Safety Data Sheet

1. Chemical product and company identification

Product name : Tetrahydrofuran, dehydrated stabilizer free

Company information

Name of manufacturer : KANTO CHEMICAL CO., INC.

Address : 2-1, Nihonbashi, Muromachi 2-Chome, Chuo-Ku, Tokyo, 103-0022, JP

Name of section : Business Administration Department, Reagent Division

Telephone number : +81-3-6214-1090 Facsimile number : +81-3-3241-1047 Mail address : BC32@kanto.co.jp

Reference No

Recommended use : For research use only

Restrictions on use : Seek expert judgment when using the product for applications other

than those recommended.

2. Hazards identification

GHS classification

Physical hazards Flammable liquids Category 2 Health hazards Acute toxicity (oral) Category 4 Acute toxicity Category 4

(inhalation:vapors)

Skin corrosion/irritation Category 2 Serious eye damage/eye Category 2A

irritation

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

Category 1 (central nervous system, respiratory

(repeated exposure) oragans, liver)

Hazard pictograms







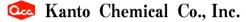
Signal word Danger

Hazard statements : Highly flammable liquid and vapor

Harmful if swallowed or if inhaled

Causes skin irritation Causes serious eye irritation May cause respiratory irritation

May cause drowsiness or dizziness



Suspected of causing cancer

Suspected of damaging fertility or the unborn child Causes damage to organs (central nervous system)

Causes damage to organs (central nervous system, respiratory oragans, liver) through prolonged or repeated exposure

Precautionary statements

Prevention

: Do not handle until all safety precautions have been read and $% \left(1\right) =\left(1\right) \left(1\right)$

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 only non-sparking tools.

Take action to prevent static discharges.

Do not breathe mist/vapors.

Wash hands, forearms and face thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area.

Wear protective gloves/protective clothing/eye protection/face

protection.

Response

: IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell.

IF ON SKIN: Wash with plenty of water.

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water .

 $\ensuremath{\mathsf{IF}}$ INHALED: Remove person to fresh air and keep comfortable for breathing.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

IF exposed or concerned: Call a POISON CENTER or doctor. IF exposed or concerned: Get medical advice/attention. Call a POISON CENTER or doctor if you feel unwell. Get medical advice/attention if you feel unwell.

Rinse mouth.

If skin irritation occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.

: Store in a well-ventilated place. Keep container tightly closed.

Store in a well-ventilated place. Keep cool.

Store locked up.

Disposal : Dispose of contents/container to hazardous or special waste

collection point, in accordance with local, regional, national

and/or international regulation.

3. Composition/information on ingredients

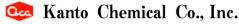
Distinction of substance or

mixture

Storage

: Substance

Synonyms : THF, Diethylene oxide, Tetramethylene oxide



Chemical name	Concentration (%)	Formula	TSCA	EC-No.	CAS RN
Tetrahydrofuran	≥ 99.5	C4H80	Listed	203-726-8	109-99-9

4. First aid measures

First aid measures

First-aid measures after

inhalation

First-aid measures after skin

contact

First-aid measures after eye

contact

First-aid measures after

ingestion

Personal Protection in First

Aid and Measures

: Remove the victim to fresh air, and make $\mathop{\mathrm{him}}\nolimits$ blow his nose and

gargle. If necessary, get medical treatment.

: Wash the affected areas under running water.

: Wash the affected areas under running water for at least 15

minutes. If necessary, get medical treatment.

: The chemical is volatile. Do not induce vomiting because it increases the risk of aspiration into the lungs. Get medical

attention immediately. If necessary, rinse mouth with water. Rescuers should wear proper protective equipment like rubber

gloves, goggles.

5. Fire fighting measures

Suitable extinguishing media : Water, dry chemical powder, carbon dioxide, dry sand, alcohol

resistant foam

Unsuitable extinguishing media

Firefighting instructions

Foam extinguisherMove containers from fire area if it can be done without risk, if

not possible, apply water from a safe distance to cool and

protect surrounding area. Fight fire from windward.

Dry chemical powder, carbon dioxide or dry sand should be used for small fires. Alcohol-resistant foam extinguisher is effective

for a large scale fire.

Personal protection (Emergency

response)

Wear breathing apparatus.

6. Accidental release measures

Personal Precautions, Protective Equipment and Emergency Procedures

General measures : Wear proper protective equipment and avoid contact with skin and

inhalation of vapor. Conduct operations from upwind and evacuate people downwind. Remove all sources of ignition. Keep away personnel except for authorized ones from spillage area by

stretching ropes.

Environmental precautions

Environmental precautions : Attention should be given to avoid discharge of spilled product

into rivers and resulting environmental damage. When diluting spill with large amounts of water, discharge of untreated

wastewater into the environment must be avoided.

Methods and Equipment for Containment and Cleaning up

For containment : Absorb spill with inert material (e.g, diatomaceous earth,

sand) and flush spillage area with copious amounts of water.

Prevention Measures for : Remove nearby sources of ignition and prepare extinguishing

4/

Issue date: 9/17/2003 Revision date: 3/15/2024

Secondary Accidents media.

7. Handling and storage

Handling

Technical measures : Wear proper protective equipment to avoid contact with skin or

inhalation of vapor. Fire is strictly prohibited.

Ventilate well at working places.

Precautions for safe handling : Use with an enclosed system or a local exhaust ventilation. Use

in well-ventilated areas.

Do not allow contact with oxidizing substances.

Storage

Storage conditions : Store in a dark, cool place and tightly closed.

Purge container with inert gas.

Material used in : Glass, fluorine resin, stainless steel, copper.

packaging/containers Do not use polyvinyl chloride resin, polyethylene, polypropylene,

polycarbonate.

8. Exposure controls / Personal protection equipment

ACGIH TWA	50 ppm
ACGIH STEL	100 ppm
Remark (ACGIH)	Skin

Appropriate engineering

controls

: Use with an enclosed system or a local exhaust ventilation.

Protective equipment

Respiratory protection : If necessary, wear chemical cartridge respirator with an organic

vapor cartage

Hand protection : Impervious protective gloves

Eye protection : Safety goggles

Skin and body protection : Protective clothing, protective boots

9. Physical and chemical properties

Physical state : Liquid
Color : Colorless.
Odor : Ethereal
pH : Neutral
Melting point : -108.5 ° C

Freezing point : No data available

Boiling point : $66 \,^{\circ}$ C

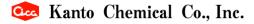
Flash point : $-17.2 \,^{\circ}$ C (C.C.)

Auto-ignition temperature : 321.1° C

Decomposition temperature : No data available

Flammability : Flammable
Vapor pressure : 200 hPa (20℃)
Relative density : No data available

Density : $0.884 - 0.889 \text{ g/cm}^3 (20^{\circ}\text{C})$



Relative gas density : 2.5

Solubility : Water: Miscible.

Partition coefficient n-

octanol/water (log Pow)

: 2.3 - 11.8 vol % Explosive limits (vol %) : $0.62 \text{ mm}^2/\text{s} (20^{\circ}\text{C})$ Viscosity, kinematic Particle characteristics : No data available

10. Stability and reactivity

Reactivity : May react with oxidizing substances.

: 0.46

Chemical stability : Stable under normal conditions.

Possibility of hazardous

reactions

: Forms explosive peroxides by oxygen in air.

Conditions to avoid : Light, heat.

Incompatible materials : Oxidizing substances. Hazardous decomposition : Carbon monoxide.

products

11. Toxicological information

Acute toxicity (oral) : Harmful if swallowed

rat LD50=1650mg/kg

Acute toxicity (dermal) Classification not possible Acute toxicity (inhalation) : No classification (gas) Harmful if inhaled (vapor)

rat LC50=18187ppm/4h

Classification not possible (dust, mist)

Skin corrosion/irritation Causes skin irritation

> Following occlusive and open application of the substance to 6 persons, irritation was observed. In skin irritation tests in rabbits, guinea pigs, rats, and mice, the substance caused

irritation. Thus, it was classified into category 2.

Serious eye damage/irritation Causes serious eye irritation

From the description that the substance causes irritation to the

eyes of humans, it was classified into category 2A.

Respiratory sensitization Classification not possible Skin sensitization Classification not possible

Germ cell mutagenicity : No classification

> As for in vivo, there are negative data on micronucleus examinations in mouse marrow erythrocytes and peripheral blood erythrocytes, chromosome aberration tests in mouse marrow cells, unscheduled DNA synthesis test in rat liver. As for in vitro, there are negative data on reverse mutation test in bacteria, chromosome aberration test, micronucleus examination and sister chromatid

exchange test in cultured mammalian cells.

Carcinogenicity Suspected of causing cancer

> It is classified as A3 by ACGIH, "suggestive evidence of carcinogenic potential" by EPA. Thus, it was classified into

category 2.

Reproductive toxicity Suspected of damaging fertility or the unborn child

> No effects on fertility or teratogenicity were observed. However, in mouse teratogenicity tests, decreased fetal viability was observed at dosing levels toxic to dams. Thus, it was classified

into category 2.

STOT-single exposure : Causes damage to organs (central nervous system)

May cause drowsiness or dizziness May cause respiratory irritation

The substance has airway stimulativeness. There is human evidence including "in inhalation exposure (vapor) at high concentration, it may adversely affect central nervous system, causing lethargy.", "in oral ingestion and inhalation exposure, cough, pharyngalgia, giddiness, headache, nausea and unconsciousness were observed." and "increased hepatic enzyme in blood, nausea, dizziness, lowered hearing ability, blood vessel edema, occipital headache and brain cramps were noted." Thus, it was classified into category 1 (central nervous system), category 3 (respiratory irritation,

narcosis).

STOT-repeated exposure : Causes damage to organs (central nervous system, respiratory

oragans, liver) through prolonged or repeated exposure

There are many reports on human repeated exposure (occupational

exposure), for example, central nervous system symptoms,

respiratory organs symptoms, and hepatopathy. However, all these effects are combined exposure effects with other solvents and there is no clear relationship with concentration or exposure time. There is evidence from animal studies including "in 12-week inhalation exposure test in rats within the concentration range of category 2, increased serum AST was observed." and "in 13-week or 2-year

inhalation exposure NTP test in rats and mice, at high

concentration (out of category), the effects on liver and central nervous system symptoms were observed." Based on the above information, it was classified into category 1 (central nervous

system, respiratory organs, liver).

Aspiration hazard : Classification not possible

12. Ecological information

Ecotoxicity

Aquatic acute : No classification

Pimephales promelas LC50=2160mg/L/96h

Aquatic chronic : No classification

Persistence and degradability

Readily biodegradable

BOD : 100%

Bioaccumulative potential

Low bioconcentration log Pow : 0.46

Mobility in soil

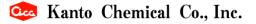
High mobility Koc : 4.9

Hazardous to the ozone layer

Ozone : Classification not possible

13. Disposal considerations

Ecological waste information : Burn in a chemical incinerator equipped with an afterburner



and a scrubber. Or entrust approved waste disposal companies

with the disposal.

Contaminated container and

packaging

: In case of disposal of empty bottles, dispose bottles after

removing the content thoroughly.

14. Transport information

International Regulations Transport by sea (IMDG)

UN-No. (IMDG) 2056

Proper Shipping Name (IMDG) TETRAHYDROFURAN

Packing group (IMDG) ΤT Transport hazard class(es) 3

(IMDG)

Air transport(IATA)

UN-No. (IATA) 2056

Proper Shipping Name (IATA) Tetrahvdrofuran

Packing group (IATA) IITransport hazard class(es) 3

(IATA)

Marine pollutant : Not applicable

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Pollutant category : Z : 127 MFAG-No

15. Regulatory information

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

16. Other information

Data sources : Dictionary of Organic Compounds, The society of Synthetic

Organic Chemistry, Kodansha Ltd. (1985) .

Solvents Handbook, T, Asahara el, Kodansha Scientific Ltd.

(1976).

Dangerous Properties of Industrial Materials, 6th ed.

N. I. Sax Van Nostrand Reinhold Company (1984) .

Handbook of 17322 Chemical Products, The Chemical Daily Co.

(2022).

NITE Chemical Risk Information Platform (NITE-CHRIP), National

Institute of Technology and Evaluation.

The information contained herein is based on several references and the present state of our knowledge. However the SDS does not always cover all information about the product, handle the product carefully. The information is intended to ordinary usage, in case of particular handlings, conduct appropriate safety measurements. The information herein is only provision of information, and it does not represent a guarantee the properties of the product. The Safety Data Sheet (SDS) is prepared based on JIS Z7253.

