



Safety Data Sheet

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

Product identifier:

Product name: Lithium bis(trimethylsilyl)amide in tetrahydrofuran 24% solution

SDS No. : 4506E-3

Relevant identified uses of the substance or mixture and uses advised against

Research and Development

Details of the supplier of the safety data sheet

Manufacturer/Supplier: KISHIDA CHEMICAL CO., LTD.

Address: 3-1, Honmachibashi, Chuo-ku, Osaka, JAPAN

Division: Chemical Safety Management Department

Telephone number: +81-6-6946-8061

FAX: +81-6-6946-1607

Section 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 3

Skin corrosion/irritation: Category 1

Serious eye damage/eye irritation: Category 1

Germ cell mutagenicity: Category 2

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 2 (nervous system)

Specific target organ toxicity – single exposure: Category 3 (Respiratory tract irritation)

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

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

ENVIRONMENT HAZARDS

Hazardous to the aquatic environment, short-term (acute): Category 3

Hazardous to the aquatic environment, long-term (chronic): Category 3

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

Label elements



Signal word: Danger

HAZARD STATEMENT

H225 Highly flammable liquid and vapor



Lithium bis(trimethylsilyl)amide in tetrahydrofuran 24% solution, 4506E-3, 2024/01/24

- H302 Harmful if swallowed
- H331 Toxic if inhaled
- H314 Causes severe skin burns and eye damage
- H341 Suspected of causing genetic defects
- H351 Suspected of causing cancer
- H361 Suspected of damaging fertility or the unborn child
- H370 Causes damage to organs (central nervous system)
- H371 May cause damage to organs (nervous system)
- H335 May cause respiratory irritation
- H336 May cause drowsiness or dizziness
- H372 Causes damage to organs through prolonged or repeated exposure (liver, central nervous system, respiratory system)
- H412 Harmful to aquatic life with long lasting effects

PRECAUTIONARY STATEMENT

Prevention

- P202 Do not handle until all safety precautions have been read and understood.
- P273 Avoid release to the environment.
- P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- P233 Keep container tightly closed.
- P240 Ground and bond container and receiving equipment.
- P241 Use explosion-proof electrical/ventilating/lighting equipment.
- P242 Use non-sparking tools.
- P243 Take action to prevent static discharges.
- P260 Do not breathe dust/fume/gas/mist/vapors/spray.
- P271 Use only outdoors or in a well-ventilated area.
- P264 Wash contaminated parts thoroughly after handling.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.
- P280 Use personal protective equipment as required.
- P270 Do not eat, drink or smoke when using this product.

Response

- P370 + P378 In case of fire: Use appropriate media to extinguish.
- P314 Get medical advice/attention if you feel unwell.
- P308 + P313 IF exposed or concerned: Get medical advice/attention.
- P310 Immediately call a POISON CENTER/doctor/physician.
- P311 Call a POISON CENTER/doctor/physician.
- P312 Call a POISON CENTER/doctor/physician if you feel unwell.
- P308 + P311 IF exposed or concerned: Call a POISON CENTER/doctor/physician.
- P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
- P363 Wash contaminated clothing before reuse.
- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P330 IF SWALLOWED: Rinse mouth.
- P301 + P312 IF SWALLOWED: Call a POISON CENTER/doctor/physician if you feel unwell.
- P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

Storage

- P403 + P233 Store in a well-ventilated place. Keep container tightly closed.



Lithium bis(trimethylsilyl)amide in tetrahydrofuran 24% solution, 4506E-3, 2024/01/24

P403 + P235 Store in a well-ventilated place. Keep cool.

P405 Store locked up.

Disposal

P501 Dispose of contents/container in accordance with local/national regulation.

Specific adverse human health effects

See "11. Toxicological Information".

Section 3. Composition/information on ingredients

Mixture/Substance selection:

Mixture

| Ingredient name | Content (%) | CAS No. | Chemicals No, Japan | Chemical formula |
|----------------------------------|-------------|-----------|---------------------|---|
| Tetrahydrofuran | 73-77 | 109-99-9 | 5-53 | C ₄ H ₈ O |
| Lithium bis(trimethylsilyl)amide | 23-25 | 4039-32-1 | — | C ₆ H ₁₈ LiNSi ₂ |

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

Impurities

2-Methyl-2-butene (CAS No.513-35-9) <6.0%

1,1,1,3,3,3-Hexamethyldisilazane (CAS No.999-97-3) <5.0%

Lithium hydroxide (CAS No.1310-65-2) <0.20%

Isoprene (CAS No.78-79-5) <0.10%

Section 4. First-aid measures

Descriptions of first-aid measures

General measures

Get medical advice/attention if you feel unwell.

IF INHALED

Remove person to fresh air and keep comfortable for breathing.

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

IF ON SKIN

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

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

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.

Do NOT induce vomiting.

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

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media



Lithium bis(trimethylsilyl)amide in tetrahydrofuran 24% solution, 4506E-3, 2024/01/24

Use appropriate extinguishing media suitable for surrounding facilities.

In case of fire, use spraying loaded liquid, foam (water-soluble liquid: alcohol-resistant foam), inactive gases, dry powder, dry sand to extinguish.

*Fire Service Act Group 4 Hazardous Materials

Unsuitable extinguishing media

Indoor Fire Plug System or Outdoor Fire Plug System

Sprinkler System

Dry Chemical Extinguishing System—Others (except for phosphates etc., Hydrogen Carbonates etc.)

Fire Extinguisher Discharging Jet Water/Spraying Water

Fire Extinguisher Discharging Jet Loaded Liquid

Fire Extinguisher Discharging Dry Extinguishing agents—Others (except for phosphates etc., Hydrogen Carbonates etc.)

Water Bucket or Water Tank

*Cabinet Order Concerning the Control of Hazardous Materials (Attached Table 5) Group 4 Hazardous Materials

Specific hazards arising from the substance or mixture

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

Runoff from fire control or dilution water may cause pollution.

See "10.Stability and Reactivity".

Advice for firefighters

Specific fire-fighting measures

Evacuate non-essential personnel to safe area.

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 a full facepiece operated in the positive pressure mode.

Section 6. Accidental release measures

Personnel precautions, protective equipment and emergency procedures

Keep unauthorized personnel away.

Ventilate area until material pick up is complete.

Wear proper protective equipment.

Environmental precautions

Prevent spills from entering sewers, watercourses, low areas or rivers. To be careful not discharged to the environment without being properly handled waste water contaminated.

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.

Preventive measures for secondary accident

Collect spillage.

Section 7. Handling and storage

Precautions for safe handling

Preventive measures

(Exposure Control for handling personnel)



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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

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.

Wash hands et al thoroughly after handling.

When using do not eat, drink or smoke.

Any incompatibilities

See "10.Stability and Reactivity".

Advice on general occupational hygiene

Wash contaminated parts thoroughly after handling.

Do not eat, drink or smoke when using this product.

Wash contaminated clothing before reuse.

Storage

Conditions for safe storage

Keep container tightly closed.

Store locked up. (P405)

Chilled storage.

Storage in accordance with local/national regulation.

Container and packaging materials for safe handling

Use closed unbreakable containers.

Section 8. Exposure controls/personal protection

Control parameters

Adopted value

(Tetrahydrofuran)

ACGIH(2005) TWA: 50ppm;

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

(2-Methyl-2-butene)

ACGIH(2021) TWA: 10ppm (Clastogenic eff)

Notation

(Tetrahydrofuran)

Skin

Exposure controls

Appropriate engineering controls

Do not use in areas without adequate ventilation.



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Eye wash station should be available.

Washing facilities should be available.

Individual protection measures

Recommend to use protective equipment in conformity with the standards.

Respiratory protection

Wear respiratory protection (dust-proof mask/gas mask). Select chemical cartridge corresponding to type of gases when using a gas mask.

Hand protection

Wear impervious protective glove.

Eye protection

Wear eye/face protection. Wear safety goggles in cases gas is generated.

Skin and body protection

Wear protective clothing.

Section 9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical state: Liquid

Color: Yellow to brown

Odor: Characteristic odor

Melting point/Freezing point data is not available.

Boiling point or initial boiling point: 65°C

Boiling range data is not available.

Flammability (gases, liquids and solids) data is not available.

Lower and upper explosion limit/flammability limit data is not available.

Flash point: -21.2°C

Auto-ignition temperature data is not available.

Decomposition temperature data is not available.

pH data is not available.

Kinematic viscosity data is not available.

Solubility:

Solubility in water: Reaction

Solubility in solvent data is not available.

n-Octanol/water partition coefficient data is not available.

Vapor pressure data is not available.

Density and/or relative density data is not available.

Relative vapor density (Air=1) data is not available.

Particle characteristics data is not available.

Other information

Other information is not available.

Section 10. Stability and Reactivity

Reactivity

Not available.

Chemical stability

Stable under normal storage/handling conditions.

Possibility of hazardous reactions

(Tetrahydrofuran)



Lithium bis(trimethylsilyl)amide in tetrahydrofuran 24% solution, 4506E-3, 2024/01/24

The vapour is heavier than air and may travel along the ground; distant ignition possible.
The substance can form explosive peroxides. Reacts violently with strong oxidants, strong bases and some metal halides. This generates fire and explosion hazard. Attacks some forms of plastic, rubber and coatings. (ICSC 0578)

Conditions to avoid

Contact with incompatible materials.

Contact with fire source.

Incompatible materials

Acids, Strong bases, Oxidizing agents, Metal halides, Water

Hazardous decomposition products

Carbon oxides, Nitrogen oxides, Explosive peroxides

Section 11. Toxicological Information

Information on toxicological effects

Acute toxicity

Acute toxicity (Oral)

[Product]

Category 4, Harmful if swallowed

[Data for components of the product]

[GHS Cat. Japan, base data]

(Tetrahydrofuran)

rat LD50=1650mg/kg (MOE risk assessment vol.5, 2006)

(Isoprene)

rat LD50=2043mg/kg (CERI NITE hazard assessment data No.45, 2005)

(1,1,1,3,3,3-Hexamethyldisilazane)

rat LD50=774mg/kg (SIAP, 2009)

(2-Methyl-2-butene)

rat LD50=1000-1700mg/kg (SIDS, 2004)

Acute toxicity (Dermal)

[Data for components of the product]

[GHS Cat. Japan, base data]

(1,1,1,3,3,3-Hexamethyldisilazane)

female rabbit LD50=547mg/kg (SIAP, 2009)

[Company proprietary data]

(Lithium bis(trimethylsilyl)amide)

Category 4

Acute toxicity (Inhalation)

[Product]

Category 3, Toxic if inhaled

[Data for components of the product]

[GHS Cat. Japan, base data]

(Tetrahydrofuran)

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

(Lithium hydroxide)

dust: rat LC50=0.96mg/L/4hr (JSOH, 1995)

(1,1,1,3,3,3-Hexamethyldisilazane)

vapor: rat LC50=1857ppm/4hr (SIAP, 2009)

[Company proprietary data]



Lithium bis(trimethylsilyl)amide in tetrahydrofuran 24% solution, 4506E-3, 2024/01/24

(Lithium bis(trimethylsilyl)amide)

Category 4

Irritant properties

Skin corrosion/irritation

[Product]

Category 1, Causes severe skin burns and eye damage

[Data for components of the product]

[GHS Cat. Japan, base data]

(Tetrahydrofuran)

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

(Lithium hydroxide)

extremely high corrosive (JSOH, 1995)

(1,1,1,3,3,3-Hexamethyldisilazane)

rabbit necrosis (SIAP, 2009)

[Company proprietary data]

(Lithium bis(trimethylsilyl)amide)

Category 1B

Serious eye damage/irritation

[Product]

Category 1, Causes serious eye damage

[Data for components of the product]

[GHS Cat. Japan, base data]

(Tetrahydrofuran)

rabbit moderate irritation (ACGIH 7th, 2005))

(Lithium hydroxide)

extremely high corrosive (JSOH, 1995)

(Isoprene)

human mild irritation (CERI/NITE Hazard Assessment Report, 2006)

(1,1,1,3,3,3-Hexamethyldisilazane)

rabbit mild irritation (IUCLID, 2000)

[Company proprietary data]

(Lithium bis(trimethylsilyl)amide)

Category 1

Allergenic and sensitizing effects data is not available.

Germ cell mutagenicity

[Product]

Category 2, Suspected of causing genetic defects

[Data for components of the product]

[GHS Cat. Japan, base data]

(2-Methyl-2-butene)

cat. 2; mouse/rat : SIDS, 2004

Carcinogenicity

[Product]

Category 2, Suspected of causing cancer

[Data for components of the product]

[GHS Cat. Japan, base data]

(Tetrahydrofuran)

cat.2; ACGIH A3 (ACGIH 7th, 2001 et al.)

[IARC]



Lithium bis(trimethylsilyl)amide in tetrahydrofuran 24% solution, 4506E-3, 2024/01/24

(Tetrahydrofuran)

Group 2B : Possibly carcinogenic to humans

(Isoprene)

Group 2B : Possibly carcinogenic to humans

[ACGIH]

(Tetrahydrofuran)

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

[NTP]

(Isoprene)

RAHC : Reasonably Anticipated to be Human Carcinogens

[EU]

(Tetrahydrofuran)

Category 2; Substances suspected human carcinogens

(Isoprene)

Category 1B; Substances presumed to have carcinogenic potential for humans

Reproductive toxicity

[Product]

Category 2, Suspected of damaging fertility or the unborn child

[Data for components of the product]

[GHS Cat. Japan, base data]

(Tetrahydrofuran)

cat. 2; mouse : IRIS TR, 2012

(Lithium hydroxide)

cat. 1A; ACGIH, 2001

[Company proprietary data]

(Lithium bis(trimethylsilyl)amide)

Classification not possible;

There is no information on the reproductive effects of this substance itself.

As for Lithium, the following effects are reported.

-It is well known that lithium can pass through the placenta (KemI-Riskline NR 2002:16).

Lithium is contraindicated in the pregnant or possibly pregnant women.

-Lithium is excreted into the mother's milk with a similar concentration in the serum (PIM 309F (2000)).

Specific target organ toxicity (STOT)

STOT-single exposure

[Product]

Category 1, Causes damage to organs

Category 2, May cause damage to organs

Category 3, May cause respiratory irritation

Category 3, May cause drowsiness or dizziness

[Data for components of the product]

[cat.1]

[GHS Cat. Japan, base data]

(Tetrahydrofuran)

central nervous system (HSDB, 2014)

(1,1,1,3,3,3-Hexamethyldisilazane)

nervous system (SIAP, 2009)

[cat.3 (respiratory tract irritation)]

[GHS Cat. Japan, base data]



Lithium bis(trimethylsilyl)amide in tetrahydrofuran 24% solution, 4506E-3, 2024/01/24

(Tetrahydrofuran)

respiratory tract irritation (HSDB, 2014)

(Isoprene)

respiratory tract irritation (NITE Initial Risk Assessment Report, 2005)

(1,1,1,3,3,3-Hexamethyldisilazane)

respiratory tract irritation (SIAP, 2009)

[cat.3 (narcotic effects)]

[GHS Cat. Japan, base data]

(Tetrahydrofuran)

narcotic effect (HSDB, 2014)

(Isoprene)

narcotic effect (PATY 5th, 2001)

(1,1,1,3,3,3-Hexamethyldisilazane)

narcotic effect (SIAP, 2009)

(2-Methyl-2-butene)

narcotic effect (SIDS, 2004)

STOT-repeated exposure

[Product]

Category 1, Causes damage to organs through prolonged or repeated exposure

[Data for components of the product]

[cat.1]

[GHS Cat. Japan, base data]

(Tetrahydrofuran)

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

Aspiration hazard data is not available.

Section 12. Ecological Information

Toxicity

Aquatic toxicity

[Product]

Category 3, Harmful to aquatic life

Category 3, Harmful to aquatic life with long lasting effects

[Data for components of the product]

Hazardous to the aquatic environment, short-term (acute)

[GHS Cat. Japan, base data]

(Tetrahydrofuran)

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

(Isoprene)

Crustacea (*Daphnia magna*) EC50=3.2mg/L/48hr (MOE Japan, 2000)

(1,1,1,3,3,3-Hexamethyldisilazane)

Algae (*Scenedesmus subspicatus*) ErC50=50mg/L/72hr (measured as TOC; SIDS, 2010)

(2-Methyl-2-butene)

Fish (rainbow trout) LC50=1.99mg/L/96hr (SIDS, 2004)

[Company proprietary data]

(Lithium bis(trimethylsilyl)amide)

Fish (*Danio rerio*) EC50= 88mg/L/96hr

Hazardous to the aquatic environment, long-term (chronic)

[GHS Cat. Japan, base data]



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(Tetrahydrofuran)

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

[Company proprietary data]

(Lithium bis(trimethylsilyl)amide)

Category 3

Water solubility

(Tetrahydrofuran)

miscible (ICSC, 1997)

(Lithium hydroxide)

12.8 g/100 ml (20°C) (ICSC, 2009)

(Isoprene)

none (ICSC, 1997)

Persistence and degradability

[Data for components of the product]

(Tetrahydrofuran)

Rapidly degradable (BOD_Degradation : 100% (METI existing chemical safety inspections, 1975))

(Isoprene)

BOD_Degradation : 2% (METI existing chemical safety inspections)

(1,1,1,3,3,3-Hexamethyldisilazane)

Not rapidly degradable (BOD_Degradation: 0% (METI existing chemical safety inspections, 1998))

(2-Methyl-2-butene)

Not rapidly degradable (SIDS, 2004)

Bioaccumulative potential

[Data for components of the product]

(Isoprene)

log Pow=2.30 (ICSC, 1997); BCF=20 (Check & Review, Japan)

Mobility in soil

Mobility in soil data is not available.

Other adverse effects

Ozone depleting chemical data is not available.

Section 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

Avoid release to the environment.

Dispose of contents/container as industrial waste. Accordance with local/national regulation.

Section 14. Transport Information

UN Number or ID Number : 2924

UN Proper Shipping Name :

FLAMMABLE LIQUID, CORROSIVE, N.O.S.

Class or division (Transport hazard class) : 3

Subsidiary hazard(s) : 8



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Packing group : II
ERG GUIDE No.: 132
Special provisions No.: 274
IMDG Code (International Maritime Dangerous Goods Regulations)
UN Number or ID Number : 2924
UN Proper Shipping Name :
FLAMMABLE LIQUID, CORROSIVE, N.O.S.
Class or division (Transport hazard class) : 3
Subsidiary hazard(s) : 8
Packing group : II
Special provisions No.: 274
IATA (Dangerous Goods Regulations)
UN Number or ID Number : 2924
UN Proper Shipping Name :
FLAMMABLE LIQUID, CORROSIVE, N.O.S.
Class or division (Transport hazard class) : 3
Subsidiary hazard(s) : 8
Hazard labels : Flamm.liquid & Corrosive
Packing group : II
Special provisions No.: A3; A803
Environmental hazards
Marine pollutants (yes/no) : no

Section 15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture
U.S. Toxic Substances Control Act (TSCA) Inventory
Chemicals listed in TSCA Inventory
Isoprene; Tetrahydrofuran; 2-Methyl-2-butene; 1,1,1,3,3,3-Hexamethyldisilazane; Lithium hydroxide; Lithium bis(trimethylsilyl)amide
Other regulatory information
Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

Section 16. Other information

References and sources for data
Globally Harmonized System of classification and labelling of chemicals, UN
Recommendations on the TRANSPORT OF DANGEROUS GOODS 22nd edit., 2021 UN
IMDG Code, 2020 Edition (Incorporating Amendment 40-20)
IATA Dangerous Goods Regulations (64th Edition) 2023
2020 EMERGENCY RESPONSE GUIDEBOOK (US DOT)
2023 TLVs and BEIs. (ACGIH)
Supplier's data/information
General Disclaimer
Please provide SDS to customers for selling or transferring.
All chemicals have unknown hazard. Handle the product with care.
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,



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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 2022).