG 404), erythema average score for 1 and 24 hours after application was 1.0, and for the other points all average scores of erythema and edema were 0.0, and based on evaluation SIDS (2009) was classified as "Not irritant".
- (6) Serious damage to the eyes or eye irritation: Category 2B
After two Draize tests using rabbits (OECD TG 405), irritation was evaluated as moderate (SIDS (2005)). Corneal opacity, iritis, conjunctival redness, and conjunctival edema were observed in one of the tests, as the average score for corneal opacity on the first day was 1 or more and for conjunctival redness was 2 or more, so they were classified because most of the cases recovered within 7 days (ECETOC TR (2) (1998)).
- (7) Respiratory sensitization: Classification not possible
Due to insufficient data
- (8) Skin sensitization: Classification not possible
Due to insufficient data
- (9) Germ cell mutagenicity: Classification not possible
in vivo and in vitro showed negative results or negative evaluation, and because of the inability to select "Not applicable" due to the revision of the classification guidance, it was marked as "Classification not possible."
- (10) Carcinogenic: Classification not possible
Since inhalation exposure data is insufficient, the following was marked as "Classification not possible." Ethanol was not included in the "Recommendation of Occupational Exposure Limits (2015)" by the Japan Society for Occupational Health. In ACGIH (2009), based on the data of animal experiments with oral administration of ethanol (carcinogenicity has

been confirmed in animal experiments, but has not been suggested in humans), it was classified as A3. Furthermore, in the proviso it was indicated as unclear in humans, and in the evaluation by NIOSH (USA) (2015), it was classified as A4 (substances that cannot be evaluated for carcinogenicity to humans due to insufficient data, etc.) (ACGIH (2004)). In addition, in CLP (EU) ethanol is "Not applicable", and in EPA (USA) it is "Not listed". Furthermore, IARC (2010) confirmed the classification of alcohol consumption and of ethanol in alcoholic beverages in Group 1 (Carcinogenic to humans), NTP (US Toxicology Program) (2014)) classified alcohol consumption as "Known" (known as carcinogenic substance to humans), but both are based on the data of alcohol beverage consumption habits in humans.

(11) Reproductive toxicity:

Category 1A

The following was classified as Category 1A.

In humans, ingestion of ethanol before birth is known to cause fetal alcohol syndrome (FAS), referred to as congenital malformations in newborns. These malformations include microcephaly, short palpebral fissures, joint, limb, and cardiac abnormalities, as well as behavioral and cognitive dysfunction in the development stage (PATTY (6th, 2012)). In addition, the fetal alcohol syndrome is associated with women with alcohol addiction who have abused and chronically drunk alcohol during pregnancy. There are no reports of fetal alcohol syndrome due to industrial oral, transdermal, or inhalation exposure.

(12) Specific target organ toxicity (Single exposure):

Category 3 (respiratory tract irritation, narcotic effect)

The following was classified as Category 3 (respiratory tract irritation, narcotic effect)

Irritation to the eyes and respiratory tract in humans due to inhalation exposure has been reported (PATTY (6th, 2012)). The rise of ethanol concentration in blood may cause mild intoxication (decreased muscle coordination, changes in mood, character, or behavior) to moderate intoxication (visual impairment, sensory paralysis, delayed reaction time, language disorder), and even severe intoxication symptoms (vomiting, lethargy, low body temperature, low blood sugar, respiratory depression, etc.). (PATTY (6th, 2012)). In addition to humans, the suppression of symptoms of the central nervous system in laboratory animals has been observed (SIDS (2005)).

(13) Specific target organ toxicity (Repeated exposure):

Category 1 (liver), Category 2 (central nervous system)

In humans, long-term heavy intake of alcohol has negative impact on almost all organs, and the strongest influence is on the liver, which is the target organ. The failure begins with fatty degeneration, and progresses through the stages of necrosis and fibrosis to cirrhosis (DFGOT vol.12 (1999)), so it was classified as Category 1 (liver). In addition, from the fact that the US FDA has approved three types of therapeutic agents as a treatment for patients with alcohol abuse and dependency (HSDB (Access on June 2013)), it was classified as Category 2 (central nervous system).



(14) Aspiration hazard: Classification not possible
Due to insufficient data

12. Ecological Information

Information as 100% ethanol

- (1) Hazardous to the aquatic environment (acute): "Not applicable"
Seaweed (chlorella) 96-hour EC50 = 1000mg/L (SIDS, 2005), shellfish (Daphnia magna) 48-hour EC50 = 5463mg/L (ECETOC TR 91 2003), fish (rainbow trout) 96-hour LC50 = 11200ppm (SIDS, 2005), acute toxicity of 100mg/L in seaweed, shellfish, and fish has not been reported.
- (2) Hazardous to the aquatic environment (Long-term): "Not applicable"
When using chronic toxicity data, there is a rapid degradation (degree of degradation due to BOD: 89% (existing inspection, 1993)), shellfish (kind of Ceriodaphnia dubia) 10-day NOEC = 9.6mg/L (SIDS, 2005), so it was marked as "Not applicable". If acute toxicity data was used for the trophic level without obtaining chronic toxicity data, both seaweed and fish were marked as "Not applicable" for acute toxicity, and are not poorly water-soluble (miscible, ICSC, 2000).
- (3) Hazard to the ozone layer: Classification not possible
The substance is not listed in the annex to the Montreal Protocol.

13. Disposal Considerations

- (1) Residual waste disposal: Follow the standards of the related laws and regulations, including those of the local government.
Outsource the disposal to an industrial waste treatment company that has obtained permission from a prefectural governor or a local public entity. When outsourcing the disposal, the processing company has to be sufficiently informed of the risks and hazardous properties.
- (2) Contaminated containers and packaging: Clean and recycle the containers, or dispose in accordance with the standards of the relevant laws and regulations, including those of the local government.
If you want to discard the empty containers, remove the contents completely.
- (3) Others: As described in section "7. Handling and storage" and in accordance with the general guidelines regarding flammable liquids.

**14. Precautions for Transportation**

- (1) UN Number: 1170 ETHANOL(ETHYL ALCOHOL) or ETHANOL SOLUTION (ETHYLALCOHOL SOLUTION)
- (2) UN Classification: 3
- (3) Packing Group: II
- (4) Fire Service Act: Category IV, Alcohols
- (5) Act on Port Regulations: Inflammable liquids (Enforcement Regulations, Article #194, Notice of dangerous goods, Annex 1)
- (6) Ship Safety Act: Inflammable liquid compounds (Dangerous Goods Regulations, Article #3, Notice of dangerous goods, Annex 1)
- (7) Act on Prevention of Marine Pollution and Maritime Disaster: Substances type Z
- (8) Emergency Response Guide book Number: 127
- (9) Others: When transporting in tank trucks and tank cars, thoroughly check the valve of the discharge port, the flange surface, and the safety valve in advance, so that leakage does not occur during transportation. Before shipping, make sure that the container is sealed and there are no leaks. During transportation and carrying, containers should always be fixed firmly, and a suitable buffer substance should be filled in advance around bottles and cans so as not to be damaged by colliding with each other during shipment.
As described in section "7. Handling and Storage".

15. Applicable Laws

- (1) Industrial Safety and Health Act: Hazardous and flammable materials (Enforcement Order, Annex Paragraph 1, Paragraph 4 No. 4, 3); Dangerous goods and hazardous materials, which name should be notified (Article 57, Paragraph 2, Enforcement Order, Article 18, Paragraph 2, No. 1, No. 2, Annex 9, 61); Dangerous goods and hazardous materials, which name should be displayed (Article 57, Paragraph 1, Enforcement Order Article 18, No. 1, No. 2, Annex 9, 61)
- (2) Poisonous and Deleterious Substances Control Act: Not applicable
- (3) Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvement to the management thereof: Not applicable
- (4) Fire Service Act: Category IV Inflammable Liquids, Alcohols (Article 2, Paragraph 7, Dangerous Goods (Annex 1, 4).
- (5) Civil Aeronautic Act: Inflammable liquids (Enforcement Regulations, Article #194,



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| (6) Ship Safety Act: | Notice of dangerous goods, Annex 1)
Flammable liquid compounds (Dangerous Goods Regulations, Article #3, Notice of dangerous goods, Annex 1) |
| (7) Act on Port Regulations: | Other hazardous materials and flammable liquid compounds (Article 21, Paragraph 2; Regulations: Article 12, notice to determine the type of hazardous materials, Annex 2) |
| (8) Act on Prevention of Marine Pollution and Maritime Disaster: | Hazardous liquid substances (substances type Z) (Enforcement Ordinance Annex 1, 20). |
| (9) Ethanol Business Act: | Article 2, Alcohol with alcohol content of 90 degrees or more |

16. Other Information

(1) References:

- 1) JIS Z7253: 2012; Hazard Communication of Chemicals Based on GHS - Labelling and Safety Data Sheet (SDS).
- 2) GHS Classification Guidance for Enterprises (Revised 2013, (Ver. 1.1))
- 3) Ministry of Health, Labor and Welfare brochure "Targeted Risk Assessment in Order to Prevent Industrial Accidents."
<http://www.mhlw.go.jp/file/06-Seisakujouhou-11300000-Roudoukijunkyokuanzeniseibu/0000099625.pdf>

(2) Ethanol information:

- 1) National Institute of Technology and Evaluation (NITE)
Chemical Risk Information Platform (CHRIP), GHS Classification, Results, Ethanol (2013)
- 2) Ministry of Health, Labor and Welfare, Workplace Safety Site
Model MSDS, Ethanol (Revised: March 31, 2014)

This safety data sheet is created in compliance with JIS Z7253:2012 and GHS Classification Guidance for Enterprises (Revised 2013, (Ver. 1.1)).

The contents have been created based on the current documentation, information, and data available. Content, hazardous and harmful physical and chemical properties etc., may have been revised after new findings and tests, so there is no guarantee of the contents. Also, these precautions are intended for normal handling, so in case of special handling, ask for instructions on appropriate safety measures for handling.