Safety Data Sheet

1. Chemical product and company identification

Product name : Tetrahydrofuran (non stabilizer)

SDS code : K7-03

Company/undertaking identification :

HAYASHI PURE CHEMICAL IND.,LTD.
Address : 3-2-12 Uchihiranomachi, Chuo-ku, Osaka, Osaka, Japan
Telephone : 06-6910-7305
E-mail : shiyaku_kikaku@hpc-j.co.jp
URL : https://www.hpc-j.co.jp/

Emergency number : 06-6910-7305

Recommended use : For research and experimental use only.

Restrictions on use : Do not use on a human body or for animal medicines, foods, household products, cosmetics, etc.

2. Hazards identification

GHS classification

Physical hazards	Explosives	No classification
	Flammable gases	No classification
	Aerosol	No classification
	Oxidizing gases	No classification
	Gases under pressure	No classification
	Flammable liquids	Category 2
	Flammable solids	No classification
	Self-reactive substances and mixtures	No classification
	Pyrophoric liquids	No classification
	Pyrophoric solids	No classification
	Self-heating substances and mixtures	classification not possible
	Substances and mixtures which in contact with water emit flammable gases	No classification
	Oxidizing liquids	No classification
	Oxidizing solids	No classification
	Organic peroxides	No classification
	Corrosive to metals	classification not possible
	Desensitized explosives	classification not possible
Health hazards	Acute toxicity (oral)	Category 4
	Acute toxicity (dermal)	classification not possible
	Acute toxicity (inhalation:gas)	No classification
	Acute toxicity (inhalation:vapors)	Category 4
	Acute toxicity (inhalation:dust/mist)	classification not possible
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Respiratory sensitization	classification not possible
	Skin sensitization	classification not possible
	Germ cell mutagenicity	classification not possible
	Carcinogenicity	Category 2
	Reproductive toxicity	Category 2
	Specific target organ toxicity (single exposure)	Category 1 (central nervous system)

	Specific target organ toxicity (single exposure)	Category 3 (Narcosis)
	Specific target organ toxicity (single exposure)	Category 3 (Respiratory tract irritation.)
	Specific target organ toxicity (repeated exposure)	Category 1 (liver, respiratory system, central nervous system)
	Aspiration hazard	classification not possible
Environmental hazards	Hazardous to the aquatic environment, short-term (acute)	No classification
	Hazardous to the aquatic environment, long-term (chronic)	No classification
	Hazardous to the ozone layer	classification not possible

Hazard pictograms (GHS JP)

GHS02 GHS07 GHS08

Signal word (GHS JP) : Danger

Hazard statements (GHS JP) :
Highly flammable liquid and vapor (H225)
Harmful if swallowed or if inhaled (H302+H332)
Causes skin irritation (H315)
Causes serious eye irritation (H319)
May cause respiratory irritation (H335)
May cause drowsiness or dizziness (H336)
Suspected of causing cancer (H351)
Suspected of damaging fertility or the unborn child (H361)
Causes damage to organs (central nervous system) (H370)
Causes damage to organs (liver, respiratory system, central nervous system) through prolonged or repeated exposure (H372)

Precautionary statements (GHS JP)

Prevention :
Obtain special instructions before use. (P201)
Do not handle until all safety precautions have been read and understood. (P202)
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. (P210)
Ground and bond container and receiving equipment. (P240)
Use explosion-proof electrical/ventilating/lighting equipment. (P241)
Use only non-sparking tools. (P242)
Take action to prevent static discharges. (P243)
Do not breathe dust/fume/gas/mist/vapors/spray. (P260)
Wash hands, forearms and face thoroughly after handling. (P264)
Do not eat, drink or smoke when using this product. (P270)
Use only outdoors or in a well-ventilated area. (P271)
Wear protective gloves/protective clothing/eye protection/face protection. (P280)

Response :
IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell. (P301+P312)
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water . (P303+P361+P353)
IF INHALED: Remove person to fresh air and keep comfortable for breathing (P304+P340)
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. (P305+P351+P338)
IF exposed or concerned: Call a POISON CENTER or doctor. (P308+P311)
Get medical advice/attention if you feel unwell. (P314)
Rinse mouth. (P330)
If skin irritation occurs: Get medical advice/attention. (P332+P313)
If eye irritation persists: Get medical advice/attention. (P337+P313)
Take off contaminated clothing and wash it before reuse. (P362+P364)
In case of fire: Use specify appropriate media to extinguish. (P370+P378)

Storage :
Store in a well-ventilated place. Keep container tightly closed. (P403+P233)

Store in a well-ventilated place. Keep cool. (P403+P235)
Store locked up. (P405)

Disposal : Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation. (P501)

3. Composition/information on ingredients

Distinction of substance or mixture : Substance

Synonyms : Tetramethylene oxide, Diethylene oxide, 1,4-Epoxybutane, Oxycyclopentane, THF

Name	Concentration or Concentration range	Formula	Kanpo number		CAS RN
			CSCL no	ISHL no	
Tetrahydrofuran	≧99.5%, ≦100%	C4H8O	(5)-53	Existing Chemical Substance	109-99-9

The above concentration or concentration range are not product specification.
All percentages listed in the above concentration or concentration range are wt%, unless otherwise specified.

4. First aid measures

First aid measures

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing.
Get immediate medical advice/attention.

First-aid measures after skin contact : Remove/Take off immediately all contaminated clothing.
Gently wash with plenty of soap and water.
Get immediate medical advice/attention.

First-aid measures after eye contact : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Get immediate medical advice/attention.

First-aid measures after ingestion : Do NOT induce vomiting.
Rinse mouth.
Get immediate medical advice/attention.

5. Fire fighting measures

Suitable extinguishing media : Water spray, Alcohol-resistant foam, Dry powder, Carbon dioxide, Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

Fire hazard : Extremely flammable liquid and vapor.

Explosion hazard : Danger of the steam explosion in indoor, outdoor, sewer.
May induce explosion of containers by heating.

Hazardous decomposition products in case of fire : In case of fire, product may produce irritative or toxic fumes/gases.

Firefighting instructions : If ignited, for the initial fire-fighting, cut off combustion sources, extinguish fire at a stroke using appropriate fire-extinguishers.
In the case of peripheral fire, quickly remove movable containers to safe places.
If unable to be moved containers, sprinkle water to containers and surrounding equipment, etc. to cool.
Even after extinguishing fire, thoroughly cool containers by using plenty of water.

Protection during firefighting : Wear appropriate fire-resistant clothing including self contained-compressed air breathing apparatus.

6. Accidental release measures

Personal Precautions, Protective Equipment and Emergency Procedures

General measures : Before entering, ventilate the area.
Do not let unauthorized persons come close to the area.
Immediately place the leakage area in isolation, with taking proper distances for all directions.
Wear appropriate personal protective devices to prevent inhalation and contact with eye, skin, and clothing, and never attempt to work on the lee.

Environmental precautions

Environmental precautions : Avoid release to the environment.
Prevent entry to sewers and public waters.

Methods and Equipment for Containment and Cleaning up

Methods for cleaning up : Clean up any spills as soon as possible, using an absorbent material to collect it.
Collect leaking and spilled liquid in sealable containers as far as possible.
Wash out the spilled area with large amounts of water.

7. Handling and storage

Handling

Technical measures : Work with appropriate personal protective equipment to prevent inhalation or contact to eyes, skin, and clothing.
Handle with care to prevent leakage, overflowing, or scattering, minimize generation of mist or vapor, and thoroughly ventilate.

Precautions for safe handling : Do not eat, drink or smoke when using this product.
Thoroughly wash your hands and gargle after handling.
Ensure good ventilation of the work station.
Do not contact, breathe or swallow.
Take precautionary measures against static discharge.
Use explosion-proof equipment.

Prevents handling of incompatible substances or mixtures : Avoid prolonged or repeated exposure.

Storage

Storage conditions : Store locked up.
Store in a well-ventilated place, away from direct sunlight. Keep container tightly closed and keep away from fire and heat sources.

Material used in packaging/containers : Light shielding airtight container.

Technical measures : Comply with applicable regulations.

Storage temperature : Cool and dark place

8. Exposure controls / Personal protection equipment

Exposure limit values	
Tetrahydrofuran	
Japan administration level	50ppm
Exposure limits (JSOH)	50ppm(148mg/m3)(skin)
Exposure limits (ACGIH)	TWA 50 ppm,STEL 100 ppm (Skin)

Appropriate engineering controls : Cover up tightly the generation source at the handling place or install local exhaust equipment or overall ventilation equipment. Install safety showers and eye-fountains near a handling place. Clearly indicate the location.

Protective equipment

Respiratory protection : Gas mask for organic gases

Hand protection : Impervious protective gloves

Eye protection : Protective glasses (general glasses, glasses with side-shields, goggles)

Skin and body protection : Impervious aprons, Impervious work clothing, Impervious long boots

9. Physical and chemical properties

Physical state	:	Liquid
Appearance	:	Liquid
Color	:	colorless transparent
Odor	:	characteristic odor
pH	:	No data available
Melting point	:	-108 °C
Freezing point	:	No data available
Boiling point	:	66 °C
Flash point	:	-14.5 °C (tag closed cup)
Auto-ignition temperature	:	321 °C
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	No data available
Vapor pressure	:	19.3 kPa（20℃）
Relative density	:	No data available
Density	:	0.88 – 0.89 g/cm³（20℃）
Relative gas density	:	2.5 (air=1)
Solubility	:	Easily soluble in water. Easily soluble in ethanol. Easily soluble in diethyl ether.
Partition coefficient n-octanol/water (Log Pow)	:	No data available
Explosive limits (vol %)	:	2 – 11.8 vol % (in air)
Viscosity, kinematic	:	No data available
Particle characteristics	:	No data available

10. Stability and reactivity

Reactivity	:	No data available
Chemical stability	:	Prone to forming explosive organic peroxides in sunlight and air.
Possibility of hazardous reactions	:	Reacts with strong oxidizing agents, strong bases and metal halides. Corrodes some kinds of plastics, rubbers and coating agents.
Conditions to avoid	:	Sunlight, heat. Ignition sources such as spark, flame and static electricity. Contact with air(oxygen), strong oxidizing agents, strong bases and metal halides.
Incompatible materials	:	Air(oxygen), Strong oxidizing agents, Strong bases, Metal halides
Hazardous decomposition products	:	No data available

11. Toxicological information

The information in this section is based on the "GHS Classification Results" by NITE.

Tetrahydrofuran	
Acute toxicity (oral)	Category 4
Acute toxicity (dermal)	classification not possible
Acute toxicity (gas)	No classification
Acute toxicity (vapour)	Category 4
Acute toxicity (inhalation:dust/mist)	classification not possible
Skin corrosion/irritation	Category 2
Serious eye damage/irritation	Category 2A
Respiratory sensitization	classification not possible
Skin sensitization	classification not possible
Germ cell mutagenicity	classification not possible
Carcinogenicity	Category 2
Reproductive toxicity	Category 2
STOT-single exposure	Category 1 Category 3 (Narcosis) Category 3 (Respiratory tract irritation.)
STOT-repeated exposure	Category 1
Aspiration hazard	classification not possible

12. Ecological information

The information in this section is based on the "GHS Classification Results" by NITE.

Tetrahydrofuran	
Hazardous to Aquatic Environment - Acute Hazard	No classification
Hazardous to Aquatic Environment - Chronic Hazard	No classification
Persistence and degradability	No data available
Bioaccumulative potential	No data available
Mobility in soil	No data available
Hazardous to the ozone layer	classification not possible

13. Disposal considerations

Ecology - waste materials : With the detail information of the waste, subcontract its disposal to a waste disposer authorized by a Prefectural Governor.

Contaminated container and packaging : Empty the packaging completely prior to disposal.

Empty containers should be taken for recycle, recovery or waste in accordance with local regulation.

14. Transport information

International Regulations

Transport by sea(IMDG)

UN-No. (IMDG) : 2056
Proper Shipping Name (IMDG) : TETRAHYDROFURAN
Packing group (IMDG) : II
Transport hazard class(es) (IMDG) : 3
Hazard labels (IMDG) : 3
Class (IMDG) : 3

Packing instructions (IMDG) : P001
IBC packing instructions (IMDG) : IBC02
Tank instructions (IMDG) : T4
Tank special provisions (IMDG) : TP1
Stowage category (IMDG) : B
Flash point (IMDG) : below -18°C c.c.
Properties and observations (IMDG) : Colourless liquid with an ethereal odour. Flashpoint: below -18°C c.c. Explosive limits: 1.5% to 12% Miscible with water.
MFAG-No : 127

Air transport(IATA)

UN-No. (IATA) : 2056
Proper Shipping Name (IATA) : Tetrahydrofuran
Packing group (IATA) : II
Transport hazard class(es) (IATA) : 3
Hazard labels (IATA) : 3
Class (IATA) : 3

PCA Excepted quantities (IATA) : E2
PCA Limited quantities (IATA) : Y341
PCA limited quantity max net quantity (IATA) : 1L
PCA packing instructions (IATA) : 353
PCA max net quantity (IATA) : 5L
CAO packing instructions (IATA) : 364
CAO max net quantity (IATA) : 60L
ERG code (IATA) : 3H

Marine pollutant : Not applicable

Regulations in Japan

Regulatory information by sea : Conform to the provisions of the Ship Safety Law.
Regulatory information by air : Conform to the provisions of the Civil Aeronautics Law.
MFAG-No : 127
Special transport precautions : When transporting, load containers so that they do not tip over, damage, drop or collapse. Make sure there is no leak in containers.

15. Regulatory information

National law

Chemical Substances Control Law	:	Priority Assessment Chemical Substances (Law Article 2, Para.5)
Industrial Safety and Health Law	:	Class 2 Organic Solvents etc. (Enforcement Order, Art., Appended Table 6-2, Ordinance on Prevention of Organic Solvent Poisoning, Art.1, Para.1, Item 4) Working Environment Evaluation Standards, Administrative Control Levels (Law Art.65-2, Para.1) Harmful Substances Whose Names Are to be Indicated on the Label (Law Art.57, Para.1, Enforcement Order Art.18 Item 1, Item 2, Attached Table No.9) Notifiable Substances (Law Art.57-2, Enforcement Order Art.18-2 Item 1, Item 2, Attached Table No.9) Tetrahydrofuran (Ordinance number : 367) Dangerous Substances - Flammable Substance (Enforcement Order Attached Table 1 Item 4) Substances on Special medical examination, Current handling workers (Act, Art.66, Para.2, Enforcement Order, Art.22 Item 1)
Japanese Poisonous and Deleterious Substances Control Law	:	Not applicable
Fire Service Law	:	Group 4 - Flammable liquids - 1st Class petroleums - soluble (Law Art.2 Para.7, Attached Table 1, Group 4)
Air Pollution Control Law	:	Volatile Organic Compounds (Law Art.2 Para.4) (MOE Official Notice to Prefectures)
Law Relating to Prevention of Marine Pollution and Maritime Disasters	:	Noxious Liquid Substances - Category Z (Law Art.3(3), Enforcement Order, Art.1-2, Attached Table No.1 Item 3)
Foreign Exchange and Foreign Trade Control Act	:	Export Trade Control Ordinance appendix 1-16
Ship Safety Act	:	Flammable liquids (Dangerous Goods Notification Schedule first second and third Article Dangerous Goods Regulations)
Civil Aeronautics Law	:	Flammable liquids (Hazardous materials notice Appended Table 1 Article 194 of the Enforcement Regulations)
Port Regulation Law	:	Flammable liquids (Article 21, Paragraph 2 of Law, Article 12 rule, notice attached table that defines the type of dangerous goods)
Road Act	:	Restriction for Vehicle Traffic (Enforcement Order Art.19-13, Publication of Japan Highway Pablic Corp.)
Waste Management on Public Cleansing Law	:	Specially Controlled Industrial Wastes (Act Art.2, para 5, Enfothment Order Art.2-4)
Japanese Pollutant Release and Transfer Register Law (PRTR Law)	:	Class 1 Designated Chemical Substances (Act Art.2 para.2, Enforcement Order Art.1 Appended Table No.1) Tetrahydrofuran (100%)
Labor Standards Act	:	Chemical Substances Causing Occupational Illnesses (Act Art.75, Para.2, Ordinance Attached Table 1-2, Item 4-1, MHLW Nortification No.36 of 1978)

16. Other information

Data sources	:	Handbook of 17423 Chemical Products, The Chemical Daily Co, Ltd. International Chemical Safety Cards. National Institute of Technology and Evaluation (NITE). 2020 Emergency Response Guidebook (ERG 2020).
Other information	:	The SDS is copyrighted material of Hayashi Pure Chemical Ind, Ltd. This Safety Data Sheet is intended to be provided for business operators who handle chemical substance products of the relevant product and is not intended to assure safety in any way. The Safety Data Sheet does not verify all the information on the applicable chemical substance in the present time. With the recognition in that unknown danger constantly exists in the relevant chemical substance, the product shall be used in the principle of self-responsibility of the user with the highest priority to safety from transport and unpacking to disposal. When the relevant chemical substance is used, the user him/herself shall collect safety information and shall investigate laws and regulations at the place, organizations, countries, etc. where the substance is actually used and give the highest priority to them. The

Company shall take no responsibility for investigating state and local regulations and the user shall handle this problem on his/her own responsibility. In the event that SDS in Japanese and SDS translated into other languages exist, the document described in Japanese is prior to all other documents whether or not there is any difference in contents, and documents in other languages shall be references.