

Safety Data Sheet

1. Identification of the substance/mixture and of the company/undertaking

Product identifier:

Product name: Tetrahydrofuran

Reference number(SDS):48120jis_E1-3

Product type:

Reagent

Details of the supplier of the safety data sheet

Manufacturer/Supplier: JUNSEI CHEMICAL CO., LTD.

Address: 1-6, Ohmano-cho, Koshigaya-shi, Saitama 343-0844, Japan

Division: Quality Assurance Department

Telephone number: +81-48-986-6161

FAX: +81-48-989-2787

e-mail address: shiyaku-t@junsei.co.jp

2. Hazards identification

GHS classification and label elements of the product

Classification of the substance or mixture

PHYSICAL AND CHEMICAL HAZARDS

Flammable liquids: Category 2

HEALTH HAZARDS

Acute toxicity (Oral): Category 4

Acute toxicity (Inhalation): Category 4

Skin corrosion/irritation: Category 2

Serious eye damage/eye irritation: Category 2A

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 (Respiratory tract irritation)

Specific target organ toxicity – single exposure: Category 3 (Narcosis)

Specific target organ toxicity – repeated exposure: Category 1 (central nervous system, respiratory organs, liver)

(Note) GHS classification without description: Not classified/Classification not possible

Label elements



Signal word: Danger

HAZARD STATEMENT

H225-Highly flammable liquid and vapor

H302-Harmful if swallowed

H332-Harmful if inhaled

H315-Causes skin irritation

H319-Causes serious eye irritation

H351-Suspected of causing cancer

H361F-Suspected of damaging fertility or the unborn child

H370-Causes damage to organs

H335-May cause respiratory irritation

H336–May cause drowsiness or dizziness

H372–Causes damage to organs through prolonged or repeated exposure

PRECAUTIONARY STATEMENT

Prevention

- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- Keep container tightly closed.
- Ground and bond container and receiving equipment.
- Use explosion–proof electrical/ventilating/lighting equipment.
- Use non–sparking tools.
- Take action to prevent static discharges.
- Do not breathe dust/fume/gas/mist/vapors/spray.
- Use only outdoors or in a well–ventilated area.
- Wash contaminated parts thoroughly after handling.
- Wear protective gloves/protective clothing/eye protection/face protection.
- Use personal protective equipment as required.
- Do not eat, drink or smoke when using this product.

Response

- In case of fire: Use appropriate media other than water to extinguish.
- Get medical advice/attention if you feel unwell.
- IF exposed or concerned: Get medical advice/attention.
- Call a POISON CENTER/doctor/physician if you feel unwell.
- IF exposed or concerned: Call a POISON CENTER/doctor/physician.
- IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- IF ON SKIN: Wash with plenty of soap and water.
- IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
- If skin irritation occurs: Get medical advice/attention.
- Take off contaminated clothing and wash it before reuse.
- 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 advice/attention.
- IF SWALLOWED: Rinse mouth. Call a POISON CENTER/doctor/physician if you feel unwell.

Storage

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

Disposal

- Dispose of contents/container in accordance with local/national regulation.

Specific Physical and Chemical hazards

- Highly flammable liquid. Vapor/air mixture may explode.

3. Composition/information on ingredients

Mixture/Substance selection:

Substance

Ingredient name:Tetrahydrofuran

Content (%):99.0<

Chemical formula:C4H8O

Chemicals No, Japan:5–53

CAS No.:109–99–9

MW:72.11

ECNO:203–726–8

Note : The figures shown above are not the specifications of the product.

Stabilizing additives

(GR) (EP) : Butylhydroxytoluene(Synonyms:2,6-Di-tert-butyl-4-methylphenol) approx. 0.03%

4. First-aid measures

Descriptions of first-aid measures

General measures

Get medical advice/attention if you feel unwell.

Keep victim warm and quiet.

Call emergency medical service.

IF INHALED

Remove person to fresh air and keep comfortable for breathing.

Give artificial respiration if victim is not breathing.

Administer oxygen if breathing is difficult.

Call a POISON CENTER/doctor/physician if you feel unwell.

IF ON SKIN (or hair)

Take off immediately all contaminated clothing. Rinse skin with water or shower.

Wash with plenty of soap and water.

If skin irritation or rash occurs: Get medical advice/attention.

If skin irritation occurs: Get medical advice/attention.

Remove and isolate contaminated clothing and shoes.

In case of burns, immediately cool affected skin for as long as possible with child water.

Do not remove clothing if adhering to skin.

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 advice/attention.

IF SWALLOWED

Rinse mouth.

Call a POISON CENTER/doctor/physician if you feel unwell.

Most important symptoms and effects, both acute and delayed

(Symptoms when inhalation or ingestion)

Nausea. Headache. Cough. Dizziness Burning sensation in the throat and chest. Unconsciousness.

(Symptoms when skin and/or eye contact)

Dry skin. Conjunctival redness of the eyes. Redness of the skin. Pain.

5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

In case of fire, use water mist, alcohol-resistant foam, dry powder, CO2 to extinguish.

Unsuitable extinguishing media

Unsuitable extinguishing media data is not available.

Specific hazards arising from the substance or mixture

Containers may explode when heated.

Fire may produce irritating, corrosive and/or toxic gases.

Runoff from fire control or dilution water may cause pollution.

Advice for firefighters

Specific fire-fighting measures

Evacuate non-essential personnel to safe area.

Cool container with water spray.

Special protective equipment and precautions for fire-fighters

Wear fire resistant or flame retardant clothing.

Wear protective gloves/protective clothing/eye protection/face protection.

Firefighters should wear self-contained breathing apparatus with full face piece operated positive pressure mode.

6. Accidental release measures

Personnel precautions, protective equipment and emergency procedures

Keep unauthorized personnel away.

In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.

Ventilate area until material pick up is complete.

Wear proper protective equipment.

PUBLIC SAFETY: Ventilate closed spaces before entering.

Do not touch or walk through spilled material.

Environmental precautions

Runoff to sewer may create fire or explosion hazard.

Vapor explosion hazard indoors, outdoors or in sewers.

Avoid release to headsprings, rivers, lakes, ocean and groundwater.

Methods and materials for containment and cleaning up

Absorb spill with inert material (dry sand, earth, et al), then place in a chemical waste container.

Use clean non-sparking tools to collect absorbed material.

All equipment used when handling the product must be grounded.

Preventive measures for secondary accident

Collect spillage.

Stop leak if you can do it without risk.

ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).

Prevent entry into waterways, sewers, basements or confined areas.

Keep out of low areas.

7. Handling and storage

Precautions for safe handling

Preventive measures

(Exposure Control for handling personnel)

Do not breathe dust/fume/gas/mist/vapors/spray.

(Protective measures against fire and explosion)

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Ground and bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting equipment.

Use non-sparking tools.

Take action to prevent static discharges.

(Exhaust/ventilator)

Exhaust/ventilator should be available.

(Safety treatments)

Avoid contact with skin.

Avoid contact with eyes.

Safety Measures

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Use only outdoors or in a well-ventilated area.

Wear protective gloves/protective clothing/eye protection/face protection.

Use personal protective equipment as required.

When using do not eat, drink or smoke.

Any incompatibilities

Strong bases, Strong oxidizing agents, Titanium(IV) chloride should not be mixed with the chemicals.

Advice on general occupational hygiene

- Wash contaminated parts thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Take off contaminated clothing and wash it before reuse.

Storage**Conditions for safe storage**

- Store in a well-ventilated place. Keep container tightly closed. Keep cool.
- Keep cool. Protect from sunlight.
- Store in accordance with local/national regulation.
- Store locked up.

Container and packaging materials for safe handling data is not available.

Specific end use(s)

- See information in Section 7.1 and 7.2 for handling and storage recommendations. See Section 8 for exposure controls and personal protection recommendations.

8. Exposure controls/personal protection**Control parameters****Control value**

Japan control value (2009) ≤ 50 ppm

Adopted value

JSOH(2015) 50ppm; 148mg/m³ (dermal)

ACGIH(2005) TWA: 50ppm;

STEL: 100ppm (URT irr; CNS impair; kidney dam)

Notation···Skin

Exposure controls**Appropriate engineering controls**

- Do not use in areas without adequate ventilation.
- Eye wash station should be available.
- Washing facilities should be available.

Individual protection measures**Respiratory protection**

Wear respiratory protection.

Hand protection

- Wear protective gloves.
- Consult with your glove and/or personnel equipment manufacturer for selection of appropriate compatible materials.

Eye protection

- Wear safety glasses with side-shields.
- Wear eye/face protection.

Skin and body protection

Wear impervious clothing and boots in case of repeated or prolonged treatment.

9. Physical and Chemical Properties**Information on basic physical and chemical properties**

Physical state: Liquid

Color: Colorless

Odor: Characteristic odor

Odor threshold: 7.3~10.2 mg/m³

Melting point/Freezing point: -108.5°C

Boiling point or initial boiling point: 66°C

Boiling range data is not available.

Flammability (gases, liquids and solids): Ignitable

Lower and upper explosion limit/flammability limit:

Lower explosion limit: 2vol %

Upper explosion limit: 11.8 vol %

Flash point: (C.C.) -14.5°C

Auto-ignition temperature: 321°C

Decomposition temperature data is not available.

Self-Accelerating Decomposition Temperature/SADT data is not available.

pH data is not available.

Dynamic viscosity: 0.5mPas(20°C)

Kinematic viscosity: 0.6mm²/s(20°C)

Solubility:

Solubility in water: 1000g/liter (20°C)

Solubility in solvent: Very soluble in ethanol and diethyl ether.

n-Octanol/water partition coefficient: log Pow0.45 (20°C)

Vapor pressure: 19.3 kPa (20°C)

VOC data is not available.

Evaporation rate data is not available.

Density and/or relative density: 0.89g/cm³(20°C)

Relative vapor density (Air=1): 2.5

Relative density of the Vapor/air - mixture at 20°C (Air = 1): 1.28

Critical temperature data is not available.

Particle characteristics data is not available.

10. Stability and Reactivity

Reactivity

Reactivity data is not available.

Chemical stability

Stable under normal storage/handling conditions.

Highly flammable.

Possibility of hazardous reactions

The vapour is heavier than air and may travel along the ground; distant ignition possible.

Reacts violently with strong oxidants, strong bases and some metal halides(e.g. Titanium(IV) chloride).

This generates fire and explosion hazard.

Attacks some forms of plastic(e.g. Polyvinyl chloride), rubber(e.g. Natural rubber, Neoprene, Butyl rubber, Nitrile rubber) and coatings.

Conditions to avoid

Contact with incompatible materials.

Open flames. Heat. Sparks.

Incompatible materials

Strong bases, Strong oxidizing agents, Titanium(IV) chloride

Hazardous decomposition products

Carbon oxides

11. Toxicological Information

Information on toxicological effects

Acute toxicity

Acute toxicity (Oral)

[GHS Cat. Japan, base data]

rat LD50=1650mg/kg (MOE risk assessment vol.5: Tentative Hazard Assessment Sheet, 2006)

Acute toxicity (Inhalation)

[GHS Cat. Japan, base data]

vapor: rat LC50=18187ppm/4hr (MOE risk assessment vol.5: Tentative Hazard Assessment Sheet, 2006)

Labor standard law, Japan; Toxic

Tetrahydrofuran

Irritant properties

Skin corrosion/irritation

[GHS Cat. Japan, base data]

human : skin, eye and mucous membrane irritation (ACGIH, 2005 et al)

Serious eye damage/irritation

[GHS Cat. Japan, base data]

rabbit : moderate irritation (ACGIH 7th, 2005))

Allergenic and sensitizing effects data is not available.

Germ cell mutagenicity

[GHS Cat. Japan, base data]

mice(in vivo tests) : all Negative (ACGIH 7th, 2005 et al.)

Reverse-mutation assay in bacteria (Ames test) :Negative (ACGIH 7th, 2005 et al.)

Chromosome aberration test :Negative (ACGIH 7th, 2005 et al.)

Carcinogenicity

[GHS Cat. Japan, base data]

cat.2; ACGIH A3 (ACGIH 7th, 2005 et al.)

[IARC]

Group 2B : Possibly carcinogenic to humans

[ACGIH]

A3(2005) : Confirmed Animal Carcinogen with Unknown Relevance to Humans

[EPA]

S; Suggestive evidence of carcinogenic potential(2005)

[JSOH]

Group 2B: The agents which are probably or possibly carcinogenic to humans

[EU]

Category 2; Substances suspected human carcinogens

Reproductive toxicity

[GHS Cat. Japan, base data]

cat. 2; mouse : IRIS TR, 2012

STOT

STOT-single exposure

[cat.1]

[GHS Cat. Japan, base data]

central nervous system (HSDB, Access on August 2014)

[cat.3 (resp. irrit.)]

[GHS Cat. Japan, base data]

respiratory tract irritation (HSDB, Access on August 2014)

[cat.3 (drow./dizz.)]

[GHS Cat. Japan, base data]

narcotic effect (HSDB, Access on August 2014)

STOT-repeated exposure

[cat.1]

[GHS Cat. Japan, base data]

central nervous system; respiratory system; liver (IRIS TR, 2012)

Aspiration hazard data is not available.

12. Ecological Information

Ecotoxicity

Aquatic toxicity

Hazardous to the aquatic environment (Acute)

[GHS Cat. Japan, base data]

Fish (Pimephales promelas) LC50=2160mg/L/96hr (ECETOC TR91, 2003)

Hazardous to the aquatic environment (Long-term)

[GHS Cat. Japan, base data]

Fish (Pimephales promelas) NOEC=216mg/L/35-38days (MOE Japan, 2009)

Water solubility

1000g/L(20°C) (PHYSPROP Database)

Persistence and degradability

Degrade rapidly [BOD_Degradation : 100% (Biodegradation and Bioconcentration Results of Existing Chemical Substances under CSCL, 1975)]

※CSCL…Chemical Substances Control Law in Japan

Bioaccumulative potential

log Pow=0.45 (20°C)(REACH Registration dossier)

Mobility in soil

Mobility in soil data is not available.

Other adverse effects

Ozone depleting chemical data is not available.

13. Disposal considerations

Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging

Waste treatment methods

Dispose of contents/container in accordance with local/national regulation.

14. Transport Information

UN No., UN CLASS

UN No. or ID No.: 2056

UN Proper Shipping Name : TETRAHYDROFURAN

Class or division (Transport hazard class) : 3

Packing group : II

ERG GUIDE No.: 127

IMDG Code (International Maritime Dangerous Goods Regulations)

UN No.: 2056

Proper Shipping Name : TETRAHYDROFURAN

Class or division : 3

Packing group : II

IATA Dangerous Goods Regulations

UN No.: 2056

Proper Shipping Name : TETRAHYDROFURAN

Class or division : 3

Hazard labels : Flamm.liquid

Packing group : II

Environmental hazards

MARPOL Annex III – Prevention of pollution by harmful substances

Marine pollutants (yes/no) : no

MARPOL Annex V – Prevention of pollution by garbage discharge

Specific target organ toxicity – repeated exposure: cat.1

Tetrahydrofuran

Maritime transport in bulk according to IMO instruments

Noxious Liquid ; Cat. Z

Tetrahydrofuran(Z-88)

15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

Chemicals listed in TSCA Inventory

Tetrahydrofuran

Other regulatory information

We are not able to check up the regulatory information with regard to the substances in your country or region, therefore, we request this matter would be filled by your responsibility.

Regulatory information with regard to this substance in your country or in your region should be examined by your own responsibility.

Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

Regulatory information in this section are limited to intentional ingredient(s), but does not contain information on non-intentional ingredients or impurities which are not informed by supplier(s).

Chemical safety assessment

Advice on safe handling for this product can be found in sections 7 and 8 of this SDS.

16. Other information

GHS classification and labelling

H225-Flam. Liq. 2: H225 Highly flammable liquid and vapor

H302-Acute Tox. 4: H302 Harmful if swallowed

H332-Acute Tox. 4: H332 Harmful if inhaled

H315-Skin Irrit. 2: H315 Causes skin irritation

H319-Eye Irrit. 2A: H319 Causes serious eye irritation

H351-Carc. 2: H351 Suspected of causing cancer

H361-Repr. 2: H361 Suspected of damaging fertility or the unborn child

H370-STOT SE 1: H370 Causes damage to organs

H335-STOT SE 3: H335 May cause respiratory irritation

H336-STOT SE 3: H336 May cause drowsiness or dizziness

H372-STOT RE 1: H372 Causes damage to organs through prolonged or repeated exposure

Reference Book

Globally Harmonized System of classification and labelling of chemicals, UN

Recommendations on the TRANSPORT OF DANGEROUS GOODS 21th edit., 2019 UN

IMDG Code, 2018 Edition (Incorporating Amendment 39-18)

IATA Dangerous Goods Regulations (62nd Edition) 2021

2020 EMERGENCY RESPONSE GUIDEBOOK (US DOT)

2021 TLVs and BEIs. (ACGIH)

JIS Z 7252 : 2019

JIS Z 7253 : 2019

2021 Recommendation on TLVs (JSOH)

Supplier's data/information

Chemicals safety data management system "GHS Assistant" Version 4.16 (<https://www.asahi-ghs.com/>)

NITE Chemical Risk Information Platform "NITE-CHRIP"

(https://www.nite.go.jp/en/chem/chrip/chrip_search/systemTop)

GHS Classification Guidance for Enterprises 2019 Revised Edition (Ver. 2.0) (Mar. 2020, METI)

Definitions and Abbreviations

SDS (Safety Data Sheet)
LD50 (Lethal Dose, 50%)
LC50 (Lethal Concentration, 50%)
IARC (International Agency for Research on Cancer)
ACGIH (American Conference of Governmental Industrial Hygienists)
EPA (US Environmental Protection Agency)
NTP (US National Toxicology Program)
JSOH (Japan Society for Occupational Health)
EU (European Union)
EC50 (Effective Concentration, 50%)
NOEC (No Observed Effect Concentration)
BOD (Biochemical Oxygen Demand)
COD (Chemical Oxygen Demand)
BCF (Bioconcentration Factor)
anh (anhydride)

General Disclaimer

This data sheet was created based on the information we currently have and may be revised according to new information. In addition, the precautions apply only to normal handling, and in the case of special handling, please make adequate countermeasure to maintain your safety.

The data given here is based on current knowledge and experience. The purpose of this Safety Data Sheet is to describe the products in terms of their safety requirements. The data does not signify any warranty with regard to the products' properties.

The GHS classification data given here is based on current Japan official data (NITE published in 2020).